# SSD

SCIENCE FOR A SUSTAINABLE DEVELOPMENT

FOSTERING SUSTAINABLE BEHAVIORS:
COMMUNITY-BASED SOCIAL MARKETING

FSB-CBSM

N. Delacollette, B. Claus, B. Verbeeck, X. Sohet,
L. Warlop & B. Dardenne
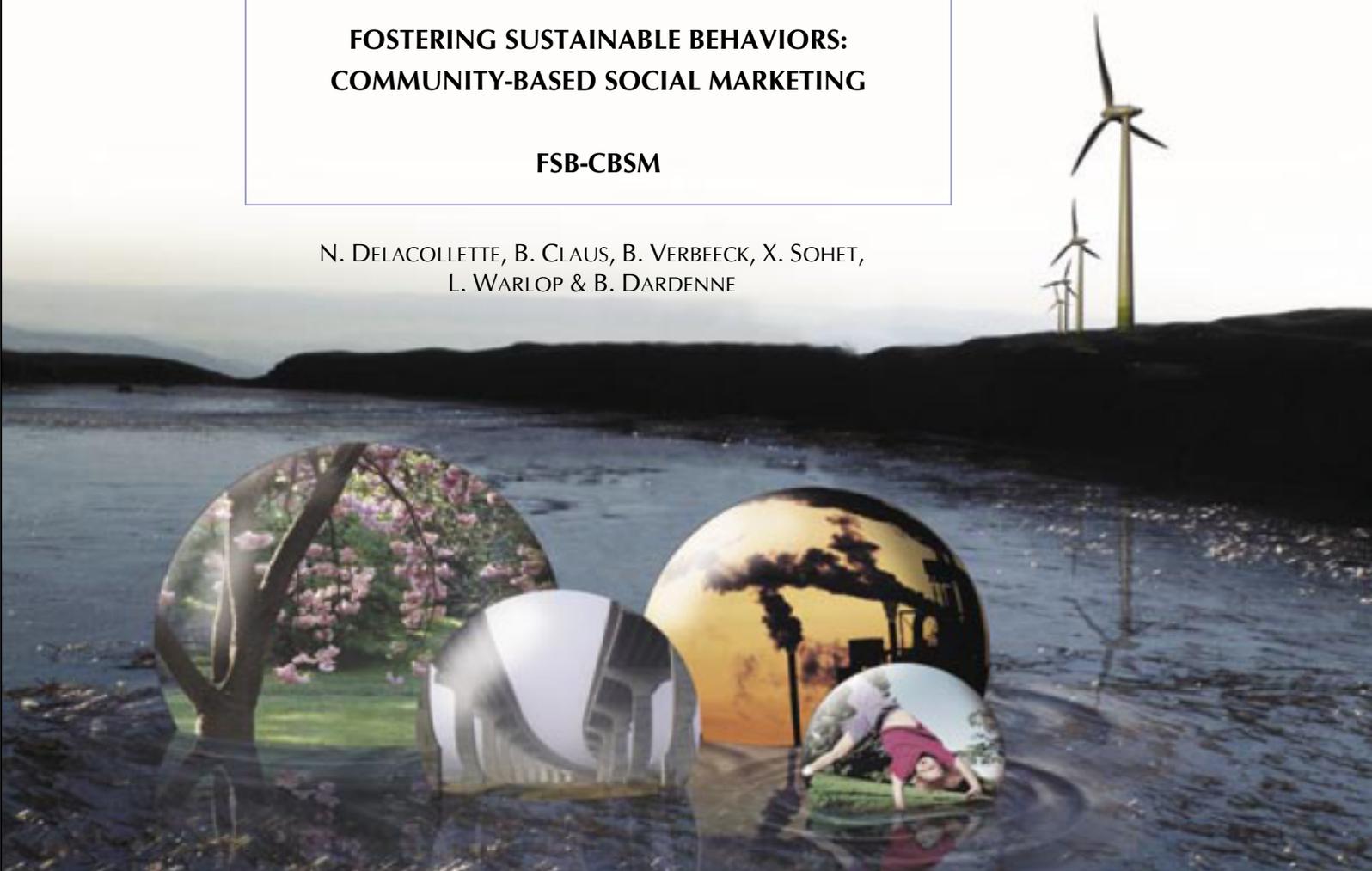
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FINAL REPORT

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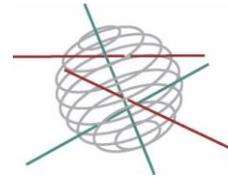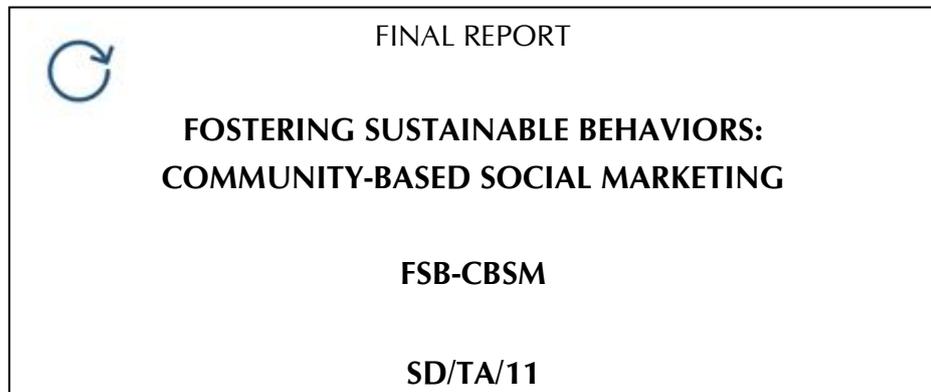
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SUMMARY

A. Context

Developing sustainable behaviors has become a major objective for our society and for political leaders. However, although most people express a positive attitude toward ecology and sustainable behaviors, they often fail to modify their former behaviors toward greater sustainability. Social marketing campaigns aim at promoting sustainable behaviors. Unfortunately, these campaigns are not always successful and their impact is seldom assessed. This research project aims at identifying the best levers to change individuals' behaviors toward greater sustainability and at developing marketing tools and strategies that could efficiently influence people's behaviors.

B. Objectives

This project had four main objectives. The first objective was to determine how people classify sustainable behaviors and which behaviors are perceived as similar. The main results indicated that participants classified sustainable behaviors into 4 categories. The first category included behaviors related to food and water. The second one was related to consumer's choices such as wastes reduction, or preference for second-hand and recycled products. The third and fourth ones were composed of behaviors that require a continued monitoring. The third one included behaviors related to the conservation of energy, whereas the fourth one comprised behaviors related to transports. We also found that the perceived norm (that is, what other people expect from me), the impact on the individual him/herself (that is, the impact of adopting the behaviors on myself and on my life) and the easiness of pro-environmental behaviors (that is, the extent to which I consider the behavior as easy or difficult) determine how the behaviors are perceived relatively to each other. Results indicated that the impact that the behaviors are likely to have on the environment does not have an impact on the social representation of these behaviors. Finally, our results revealed that the perceived easiness of behaviors was mainly determined by people's physical environment and available infrastructures.

The project's second objective was to identify the cognitive, emotional and psycho-social antecedents of sustainable behaviors. In a first set of 2 studies, we investigated the impact of attitudinal ambivalence on sustainable behaviors. Attitudinal ambivalence is a simultaneously positive and negative evaluation of a given object. Results indicated that ambivalence significantly improved the prediction of intentions toward pro-environmental action as well as pro-environmental behaviors, besides the "traditional" predictors of intentions (attitude, subjective norm, and perceived behavioral control). The more people are ambivalent toward pro-environmental behaviors, the less they intend to take some form of pro-environmental action. A third study was designed in order to have a better understanding of attitudes content and, by this way, of ambivalent attitudes. The results

indicated that the positive component of attitudes elicits more abstract and distant thoughts, whereas the negative component elicits relatively concrete and close thoughts. Regarding the project's second objective, a second line of research investigated the impact of emotions on sustainable behaviors and intentions. We ran a set of 5 correlational studies focusing on moral emotions, in other words, emotions that are a consequence of the evaluation of a behavior or situation. Our studies investigated both own and vicarious emotions (aroused due to someone else's behavior). Their results indicated that vicarious emotions influence pro-environmental intentions and behaviors, whereas individual emotions appeared as clearly less efficient. Moreover, in most studies, vicarious guilt was the best predictor of the intention to behave in an environmentally-friendly way. Our results also indicated that the control people think they have on pro-environmental behaviors influences their feelings of vicarious guilt. Finally, our results regarding emotions indicated that responsibility feelings have a significant and positive impact on pro-environmental behaviors.

A third line of research investigated the impact of intra-individual variables on pro-environmental behaviors. Results indicated that Social Dominance Orientation, self-monitoring and materialism have a significant negative impact on pro-environmental intentions. In other words, some of the values to which people adhere influence their intentions toward sustainable behaviors.

A set of 2 studies also revealed an impact of endocrinology on people's behavior. In this research, we showed that biological markers like prenatal testosterone have an influence on how people approach situations in which behavioral monitoring is necessary to display ecological behavior. This is fully in line with the previously mentioned studies when one considers this as a biological analogue of more psychological intra-personal states. In our research, indicators of high prenatal testosterone levels caused people to drive more aggressively. Although – as this group of people did not cause more accidents – this did seem to match their level of skill, they failed to assume an ecologically efficient driving style (see below for more information about driving behaviors).

Finally, in line with the project's second objective, a fourth line of research focused on the impact of the physical and social environment on sustainable behaviors. One cannot but see that people act in a context, and that this context influences every single intra-individual level previously discussed. The environment of an individual plays a moderating role in how perceptions, preferences and intentions are shaped, and how these latter are translated into actions. Combining 16028 responses of EFP-campaigns conducted by the WWF with infrastructural indices based on respondents postal codes allowed us to study the nature of this interaction. We showed how the mere perception of one's environment brings about different mind states that in turn determine how the

environment is acted upon. Preliminary results show that reminders of nature shape intentions to preserve it, and how even the best of intentions are hard to execute when public infrastructure is not fit to facilitate them.

The impact of the perceived physical environment was also studied through a very concrete behavior: driving. Our results show that leading people to believe they are in a safe care ironically leads them to adjust their behavior to shape the situation they are in to a more risky one. Risk homeostasis theory indeed predicts that people bolster an optimal trade off between the benefits and the drawbacks of taking risk. When an external influence changes this balance, people adjust for this. When the change is an objective change, this does not come with a price in increased danger. However, we found that it does come with a price in terms of the ecological cost of driving behavior that is risk seeking and more aggressive. This translates into higher fuel consumption and more wear and tear. When the change is subjective, an additional cost of increased danger might be incurred.

The project's third objective was to develop and assess tools and strategies aimed at improving social marketing campaigns. This objective was based on the results of the two previous objectives. A first line of research focused on emotions. In a set of 4 studies, we induced different types of emotion and then assessed participants' intentions and actual behaviors toward the environment. Of special interest, two of these studies used the Ecological Footprint measure in order to induce a specific emotion. The Ecological Footprint was therefore used in a dynamic way as a social marketing strategy. Results indicated that the induction of guilt led to a greater intention to demonstrate pro-environmental behaviors than was the case with the induction of pride and without any induction of emotion. Furthermore, in some of the studies, only the induction of collective guilt led to actual pro-environmental behavior. However, this effect was not constant and additionally depended upon the individuals' level of group identification. Consequently, the impact of identification level makes the use of collective guilt in marketing campaigns or messages rather difficult and further research seems to be needed in order to have a better understanding of the conditions under which collective guilt has a positive impact on sustainable behaviors.

A second line of research regarding objective 3 investigated the impact of message framing on sustainable intentions and behaviors. We tested the impact of messages focusing on very concrete, short term and personally relevant positive consequences of pro-environmental behaviors. The results indicated that people are willing to behave environmentally-friendly to a higher extent when they receive a message highlighting the short-term consequences of pro-environmental behaviors on themselves than when

they receive a message highlighting long-term consequences on others or a neutral message. Furthermore, this effect was stronger on men than women.

The last line of research related to the third objective focused on the impact of an abstract versus a concrete mindset on attitudes and intentions toward pro-environmental behaviors. This line of research was based on the Construal Level Theory, according to which it is possible to tune people to a high or a low construal level and consequently to a more abstract or a more concrete mindset. Some of our results showed that people who were placed in a more abstract mindset expressed less negative thoughts regarding pro-environmental behaviors and more pro-environmental intentions. However these results were not constant and further research is needed in order to test whether tuning people to a more concrete or abstract mindset can be an effective strategies to trigger pro-environmental behaviors.

In line with this third objective, we also tested a pilot project called the climate transition tool. Households were invited to register on the internet and to use a carbon footprint calculator. They could then monitor their own consumption and follow the CO_2 emissions of the whole group. This pilot project was very promising and the social comparison offered to participants was very appealing.

Finally, the project's fourth and last objective was to communicate about our research and results. The results of this project were presented in several workshops and in several journals or newspapers. Papers for peer-reviewed journals are currently written.

C. Conclusions

Studies related to Objective 1 confirmed that all pro-environmental behaviors are not equal, not perceived the same way. Furthermore, results also indicated that the impact that the behaviors are likely to have on the environment does not have an impact on the social representation of these behaviors. Consequently, campaigns focusing on the positive or negative consequences of some behaviors on the environment might be ineffective in changing people's representations and attitudes. Instead, they would be more efficient by highlighting the positive impact these behaviors can have on the individual him/herself, the easiness of the behaviors and their normative aspect. Objective 1 results also indicated that people often consider pro-environmental behaviors as difficult if they think their environment lacks the infrastructures that are necessary for these behaviors. This result points to the necessity of providing people with the means to behave environmentally-friendly and to inform them about the possibilities their physical environment offers them in order to act pro-environmentally.

Studies related to objective 2 and attitudinal ambivalence pointed to the fact that it is important to consider attitudes as complex variables and take into consideration their ambivalent aspect. Our results indicated that negative components of attitudes were generally more concrete and less distant than the positive ones. This also means that,

when both types of thoughts are present at the same time, thoughts related to the negative components have more chances to be taken into consideration when making a decision (as people preferentially attend to short term and personally-relevant arguments when making a decision). Together with studies related to Objective 3, these results pointed to the importance of highlighting the direct benefits people can have when they behave environmentally-friendly. Concretely, it means that marketing campaigns and messages would be more effective if their content was focused on the short term and direct interests of pro-environmental behaviors for people rather than on the interests for future generations or people living in foreign countries.

Studies related to emotions first indicated that vicarious or collective guilt might be effective in triggering pro-environmental behaviors. However, further research is needed in order to have a better understanding of the conditions allowing a positive impact of guilt on sustainable intentions and behaviors.

The observed impact of perceived control on guilt suggests that strengthening this feeling of control amongst people could favour pro-environmental behaviors through different mechanisms, such as the direct impact of subjective control on behaviors, but also its indirect impact through behavioral intentions and feelings of vicarious guilt.

Finally, the results of this line of research also indicated that Ecological Footprint can be used as a dynamic tool and can contribute to changing people's behaviors.

D. Contribution of the project in a context of scientific support to a sustainable development policy

The project allowed us to make recommendations (that can be found in the conclusions) for a higher efficiency of social marketing campaigns. The inclusion of two associations active in environmental prevention as partners of this project, as well as the participation of representatives of both associations and public actors in the follow-up committee, guarantee the dissemination of these recommendations and their possible application in social marketing campaigns.

E. Keywords

Sustainable behaviors – environment – social marketing – ambivalence – moral emotions - communities – infrastructure - individual differences - perception – risk compensation

INTRODUCTION

Reducing our negative impact on the environment and achieving sustainability is a major objective of governmental policies. In order to achieve sustainable development, the individual commitment in ecological practices is a priority. Currently, governments and associations act as social marketers trying to develop campaigns in order to promote ecological consumer patterns. However, although most people express positive attitudes toward sustainable development and ecology, they are still reluctant to change their behaviors. Governments and associations often act as social marketers trying to develop campaigns in order to promote sustainable consumption. Unfortunately, these campaigns are not always successful in reaching their goals and, besides, their impact is rarely assessed. Consequently, the best levers to change people's behaviors still remain unknown. Unsustainable behaviors are likely to be highly resistant to change except if the communication targets the appropriate psychological levers. Effective social marketing communication needs to start from the psychological facilitators and inhibitors (individual differences, cognitive representations, and psychosocial factors) of the targeted behaviors. The present research project aimed at a better understanding of these facilitators and inhibitors, as well as at developing green marketing strategies and tools.

In psychology and related areas, intentions and behaviors are generally envisaged as being determined by three types of variables (Theory of Planned Behavior, Ajzen, 1991): The attitude toward the behavior (*Is it positive or negative? Am I favorable or not?*); the subjective norm (*Do people around me have this behavior? Do they think it's important to have it?*); and the perceived behavioral control (*am I able to engage in this behavior? Do I have control over it?*). However, this model predicting behavior is very cognitive and does not leave space for variables such as feelings and emotions. It has nevertheless been shown that emotions have a strong impact on behavioral intentions (see for instance Kaiser, 2006). This model also fails to include environmental variables such as the impact of actual physical environment on the intentions and behaviors, as well as the perception people have of this environment. Additionally, some individual variables, such as gender, values or hormones, can also play a crucial role in people's behaviors. We therefore proposed to focus on these possible predictors of sustainable behaviors and to investigate whether they could be efficient levers to change behaviors toward more sustainability.

Furthermore, this research project did not focus on a single behavior, but on a whole set of sustainable behaviors, which are presumably numerous and varied. People are likely to have different representations of these various behaviors. Furthermore, these different behaviors might be sensitive to different variables. Consequently it is important to know exactly what is hidden behind the label "sustainable behaviors" and which behaviors are

similar or not. The first objective of this project was thus to have a better understanding of the representation people have of sustainable behaviors and of the dimension(s) that could underlie this representation. We also sought to know whether the Ecological Footprint measure reflects this representation. The second objective was to identify cognitive, emotional, psycho-social and environmental levers and inhibitors of sustainable behaviors. In a third objective, we aimed at identifying how to use these levers and inhibitors in marketing campaigns in order to efficiently modify people's behaviors. In other words, we aimed at developing tools and strategies that could allow promoting sustainable behaviors efficiently. Finally, the fourth and last objective was to communicate about and spread our findings. These four objectives were interrelated and influenced each other.

Objective 1: Determine how people classify sustainable behaviors and which dimensions differentiate these behaviors.

   1.A. Classifying ecological behaviors

Sustainable behaviors are likely to be differentiated according to several dimensions, for instance perceived impact on the environment, perceived cost or benefit, individual or collective behavior, etc. These dimensions may also be different for experts and lay people. We thus aimed at investigating the perceived similarities and differences between sustainable behaviors as well as the dimensions people use to classify (or cluster together) these behaviors, which may help to determine what types of sustainable behaviors are likely to be influenced by the same levers and inhibitors, and will allow a better targeting of specific behaviors in marketing campaigns. We also intended to compare the representations of sustainable behaviors of experts and lay people. Indeed, it is likely that experts, who design social marketing campaigns, have a different representation from lay people, who are the campaigns' targets. In the case of a mismatch between experts' and lay people's representations, social marketing campaigns might not be suited to the latter. It is thus important to know whether experts' and lay people's representations differ.

   1.B. Ecological Footprint (EF) Measure

The Ecological Footprint is a measure of the space or land required to produce the natural resources a person (a family, an organization, a city, a population…) consumes as well as the space needed to reprocess the waste produced by this person (family, organization, city, population). First, we intended to study the EF measure properties and examine whether we may consider it as a good index of ecological behaviors. Second, we also aimed at developing the Ecological Footprint as a dynamic marketing tool. This highly publicized measure might indeed be used in a more active way and might become a social marketing tool. The EF score is generally presented in a very vivid way and in comparison to the mean of different populations. This is likely to have an impact on emotions and

attitudes related to sustainable behaviors. Consequently, it would have a good potential as a sensitization and even as a behavior modifying instrument.

Objective 2: Investigate cognitive, psychosocial and emotional antecedents of sustainable behaviors.

We aimed at identifying the antecedents of sustainable behaviors and developing a psychosocial model of sustainable behaviors. For this purpose, we investigated the link between attitudes and both intentions and concrete behaviors. We gave special attention to the role of affects and moral emotions (such as guilt) elicited by sustainable behaviors or lack of behavior, as they are recognized as an important determinant of behaviors (and given that people mainly hold positive cognitive attitudes but do not engage in relevant behaviors). Additionally, we investigated some specific intra-individual variables.

We also aimed at investigating the link between environment, such as for instance infrastructures offered to the citizens (public transport, cycling roads, green spaces…), and sustainable behaviors at the community level. It might indeed be very useful to know which types of infrastructures are likely to favor sustainable behaviors.

Objective 3: Develop and assess original social marketing communications.

This third objective is based on objectives 1 and 2 results. We intended to develop marketing techniques and tools as well as recommendations (for practitioners and decision-makers) that could be applied in various real settings. We tested several techniques or types of messages.

We used both controlled settings (experimental designs), to delineate precisely the effects of the variables identified through objectives 1 and 2 and the conditions of apparition of these effects, and more concrete settings (quasi-experimental designs) in order to test our techniques or messages in settings closer to real-life situations.

Objective 4: Communication and results dissemination

 The last objective of this project was the communication about our research and results. We aimed at disseminating our results to a large audience. For this purpose, we targeted scientific publications (several papers are in preparation) as well as practitioners and lay people. Some of our results were consequently disseminated through journals, television, radio and internet. We also participated to several workshops on sustainable consumption/behaviors. We also organised an enlarged final follow-up meeting in order to invite several persons and organisations that could have some interests in the concrete conclusions of our research project. Finally, the present report will also help us in the dissemination of our results.

METHODOLOGY AND RESULTS

The methodology we used to reach our objectives was composed of varied approaches. However, most of them were surveys or experimental studies. Below, we detail the studies that were run in order to reach Objectives 1, 2 and 3. Nevertheless, some of the studies or line of research we carried out did not give any significant results. For this reason, we decided not to describe these studies in this report and to focus only on the studies that yielded significant results.

I.   Objective 1: Determine how people classify sustainable behaviors and which dimensions differentiate these behaviors

In order to complete the first objective, we first ran 3 studies aiming at investigating the social representation of pro-environmental behaviors. In the first study, we examined the perceived similarities between different pro-environemental behaviors amongst a student population. We aimed at identifying clusters of behaviors and possible dimensions that could underlie this representation. In a second study, we examined perceived similarities between these behaviors amongst a very large sample of adults, including experts and lay people. We aimed at comparing experts' and lay people's representations. Furthermore, we investigated 4 dimensions that were likely to underlie social representations. As the dimension of *Easiness/difficulty* of the behaviors seemed to underlie these representations, we designed a third study in order to have a better understanding of this dimension.

Finally, we also ran a study in order to examine the structure of the Ecological Footprint Measure and we compared the results of this study to the results obtained in the studies about social representations.

I.1 Classifying ecological behaviors : Social representations

I.1.1. Social representations – study 1

This first study helped us to identify which pro-environmental behaviors are perceived as similar or not and consequently to identify clusters of behaviors.

Method

Participants

160 psychology students from the ULg participated in this study.

Procedure and material

Participants were asked to complete a questionnaire at the end of a psychology class.

After a short introduction about ecology and environmental problems, they were asked to write the five ecological behaviors that first came to their mind. Second, they received a list of 20 ecological behaviors (adapted from the EF measure). For each of these behaviors, they were asked to write down 3 words first coming to their mind. Third, they were asked to categorize the 20 behaviors in several groups as a measure of complexity.

When the questionnaire was completed, participants were collectively debriefed.

Results

The words participants generated in response to the 20 behaviors presented in the questionnaire allowed us to compute a similarity score for each pair of behaviors. The similarity score (*Ellegard score*) was calculated as follows:

$$\frac{\text{Number of words in common for behav.1 and behav.2}}{\sqrt{(\text{number of words generated for behav.1 * number of words generated for behav.2})}}$$

With the similarity scores obtained for each pair of behaviors, we computed a similarity matrix for the 20 behaviors. Using this matrix as a data input, we ran a Multidimensional Scaling analysis. This analysis takes into account all the similarity scores and produces a bi-dimensional representation of the behaviors. This representation allows seeing which behaviors are perceived as similar and helps to identify the dimensions people probably used to classify the behaviors.

Here are the graphic results of this Multi-dimensional scaling analysis (stress = .20):
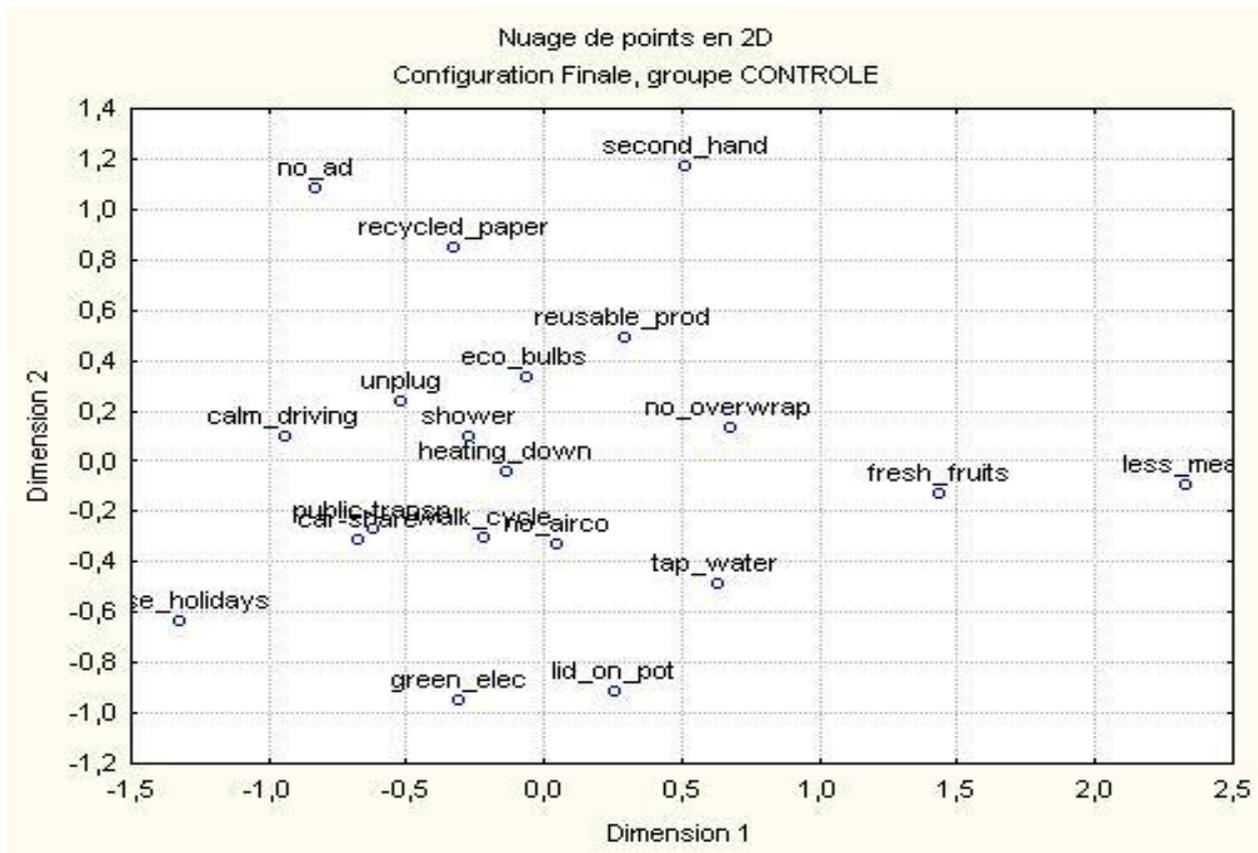
Figure 1: Representation of sustainable behaviors – multidimensional scaling (Social Representations - study 1).

The distances between the behaviors represented as dots on figure 1 indicate which behaviors are judged similar to one another and which ones are not. For instance, using public transports, walking or cycling for short distances and sharing cars to go to work or university are perceived as very similar behaviors. To help us locating behaviors groups more precisely, we used a clusters analysis[1]. This analysis allows identifying more clearly the number of clusters according to the aggregation distance between objects subgroups. In this case, the analyses revealed 3 clusters. We then tried to identify what could be the dimensions organizing the representation.

Behaviors were grouped as follows:

- Category 1: buying second-hand products; avoiding receiving advertisings thanks to a sticker "no ad" on the letter box; replacing "usual" paper with recycled paper; buying reusable/refillable/fixable products; using economic light bulbs.
- Category 2: systematically unplugging electric devices (television, DVD, computer…) to avoid leaving them in standby; taking showers rather than baths; driving one's car more calmly; turning the heating down before going to bed or

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[1] Hierarchical clustering, also using a distance matrix to determinate how objects are grouped together.

leaving the home; using public transports for everyday trips to work/university; choosing car-sharing to go to work/university; cycling or walking for short distances; not using air conditioned in the car; drinking tap water; cooking with a lid on pots and pans; choosing a "green electricity" provider (using renewable energies); replacing far-away holidays with the plane by a closer trip allowing to travel by train or car.

- Category 3: eating fresh fruits and vegetables rather than deep-frozen ones; eating meat less often and replacing it by a vegetarian meal; avoiding buying over-wrapped products.

The first category seems to be linked to decision-making. Indeed, it mainly includes purchase behaviors or consumer choices (for instance buying second-hand products, recycled paper...). Most of these behaviors can easily been automated. The second category seems to imply behavioral regulation, that is, behaviors that require a continued monitoring. Indeed, behaviors such as driving one's car more calmly or systematically unplugging electric devices, necessitate a continued control and more personal involvement than, for instance, a purchase choice. Behaviors in this second category would consequently be more difficult to perform. Finally, the third category might be linked to eating habits which might be seen as a unique and typical sustainable class of behaviors. To validate this interpretation, we created a second study.

I.1.2. Social representations – study 2 (experts vs. lay people)

This second study aimed at a better understanding of the results obtained in the first study on social representations. Additionally to the perceived similarities of the behaviors, we investigated several dimensions likely to underlie the representations structure. This could help us to better target different types of sustainable behaviors in green marketing messages. Consequently, although this study mainly responds to Objective 1, it is also in line with Objectives 2 and 3.

Furthermore, we compared experts' and lay people's representations in order to know whether these representations are similar or not.

Method

Participants

1045 adults participated to this study. They completed a questionnaire on the internet. Invitations to fill in the questionnaire had mainly been sent through Ecolife and Espace-Environnement's mailing lists and newsletters, as well as through the intranet of the ULg. Unfortunately, 236 questionnaires had missing data. As a consequence, most analyses were carried on a sample of 809 participants.

Procedure and material

After a welcome message, participants read a list of 20 pro-environmental behaviors on a first screen. Although these behaviors were quite similar to the behaviors used in the previous study, they were not identical. We modified the list according to Ecolife and Espace-Environment suggestions, in order to stick closer to pro-environemental associations' interests. After reading the list, participants were asked to classify these behaviors into groups according to their perceived similarities or connections. For this purpose, they could indicate that each of the behaviors belonged to one of (up to) 6 groups.

After the classification task, participants were asked to rate the behaviors on each of the 4 following dimensions:

- perceived consequences of the behavior on the environment
- social norms (that is, expectations from friends and relatives)
- perceived consequences of the behavior on the respondent him/herself
- Easiness / difficulty to perform the behavior (related to behavioral control)

Finally participants answered the ecological footprint questionnaire as well as a few socio-demographical questions (age, gender, postal code, profession...). Amongst these questions, two questions about their possible activities in the environmental field allowed us to classify the respondents as either professionals, volunteer in the environmental field or lay people.

We considered that expertise could be linked either to their profession (professionals in the environmental field would then be considered as experts, whereas lay people would not) or to their everyday commitment to pro-environmental behaviors (in this case, people with a low Ecological Footprint score would be considered as experts, whereas people with a high score would not).

Results

We created 6 subgroups of participants according to their professional expertise (professionals vs. volunteers vs. lay people) and their commitment to pro-environmental behaviors (low vs. high Ecological Footprint, divided following a median-split). We then calculated the proportions of co-occurrences for each pair of behaviors and for each subgroup of participants, by dividing the actual number of co-occurrences by the maximum number of possible co-occurrences (that is, the number of participants in the subgroup). In other words, we calculated the proportion of people who classified 2 behaviors together. We did this for each pair of behaviors and in each subgroup. We thus obtained a set of similarity matrices as the one used in study 1. We used each of these matrices as a data input and ran a Multidimensional Scaling analysis for each subgroup. Results did not reveal differences between subgroups. It appeared that experts and lay people share a similar representation of pro-environmental behaviors.

We then ran the analyses on all participants together, whatever their expertise level. Results of the Multidimensional Scaling analysis can be seen in Figure 2 (stress = .11).
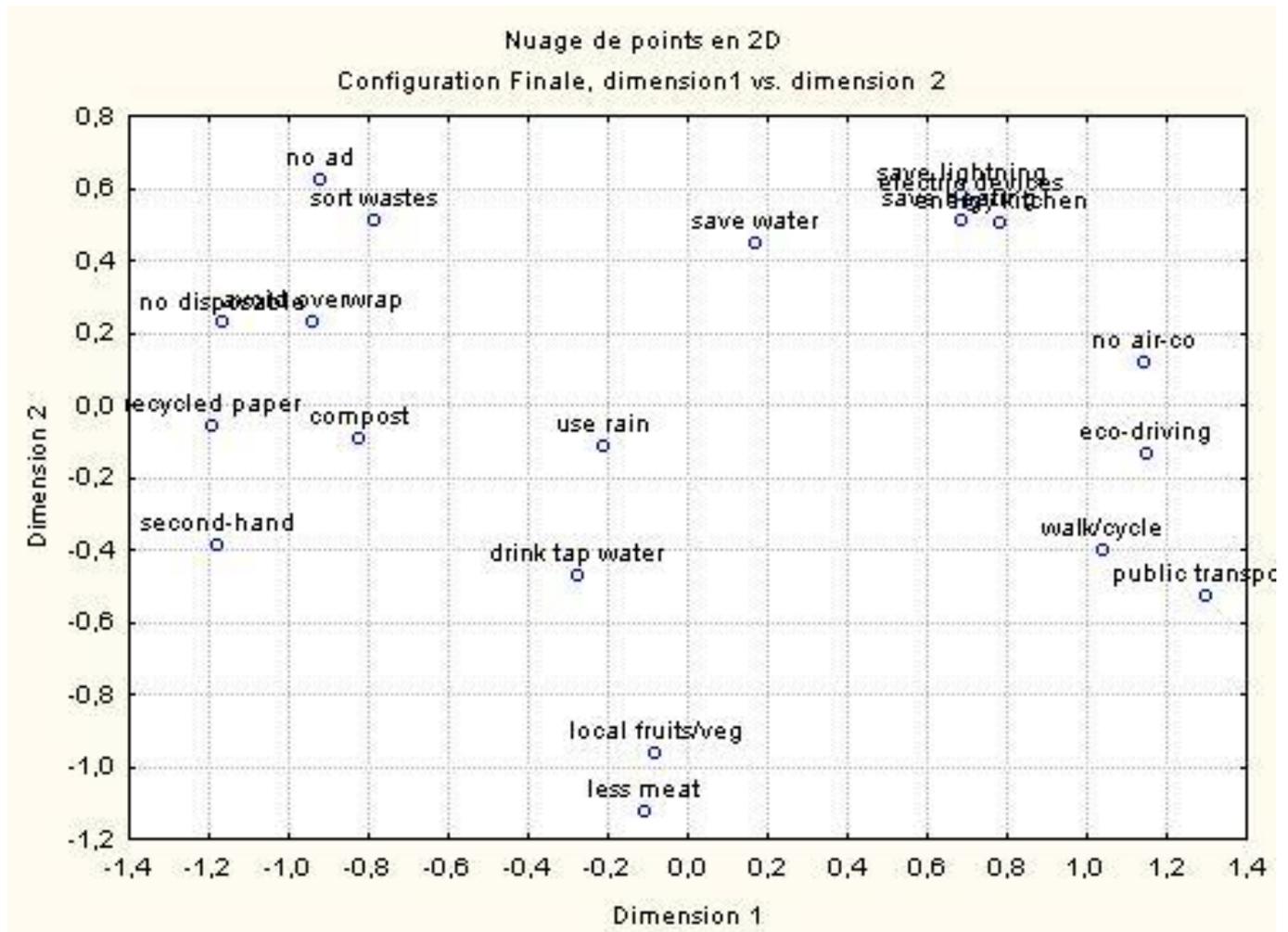
Figure 2: Representation of sustainable behaviors – multidimensional scaling (Social Representations - study 2).

In Figure 2, the distance between the dots corresponds to the perceived similarity between behaviors. As in study 1, we ran a clusters analysis in order to identify the ideal number of clusters. The analyses revealed 4 clusters. Behaviors were grouped as follows:

- Category 1: buying local / bio / season fruits or vegetables, eating less meat and replacing it by a vegetarian meal, avoiding wasting water, collecting and using rain water, drinking regularly water from the tap rather than bottled water.
- Category 2: avoiding buying overwrapped products or products wrapped individually, avoiding disposable products and preferring refillable / reusable / fixable products, replacing normal paper with recycled paper, avoiding receiving

advertising thanks to a sticker on the letter box, sorting my wastes (paper...), composting waste from the kitchen or the garden, buying second-hand products.

- Category 3: avoiding wasting heating energy, avoiding wasting lightning energy, avoiding wasting electricity consumed by different devices, avoiding wasting energy in the kitchen.
- Category 4: choosing a way of driving that allows saving fuel, walking or cycle for short distances, using public transports or car-sharing for long distances, in the car avoiding using air conditioned.

The first category seems to be focused on water and food and is quite close to the third category of study 1, dealing with eating habits. The behaviors in the second category seem to reflect a motivation to reduce solid wastes and the negative consequences of consumption. Most of these behaviors can be considered as consumer choices. In this sense, this category seems quite close to category 1 of study 1 (that had been identified as decision-making). A similar parallel can be established between category 2 of study 1 (behavioral regulation) and the third and fourth categories of the present study. These two categories are mainly composed of behaviors that require a continued monitoring. However, category 3 behaviors are related to the conservation of energy (electricity and heating energy) and category 4 behaviors are related to transports.

We then turned our attention to the 4 dimensions likely to underlie the social representation of pro-environmental behaviors. We first ran a multinomial logistic regression with the belonging to one of the 4 categories as the dependent variable and the 4 dimensions (perceived consequences of the behavior on the environment, social norms, perceived consequences of the behavior on the respondent him, and easiness / difficulty to perform the behavior) as independent variables. In other words, we tried to predict the belonging of each of the pro-environmental behaviors to one of the 4 categories on the basis of the 4 dimensions. Unfortunately, the results of this analysis did not reveal any significant result. That is, none of the dimensions significantly determined the belonging of the pro-environmental behaviors to one of the 4 categories (all $ps > .3$).

We then ran a linear regression with the coordinates of each behavior on the 2 dimensions identified in the Multidimensional scaling analysis as dependent variables. The independent variables (predictors) were the 4 dimensions. This analysis allowed us to identify which dimension(s) influence(s) the relative position of the pro-environmental behaviors. Results indicated a significant impact of norms ($\beta = .66$, $F(2, 14) = 13.88$, $p < .001$), of perceived impact on the respondent ($\beta = -.43$, $F(2, 14) = 5.26$, $p = .02$), and of easiness/difficulty ($\beta = -.31$, $F(2, 14) = 3.78$, $p = .05$). However, the perceived impact on the environment did not have a significant impact ($\beta = -.24$, $F(2, 14) = 1.77$, $p = .21$). In other words, it means that the perceived norm, the impact on the individual him/herself and the easiness of pro-environmental behaviors determine how they are perceived

relatively to each other. The significant effects of easiness and impact on the individual are in line with our interpretation of the previous study. We assumed that the control and involvement required by the behaviors were an important determinant of the representations (decision making vs. continued behavioral regulation). However, easiness remains a very general notion as it covers a wide variety of perceptions. Indeed, a behavior can be perceived as either easy or difficult for many different reasons: because of the time it can take, because it requires an important change of habits, because it is expensive, because the necessary infrastructures are not available, etc. A third study was consequently designed in order to investigate what determines the perceived difficulty of pro-environmental behaviors.

I.1.3. Easiness/difficulty of behaviors (social representations - study 3)

This third study on social representations aimed at investigating the variables that drive the perceived easiness/difficulty of pro-environmental behaviors. We expected to answer the following question: why do people consider some pro-environmental behaviors as difficult and some others as easy?

Method

Participants

497 participants answered the questionnaire on the internet. However, due to missing data, we had to exclude 93 participants. Analyses were consequently carried on a total of 404 participants.

Procedure and Material

In order to create the questionnaire, we selected 2 pro-environmental behaviors in each of the categories identified in the previous study. Each set of 2 behaviors was composed of a rather easy behavior and a rather difficult one. This selection of behaviors allowed us to have a set of 8 varied behaviors in our questionnaire. The selected behaviors were:

- buying local / bio / season fruits or vegetables
- drinking regularly water from the tap rather than bottled water
- avoiding disposable products and preferring refillable / reusable / fixable products
- composting waste from the kitchen or the garden
- avoiding wasting heating energy
- avoiding wasting energy in the kitchen
- choosing a way of driving that allows saving fuel
- using public transports or car-sharing for long distances

We then drew a list of factors likely to influence the perceived easiness/difficulty of behaviors. In order to reduce the number of variables to be investigated, we grouped some of these factors and then selected the 6 variables that were judged as the most relevant:

- time (*this behavior consumes/would consume a lot of my time*)
- infrastructure and physical environment (*the place where I live prevents me from having this behavior –lack of the necessary infrastructures, the place where I live does not allow me*)
- knowledge (*I have few information about this behavior or about its alternatives*)
- habits and comfort (*having this behavior implies/would imply for me to change my habits or lifestyle –for instance, modify my organization or accept less comfort*)
- priorities (*currently, there are other problems or priorities in my life that prevent me from having this behavior*)
- norms (*society and/or people around me encourage me to have this behavior*)

We thus investigated the links between these 6 variables and the perceived easiness/difficulty of behaviors. After a short introduction describing the questionnaire, participants answered questions evaluating the perceived easiness/difficulty of each of the 8 behaviors by indicating on a 5-point likert scale to which extent the behavior is easy or difficult. Then participants were asked to indicate their agreement with each of the items related to the 6 variables (time, infrastructures and physical environment, knowledge, habits and comfort, priorities, norms) on a 5-point likert scale ranging from completely disagree to completely agree. They finally answered socio-demographical questions and were thanked for their participation.

Results

For each of the 8 behaviors, we ran a linear regression analysis with the behavior as the dependent variable and the 6 dimensions (time, physical environment, knowledge, habits, priorities, norms) as independent variables. Values of the statistics (β and p) can be seen in TABLE I. Significant effects are in bold.

TABLE I: impact of time, physical environment, knowledge, habits, priorities and norms on pro-environmental behaviors.

Behavior	Time		Physical env.		knowledge		habits		priorities		norms	
	β	P	β	p	β	p	β	p	B	p	β	p
Buy local	**-.25**	**.001**	**-.18**	**.001**	**-.12**	**.006**	-.07	.11	**-.23**	**.001**	.05	.17
Drink tap water	.05	.23	**-.45**	**.001**	**-.08**	**.03**	**-.11**	**.008**	**-.28**	**.001**	**.09**	**.01**
Avoid disposable	-.09	.08	**-.16**	**.004**	**-.22**	**.001**	**-.13**	**.01**	**-.14**	**.009**	.05	.20
Compost	**-.11**	**.007**	**-.52**	**.001**	**-.13**	**.001**	**-.15**	**.001**	**-.11**	**.005**	.03	.28
Save heating	**-.15**	**.004**	**-.42**	**.001**	-.02	.62	**-.11**	**.02**	-.04	.48	-.02	.59
Kitchen energy	**-.23**	**.001**	-.03	.71	**-.13**	**.01**	**-.10**	**.05**	-.10	.08	.04	.34
Eco-driving	-.02	.77	**-.19**	**.001**	**-.18**	**.001**	**-.28**	**.001**	-.07	.19	.08	.10
Public transports	**-.21**	**.001**	**-.31**	**.001**	.003	.95	**-.23**	**.001**	**-.20**	**.001**	.06	.06
Mean Easiness	-.11	.07	**-.33**	**.001**	**-.10**	**.04**	**-.13**	**.01**	**-.15**	**.007**	.08	.06

As can be seen in TABLE I, all the variables investigated had a significant effect on several of the behaviors, except for norms.

We then examined the impact of the 6 variables on pro-environmental behaviors in general, with the objective of identifying which variables have the strongest impact. For this purpose, we created an index of mean easiness, by averaging the easiness scores for the 8 behaviors ($\alpha = .52$). We also created indexes for the 6 variables by averaging the scores of each variable regarding the 8 behaviors (all αs $> .50$). We then ran a logistic regression with mean easiness as the dependent variable and the mean scores of the 6 variables as independent variables. Physical environment, knowledge, habits and priorities had a significant impact on mean easiness. Furthermore, time and norms had a marginally significant impact on mean easiness. Results are summarized in TABLE I.

We finally ran a forward regression. This analysis adds the variables one by one into the model according to their significance. It consequently allowed us to identify the variables that have the strongest impact on mean easiness. The first of these variables is Physical environment. Said otherwise, the most important determinant of the perceived easiness or difficulty of a behavior is the perception people have of the possibilities offered by their direct environment to have pro-environmental behaviors or not. Then, the most important variables are time, priorities, knowledge, habits and, finally norms.

I.1.4 conclusion regarding social representations

This set of three studies on social representations of pro-environmental behaviors allowed us to identify different classes of behaviors. The first one is related to food and water. The second one deals with consumer's choices such as wastes reduction, or preference for second-hand and recycled products. The third one is composed of behaviors that require a continued monitoring and can be divided into 2 sub-categories: conservation of energy on the one hand, and transports on the other hand.

We then turned our attention toward the dimensions that could explain the perceived differences and similarities between behaviors. Results indicated that the perceived norm (that is, what other people expect from me), the impact on the individual him/herself (that is, the impact of adopting the behaviors on myself and on my life) and the easiness of pro-environmental behaviors (that is, the extent to which I consider the behavior as easy or difficult) determine how the behaviors are perceived relatively to each other. Results also indicated that the impact that the behaviors are likely to have on the environment does not have an impact on the social representation of these behaviors. These results taken together might indicate that campaigns focusing on the positive or negative consequences of some behaviors on the environment might be ineffective in changing people's representations and attitudes. Instead, they would be more efficient by highlighting the (positive) impact these behaviors can have on the individual him/herself, the easiness of the behaviors and their normative aspect.

In a third study, we tried to identify what people understand by "easy" or "difficult" when they talk about pro-environmental behavior. Results indicated that the variable that had the strongest link to perceived easiness was physical environment and infrastructures. In other words, people often consider pro-environmental behaviors as difficult if they think their environment lacks the infrastructures that are necessary for these behaviors. This result points to the necessity of providing people with the means to behave environmentally-friendly and to inform them about the possibilities their physical environment offers them in order to act pro-environmentally.

I.2. Ecological footprint measure: structure of attitudes and intentions

Ecolife provided us with the recorded data of their online footprint measure. The available data include the Ecological Footprint (EF) questionnaire itself, measures of engagement towards a series of sustainable behaviors, and some demographics. We used these data to see whether the behaviors as assessed in the EF could be mapped upon the attitudinal structure found in the previous study.

Method

Participants

We used the data collected with the EF measure during campaigns run from October 2006 to October 2007 throughout the country. 16028 respondents filled in the questionnaire completely, including the demographical data, which we used in another study related to Objective B.

Procedure and material

The main measure was the EF measure, a list of ten – «Which of the following behaviors best describes you » – questions. Respondents were also asked to indicate their family size, which was used to weight their answers to the behavior questions (e.g. the EF of a person decreases as he/she shares a car with more family members). After completing questions related to their Ecological Footprint, people were asked to provide some demographical data like age (1-6 point scale), occupation, postal code and gender.

Results

A confirmatory factor analysis looking to replicate the findings of II.1.1 yielded partial support for these previous results (see TABLE II).

TABLE II: Results of the confirmatory factor analysis on Ecological Footprint data.

Rotated Component Matrix[a]

	Component		
	1	2	3
EF1-Food	-,108	,585	-,059
EF2- Meat	,400	,320	,182
EF3-Sz House	,691	-,067	,182
EF4-Isolation	-,256	,488	-,080
EF5-Heating	,195	,031	,608
EF6-Electricity	,163	,671	-,035
EF7-Paper Use	,344	,551	,144
EF8-Car Use	,755	,088	-,070
EF9-PT Use	-,462	,092	,218
EF10-Holiday	,183	,108	-,729

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	1,870	18,703	18,703
2	1,336	13,364	32,067
3	1,030	10,301	42,368
4	,995	9,951	52,319
5	,955	9,549	61,868
6	,911	9,115	70,983
7	,824	8,237	79,220
8	,770	7,697	86,917
9	,709	7,092	94,009
10	,599	5,991	100,000

Through these analyses, we find some interesting similarities between the structure found here, and in the previous studies. We find that transport and food habits are related. Also, we find some support for the regulatory (continued monitoring) versus one-shot decision (consumer's choices) dichotomy. Buying local food, monitoring electricity use and paper use, clearly load onto the same factor. Car use (which is more related to owning a car) and the use of public transport, type of house and partly also insulation could be considered one shot decisions with regulatory consequences. The same goes for eating less meat, which often can be a one-shot decision ("from now on, I become a vegetarian" or "from now on, we skip meat on one meal a week"), and therefore also loads on this one shot

factor. Strangely, Insulation also loads on the regulatory component, something that might be explained by the fact that this is sometimes seen as a larger group of constructs that could be described as "conserving energy on house heating" which also involves turning down the heating, closing windows etc. It is important to note that the item "Heating" assesses what type of heating is used (gas, electricity, oil,…), and not the monitoring of heating use.

Also noteworthy is the fact that these three factors only account for 40% of explained variance, and that a single factor – gauging for the effect of what is common to all these decisions, i.e. "the ecological mindset" - can only explain less than 20%.

The behaviors assessed in the EF questionnaire are therefore multi-faceted and determined by more factors than taken into consideration in this analysis.

I.3. Conclusions regarding Objective A

The studies related to objective 1 clearly indicate that sustainable behaviors are not all perceived the same way. It also appeared that variables such as the perceived social norm, the impact of the behaviors on the individual him/herself and the perceived easiness or difficulty of pro-environmental behaviors play a role in the representation of sustainable behaviors. However, the impact of these behaviors on the environment seems unrelated to these representations. This result might question the effectiveness of green marketing campaigns that are focused on the positive consequences of these behaviors.

Additionally, results indicate that the perceptual or mental structure of sustainable behaviors is also reflected in how people act. Behaviors that are perceptually closer to each other, are also frequently executed together. As the direction of this relationship is not clear, it could be that there is an underlying common denominator. The physical environment that people act in could partly be such a common denominator, and this will be further discussed under Objective B.

II.   Objective 2: Investigate cognitive, psychosocial and emotional antecedents of sustainable behaviors

The most common model used to predict behavior in psychology and other related areas generally identifies 3 main predictors of behavioral intentions, which themselves influence behaviors (see Ajzen, 1991): attitudes, subjective norms and perceived behavioral control.

However this model is rather cognitive and rational and do not leave a wide place for emotions. We decided to investigate additional variables likely to influence pro-environmental behaviors. We consequently examined the impact of moral emotions, with a special focus on vicarious and collective emotions. We also investigated the structure of attitudes and highlighted the role of attitudinal ambivalence as a mitigator of pro-environemental behaviors. We also studied some intra-individual variables, such as materialistic values and attitude toward social dominance, as well as some physiological variables (endocrinology). Finally, we focused on the role of infrastructural variables (predictors at the community-level) and on the perception that people have of these infrastructures and of their physical environment. As an example of the impact of physical environment perception on behavior, we ran a set of 3 studies showing that the characteristics of a car directly influences the way people drive.

In a more applied setting, we also ran two field studies focusing on people's attitudes and behaviors toward wastes.

II.1. Attitudinal ambivalence and intentions toward sustainable behaviors

Attitudes have been shown to be determinants of behaviors. Most often, attitudes have been considered as unidimensional and measured as a simple bipolar judgement (that is, a given behavior is perceived either as good or bad, either as acceptable or not). However, it has been shown that attitudes can have complex structures (see for instance Petty, Wegener & Fabrigar, 1997; Fabrigar, McDonald & Wegener, 2005). Attitudes regarding pro-environmental behaviors can be in many cases ambivalent. That is, they can be positive and negative at the same time. Said otherwise, attitudinal ambivalence is a simultaneously positive and negative evaluation of a given object. For instance, I can consider that using public transports rather than my car is positive because it allows me to reject less CO_2 and save money; but I can also consider that it's negative because it is time-consuming and it makes me more dependent on other people. The more a person holds extreme and similar positive and negative beliefs/attitudes/emotions concerning a given behavior, the more this person is said to be ambivalent.

We thus decided to investigate the impact that attitudinal ambivalence can have on pro-environmental behaviors. Our general prediction is that ambivalence is a negative predictor of pro-environmental intentions and behaviors on top of traditional predictors such as attitude, subjective norms and perceived behavioral control. We first ran 2 correlational studies showing that objective ambivalence predicts both pro-environmental action and behaviors. We then ran a third study investigating the content of attitudes. We showed that the positive and negative components of attitudes toward pro-environmental behaviors are composed of very different thoughts and beliefs.

II.1.1 Objective ambivalence and complexity of taking ecological actions

This study aimed at differentiating people who are taking pro-environmental actions or not and finding out whether attitudinal ambivalence predicted this intention in addition to the "classical" predictors identified by the Theory of Planned Behavior (Ajzen, 1991). Besides, we included a measure of attitudinal complexity (see for instance Linville, 1982). To make things simple, complexity is an evaluation of the number of independent dimensions people use when thinking to an issue. Complexity is associated with a pre-decisional mind set and as such could be a brake to ecological actions: too many complexities kill the act.

Method

Participants

129 students (mainly 3rd year psychology students) from the ULg completed a questionnaire at the end of a psychology class. Two participants failed to answer all the items and were then not included into the analyses.

Procedure and material

The questionnaire assessed traditional predictors of intention, attitudinal ambivalence, pro-environmental intentions and pro-ecological action. First, participants answered a series of general questions about ecology and pro-environmental behaviors. Importantly, no mention was ever made concerning specific pro-environmental behaviors, that is, participants freely instantiated the general category of "pro-environmental behaviors". Amongst the questions, some items measured the "traditional" predictors of intentions: attitude, subjective norm and perceived behavioral control. Other items measured the ambivalence felt toward pro-environmental behaviors. Ambivalence was measured as the objective ambivalence. We asked participants to rate how much they felt decided, determined, and confident when thinking about the positive sides of pro-environmental behaviors as well as how much they felt undecided, confused, and hesitant when thinking about the negative sides of pro-environmental behaviors. We then computed an ambivalence score using Thompson's formula (Thompson, Zanna & Griffin, 1995). It is important to note that the same basic methodology was used to measure the traditional predictors of behaviors that consequently shared the same method as the measure of ambivalence. As a consequence, any added value of ambivalence besides the traditional predictors could not be attributed to a difference in the method of data collection.

In order to compute a complexity score, we provided participants with a list of 15 ecological behaviors (such as using tap water or buying reusable product). We asked participants to Q-sort the items in at least 2 piles but not more than 5 with at least 3 behaviors in each pile. A complexity score was calculated based on Scott's formula (Scott, 1962; 1969). Participants also reported on a *yes* or *no* scale if they ever participated in any pro-ecological action (without again any mention of what this action could be).

Results

We first evaluated a simple model with the traditional predictors of behavior. As expected, intention was predicted by attitude, subjective norm, and perceived behavioral control, βs > .15, ps < .085; percentage of variance explained R^2 = .19. Intention significantly predicted action, β = .23, t = 2.83, p = .003, R^2 = .09. The fit of this model (without any direct links from attitude, norms and control to behavior) is rather good: χ^2 = 6.08, df = 3, p = .11, RMSEA = .09.

We then added both measures of ambivalence and complexity as predictors of intention and behavior. In addition to the traditional predictors of behavioral intentions, objective ambivalence was a significant additional predictor of the intention to take a pro-ecological action, β = -33, t = 4.03, p < .001. The direct path from ambivalence to action was significant (β = -.16, t = 1.68, p = .05, one-tailed). The indirect effect of ambivalence on action through intention was also significant, β = -.08, t = 2.15, p = .03. As a result, the total effect of ambivalence on action was significant, β = -.24, t = 2.72, p = .007. Overall, the more people are ambivalent toward pro-environmental behaviors, the less they take a pro-ecological action. As predicted, complexity decreased action, β = -.18, t = 2.14, p = .03 but had no effect on intention, β = .12, t = 1.62, p > .10. The fit of this preferred model is pretty good: χ^2 = 5.49, df = 3, p = .14, RMSEA = .08 (see Figure 3). R^2 for intentions is .30 and .15 for action, which is an increase of .11 and .06, respectively, compared to the base-line model.

The main result of this study is that ambivalence improved the prediction of action (besides attitude, subjective norm, and perceived behavioral control), both indirectly through intention and directly (with a one-tailed region of significance). This means that highly ambivalent people, in addition to having weaker intentions to take an ecological action, are also less likely to transform their intentions into actual actions. Additionally, we were also able to show that participants' attitudinal complexity is an additional significant predictor of action. In conclusion, this study showed that both ambivalence and complexity moderate both people's intentions to behave environmentally-friendly as well as their self-reported pro-ecological action.
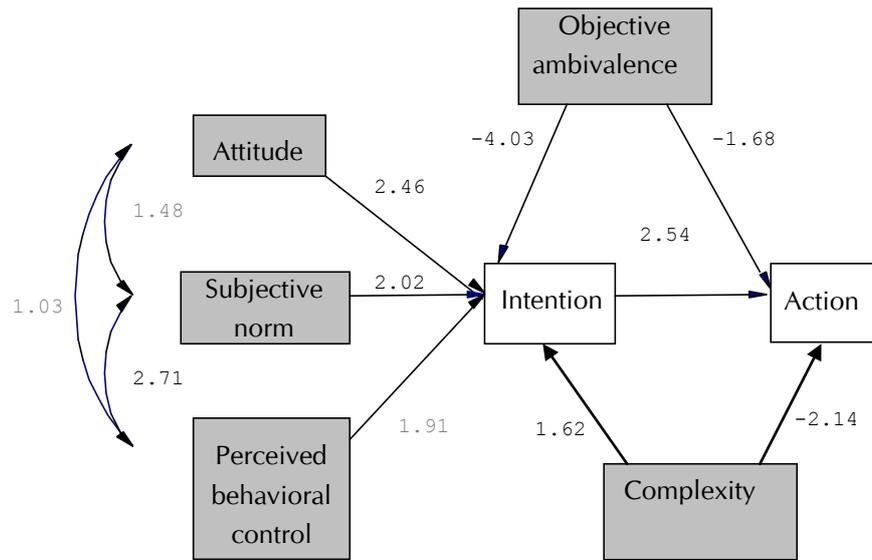
Chi-Square=5.49, df=3, P-value=0.13943, RMSEA=0.083
Numbers close to paths are *t* values

Figure 3: prediction of ecological intention and action by attitude, subjective norm, perceived general control, attitudinal ambivalence and complexity.

II.1.2 Ambivalence, feeling of accountability and specific behaviors

The previous study indicated that ambivalence is clearly an important moderator of the link between "good" global intentions and concrete but general action. We then tested if this link holds true when specific behaviors are at stake. Furthermore, we assumed that feeling accountable (that is, in control of and responsible for the behavior) could be an important variable influencing both ambivalence and pro-environmental behaviors. The model tested is displayed in Figure 4 (tested separately for each specific behavior).

Method

Participants

Participants came from 3 different samples. The first sample was the same as in the previous study, composed of 129 students from the ULg. The second sample was composed of 156 students from a college of Education in Liège. Finally, the third sample included 269 students from the K.U.Leuven.

Procedure and Material

Participants were asked to evaluate 5 **specific** behaviors (turning off the light, using public transports instead of personal car, using reusable bags for shopping, buying ecological products, recycling paper). They first had to rate how much they controlled and felt responsible for these behaviors. Next, we evaluated objective ambivalence, that is, how much participants feel positive when they think about positive sides, and then how much

they feel negative when they think about negative sides of each specific behavior. Then participants reported how often they perform each of these specific behaviors. Some demographic data were also collected (age and gender). At the end, participants reported their intentions to perform the behaviors in the following weeks.
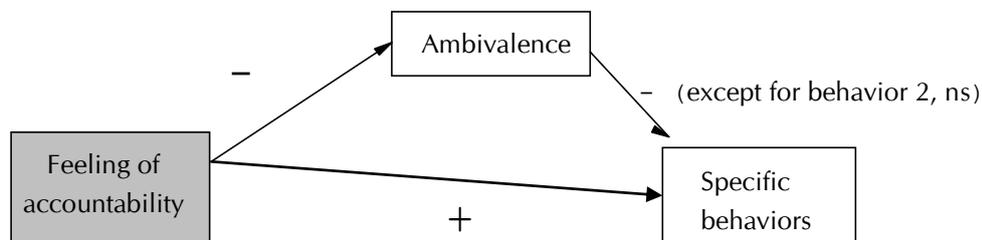

Figure 4: Prediction of specific ecological behaviors by feeling of accountability and attitudinal ambivalence.

Results

In line with the previous study, ambivalence always negatively predicted each specific behaviors, βs > -.09, ts > 2.26, ps < .03 (with the notable exception of behavior 2 related to public transports, β = .04, t < 1) whereas feeling of being accountable always directly increased the self-reported frequency of behaviors, βs > .14, ts > 3.25, ps < .002. Furthermore, the more participants felt accountable and the less they reported ambivalence, βs > -.18, ts > 4.19, ps < .001. The indirect effect of accountability on behavior through ambivalence was always positive, βs = .02, ts > 1.94, ps < .055, except for behavior 2 for which the indirect effect is non significant (β = .01, t < 1).

II.1.3 Ambivalence and attitude content

The previous studies demonstrated that attitudinal ambivalence is negatively correlated to pro-environmental intentions, actions and behaviors. We then sought to have a better understanding of what lies behind ambivalence. For this purpose, we designed this study on attitude content which investigated the thought linked to both the positive and the negative sides of acting pro-environmentally. The results of this study will allow to take into account the specificities of each aspect of attitudes when designing green marketing messages.

Method

Participants

In the first phase of this study, 30 students participated. They were recruited on the campus of the University of Liège. There were 15 females and 15 males.

Then, in a second phase, 4 judges rated the answers of these participants on several questions described hereafter.

Procedure and material

Phase 1

Participants were asked to first think about the _positive aspects only_ of 7 pro-environmental behaviors (avoiding wasting paper, choosing public transports or car-sharing, buying recyclable or second-hand products, saving electricity, walking or cycling for short distances, eat local and season's products, buying long-lasting products). For each of the behaviors, examples were given. Then, for each of these behaviors, participants listed the first thoughts that came to their mind. Next they thought about the _negative sides only_ of the same behaviors and listed their thoughts (for half of the participants, the order of these tasks was counterbalanced). Finally, they indicated the frequency to which they personally have each of the 7 behaviors. Participants were then debriefed and thanked.

Phase 2

4 judges then read the thoughts generated by the participants and, for each of these thoughts, answered 3 questions. First, they evaluated to which extent the thought referred to something concrete or abstract (_abstractness_). Second they were asked to indicate whether the thought referred to a close or to a distant future (_time distance_). Third and finally, they indicated whether the thought was linked to the respondent him/herself or someone close, or to unknown / unrelated persons (_social distance_). For each question, they indicated their responses on a 7-point likert scale.

Results

We first computed an abstractness score for positive aspects on the one hand, and for negative aspects on the other hand, by averaging the abstractness score obtained for each of the 7 behaviors (α = .73 for positive aspects and α = .60 for negative aspects). We used the same procedure to compute time distance scores (α = .65 for positive aspects and α = .56 for negative aspects). We also computed, with the same procedure, social distance scores, although the consistency of these scores is not very high (α = .46 for positive aspects and α = .28 for negative aspects).

We then compared each of these scores for both aspects.

Results indicated that thoughts related to the positive aspect(s) of pro-environmental behaviors were evaluated as **more abstract** (M = 2.22) than thoughts related to the negative side (M = 1.92), $t(29)$ = 2.70, p < .02. The first ones were also related to **a more distant future** (M = 2.93) than the second ones (M = 1.86), $t(29)$ = 10.94, p < .001. Finally thoughts related to the positive aspect(s) expressed **more social distance** (M = 3.96) than thoughts related to the negative aspects (M = 2.76), $t(29)$ = 12.02, p < .001.

There was no impact of gender, all Fs < 1.92, ps > .18.

II.1.4. Conclusions regarding attitudinal ambivalence

Although previous studies in psychology and related areas mainly measured attitudes as a unidimensional variable, our results showed that attitudinal ambivalence plays a crucial role in predicting intentions and behaviors. Regarding Objective B, our results indicated that attitudinal ambivalence significantly and negatively influences sustainable behaviors. The more people are ambivalent, the less they have pro-environmental intentions and behaviors.

Another important result is the difference between positive and negative components of attitudes toward pro-environmental behaviors. Indeed, the positive component elicits more abstract and distant thoughts, whereas the negative component elicits relatively concrete and close thoughts. This also means that, when both types of thoughts are present at the same time (which is the case for ambivalent individuals), thoughts related to the negative component have more chances to be taken into consideration when making a decision. Previous studies have indeed shown that people preferentially attend to short term and personally-relevant arguments when making a decision (see for instance Daly & Wilson, 2005).

The next step is to find ways to reduce ambivalence as well as the prevalent effect of negative arguments amongst individuals thanks to marketing campaigns. Several studies have been designed to investigate this question. As these studies are related to Objective C, they will be described further in this report (in the section devoted to Objective C studies).

II.2. Moral emotions and pro-environmental behaviors: correlational studies

As explained in the introduction, emotions often fail to be taken into consideration in classical models predicting intentions and behaviors. We consequently investigated the impact emotions could have on pro-environmental intentions and behaviors. We ran a set of 4 correlational studies investigating the impact of emotions on sustainable intentions and behaviors. We focused on **moral emotions** (see for instance Tangney,

Stuewig, & Mashek, 2007), that is, emotions that are a consequence of the evaluation of a behavior or a situation. For instance, if I have the opportunity to reduce my consumption of energy but fail to do it, I might feel ashamed or guilty when I think about my behavior. The most commonly studied moral emotions are pride, guilt, shame and anger. We assumed that, on top of the usual predictors of behaviors (attitude, subjective norm and perceived control), moral emotions can strongly influence behavioral choices toward sustainability. Furthermore, we differentiated vicarious, collective and own emotions, and hypothesized that vicarious and collective emotions are better predictors of sustainable behaviors and ecological actions than own emotions. <u>Vicarious</u> emotions refer to the emotions experienced when one observes someone else's behavior. For instance, if I witness a very close friend behaving without any care for the environment, I might feel guilty, although I did not enacted any negative behavior myself. If I witness the same friend doing effortful actions in order to protect the environment, I'm likely to feel proud, even if I did not make any effort personally. <u>Collective</u> emotions refer to the emotions experienced in response to one's (socially relevant) group behaviors. For instance, I could feel guilty because the inhabitants of my country produce a lot of toxic waste or a lot of CO_2, even if I'm not personally responsible for this situation. The literature has shown that some vicarious and collective emotions, more specifically guilt feelings, generally lead to a wish to repair for the harm that has been done (see for instance Leach, Iyer & Pedersen, 2006). On the other hand, own negative emotions are often evacuated through excuses and justifications and consequently are less likely to lead to a wish to repair. We then proposed that vicarious and collective emotions have a stronger impact on behaviors that own emotions.

II.2.1 Own, vicarious emotions and ecological actions

This study's main objective was to examine the impact of several own and vicarious emotions on pro-environmental intentions and action in addition to the classical predictors of behaviors (attitude-subjective norm-perceived behavioral control).

Method

Participants

129 students participated in Study 4 (127 valid cases). They were asked to complete a questionnaire at the end of a psychology class at the ULg. Age and gender were recorded.

Procedure and material

Participants were asked to complete a questionnaire including questions about:
- Whether they did or did not take an ecological action (as in the study about objective and subjective ambivalence, see point II.1.1)

- The emotion they felt when they conducted 5 specific sustainable behaviors (*turning off the light, using public transports instead of personal car, using reusable bags for shopping, buying ecological products, recycling paper* – same behaviors as in the study on ambivalence, feeling of accountability and specific behaviors, see point II.1.2): pride.
- The emotions they felt when they did *not* conduct these 5 specific sustainable behaviors: anger, shame and guilt.
- The emotion they felt when someone connected with them (friend or relative) conducted these 5 specific sustainable behaviors: vicarious pride.
- The emotions they felt when someone connected with them (friend or relative) did *not* conduct these 5 specific sustainable behaviors: vicarious anger, shame and guilt.

After completing the questionnaire, participants were debriefed and thanked.

Results

We performed a logistic regression analysis with separate-groups covariance matrix. Amongst all personal and vicarious emotions evaluated in the questionnaire, only vicarious guilt significantly predicted whether participants had taken or not an ecological action, Wald = 4.277, p < .05; Nagelkerke R^2 = .235. The other emotions evaluated in the questionnaire did not predict whether participants had or not an ecological action. To our knowledge, this is the first study that ever examined so many moral emotions at the same time and at both personal and vicarious levels. Furthermore, guilt and shame were perfectly discriminated by participants at both the personal and vicarious levels, as showed by a confirmatory analysis comparing a one to a two-factor (separating guilt and shame at the personal as well as vicarious level) model, all $\Delta\chi^2$ > 4.93, ps < .05.

II.2.2 Own, vicarious emotions and specific pro-environmental actions

The previous study indicated that people are more prone to commit to pro-environemental actions when they feel vicarious guilt. In the present study, we examined whether vicarious guilt also influences specific pro-environmental behaviors, in addition to general pro-environmental actions.

Method

Participants

425 students participated in this study. There were 156 students from a college of Education in Liège and 269 students from the K.U.Leuven.

Procedure and material

Participants were asked to complete a questionnaire which included questions about 5 specific pro-environmental behaviors (*turning off the light, using public transports instead of personal car, using reusable bags for shopping, buying ecological products, recycling paper* – same behaviors as in the previous study and in the study on accountability and specific behaviors -point II.1.2):

They first reported the frequency of these behaviors. Then they were asked to indicate their guilt feelings when someone connected with them (friend or relative) did *not* have some these behaviors. Finally, participants answered questions about their intentions to perform pro-environmental behaviors in the near future. After completion of the questionnaire, participants were collectively debriefed.

Results

The data collected in Liège and Leuven yielded the same results (with no difference between cities, valid N total = 414). A first analysis was conducted on feeling of guilt, intentions and aggregated behaviors. As can be seen in figure 5, results indicated that vicarious guilt predicted both behavioral intentions and specific pro-environmental behaviors (both $p < .001$), which is in line with our hypotheses. Intentions predicted self-reported behaviors ($p < .001$). Finally, vicarious guilt no longer predicted self-reported behaviors when intentions were controlled for ($p > .5$). More importantly, the indirect effect of vicarious guilt on self-reported behaviors through intentions was significant ($p < .05$), these results indicated that vicarious guilt increased participants' intentions to perform pro-environmental behaviors, which in turn led to more actual behaviors. In other words, the more participants felt guilty because someone connected with them failed to have pro-environmental behaviors, the more they had intentions that led them to behave environmentally-friendly.

In a second step, we replicated this analysis at the level of each specific behavior and for each linguistic community with the same results, except for behavior 2 (use of public transports) which is not directly influenced by the level of guilt.


$$B = .25**, SE = .04 \qquad B = .35**, SE = .03$$

$$B = .11**, SE = .03$$
$$(B = .02, SE = .03)$$
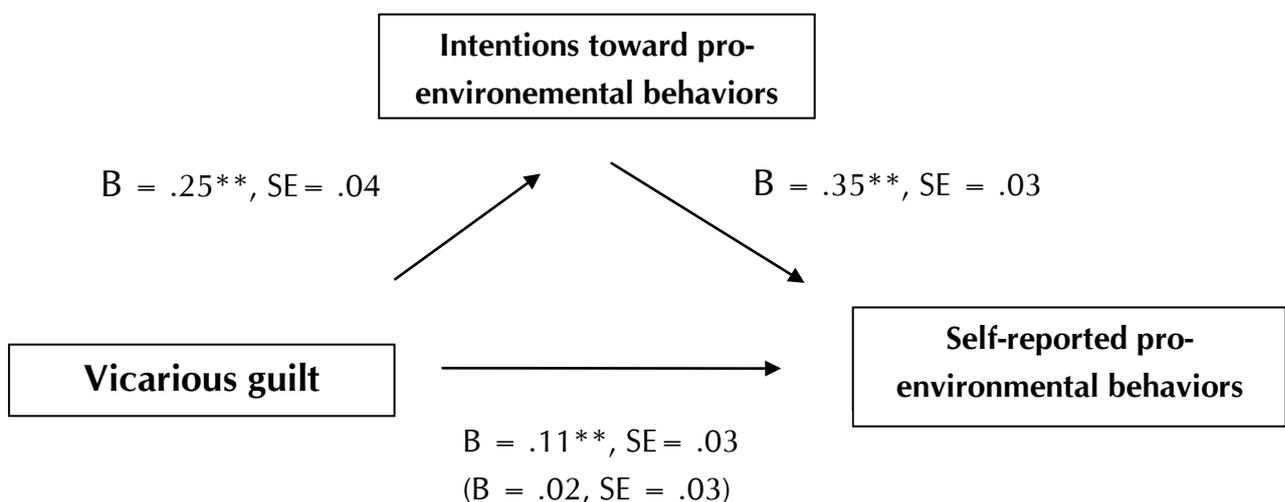
Figure 5: Impact of Vicarious Guilt on aggregated intentions and behaviors (B are unstandardized path coefficients).

II.2.3 Vicarious guilt, wish to repair, implementation intentions and pro-environmental behaviors

This study also investigated the links between vicarious guilt, pro-environmental intentions and behaviors, but added the wish to repair as a possible mediator between the feeling of guilt and the intentions. Previous research has shown that collective guilt and vicarious guilt were linked to a motivation to repair (see for instance Lickel, Schmader, Curtis, Scarnier & Ames, 2005). These emotions would trigger a wish to repair for the other person's "wrong" behavior (or lack of "good" behavior). We thus assumed that feeling vicarious guilt would lead to a wish to repair, which would in turn trigger pro-environmental intentions. We more specifically examined implementation intentions (see for instance Gollwitzer, 1999). This type of intentions might also mediate the impact of emotions on pro-environmental behaviors. Unlike goal intentions (which specify the final goal one wants to reach), implementation intentions specify how one is going to reach his/her goal. They identify how, when and where precisely one is going to act in order to reach his/her goal. We believe that guilt feelings might lead to the creation of this second type of intentions. These intentions would then lead to pro-environmental behaviors.

Method

Participants

80 adult participants (non-students) were recruited and accepted to participate in this study.

Procedure and material

Participants were asked to answer questions about the frequency of the 5 specific pro-environmental behaviors used in the previous study and about their guilt feelings when someone connected with them did *not* perform pro-environmental behaviors. Then participants answered questions about their wish to repair and implementation intentions. After completing the questionnaire, participants were individually debriefed.

Results

In line with the results of the previous studies, this study results indicated that vicarious guilt predicted pro-environmental behaviors, β = .09, t(80) = 1.89, p = .06. However, this relation between guilt and behaviors was mediated by the implementation intentions. Furthermore, the link between vicarious guilt and implementation intentions was partially

mediated (p > .05) by the wish to repair. The links between these variables are represented in figure 6.

It appears that vicarious guilt helps to create implementation intentions and, at the same time, triggers a wish to repair for the other person's lack of pro-environmental behavior. The wish to repair then reinforces the implementation intentions that lead in turn to the behaviors (The theoretical model adequately fitted the observed data, p > .23).
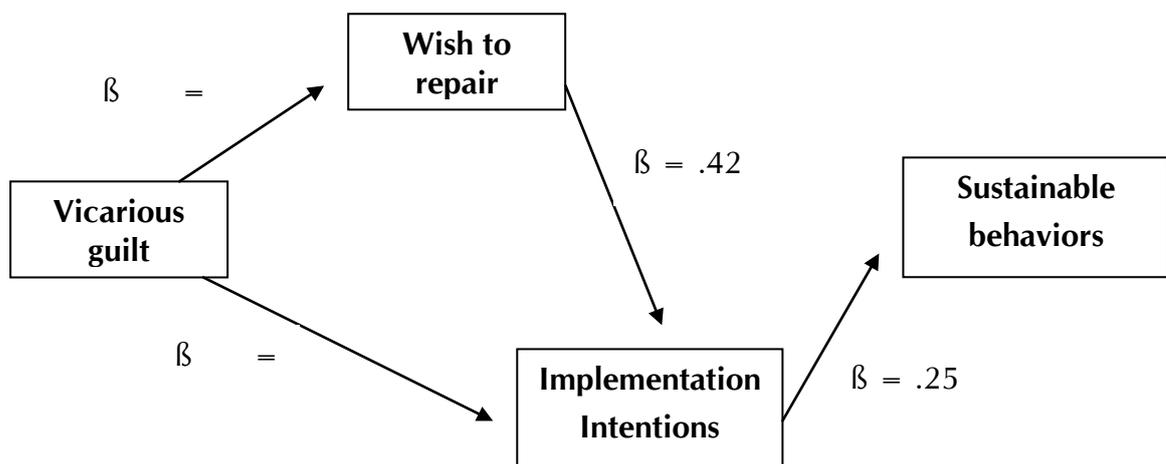

Figure 6: indirect impact of vicarious guilt on self-reported sustainable behaviors (Chi-Square = 2.93, df = 2, P-value = 0.23154, RMSEA = 0.077.).

II.2.4 Antecedents of emotions, vicarious guilt and ecological action

Whereas previous studies have focused on self-reported behaviors, the present study's objective was to test the impact of vicarious emotions on *actual* behaviors (and thus to go one step further than previously described studies). In this study, we focused on guilt and anger and the actual behavior was participants' commitment to some ecological actions. We were also interested in the antecedents of emotions.

Method

Participants

40 students were recruited on the campus of the ULg.

Procedure and material

Participants were first asked to complete a questionnaire, related to environment and to close relations' behaviors. Participants first answered questions about some possible antecedents of vicarious emotions (perception of a lack of respect toward environment, perceived interdependence with the other person, and perceived control). Then participants answered questions about the emotions they felt (i.e. guilt and anger) when

someone connected with them did not respect environment. They finally completed questions about their own intentions to perform several pro-environmental behaviors.

After completing the questionnaire, participants were explained that an environmental action group had been created in their university and that this action group was seeking help amongst students to organize several pro-environmental actions. Participants were given a letter from the so-called action group and were afterward asked if they would be willing to help this group for some specific actions. They had to indicate in which actions they would be willing to participate and how much time they would agree to spend. Various actions were proposed, as for instance signing a petition, donating money, collecting money, organizing a pro-environmental conference, participating in sensitization campaigns in schools and so on. According to the answers of the participants, we could then calculate an index of involvement into pro-ecological action. After completing the actions form, participants were debriefed and were given a list of addresses where they could find information in case they would still be willing to engage in pro-environmental actions.

Results

The number of actions to which each participant registered was computed in order to obtain a pro-ecological action index. Then, the impact of vicarious anger and guilt on both intentions and pro-ecological action was tested. Results indicated that vicarious guilt, but not anger, predicted intentions to perform pro-environmental behaviors, $\beta = .33$, $p < .05$ (see Figure 7). Intentions predicted in turn pro-ecological action, $\beta = .41$, $p < .01$. However, neither vicarious guilt nor vicarious anger directly predicted action, $p > .3$. Additionally, amongst the antecedents of guilt, only participants' perceived control on environment and sustainable behaviors influenced guilt, $\beta = .34$, $p < .05$. In other words, the more participants felt they could have some kind of control on their own pro-environmental behaviors, the more they felt guilty when someone connected with them (a friend or a relative) failed to behave environmentally-friendly. The more participants felt guilty, the more they intended to perform sustainable behaviors. Finally, these good intentions led them to commit to pro-ecological actions.

These results again confirm that vicarious guilt is an important predictor of ecological action and sustainable behaviors. Furthermore, the impact of guilt on action was fully mediated through intentions, which is in line with Studies 5 and 6 results.
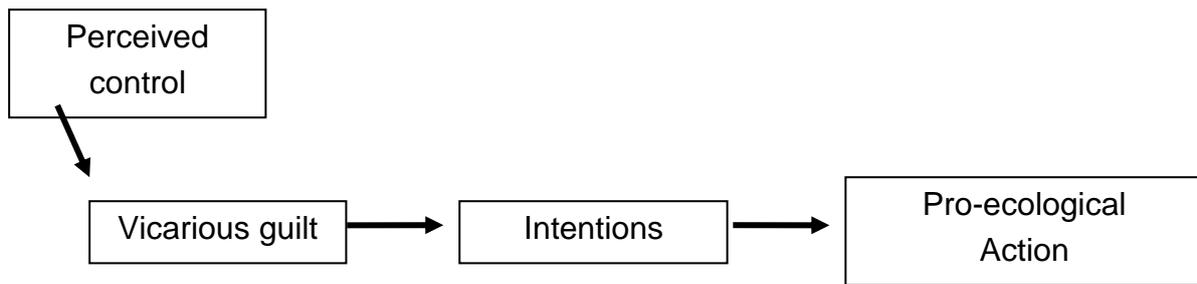
Figure 7: Impact of vicarious guilt on intentions and pro-ecological action

II.2.5 Positive emotions and pro-environmental behaviors

Because literature mainly investigates negative moral emotions, the previous studies were mainly focused on negative emotions (that is, guilt, shame and anger) and examined only one positive emotion (pride). The present study aims at investing the impact of several positive[2] and negative emotions on (self-reported) sustainable behaviors. It also investigates some possible antecedents of these emotions. This study was also an occasion for replicating previous findings on an adult, professionally active population.

Method

Participants

Participants were 80 administrative employees from banks. They completed the questionnaire at the end of a training session.

Procedure and material

Participants were asked to complete a questionnaire. They first reported the frequency of 15 sustainable behaviors. Then they reported the emotions they generally felt when they behave environmentally-friendly (pride, satisfaction, joy) or when they failed to perform these behaviors (shame, guilt, anger). They also expressed some moral judgments concerning their behaviors (responsibility feeling). Then they answered questions about their perceived control and the automatic aspect of these behaviors. Finally, they answered questions about vicarious emotions (what do they feel when someone they are connected with behaves environmentally-friendly or fails to do so?). After completing the questionnaire, participants were debriefed and thanked for their participation.

Results

We tested the impact of all the individual and vicarious emotions and of the feeling of responsibility in a regression model predicting the mean frequency of sustainable behaviors (α = .69). Results indicated a **significant effect of Responsibility feeling**, $\beta =$

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[2] Following suggestions from the follow-up committee.

.56, t = 2.58, p < .02. The more people felt they had a responsibility in environment preservation, the more pro-environmental behaviors they had. We also found a significant effect of **vicarious anger**, *β* = .45, t = 2.15, p < .04. The more respondents felt vicariously angry, when observing another person failing to behave environmentally friendly, the more they reported having pro-environmental behaviors themselves. We also observed a marginally significant effect of **vicarious guilt**, *β* = .35, t = 1.79, p < .09[3]. The more people felt vicariously guilty, the more they had pro-environmental behaviors. Finally, results revealed a marginally significant and negative effect of **individual anger**, *β* = -.44, t = -2.00, p < .06. The more people felt angry at themselves because they failed to have pro-environmental behaviors, the less they reported having such behaviors.

II.2.6. Conclusions regarding moral emotions

In the five correlational studies on moral emotions and pro-environmental behaviors, we constantly observed an impact of **vicarious guilt** on pro-environmental intentions, actions and behaviors. On the other hand, own guilt failed to be an efficient lever. In other words, when people feel guilty for their own behaviors, they are not motivated to repair and to behave more environmentally-friendly. However, when they feel guilty because of someone else's lack of pro-environmental behavior, they are motivated to repair, they express the intentions to have more pro-environmental behaviors and they behave more environmentally-friendly.

Our results also indicated that the control people think they have on pro-environmental behaviors influences their feelings of vicarious guilt. The more pro-environmental behaviors are perceived as easily controllable, the more individuals feel guilty when their friends or relatives fail to have these behaviors. This result reinforces the central role of subjective control highlighted by the Theory of Planned Behavior (Ajzen, 1991) and suggests that strengthening this feeling of control amongst people could favour pro-environmental behaviors through different mechanisms, such as the direct impact of subjective control on behaviors, but also its indirect impact through behavioral intentions and feelings of vicarious guilt.

Finally, it also appeared that responsibility feelings or, said otherwise, moral norms, play an important role in pro-environmental intentions and behaviors. This result is in line with results found in the literature (see for instance Bamberg & Möser, 2007).

Regarding these results, we assumed that vicarious –or collective- guilt could be a lever in sustainable marketing campaigns and we consequently tested the impact of messages

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[3] This effect was qualified by an interaction vicarious guilt X gender, *β* = .42, t = 2.16, p < .04. Vicarious guilt actually had a significant impact on men only, *β* = .38, t = 2.12, p < .05. Although in the right direction, the impact of vicarious guilt on women failed to reach significance, *β* = .20, t = 1.39, p < .17.

eliciting vicarious/collective guilt on pro-environmental behaviors. As these studies are mainly related to Objective 3, they will be described in the section devoted to this objective.

II.3. Intra-individual variables and sustainable behaviors

Behaviors are often influenced by intra-individual variables. We assumed that pro-environmental behaviors are influenced by variables related to values and beliefs. For instance, it is likely that people who adhere to materialistic values have less sustainable behaviors than people who do not adhere to these values. Also, people who do not adhere to collectivistic and egalitarian values (for instance, people who are oriented toward social dominance) are probably less likely to have sustainable behaviors. We also assumed that people who generally take into consideration the long-term future consequences of their behaviors would be more likely than others to behave environmentally-friendly. We thus examined these variables in a set of 2 studies in order to identify which ones influence pro-environmental intentions and behaviors.

II.3.1. Materialism, Social Dominance and pro-environmental Behaviors – correlational study

This study investigated the link between different intra-individual variables (materialism, habits, consideration for future consequences of behaviors, risk taking, perception of climate risks, fatalism, and social dominance orientation) and pro-environmental intentions.

Method
Participants
50 students were recruited on the ULg campus to participate in this study. There were 30 women and 20 men.

Procedure and Material
Participants completed a questionnaire that included questions about:
- Materialism (Materialism Scale, Richins & Dawson, 1992)
- Climate Risk Perception (Risk Perception Index, Leiserowitz, 2006)
- Fatalism (Fatalism Index, Leiserowitz, 2006)
- General Risk Taking (RiskPerception and Risk-Behavior Scales, Weber, Blais & Betz, 2002)
- Social Dominance Orientation (SDO, Pratto, Sidanius, Stallworth & Malle, 1994)

- Consideration for Future Consequences (CFC, Strathman, Gleicher, Boninger & Edwards, 1994)
- Habits (items created by the authors of the study)
- Intentions to have pro-environmental behaviors

They also indicated their age, gender and faculty.

After completing the questionnaire, participants were debriefed and thanked.

Results

We first correlated all the independent variables[4] with pro-environmental intentions. Results indicated a negative link between materialism and intentions ($r = -.31$, $p < .03$ – the more people adhere to materialistic values, the less they have intentions to have pro-environmental behaviors); between Social Dominance Orientation (SDO) and intentions ($r = -.40$, $p < .05$ – the more people are oriented toward social dominance, the less they have pro—environmental intentions); and between fatalism and intentions ($r = -.30$, $p < .04$ – the more people are fatalist, the less they have pro-environmental intentions). Results revealed a positive link between perception of climate risks and intentions ($r = .32$, $p < .03$ – the more people perceive there is a climate risk, the more they have pro-environmental intentions); and between consideration for future consequences (CFC) and pro-environmental intentions ($r = .38$, $p < .007$ – the more people consider the future consequences of their behaviors, the more they have pro-environmental intentions). There was no link between general risk-taking and pro-environmental intentions.

We then tested more complex models. The model that fitted the data most reasonably is represented in Figure 8. SDO had a direct and negative impact on the intentions to behave environmentally-friendly, $B = -.51$, S.E. = .23, $p < .04$. SDO also had a negative impact on the Consideration for Future Consequences (CFC), $B = -.80$, S.E. = .19, $p < .001$. The more participants were oriented toward social dominance, the less they paid attention to the long-term future consequences of their behaviors. In turn, this low consideration for future consequences led to high materialism, $B = -.45$, S.E. = .15, $p < .006$. That is, the less people felt concerned with the consequences of their behaviors, the more they paid importance to material possessions. Finally, a high materialism led to a low level of pro-environmental intentions, $B = -.28$, S.E. = .17, $p = .09$, although this last result is only marginally significant (this might be due to a small number of participants).

When CFC and Materialism were included in the regression, the direct effect of SDO on pro-environmental intentions became non-significant, $B = -.29$, S.E. = .26, $p > .26$.

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[4] We could not include habits in these analyses because the Habits index's validity was too low ($\alpha = .15$).

We then tested whether this indirect effect was significant thanks to bootstrapping (5000 resamplings). In other words, we tested whether the effect of SDO on intentions was significantly doubly mediated by CFC and then Materialism. Unfortunately, the indirect effect was non-significant, as zero was included into the interval provided by the bootstrapping analysis estimating the effect ([-.25 ; .02]). This means that CFC and materialism are not sufficient to explain the negative impact of SDO on pro-environmental intentions. Nevertheless, we can conclude to a partial mediation of this effect through CFC and materialism.
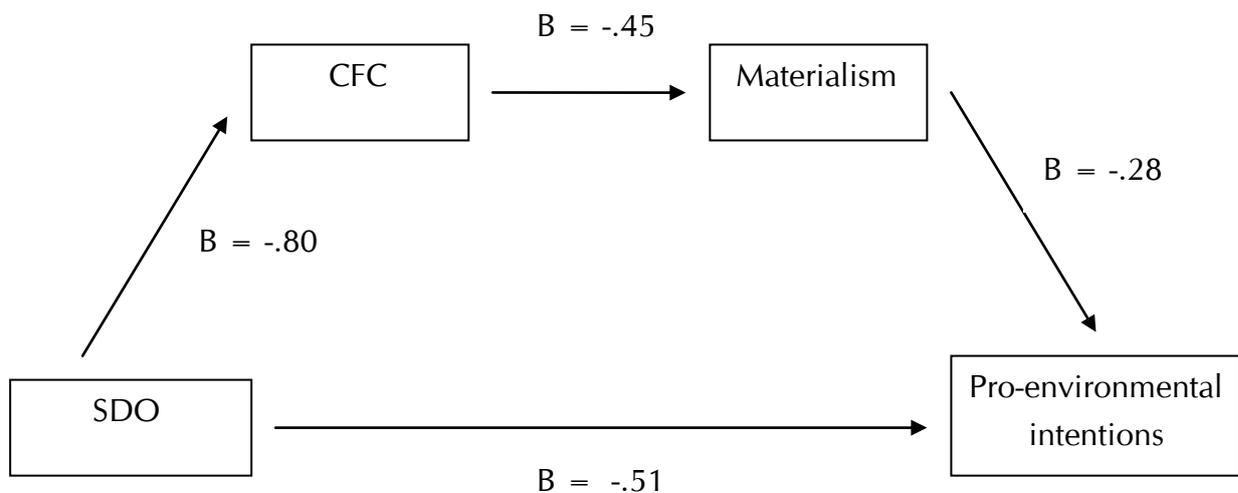

Figure 8: Model of the impact of SDO, CFC and Materialism on Pro-environmental intentions.

II.3.2 Self-monitoring and sustainable behaviors – correlational study

The previous study indicated that materialism is negatively related to pro-environmental intentions. In the literature, a positive relation between self-monitoring and materialism has been identified (see for instance Browne & Kaldenberg, 1997). Self-monitoring refers to an individual's ability and desire to monitor his/her self-presentation in order to give a positive image of him/herself. The more people are high self-monitors, the more they pay attention to the perception others have of themselves and the more they will control and adapt their behavior to others' expectations.

We assumed that self-monitoring could also be linked to pro-environmental intentions, through its impact on materialism. We hypothesized that high self-monitors would pay more attention to material signs of their status or success and would consequently have less intentions to protect the environment. The present study was designed to test this hypothesis.

Method

Participants

130 participants completed the questionnaire on the internet. Most of them were students at the ULg. We identified 3 outliers, subsequent analyses were consequently carried on a maximum of 127 participants.

Material and procedure

The questionnaire included the Self-monitoring Scale (Snyder, 1974 ; Gana & Brechenmacher, 2001), a scale that measures the abilities and desires of individuals to monitor their self-presentation. It also included the Materialism scale (see previous study) and a measure of pro-environmental intentions.

Participants received an invitation to complete the questionnaire by email and they were given the possibility, after completing the questionnaire, to contact the main researcher to get more information.

Results

Linear regression analyses revealed a direct and negative impact of self-monitoring on pro-environmental intentions, $B = -.04$, S.E. $= .01$, $p < .002$. The higher the self-monitoring score, the fewer participants had pro-environmental intentions. We also identified a direct and negative effect of materialism on intentions, $B = -.26$, S.E. $= .08$, $p < .003$, replicating the results of the previous study.

Finally, self-monitoring had a positive impact on materialism, $B = .03$, S.E. $= .02$, $p = .05$. These results are represented in Figure 9.

We then used bootstrapping (5000 resamplings) to test the mediation. However, zero was included into the interval estimated for the indirect effect ([-.02 ; .0006]), leading us to reject the total mediation of the impact of self-monitoring on pro-environmental intentions through materialism. In other words, the negative effect of self-monitoring on pro-environmental intentions is probably mediated through other variables in addition to materialism.
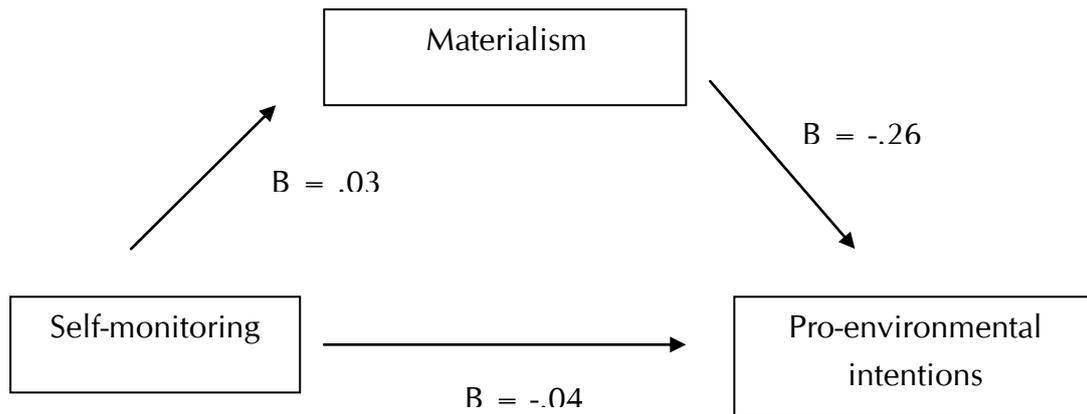
Figure 9: Impact of self-monitoring on pro-environmental intentions through materialism.

II.3.3. conclusions regarding intra-individual variables

Although we could not establish complete mediation models on our data, our results indicated that SDO, self-monitoring and materialism have a significant negative impact on pro-environmental intentions. In other words, some of the values to which people adhere influence their intentions toward sustainable behaviors. Now the question is: Is it possible to modify these values or to make other values salient thanks to social marketing campaigns? As people often adhere to different types of values, a possibility to counterbalance the impact of materialism would be to make other types of values salient. Another possibility would be to weaken the link between self-monitoring and materialism by offering people non-material ways to give a positive image of themselves.

II.4. Sustainable predictors at the community level

II.4.1 Community affordance study

In previous studies we found that ecological behavior is multi-determined, and that often, intentions are not readily translated into behaviors. Investigating potential explanations for this behavioral gap, our attention was drawn to the role that the physical environment can play in facilitating or inhibiting ecological behavior on the one hand, and how it can shape or reflect preferences and influence attitudes on the other hand.

It goes without saying that the physical environment that people live in can determine which behavior is easier, and which one is harder to perform. It's not unreasonable to

think that people that live far away from any train station or bus stop find it harder to use public transport than people that live in a city centre. On the other hand, one can wonder why people choose to live in the countryside, far from any public facilities. This could be a reflection of their attitude towards nature, and the importance they attach to it. On a downside, this way of living is usually considered more taxing to that same environment. One could also wonder whether contact with nature reminds us of the importance of it, or on the contrary makes us unaware of its diminishing presence and limited nature.

In short, in this project we wanted to investigate the effect of people's physical environment on their behavior in terms of ecological impact, and how that same environment shapes people's attitude towards ecological change.

Our analysis for this project is based on a dataset kindly provided to us by Ecolife and WWF, containing responses to different Ecological Footprint campaigns. The ecological footprint consists of a number of questions (ten in this case) assessing a wide but fairly comprehensible range of behaviors. In the provided dataset, people also reported the postal code of their home town, as well as some demographic variables like gender, age, occupation and family size. Additionally, a questionnaire gauged for the extent to which people are willing to change their behavior to save the environment. This questionnaire differed between campaigns, so we are only able to calculate an average intention measure. Data was collected from 16028 respondents, comprising a representative sample of Belgian inhabitants. The graph below (Figure 10) indicates all communities that are included in our sample (indicated in white), leaving out only seventeen communities (indicated in black).
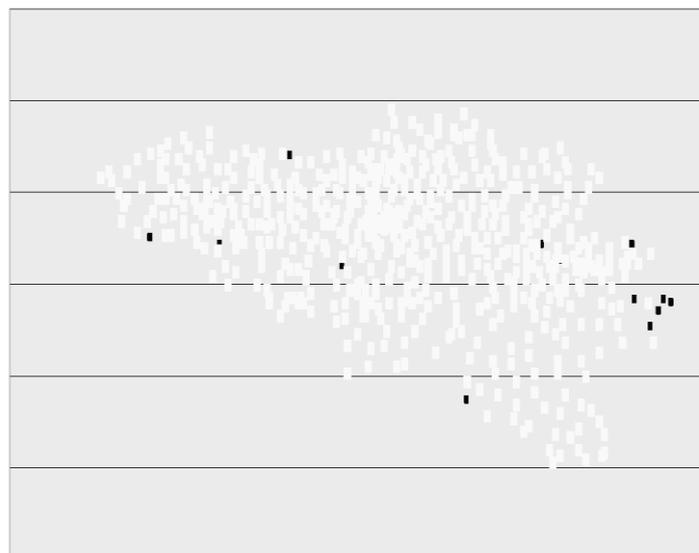

Figure 10: Communities included in the sample

A first analysis approach (Multilevel Multivariate ordered logit Rash-model) yielded unsatisfactory results caused by low consistency in ecological behavior. An ecological mindset might exist, but detecting it from consistent ecological behavior might be hampered by the contingencies on which this behavior depends, contingencies of which infrastructural ones are potentially only a subset. Therefore, we needed to think in terms of ecological behavior (plural) in which we can nudge people into. A new approach is being developed using seemingly unrelated equations, i.e. a systems testing approach. With this latter, we can estimate different equations for different behaviors at once, allowing for correlated regression disturbances between equations, therefore effectively testing the moderating effect of infrastructural parameters as a moderator class, avoiding having to test moderators for every specific behavior separately.

Results of phase one already indicate that it is safe to say that infrastructures indeed influence behavior. Two case studies by means of comparative statistics reveal for instance, that by installing one Ha of forest in a city like Leuven, the total Ecological Footprint of the inhabitants of that city will go down by 2 Ha by means of more pronounced ecological intentions and shifts in behavior. On the other hand, installing one kilometre of road would increase the total ecological footprint by a magnitude of 50 Ha. These results show how – apart from its theoretical contribution in understanding drivers of ecological behavior – a final version of our analyses could be used to support policy decisions about public infrastructures.

II.5. Placebo effect and driving behavior: Ironic effects of increasing traffic safety

Risk homeostasis theory (Wilde, 1982) says that people seek an optimal level of risk. Therefore, when security increases, people adjust their behavior so that the resulting risk stays the same. This has been shown with ABS, helmet-wearing cyclists, seatbelts, etc (e.g. Johnson, Jurik, Kreb, & Rose, 1978). Although this theory predicts that accidents stay constant (or decline less than expected), more aggressive driving is less ecologically friendly. Therefore we investigated whether increased perceived safety is enough to create a placebo effect in line with risk homeostasis theory, and whether focusing on safety in communication about cars leads to less ecologically friendly driving.

II.5.1 Study 1 – driving behavior

In this first study, we wanted to check whether mere information about the safety of the car participants are going to drive effectively changes the way they drive this car, as predicted by literature about the placebo effect (Shiv, Carmon, and Ariely 2005). As to the direction of the change, we expect – in line with risk homeostasis theory – that more safety information will lead to more aggressive driving behavior, to restore the optimal risk level.

Method

Participants

87 students from the KULeuven participated in this lab-experiment in return for course credit.

Procedure

Participants came individually in sessions of 20 minutes. They were invited to take place in a driving simulator. The car they drove – a non-branded prototype - was depicted on a poster hanging in the room, also mentioning some features of the car. The participants were made aware of the poster. The features of the car were manipulated between subjects. Either, there was a focus on the safety features of the car, or the features mentioned were more general ones. The simulator measured parameters of participants' driving behavior, like speed, acceleration, deceleration, revving, breaking, forces applied to the car's wheels, etc.

Results
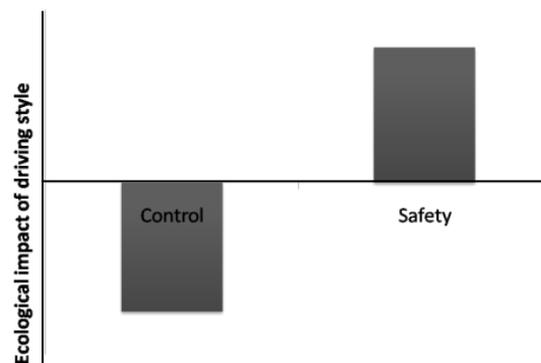
Figure 11: ecological impact of driving style according to the features of the car

First, we aggregated the driving measures into one composite measure, representing driving aggressiveness or ecological impact of driving style. This composite measure was internally consistent (Cronbach's $\alpha > .8$), and we found a significant main effect of our safety manipulation ($F(1,85) = 4.678$; $p < .05$), where the negative ecological impact of driving in the safety condition was higher ($M = .1468$, $SD = .6734$) than in the control condition ($M = -.1641$, $SD = .6670$).

II.5.2 Study 2 – driving behavior: boundary conditions

In this second study, we wanted to replicate the previous study. Additionally, we wanted to investigate the risk regulation mechanism that was previously put forward as the driver of the hypothesized differences in driving behavior in response to safety cues.

Method

Participants

50 students from the KULeuven participated in this lab-experiment in return for course credit.

Procedure

The procedures was largely the same as in the previous study, but this time the safety manipulation consisted in having participants either drive a small car (VW polo) or a large car (BMW 5). The safety manipulation was therefore more implicit this time. The information was given on a pc screen. Also, a questionnaire was administered after the driving session, gauging for chronic differences in regulatory focus (prevention and promotion focus) (Higgins 1997). We will investigate whether the effects of safety information on driving behavior are moderated by chronic promotion and prevention orientation. Finding moderation by these variables would provide support for the hypothesized risk regulation process.

Results

In analyzing the results of this study, we again constructed a composite measure of driving behavior containing all driving measures, which was internally consistent (Cronbach's $\alpha > .9$).

We replicated the results of the previous study, showing a marginally significant main effect of the safe car on driving intensity ($F(1, 48) = 3.239$, $p < .08$) where the big, safe car leads to a higher driving intensity (M = 2.6936, SD = .3514) than the small car (M = 2.4871, SD = .42087).

More importantly however, we found a significant interaction effect between car type and promotion focus on driving intensity ($F(1,46) = 4.416$, $p < .05$) where only participants low in promotion focus seemed to be sensitive to the effect of car type. Participants high in promotion focus seem to drive with high intensity, no matter what car type.
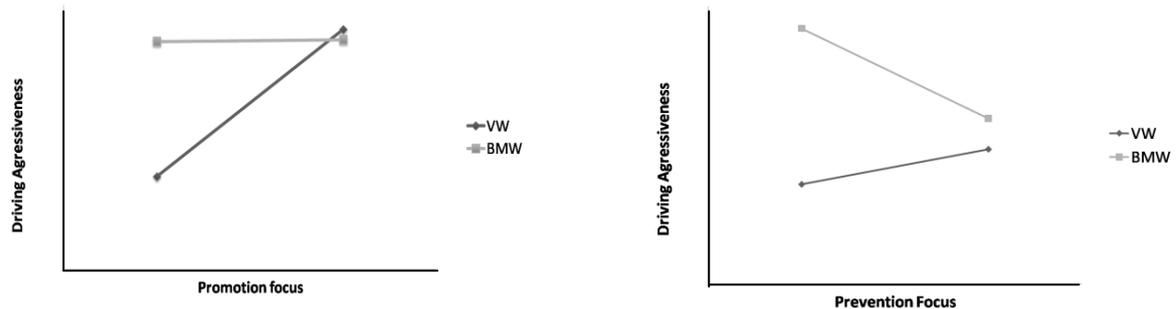
Figure 12: driving aggressiveness according to type of car and promotion/prevention focus

Conversely, we found a directional interaction effect between car type and prevention focus ($F(1, 46) = 2.413$, $p > .10$) where again only participants that score low on promotion focus seemed to be affected by car type, whereas people high in prevention focus seemed to drive cautiously, no matter what car they thought they were driving. These results imply that promotion and prevention focus can impose boundary conditions on the previously found effect, and support an explanation of these effects in terms of risk regulation according to risk homeostasis theory, as hypothesized.

II.5.3. Study 3 – generalization of risk compensation

A third study was conducted to serve two purposes. First we wanted to rule out any motivational issues in our previous designs. It could be that the car simulator environment induced participants to wanting to set a certain result, either showing how well the can observe traffic rules, or showing driving skill. Secondly, we wanted to investigate whether the effect we found consists of a domain specific trade-off or a change in participants' mental states that transcends the domain in which it was caused.

Method

Participants

273 students from the KULeuven participated in this lab-experiment in return for course credit.

Procedure

Participants came to the lab in groups of 9 in for a mixed session of 55 minutes. We used a between subjects priming procedure where participants only had to evaluate car ads, either for a smaller unsafer car or a big bulky car. Participants also evaluated perceived properties of the car (among which safety). Afterwards they engaged in a decision making task, designed to assess attitude towards risk, that was made incentive

compatible (i.e. the outcome was consequential for what participants could earn for their participation).

Results

Results show that the priming procedure had a direct impact on attitude towards risk, in line with the results of study one and two. Moreover, this effect was mediated by safety perception of the car that was previously evaluated, and not e.g. by how much participants think the car costs. Car type had a direct effect on risk taking in the subsequent phase B = .97, S.E. = .43, $p < .03$. Car type also had an effect on perceived safety B = .89, S.E. = .15, $p < .001$. Additionally, perceived safety predicted risk seeking behavior B = .45, S.E. = .21, $p < .04$, and the direct effect of car type on risk seeking tendency went away when the mediator – perceived safety – was included B = .57, S.E. = .47, $p > .10$, showing full mediation. The sobel test was significant ($Z = 2.03$; $p < .05$) and bootstrapping this mediation (5000 samplings) showed that zero was not in the confidence interval [-.87; -.06].

II.5.4 Conclusions regarding placebo effects and driving behaviors

The three studies mentioned above show strong support for an effect of non-motivational (the cues delivered do not comprise any punishment or reward) contextual cues consistent with Risk Compensation Theory. Apparently, highlighting the safety of a car could have ironic effects in that people compensate in their driving style. This should have no effect on overall danger of driving, but does have a cost in terms of a diminished ecological efficiency of the driving style maintained. An additional interesting finding is that this kind of risk compensation is not domain specific, which could have important practical implications and is a promising result to spur future research.

II.6. Endocrinology and ecological driving behavior

Lay theory says that aggressive, eco-unfriendly driving is done mostly by male individuals, mostly of the macho kind, and mostly in some sort of high performance car, or a car that is meant to look as a high performance car. In the following two studies, we will assess this lay theory, looking at the effect of gender, prenatal testosterone levels as a proxy for "macho-quality", and car type on driving aggressiveness. Car type will again be manipulated in a placebo paradigm - by means of instructions - actually keeping the car the participants are driving constant.

II.6.1. Study 1 - endocrinology

In this first study, we wanted to test the relation between prenatal testosterone and driving behavior on the one hand, and between gender and driving behavior on the other hand. Because levels of prenatal testosterone differ greatly between genders, we do not jointly test the impact of these variables.

Method

Participants

90 students from the KULeuven participated in this lab-experiment in return for course credit.

Procedure

Participants again came individually in sessions of 20 minutes. They were invited to take place in a driving simulator. Participants were asked to finish one lap in the driving simulator, observing traffic regulation. The simulator – as in previous studies – measured parameters of participants' driving behavior, like speed, acceleration, deceleration, revving, breaking, forces applied to the car's wheels, etc. After this, participants' hands were scanned on a flatbed scanner (hp Scanjet G3110). The resulting pictures allowed us to afterwards measure the ratio of the index finger to the ring finger (2D:4D), the latter being a proxy for prenatal exposure to testosterone (see e.g. Manning et al. 1998).

Results

We again composed an aggregate index of driving intensity (Cronbach's $\alpha > .7$), and assessed its correlation with participants' 2D:4D ratio. Also, gender differences in driving intensity were checked. Results confirmed the positive relationship between prenatal testosterone and driving intensity ($r = .239$, $p < .03$).

TABLE III: correlations between digit ratio, accidents and driving agressiveness

Correlations				
		2D:4D	Accidents	AvgAgressive
2D:4D	Pearson Correlation	1	-,055	-,239[*]
	Sig. (2-tailed)		,605	,023
	N	90	90	90
Accidents	Pearson Correlation	-,055	1	,566[**]
	Sig. (2-tailed)	,605		,000
	N	90	90	90
AvgAgressive	Pearson Correlation	-,239[*]	,566[**]	1
	Sig. (2-tailed)	,023	,000	
	N	90	90	90

Group Statistics					
	Gender	N	Mean	Std. Deviation	Std. Error Mean
AvgAgressive	,00	49	-,1548	,62170	,08881
	1,00	41	,1850	,82882	,12944
Accidents	,00	49	1,08	2,652	,379
	1,00	41	4,54	8,382	1,309

Additionally, men (M=.1850, SD=.8828) seemed to drive more intensely than women (M=-.1548, SD=.6217) (t(88)=-2.220, p<.03). However, the relation between prenatal testosterone and driving behavior directionally exists in both men and women separately, and has more predictive power in a joint regression. Therefore, concerning driving intensity, differences in prenatal testosterone seem to be the dominant explanation over gender.

II.6.2. Study 2 - endocrinology

Method

Participants

83 students from the KULeuven participated in this lab-experiment in return for course credit.

Procedure

The procedure replicated that of the previous study, with a manipulation of car type, either highlighting safety features or performance features of the car.

Results

In this study we tried to replicate the results of study 1. However, we didn't find an overall significant correlation. When participants were told about the qualities of the car, this correlation only showed up $(r = .305, p = .05)$ when the car was presented as a safe car $(F(1,82) = 3.370, p < .07)$.
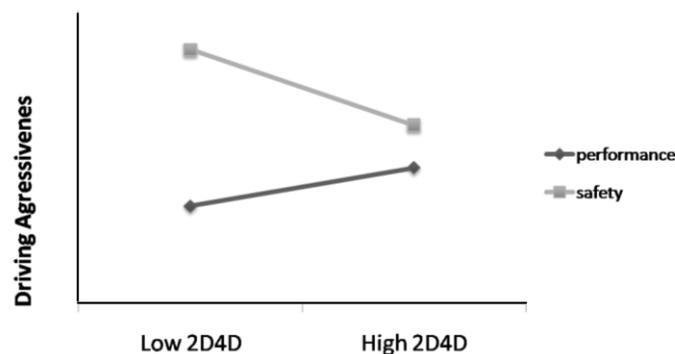
Figure 13: driving aggressiveness as a function of type of car and digit ratio.

Although this might seem counterintuitive – and it is against lay theory – this result is consistent with the fact that - although people high in prenatal testosterone drive more intensely, in our setup they also seem to drive more accurately. This seems to indicate that they do not overestimate their abilities, but they do seek their limits. A safer car would then create an environment where it is rational to take more risk, leading to more intensive driving behavior.

II.7. Attitudes and behaviors toward wastes – field studies

Within the framework of Objective 2, we ran 2 field studies, in order to investigate in concrete settings the impact of several variables on specific sustainable behaviors. We investigated behaviors related to waste. These 2 studies were possible thanks to the collaboration of the ULg, Espace-Environnement, Idelux (Intercommunale de Développement Durable de la Province du Luxembourg) and Ourthe et Somme (Tourist operator in the Luxemburg Province).

II.7.1 Waste in the Luxembourg Province

This study aimed at investigating the variables likely to influence littering and pro-environmental action through a field study. For this purpose, we created a questionnaire and collected data through a telephone survey campaign. This study was also the occasion to partially fulfil Objective 4, as the survey results were presented to local actors and deciders of waste management and prevention during the *Assises de la Propreté*, a meeting organized by Idelux in order to summarize the actions of a local campaign (about waste prevention).

Method

Participants

618 persons were contacted by phone and requested to answer a questionnaire about wastes in the Luxemburg Province. 305 persons completed the questionnaire (183 females and 122 males).

Procedure and material

Participants first answered questions about their attitudes toward littering and environment preservation, about the social norm, the moral norm and their perceived control on environment and waste management. Then they answered general questions about their perception of waste and littering in the Luxemburg Province and about their own behaviors. Amongst these last questions, one of them evaluated the extent to which participants had littering behaviors. Another one evaluated their readiness to participate in pro-environmental actions. Then they answered a few items adapted from the Consideration for Future Consequences (CFC) Scale, which assesses the extent to which people think about the long-term consequences of their behaviors. Finally, they answered a few socio-demographical questions and were thanked for their participation.

Results

We first tested the impact of gender, attitude, social norm, moral norm, perceived control and CFC on the self-reported littering behaviors. Only gender significantly

predicted this behavior, ($\chi^2(2)$ = 9.14, p < .02) : 31.2 % of women reported having (sometimes or seldom) littering behaviors, whereas 46.7 % of men did so. We failed to find any significant effect of the other variables.

We then tested the impact of the same independent variables on the willingness to participate in pro-environmental actions. Results indicated a significant effect of moral norm, B = 1.68, SE = .69, p < .02. The more respondents thought that environment preservation was their responsibility or duty, the more they were willing to participate in pro-environmental actions such as, for instance, volunteering to clean waste along the rivers.

We also found an impact of CFC on the willingness to participate in pro-environmental actions, B = .52, SE = .18, p < .005. The more people paid attention to the consequences of their action in the long-term, the more they were ready to join pro-environmental actions.

II.7.2. Tourism and waste management

This study focused on waste production and sorting amongst tourists visiting the Luxemburg Province. This study's objective was to allow us to know which variables should be targeted in this specific population, in order to lead them to pay more attention to waste management, in line with Objective 3. For this purpose, we collaborated with Idelux and with a Local Tourists Operator (Ourthe et Somme), which gave us the opportunity to distribute questionnaires to tourists.

Method

Participants

The questionnaire was distributed to approximately 500 tourists renting a house in the Luxemburg Province during Christmas holidays. They were asked to complete the questionnaire and to drop it in a ballot box at the end of their stay. Unfortunately, only 66 questionnaires were completed and returned.

Procedure and material

Participants received the questionnaire at their arrival at the reception of our partner. They were asked to complete it and return it at the end of their stay in a ballot box.

The questionnaire was composed of two distinct parts. The first part included questions about attitudes, perceived control, social norm, moral norm and perceived consequences of behaviors toward waste (such as sorting waste or not). The second part of the questionnaire included items assessing self-reported behaviors toward waste (did you pay attention to reduce your production of waste?; did you respect the instructions for sorting waste?...). Only half of the participants received the second part of the questionnaire. This allowed us to test whether receiving this questionnaire at their arrival influenced their

behavior or not. Finally, respondents' behavior toward waste was objectively evaluated. Indeed, employees in charge of the houses cleaning were asked to check whether respondents sorted their waste during their stay.

Results

The statistical analyses were made difficult because of the limited number of questionnaires that were completed and returned. Amongst these, 27 questionnaires included the self-evaluation questionnaire. Data regarding the objective behavior of respondents (employees' evaluations) could be obtained for 39 respondents. Regarding this behavioral measure, despite the low rate of responses, we observed an impact of gender, B = -.23, S.E. = .11, $p < .05$, indicating that women paid more attention to sorting their waste than men. Regarding self-evaluation, we observed a positive effect of moral norm on self-reported behaviors, B = .44, S.E. = .19, $p < .04$. This replicated the results obtained in the study on positive emotions.

II.8. Conclusions regarding Objective B

The studies we ran in line with Objective B highlighted several variables that affect pro-environmental intentions and behaviors. We think that it is important to take these variables into consideration when designing campaigns and messages aiming at changing people's behaviors toward more sustainability.

First of all, our results indicated that it is important to consider attitudes as complex variables and take into consideration their ambivalent aspect. Indeed, attitudes toward pro-environmental behaviors can be at the same time positive and negative, although people are not always aware of being ambivalent. Our results showed that attitudinal ambivalence has a strong impact on pro-environmental intentions and behaviors. The more they are ambivalent, the less they act environmentally-friendly. It is consequently important to look for ways to reduce attitudinal ambivalence.

We further investigated the content of attitudes in order to have a better understanding of ambivalence. Our results pointed to several differences between positive and negative components of attitudes. The positive component is related to more abstract and to socially and temporally more distant thoughts or arguments than the negative component. In other words, when people think about the negative aspects of pro-environmental behaviors, very concrete thoughts cross their mind. On the other hand, when they think about the positive aspects, abstract and distant thoughts cross their mind. This also implies that, when people think about both positive and negative aspects at the same time, thoughts related to the negative aspects have more chances to

be taken into consideration when making a decision, as people generally pay more attention to concrete, short-term than to abstract, long-term arguments.

Regarding emotions, our results highlighted a positive impact of vicarious guilt on pro-environmental intentions, actions and behaviors. Vicarious guilt leads to a wish to repair for someone else's lack of pro-environmental behavior. This wish to repair drives the pro-environmental intentions that will in turn lead to the environmentall-friendly behavior. Through our studies on emotions, we also brought to light a link between perceived behavioral control and vicarious guilt. In addition to the direct impact of perceived control (see for instance Ajzen, 1991) on the intentions and behaviors, we identified an indirect impact on behavioral intentions through vicarious guilt. These results thus point to the crucial role that perceived control plays in environmentally-friendly behaviors, both directly and indirectly.
Finally, our data also revealed that responsibility feelings (or moral norms) have a significant impact on intentions and behaviors.

We also focused on the impact that some variables directly related to the individual him/herself might have on pro-environmental behaviors and intentions. First of all, it appeared that some intra-individual variables influence these intentions and behaviors. Our data indicated a negative impact of Social Dominance Orientation, self-monitoring and materialism, and a positive impact of Consideration for Future Consequences. In other words, people's values influence their behaviors.
Going futher on this, we also showed that biological markers like prenatal testosterone have an influence on how people approach situations in which behavioral monitoring is necessary to display ecological behavior. The aggregate of our research therefore looks at the person displaying behavior that is more or less sustainable from a quite comprehensive variety of angles, all of which give information about how ecological behavior is constructed intra-individually.

Additionally, one cannot but see that people act in a context, and that this context influences every single intra-individual level previously discussed. The environment of an individual plays a moderating role in how perceptions, preferences and intentions are shaped, and how these latter are translated into actions. We showed how the mere perception of one's environment – e.g. how safe it is to act – brings about different mind states that in turn determine how the environment is acted upon. We showed that reminders of nature shape intentions to preserve it, and how even the best of intentions are hard to execute when public infrastructure is not fit to facilitate them.

Finally, we ran a couple of applied studies, which confirmed the impact of moral norms and of Consideration for Future Consequences on specific behaviors related to waste management.

All of the variables described here-above are likely to have an impact on behaviors through social marketing campaigns. However, the question is how to concretely adapt messages in order to efficiently modify people's intentions and behaviors. This question will be tackled in relation to Objective C.

III.   Objective 3: Develop and assess original social marketing communications

In order to reach this third objective, we tested the effects of messages manipulating some of the variables described before in order to trigger pro-environmental intentions and behaviors. However, while our time was limited, we could not examine manipulations of all of the variables investigated in the context of objective B. We consequently focused on some of them.

In a first set of studies, we investigated messages eliciting moral emotions. We mainly focused on vicarious and collective guilt and tried to understand under which conditions messages activating this type of emotion can influence pro-environmental intentions and behaviors.

Second, in relation to the differences observed with respect to the positive and negative aspects of attitudes, we sought ways to make positive aspects of pro-environmental behaviors more salient and more important regarding decision-making. In a first line of research, we examined the impact of messages emphasizing very concrete positive consequences of pro-environmental behaviors. In the second line of research, we tested different ways to lead people to a more abstract mindset, with the objective of making positive aspects (which are more abstract) more salient.

Finally, in a pilot experience, we used some of the variables influencing pro-environmental behaviors (such as norms and social comparison) in a web project aimed at leading people toward more sustainable behaviors.

III.1. Emotion induction and sustainable behaviors

Studies related with objective B revealed a negative impact of vicarious guilt on pro-environmental intentions and behaviors. We consequently assumed that messages inducing this type of feeling should be successful in triggering environmentally-friendly

behaviors. However, from a practical point of view, inducing vicarious guilt is a rather difficult objective. Moreover, it might be questionable from an ethical point of view. For these reasons, we mainly focused on collective guilt, which is felt after one's social group negative behavior or lack of positive behavior (whereas vicarious guilt is felt after another person's -with whom we feel interdependent- negative behavior or lack of positive behavior).

We first tested the impact of a message inducing collective guilt on people's pro-environmental intentions and behaviors. Then, we focused on the conditions under which collective guilt can lead people to environmentally-friendly behaviors.

III.1.1. Induction of guilt, pro-environmental intentions and behaviors – study 1

<u>Method</u>

Participants

114 students from the K.U.Leuven participated in this study.

Procedure and material

Participants first took an Ecological Footprint (EF) test on a computer. The meaning of EF was first explained. Participants could read a definition of EF and what exactly meant a high score or a low score. Then they answered 10 questions assessing their EF. These questions had been adapted for a young audience (for instance, items about car driving were modified). After answering these questions, they received a fake feedback indicating that their own EF (vs. their group's EF) was lower (vs. higher) than that of most people from the same age group. They were either congratulated or blamed for their own (or their group's) behavior. The purpose of these fake feed-backs was of course to induce an emotion. There were 4 experimental groups (own guilt / collective guilt / own pride / collective pride) and a control group (control participants just received their EF estimate, and there was no comparison with other people/groups).

After receiving the feedback, half of the participants answered questions about the emotions they were feeling as a manipulation check. Then participants completed questions about their intentions to alter a number of behaviors in line with a more sustainable lifestyle.

Finally, participants were asked to write a short text about three subjects as a concealed behavioral measure of their efficient use of paper and pencil, as was previously used by Cornelissen et al. (2007).

<u>Results</u>

The manipulation checks yielded fairly good results. Pride was higher in all pride induction conditions. One peculiar finding however is that, apparently, the collective emotion induction appeared to be easy to avoid. Guilt was higher in the own guilt condition, but

not in the collective condition. This could be explained by a phenomenon called "diffusion of responsibility" (see for instance Schlenker, 1975) by which one blames others of the assumed group more than oneself. Although one can overtly deny responsibility in a reaction to the induced guilt, this does not necessarily imply that one really avoids the emotion induction. When looking at the results of the study, this scenario is very likely, because the guilt manipulation – although denied at an explicit level - appears to have worked in terms of behavioral intentions.

Results revealed a significant effect of guilt, $F_{(15, 76)} = 2,411$, $p < .007$. All the participants in the two guilt conditions taken together expressed significantly more intentions to change their behavior towards more sustainability. However, there was no impact of the collective manipulation on the intentions. That is, inductions of own guilt and collective guilt had the same effect on behavioral intentions.

Unfortunately, the behavioral measure did not yield significant results.

III.1.2 Induction of guilt, pro-environmental intentions and behaviors – study 2

In this study, we measured participants' identification to their group in order to check whether this variable could moderate the impact of collective guilt on intentions and behaviors. Indeed, collective guilt can only be felt if the individual is identified to some extent to his/her social group. Additionally, it is possible that highly identified individuals deny the negative information received about their ingroup and consequently fail to feel collective guilt.

We also used a different and new behavioral measure in order to evaluate pro-environmental behaviors.

Method

Participants

99 students from the ULg were recruited to participate in this study.

Procedure and material

The procedure was identical to the procedure used in the previous study, except that participants completed a group identification measure before completing the EF measure. Furthermore, all the participants completed the manipulation check assessing the emotions they felt after the EF feedback. The behavioral measure also differed from the previous study. Indeed, after completing the intention measure, participants were thanked and were told that the study was over. Then, they were asked to participate in another short study. This study was described as a study on advertising and participants were required to taste and evaluate 2 different brands of orange juice. Then they were given a questionnaire allegedly in order to evaluate the juices. In order to taste the juices, they could either

choose to take a disposable plastic cup or a glass. We were actually interested in this choice, as choosing a glass is a more sustainable choice than choosing a disposable plastic cup. We assumed that, in the collective guilt condition, participants would choose less plastic cups than in the other conditions.

Results

The analyses revealed a significant effect of the emotions induction on the guilt participants felt, $F(4, 80) = 5.74$, $p < .02$. Participants induced with guilt felt guiltier than participants induced with pride, which means that the emotion induction was successful. Then we tested the effect of the emotion induced (guilt vs. pride) and of the own or collective nature of the induction on the behavioral intentions (aggregated in a single index, $\alpha = .60$). This analysis revealed a significant effect of emotion, $F(1, 80) = 6.41$, $p < .02$. As in the previous study, participants induced with guilt expressed more pro-environmental intentions than participants induced with pride. There was however no effect of the own or collective nature of the induction on intentions.

We then tested the impact of the emotion induced and the own or collective nature of the induced emotion on the behavioral measure, that is, the choice of either a disposable plastic cup or a glass. For this purpose, a specific contrast comparing collective guilt condition to all 3 other conditions was entered along main effects and identification scores in a forward stepwise logistic regression. It revealed that the additive interaction was the only variable influencing the choice of plastic cup vs. glass ($B = -.41$, $SE = .13$, $p < .005$). As can be seen in Figure 14, the results indicated that participants induced with collective guilt chose significantly less disposable plastic cups than participants in the other conditions. This indicates that the collective nature of the guilt induction is mainly responsible for the choice of a glass instead of a plastic cup. Additionally, intention to behave environmentally-friendly was negatively correlated with the choice of plastic cup, $r = -.41$, $p < .001$. In other words, the more participants intended to have pro-environmental behaviors, the less likely they were to use a disposable plastic cup.
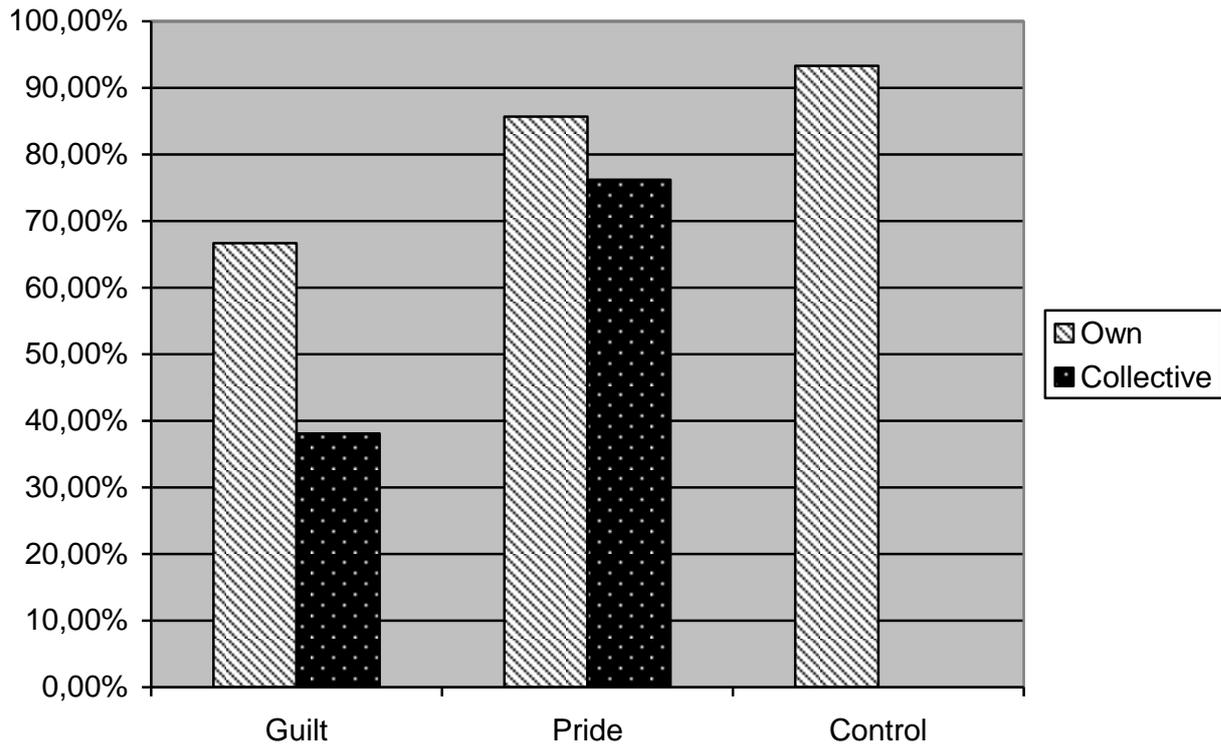
Figure 14: Proportion of plastic cups chosen in each condition.

III.1.3. Collective guilt and perceived individual control

The 2 previous studies tested the impact of collective guilt on pro-environmental intentions and behaviors. This third study tested the impact of an induction of collective guilt on pro-environmental action, more precisely, on the willingness to commit to actions aiming at raising public awareness about environmental problems. Furthermore, we manipulated participants' subjective control.

We assumed that, in line with previous results, collective guilt would lead to a stronger wish to repair and to more pro-environmental intentions than collective pride or a control condition. Additionally, we expected people with a high subjective control to be more prone to commit to some pro-environmental action. Indeed, people who have a high subjective control are more likely than those who have a low subjective control to trust their ability to repair for others' negative behaviors and to think they can easily change their behaviors. For this reason, we assumed that the former would express more pro-environmental intentions and a higher commitment to pro-environmental actions than the latter.

Method

Participants

108 students from the University of Liège replied to a questionnaire on the internet. There were 78 females and 30 males. Analyses revealed 3 outliers. They were removed from subsequent analyses, which were consequently carried on 105 participants.

Procedure and material

Participants received an email inviting them to participate in a study about social networks. Once they accepted to participate, they connected to the website. They were explained that they would have to complete questions about themselves and about the social groups they belong to, as well as about their opinions concerning a topic that would be randomly attributed. Participants then answered several questionnaires. One of them was about attitude toward environment. Another one was about participants' control on their everyday life. After completing these questionnaires, they received bogus feed-backs about the two questionnaires mentioned earlier. They first received a feedback about the average attitude of their social group concerning environment. This feedback aimed at inducing either collective pride or collective guilt (they were told either that their group was very respectful of the environment or that their group did not pay enough attention to environment preservation). There was also a control condition in which participants did not receive any significant information about their group performance. Then they received an individual feedback about the general control they had in their life. This second feedback was intended to induce either a high or a low feeling of control. Here again, participants placed in the control condition did not receive any significant information about their control abilities. After each of the feedbacks, participants completed a manipulation check about their guilt feeling. Then they completed a filler task and were told that the study was over. Before leaving the website, they were asked to read a letter allegedly written by a pro-environmental action group, recruiting people for several actions (such as signing a petition, collecting money, participating in a manifestation, etc.). We were actually interested in the impact of our manipulations (collective guilt / pride and low / high control) on participants' answers to this request. Participants were debriefed a few weeks later by email.

Results

We first verified the effectiveness of our manipulation. As expected, participants who received a negative feedback about their social group's attitude felt guiltier ($M = 1.88$) than participants who received a positive feedback ($M = 0.86$) and participants in the control condition ($M = 0.97$), $F(2,102) = 10.16$, $p < .001$. More surprisingly, participants who received a negative feedback concerning their control abilities felt

guiltier (M = 1.84) than participants who received a positive feedback (M = 0.89) and control participants (M = 0.97), $F(2,102)$ = 9.22, p < .001.

We then investigated the impact of our manipulations on the commitment to pro-environmental actions. We failed to find a main effect of collective guilt / pride induction, $F(2,96)$ = .48, p > .6, as well as an effect of the control feedback, $F(2,96)$ = .86, p > .4. Results however revealed an interaction between these two variables, $F(4,96)$ = 2.58, p < .05 (see Figure 15). Further analyses revealed that, when participants did not receive any significant information about their group attitude (control condition for the guilt/pride variable), the expected effect of control appeared. That is, participants who were induced with a high feeling of control expressed higher intentions to commit to pro-environmental actions (M = 2.78) than those who were induced with a low feeling of control (M = 0.77) (p < .02).

Collective guilt induction had the expected impact only in the low control condition. That is, when participants received both a negative feedback on their group attitude (collective guilt) and a negative feedback on their control abilities, they express higher intentions to participate in pro-environmental actions (M = 2.92) than when they were induced with collective pride (M = 1.54, p < .06) and than control participants (M = 0.77, p < .006).

In brief, the experimental condition leading to the highest commitment to pro-environmental actions is the combination of collective guilt and low control. Although that might seem surprising, manipulation checks indicated that the induction of a low sense of control led to guilt feelings. Our results could then be understood as the additional effects of 2 different guilt manipulations.
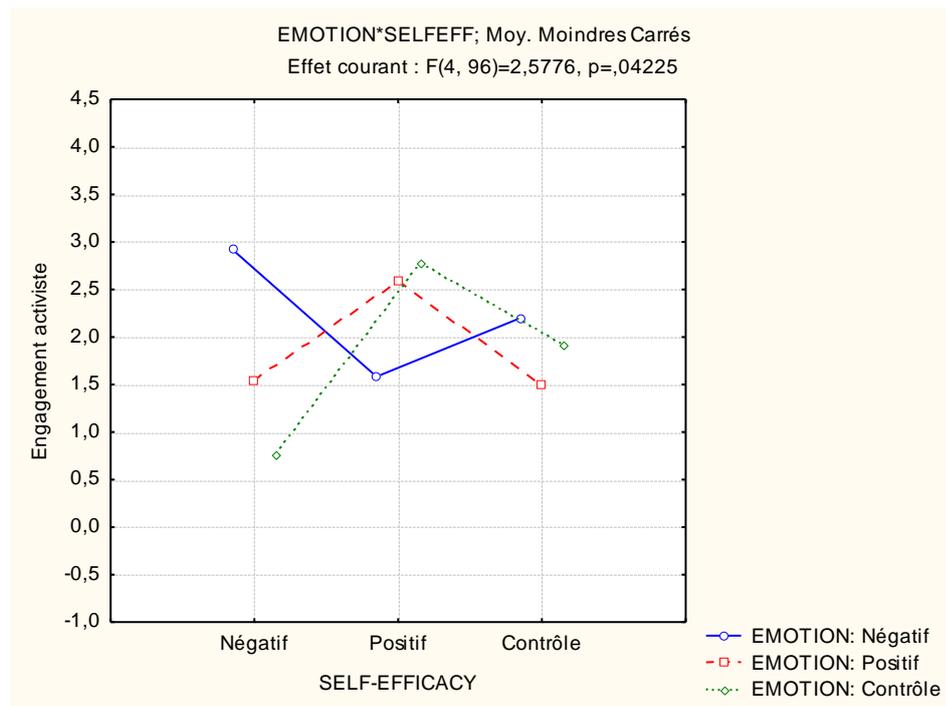
Figure 15: Commitment to pro-environmental action according to experimental conditions.

III.1.4. Collective guilt, induced hypocrisy and group identification

In this fourth and last study on collective guilt, we induced guilt thanks to the induced hypocrisy paradigm (Aronson, Fried and Stone, 1991). This paradigm is used to induce a state of cognitive dissonance. For this purpose, participants are first asked to express a pro-normative position and, in a second step, they are made aware of their transgression of this position. We assumed that this situation would prompt guilt feelings, which in turn would lead to an increase in pro-environmental behaviors. Furthermore, we compared individual-based and group-based induced hypocrisy. That is, the feedback about the norm transgression either targeted the individual him/herself or his/her ingroup. By this way, we expected to prompt either individual guilt or collective guilt. In line with previous studies, we assumed that the condition of group-based induced hypocrisy, intended to elicit collective guilt, would lead to more pro-environmental behaviors than the other conditions.

We also examined the role of group identification, as in the second study inducing collective guilt and described here-above. We expected the level of identification to moderate the impact of collective guilt on pro-environmental behaviors.

Method

Participants

132 students from the ULg were recruited on the campus. There were told that they would complete a psychology test battery, which would provide various data for the Social Psychology Unit of the University. They were told they would receive a small gift at the end of the questionnaires completion, in order to thank them for their participation.

Procedure and Material

Participants first completed a set of 6 items assessing their identification to their ingroup (psychology students). Then, participants completed a questionnaire about their consumption habits. The questionnaire was described as evaluating the extent to which participants' habits were environmentally-friendly or not. However, their answers were of no interest to us, this questionnaire was only part of the cover story. It actually gave us the occasion to later provide participants with a bogus feed-back about their own score or their ingroup's score to the questionnaire. After completing the questionnaire, participants were asked to write a short text explaining the importance of environmentally-friendly consumption. They were then told that this text would be made public (it would be published in a folder). By this way, participants expressed the pro-normative position.

When the experimenter received the questionnaire, she took a look at it and commented participants' answers. This comment was actually the bogus feed-back. There were 6 conditions : the feed-back could be either positive, negative (transgression awareness) or neutral (control condition). It could target either the individual him/herself or his/her ingroup. The aim of this feed-back was of course to induce either (own or collective) guilt, or (own or collective) pride, or no specific emotion (in the control condition).

Then participants were required to complete a new and distinct questionnaire evaluating the emotions they felt. We were only interested in the emotions related to guilt as this questionnaire actually constituted our manipulation check.

Finally participants were thanked for their participation and were offered a gift to thank them for their participation. They could choose this gift amongst different stationery articles (for instance, pen, eraser, notepad...). Some of them were eco-friendly (recycled paper, recycled pen...) and others were not (bleached paper, plastic pen...). We were interested in their preference for the eco-friendly alternatives.

After they chose their gift, participants were debriefed.

Results

We first checked whether our manipulation through the adaptation of the induced hypocrisy paradigm was effective to induce guilt. An ANOVA 2 (positive vs. negative feed-back) X 2 (individual vs. collective level) revealed a main effect of the type of feed-back, F (1, 99) = 11,93 , p < .01. Participants who received a negative feed-back felt guiltier than participants who received a positive feed-back as expected.

We then tested the impact of our manipulation and of participants' identification to their ingroup on the type of gift they chose. For this purpose, we created 3 contrasts testing the main effect of the feed-back, the main effect of the level (individual or collective) and their interaction and entered them in a binary logistical regression together with the identification score. The dependent variable was the choice of either an eco-friendly gift (1) or not (0). The interaction between feedback, level and identification was marginally significant, B = .56, S.E. = .31, p = .065. A deeper analyse of the data[5] revealed that the negative collective feedback ("your ingroup transgressed the pro-environmental norm") led participants to choose more eco-friendly gift, but only when they were weakly identified to their ingroup. In other words, our manipulation was not effective with people who are strongly identified to their ingroup. Previous research has shown that highly identified individuals are also the most prompt to defend their ingroup against negative feedback or criticism (see for instance Roccas, Klar & Liviatan, 2006). In our experimental situation, it is possible that highly identified individuals did not accept the negative feed-back about their ingroup and were consequently less willing to repair for their ingroup's behavior.

<div style="text-align:center">III.1.5. Conclusions regarding induction of guilt</div>

In conclusion, it appeared that collective guilt induction might be an effective strategy in order to trigger sustainable behaviors. Indeed, our results indicated a significant and positive impact of collective guilt on both pro-environmental intentions and behaviors.

However, it also appeared that this effect is dependent upon the level of ingroup identification. We can conclude, from both previous research and our results, that a minimal level of identification is necessary in order to feel collective guilt, but also that a high level of identification cancels the positive impact of collective guilt on pro-environmental behaviors. This impact of identification level makes the use of collective guilt in marketing campaigns or messages rather difficult, as the targets' level of identification with their ingroup is generally unknown. Further research would consequently be needed in order to clarify the conditions under which collective guilt is efficient in order to trigger pro-environemental behaviors.

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[5] With the Johnson-Neyman method.

The results of our studies on collective guilt also indicated that EF can effectively be used as a dynamic tool and can contribute to changing people's behaviors. In other words, EF is not only a tool for measuring people's behaviors, but it can also be a way of changing these behaviors through the feedbacks that are given after the completion of the measure.

III.2. Framing of the message

Our results regarding Objective B indicated that the negative aspects of pro-environmental behaviors are generally more concrete and perceived as closer (from both social and time point of views) than positive aspects. Now, it has been shown that people pay more attention to concrete, short-term and personally relevant arguments when they make a decision. In order to reduce ambivalence as well as the prevalent effect of negative arguments related to pro-environmental behaviors, we tested the impact of messages focusing on very concrete, short term and personally relevant **positive** consequences of pro-environmental behaviors. Said otherwise, we studied the impact of the framing of pro-environmental messages with a focus on the content of these messages.

III.2.1. framing of the message – study 1
In this first study, we compared the impact of a message developing short-term positive personal consequences of pro-environmental behaviors to a message developing their long-term positive consequences on strangers.

Method
Participants
90 participants (45 males and 45 females) participated in this study. All of them were adults working in a research centre.

Procedure and material
In the 3 conditions, participants were told that the study was a simulation of a job hiring test. They first read a message that was either neutral, either pro-ecological with arguments explaining that ecology is good for us and our relatives, now; or pro-ecological with arguments explaining that ecology is good for future generations, especially in developing countries. Then participants were tested on their memory of the text content. After having completed a filler task, they were presented with 5 cars varying according to various criteria, including the CO_2 they reject, and they had to indicate which one they would prefer as a company car. Then their willingness to replace the car with a free public transportation pass was assessed. After that, they evaluated how important they considered

15 improvements that could be made at their alleged office. Amongst these improvements, 8 were eco-friendly ones. Then they completed a questionnaire assessing their intentions toward pro-environmental behaviors and their attitudes about ecology. Finally, they were debriefed and thanked.

Results

We first analyzed the impact of our manipulation (short-term vs. long-term message vs. control) on the choice of the car (coded according to its CO_2 rejection). Results indicated an interaction between participants' gender and type of message, $p < .002$. The type of message had an impact on men ($p < .008$), but not on women ($p > .11$). Men selected a car rejecting less CO_2 more often when they received a message highlighting the short-term consequences of pro-environmental behaviors on themselves than when they received a message highlighting long-term consequences on others or a neutral message.

There was no impact of the type of message on the willingness to replace the car with a free public transportation, neither on the type of improvement that could be made in the work place.

Finally, we found a gender effect on pro-environmental intentions ($p < .03$). This interaction was qualified by an interaction type of message X gender, $p = .05$. The type of message did not have an impact on women, but it had a marginally significant impact on men, $p = .08$. Men expressed pro-environmental intentions to a greater extent when they received a message highlighting short-term consequences of pro-environmental behaviors on themselves than when they received one of the other two messages.

III.2.2. framing of the message – study 2

The previous study revealed an impact of the type of message on the intentions to have sustainable behaviors. However, in this study, we manipulated at the same time temporal distance (short-term vs. long term consequences), social distance (impact on the perceiver him/herself or on unknown persons) and concreteness of the message. We do not know whether the effect we observed is due to one of these variables or to their combination. We thus designed the present study in order to disentangle the possible impact of each variable.

Method

Participants

Participants were administrative employees in several bank companies. We have not yet received all the questionnaires. Some preliminary analyses have consequently been carried on 35 participants.

Procedure and material

The procedure was similar to the previous study's procedure, except that there were 4 experimental conditions. We created 4 messages according to a 2 (short-term vs. long-term consequences of sustainable behaviors) X 2 (consequences on the perceiver him/herself vs. consequences on unknown people) design. We also included questions on intra-individual variables (Consideration for Future Consequences Scale and Rationality-Experientiality Scale) at the very beginning of the questionnaire. The dependent measures were similar to the previous study's measures.

Results

We ran an ANOVA with time (short –term vs. long-term) and target (perceiver vs. unknown people) as independent variable and the choice of a more or less polluting car as a dependent variable. Preliminary analyses indicated that target had a main effect, $F(1, 31) = 7.96$, $p < .009$. Participants chose a car rejecting less CO_2 when the text they read focused on the positive consequences of pro-environmental behaviors on themselves rather than when it focused on consequences for others. This effect was however qualified by an interaction target X time, $F(1, 31) = 8.18$, $p < .008$. This difference only held true only when the consequences were described on a short-term ($t(14) = 4.41$, $p < .001$), not on a long-term basis ($t(17) = -.03$, $p > .9$).

III.2.3. Conclusions regarding framing of the message

Results of this line of research pointed to the importance of highlighting the direct benefits people can have when they behave environmentally-friendly. Concretely, it means that marketing campaigns and messages would be more effective if their content was focused on the short term and direct interests of pro-environmental behaviors for people rather than on the interests for future generations or people living in foreign countries.

Results indicated that the impact of the message framing might be different for men and women. This should be further investigated in future research.

III.3. construal level and sustainable behaviors

As positive aspects of pro-environmental behaviors are more abstract than negative ones, we thought the former would be more salient if people are in an abstract mindset. We consequently tested situations and manipulations likely to activate an abstract mindset and we examined their impact on pro-environmental intentions and behaviors.

III.3.1. Induction of high-low construal level – study 1

According to Construal Level Theory (see for instance Trope, Liberman & Wakslak, 2007), objects, events and individuals can be perceived as either close or distant. Authors qualify the abstract and distant perception as high level construal, whether concrete and close perception is qualified as low level construal.

It is possible to manipulate the construal level of people at a given time. We used a manipulation of construal level in order to tune people to a high construal level and consequently to a more abstract mindset. We then assessed their pro-environmental intentions and behaviors. We assumed that people in an abtract mindset (high level construal) would have more pro-environmental intentions.

Method
Participants
60 students were recruited to participate in this study. They were told that they would answer 2 questionnaires related to two distinct experiments.

Procedure and Material
Participants were asked to complete a first questionnaire on mental processes. They were told that they would be asked to think about either why (for half of the participants) or how (for the other half) someone could have a given behavior. They had to answer the questions in cascade. That is, the behavior was followed by an empty frame in which they were supposed to write their answer. Then this answer was followed by the question how/why and then again an empty frame that they had to complete. In total, they had to complete 3 successive frames. This manipulation has been shown to be effective in priming a high level (why) or a low level (how) construal (see for instance Wakslak & Trope, 2009). After an example, they completed the answer the questions for the behavior of interest, which was "reducing one's emissions of CO_2".

After this question, they were asked to list the positive and negative aspects of the behavior. We were interested in the number of arguments they would list.

Then they completed the second questionnaire which assessed their pro-environmental intentions.

Results

Results indicated that people in the high level construal (why) produced less negative arguments (M = 2.00) than people in a low level construal (how) (M = 3.20), t(58) = 2.69, p < .01. Said otherwise, people who are in an abstract mindset have less negative thoughts related to pro-environmental behaviors.

Results did not indicate any significant effect of the manipulation on the number of positive arguments (p > .4) and on the intentions (p > .8).

III.3.2. Induction of high-low construal level – study 2

In the previous study, the induction of a low or high level construal (concrete or abstract mindset) was directly related to pro-environmental behaviors. Indeed, participants were asked to indicate how or why a pro-environmental could be realised. In the present study, we used the same manipulation but without any reference to pro-environmental behaviors. We reasoned that any manipulation tuning people to an abstract or concrete mindset should have the same impact on positive and negative thoughts accessibility.

Method

Participants

40 students were recruited to participate in this study.

Material and procedure

The material and procedure were identical to the previous study. However, the behavior used for the construal level manipulation (how vs. why) was unrelated to environment (i.e. *have a regular practice of sport*).

Results

In this second study, we failed to obtain an impact of the manipulation on the number of positive arguments (p > .4) and on the number of negative arguments (p > .6). However, results revealed a significant impact of the manipulation on the intentions, t(38) = 4.72, p < .001. Participants tuned with a high level construal (why) had more pro-environmental intentions (M = 4.24) than participants tuned with a low level construal (how) (M = 3.66).

III.3.3. Conclusions regarding construal level

Results of this line of research indicated that an abstract mindset might lead to less negative thoughts and to more intentions regarding pro-environmental behaviors than a concrete mindset. However, we did not replicate the same results from one study to the other. We believe that this line of research deserves more attention and should be more deeply investigated. It is also important to underlie that this type of manipulation might have a very different impact on real behaviors. Indeed, although intentions seem positively influenced by an abstract mindset (rather than by a concrete mindset), it is possible that a concrete mindset could help people to act out some behaviors. Future research should investigate the impact of mindset on both intentions and behaviors.

III.4 Klimaatbudget – Climate transition tool/Personal Climate Budget

The last point developed in relation to Objective C is different from what has been previously described in the sense that it is not a survey or a lab experiment. Instead, it's an applied and interactive pilot experiment using Ecolife's website.

The project 'climate transition tool/personal climate budget' is an innovative model to promote ecological behavioral change among households in Flanders. It's seen as powerful tool for learning about the climate change impacts of different behaviors and understanding how to live with and adapt to environmental change. This project was funded by the INDAVER Fund. Support with the concept development and project evaluation was assessed by Ecolife and KUL within the framework of the SSD-project.

Carbon emissions are the primary cause of climate change. There are many ways of contributing to a lower carbon-intensive production and consumption pattern. From the use of non-carbon energy sources to an expanded renewable energy supply. As part of this, encouraging households and individuals to take greater responsibility for their carbon footprint is important.

The purpose of the 'personal climate budget'-project is first of all to experiment on a small scale with a personal carbon budget for households and individuals. The target group of the project were 'cultural creatives': these are mostly higher educated people that combine a concern for social activism and ecology. There was a collective dimension in the project: the participating households can be seen as members of a specific carbon budget community (cfr. facebook).

A first pilot project was elaborated during the months march till august 2010. A group of 150 households in Ghent agreed to participate. They agreed to register on a monthly basis their consumption data (energy, mobility, food) in an online registration format and carbon footprint calculator on the website www.klimaatbudget.be. These tools were used for monitoring household consumption in relation to a predetermined climate

budget (= quantity available CO_2-emissions per household on a yearly basis) to raise awareness and promote a less energy-intensive consumption style. A pilot measurement, based on consumption data of past (half) year, at the start of the pilot project was assessed. This gave a global overview of all CO_2-emissions of all participating households.

A personal start budget for every household was determined. Each participant or household received at the beginning of the pilot an average personal carbon budget (expressed in CO_2). Households could set monthly or for the whole period of the project personal targets to lower their carbon-intensive activities. Households could also continuously monitor their own CO_2-emissions related to their predetermined carbon budget by registering their monthly consumption data (energy, mobility, food) and undertaking specific environmental actions to lower their environmental impact (and CO_2-emissions). There was also a group dynamic: one could follow the evolution of the CO_2-emissions of the whole group. One of the aims that was not realised in the pilot project (due to ict-matters) was the possibility of mutual carbon trading between the participating households.

A campaign website was developed containing the aims and practical information of the project. Important for the participants was the online registration tool and the monthly newsletter (data, best practices).

At the beginning and end of the pilot project two online questionnaires were sent out to the participating households. Participants were asked about their ecological attitude and effective ecological behavior. Questions were asked about some psychological mechanisms (motivational aspects, informative aspects,...) that are at stake during the project. Main findings were that participating households increased in a way their ecological awareness on their personal consumption pattern and also their willingness to undertake ecological actions. Changes in ecological attitudes were just slightly noticed. Participants found it stimulating to collaborate as a group. The information (best practices, practical tips, monthly newsletter) on the campaign website was found helpful and interesting. According to most participants the usability of the online tool (f. i. data entry) could be further optimized. The ability to compare carbon budget among households with other participants seemed very appealing, especially compared with households with similar composition and type of house.

III.5. Conclusions regarding Objective C

The studies related to objective C first indicated that collective guilt is related to pro-environmental intentions and behaviors and that messages inducing such emotions have an impact on people's behaviors. Nevertheless, the level of group identification seems to moderate the impact of collective guilt on behaviors. This makes collective guilt difficult to use in green marketing campaigns, as people's level of identification to their group is generally unknown. The link of collective guilt with perceived behavioral control and with wish to repair (observed in relation with objective 2) might offer another opportunity to influence people's behaviors in marketing campaigns. Indeed, providing people with a higher perceived behavioral control might influence them toward more sustainability. Similarly, encouraging their wish to repair for others' lack of sustainable behaviors might favour a behavioral change toward more sustainability. These proposals should be tested in further research.

The line of research focusing on emotions also proved that the Ecological Footprint measure can be used as a dynamic tool. After the completion of this measure, the type of feedback given to participants can significantly influence intentions and behaviors.

The studies on message framing highlighted the impact of short-term and self-relevant benefits on pro-environmental behaviors. These studies highlighted the importance of focusing green marketing campaigns on the short-term direct consequences of pro-environmental behaviors on people rather than on the interests for future generations.

The studies focusing on abstract and concrete mindsets seem promising, although this line of research necessitates further investigation before conclusions can be drawn.

Finally the climate transition project highlighted the importance of social norms, social comparison and group identity in behavioral change. It appears as a very promising tool in order to lead people to long-lasting sustainable behaviors.

IV.   Objective 4: Communication and results dissemination

Results of this objective are described below in the "dissemination and valorisation" part.

POLICY SUPPORT

1. Input of the project in the context of scientifical support to sustainable development policy

The project allowed us to make recommendations (that can be found in the conclusions related to each objective as well as bellow) for a higher efficiency of social marketing campaigns. The inclusion of two associations active in environmental prevention as partners of this project, as well as the participation of representatives of both associations and public actors in the follow-up committee, guarantee the dissemination of these recommendations and their possible application in social marketing campaigns.

2. Recommendations (regarding decision support)

First of all, our results point to the importance of being aware that all pro-environmental behaviors are not equal. The results related to the first objective indicated that it might be interesting to design green marketing campaigns focusing on groups of behaviors that are perceived as similar or related.

Our research indicated that the impact of sustainable behaviors on the environment is not related to the representations people have of these behaviors. Instead, these representations are linked to the impact of sustainable behaviors on the individual her/himself. Additionally, people seem to be more influenced by short-term self-relevant impacts of their pro-environmental behaviors than by long-term other-relevant impacts. Regarding green marketing campaigns, these results taken together underlie the necessity to highlight the concrete and positive consequences that sustainable behaviors can have on people themselves.

However, as indicated by the results of the studies on attitudinal ambivalence, highlighting positive sides of sustainable behaviors might not be sufficient to change people's behaviors. Indeed, our results showed that the more people are ambivalent (have at the same time positive and negative attitudes toward the behaviors), the less they have sustainable behaviors. Consequently, in addition to emphasizing the concrete and positive consequences of sustainable behaviors, it might be important to tackle the negative sides of the same behaviors. For instance, campaigns could at the same time describe the direct positive impact of a behavior and decrease the perceived constraints or negative consequences of having such a behavior.

Our results, taken together with the literature, point to the importance of perceived behavioral control in emotions, intentions and behaviors. It is very likely that increasing people's perception of control in green marketing campaigns could lead them toward more sustainability.

Regarding emotions, although our findings would need additional investigations to be fully usable, we can already conclude that vicarious and collective emotions are more effective in triggering pro-environmental behaviors than individual emotions.

Our studies on emotions also proved that the Ecological Footprint Measure can efficiently be used as a dynamic marketing tool. We thus encourage the use of this tool as a green marketing tool.

Our results also draw attention on the role that the physical environment plays in both representations and behaviors. These findings stress the necessity of providing people with the infrastructures that are necessary to a sustainable way of life. It is also important to inform people about what their living place offers them and allows them in terms of sustainable behaviors.

Social norms and social group identification also appear as important variables in the determination of people's behaviors. They can also help green marketing campaigns to reach their goals.

Finally, we want to stress that the necessity of being careful to the impact of other messages and other campaigns on sustainable behaviors, as the studies on safety and driving demonstrated the power of these messages on behaviors.

DISSEMINATION AND VALORISATION

A. Papers

- La Libre Belgique – interview of Benoit Dardenne and Nathalie Delacollette

- Huart, J., Delacollette, N., & Dardenne, B. (2009). « *Comment Favoriser les Comportements Ecologiques ?* ». *Imagine demain le monde*, *71* (janvier – février 2009).

- *Psychologie et Ecologie : Comment amener à davantage de comportements favorables à l'environnement ?* Article publié sur le site Réflexion de l'ULg (http://reflexions.ulg.ac.be)

- *Boulversements Climatiques*, Article publié dans *Le quinzième jour*, journal de l'ULg (décembre 2009, n°189)

- Imagine demain le Monde, 81, Septembre-Octobre 2010 – « Place au changement », Dossier Spécial Climat - interview N. Delacollette

B. Meetings and workshops

- The project and some of our results have been presented by Steven Vromman at the annual meeting of Global Action Plan (Dublin, 16-18 April 2007).

- Les Assises de la Propreté – Luxembourg Province, 2/12/2009. Presentation of a survey results + summary of these results in several newspapers (Le Soir, La Meuse) + Radio interview (Vivacité) + Local TV interview (TVLux)

- Participation in a multi-disciplinary workshop on sustainable behaviors in Brussels (organised by the UCL)

- Potential participation in 9th Biennial Conference on Environmental Psychology, Eindhoven (abstract under review)

C. Valorisation

The dissemination of this project results led to some contacts with private companied interested in the topic. These contacts already led to a one year research project with Electrabel.
A second research project possibility is currently discussed with another private partner.

D. Others

- Dissemination of the results through the website "Reflexion", created by the ULg in order to disseminate research results to a large public.

- Presentation of the project on the radio, RCF Liège

- Presentation of the project on TV ("Planète Nature", on RTBF)

- Participation to the "Doc Café", conference organised by the ULg, on organic food ("Le bio est dans le pré. Peut-il nourrir la planète") (N. Delacollette)

- Article written about risk compensation and ecological driving on consumer science blog (www.consumerscience.org)

- « Klimaatbudget – Climate transition tool » : this pilot project is also an occasion to disseminate knowledge linked to our findings and to use the present project as a basis for a long-term project.

PUBLICATIONS

1. Peer-reviewed publications

Peer-reviewed publications are currently written.

- Claus, Warlop, Delacollette & Dardenne. Is it safe to talk about car safety? Non-motivational Risk Compensation leads to eco-unfriendly driving (manuscript in preparation)
- Claus, Warlop, Delacollette & Dardenne. Public Infrastructure as a Moderator For Ecological Behavior: a SUR Approach. (manuscript in preparation)
- Delacollette, Dardenne, Claus & Warlop. Attitudinal ambivalence, complexity and their impact on sustainable behaviors (manuscript in preparation)
- Delacollette, Huart, Dardenne, Claus & Warlop. Framing of green marketing messages : impact of the messages concreteness on sustainable behaviors (manuscript in preparation)

2. Others

Other publications are listed in the Dissemination and Valorisation part, point A.

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REFERENCES

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179-211.

Aronson, E., Fried, C., & Stone, J. (1991). Overcoming denial and increasing the intention to use condoms through the induction of hypocrisy. *Amercian Journal of Public Health, 81*, 1636-1638.

Bamberg, S., & Möser, G. (2007). Twenty Years after Hines, Hungerford and Tomera: A new meta-analysis of pro-environmental behaviour. *Journal of Environmental Psychology*, *27*, 14-25.

Browne, B. A., & Kaldenberg, D. O. (1997). Conceptualizing self-monitoring: links to materialism and product involvement. *Journal of Consumer Marketing*, *14*, 31-44.

Cornelissen G, Pandelaere M, Warlop L, Dewitte S, (2007) Positive cueing: Promoting sustainable consumer behavior by cueing common environmental behaviors as environmental. *International Journal of Research in Marketing*, 25(1), pp.46 – 55.

Daly, M., & Wilson, M. (2005). Carpe diem : Adaptation and devaluing the future. *The quarterly Review of Biology*, *80*, 55-60.

Fabrigar, L. R., MacDonald, T. K., & Wegener, D. T. (2005). The structure of attitudes. In D. Albarracín, B. T. Johnson, & M. P. Zanna (Eds.), *The handbook of attitudes* (pp. 79–124). Mahwah, NJ: Erlbaum.

Gana, K., & Brechenmacher, N. (2001). Structure latente et validité de la version française du self-monitoring scale : Echelle de monitorage de soi. *L'Année Psychologique*, *101*, 393-420.

Gollwitzer, P. M. (1999). Implementation Intentions. Strong effects of simple plans. *American Psychologist*, *54*, 493-503.

Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, 52(12), 1280-1300.

Johnson, M. S., Jurik, N. C., Kreb, A. R., & Rose, T. L. (1978). The Wheels of Misfortune: A Time Series Analysis of Bicycle Accidents on a College Campus. *Eval Rev*, 2(4), 608-619.

Kaiser, F. G. (2006). A moral extension of the theory of planned behavior: Norms and anticipated feelings of regret in conservationism. *Personality and Individual Differences*, *41*, 71-81.

Leach, C. W., Iyer, A., &Pedersen, A. (2006). Anger and guilt about ingroup advantage explain the willigness for political action. *Personality and Social Psychology Bulletin*, *32*, 1232-1245.

Leiserowitz, A. (2006). Climate change risk perception and policy preferences: The role of affect, Imagery and Values. *Climatic Change*, *77*, 45-72.

Lickel, B., Schmader, T., Curtis, M., Scarnier, M., & Ames, D. R. (2005). Vicarious shame and guilt. *Group Processes and Intergroup Relations*, *8*, 145-157.

Linville, P. W. (1982). The complexity-extremity effect and age-based stereotyping. *Journal of Personality and Social Psychology*, *42*, 193–211.

Petty, R. E., Wegener, D. T., & Fabrigar, L. R. (1997). Attitudes and attitude change. *Annual Review of Psychology*, *48*, 609-647.

Pratto, F., Sidanius, J., Stallworth, L. M., & Malle, B. F. (1994). Social Dominance Orientation: A personality variable predicting social and political attitudes. *Journal of Personality and Social Psychology*, *67*, 741-763.

Richins, M. L., & Dawson, S. (1992). A consumer values orientation for materialism and its measurment : Scale development and validation. *Journal of Consumer Research*, *19*, 303-316.

Roccas, S., Klar, Y., & Liviatan, I. (2006). The paradox of group-based guilt : Modes of national identification, conflit vehemence, and reactions to the in-group's moral violations. *Journal of Personality and Social Psychology, 91*(4), 698-711.

Schlenker, B. R. (1975). Group Members' Attributions of Responsibilities for Prior Group Performance. *Representative Research in Social Psychology*, *6*, 96 – 108.

Scott, W. A. Cognitive complexity and cognitive flexibility. Sociometry, 1962, 25, 405-414.

Scott, W. A. Structure of natural cognitions. Journal of Personality and Social Psychology, 1969,12, 261-278.

Shiv, B., Carmon, Z., & Ariely, D. (2005). Placebo effects of marketing actions: Consumers may get what they pay for. *Journal of Marketing Research*, 42(4), 383-393.

Snyder, M. (1974). Self-monitoring of expressive behavior. *Journal of Personality and Social Psychology*, *30*, 526-537.

Strathman, A., Gleicher, F., Boninger, D. S., & Edwards, C. S. (1994). The consideration of future consequences: Weighing immediate and distant outcomes of behavior. *Journal of Personality and Social Psychology*, *66*, 742-752.

Tangney, J.P., Stuewig, J., & Mashek , D.J. (2007). Moral Emotions and moral behavior. *Annual Review of Psychology*, *58*, 345-372.

Thompson, M. M., Zanna, M. P., & Griffin, D. W. (1995). Let's not be indifferent about (attitudinal) ambivalence. In R. E. Petty & J. A. Krosnick (Eds.), Attitude strength: Antecedents and consequences (pp. 361–386). Mahwah, NJ: Lawrence Erlbaum.

Trope, Y., Liberman, N., & Wakslak, C. (2007). Construal levels and psychological distance: effects on representation, prediction, evaluation and behavior. *Journal of Consumer Psychology*, *17*, 83-95.

Wakslak, C., & Trope, Y. (2009). The Effect of Construal Level on Subjective Probability Estimates. *Psychological Science*, *20*, 52-58.

Weber, E. U., Blais, A.-R., & Betz, N. E. (2002). A domain-specific risk-attitude scale: Measuring risk perceptions and risk behaviors. *Journal of Behavioral Decision Making*, *15*, 263-290.

Wilde, G. J. S. (1982). The Theory of Risk Homeostasis: Implications for Safety and Health. *Risk Analysis*, 2(4), 209-225.

ANNEXES

Minutes of the follow-up committee meeting

The annexes are available on our website

http://www.belspo.be/belspo/ssd/science/pr_transversal_en.stm