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COOPERATION

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by

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Introduction

Whether or not individuals engage in energy-saving behaviors depends on many factors (Lindenberg & Steg, 2007). These can be motivational (for example, people can be unaware of environmental problems associated with household energy use, but also institutional (for example, no alternatives may be available for energy-intensive practices). Furthermore, socio-demographic factors such as income and education level also affect behavioral choices, because they determine to what extent individuals are able to engage in energy-saving behavior. This combination of motivation, opportunity, and ability determines to what extent individuals engage in energy-saving behaviors (Olander & Thogersen, 1995).

These factors probably interact with each other. The influence of motivational factors on behavior may be affected by institutional factors, and vice versa (Guagnano, Stern, & Dietz, 1995). Individuals may for example be highly motivated to use public transport to travel to work, but if there is no public transport connection available, this motivation will not be translated into behavior. In this example, the lack of a public transport connection between ones' home and workplace is a barrier that prevents the individual from reducing car use.

The aim of this project is to identify the strengths and relevance of various barriers for reducing energy consumption. To meet this aim, questionnaire data were collected in seven European countries (Norway, United Kingdom, Netherlands, France, Switzerland, Hungary, and Greece). These data include information about peoples' current energy behaviors, the psychological antecedents of these behaviors, and demographic factors that may influence energy behavior. Psychological antecedents were based on two widely-used models of pro-environmental behavior: the norm-activation model (Schwartz, 1977; Schwartz & Howard, 1981) and the theory of planned behavior (Aizen, 1991). The norm-activation model states that behavior is the result of feelings of moral obligation to engage in behavior (so-called personal norms). The strength of these personal norms depends on two main factors: The extent to which individuals are aware of the problems caused by not engaging in the behavior (problem awareness) and the extent to which the individuals believe they can resolve these problems by engaging in the behavior (outcome efficacy). The theory of planned behavior is based on the idea that individuals' behavior is the result of a cost-benefit analysis. The theory postulates that three factors determine the outcome of this analysis: Beliefs about the likely costs and benefits of engaging behavior (attitudes), beliefs about the social costs and benefits of the behavior (subjective norm), and the perceived ability of the individual to engage in the behavior (perceived behavior control). By including both the norm-activation model and the theory of planned behavior, we gain an insight into the extent to which both normative considerations and cost/benefit calculations motivate individuals to reduce household energy use. Another psychological antecedent of energy behavior that is included in this questionnaire is habit, which is the extent to which people act automatically in a given situation (Verplanken en Orbell, 2003). This factor is included as an antecedent of light use behavior.

We also collected data on institutional factors in all seven countries, allowing us to study the influence of psychological, socio-demographic, and institutional barriers on energy behaviors.

To study whether antecedents differ across behaviors, we include efficiency behaviors (i.e. purchasing energy-efficient light bulbs), curtailment behaviors (i.e. turning off light in unoccupied rooms), transport behaviors (overall transport mode choice & transport mode choice for short-distances), adoption of sustainable energy

sources, and the acceptability of energy policies. The aim of the study is to identify the main determinants of these behaviors and the intention to change these behaviors.

Method and participants

Data were collected using two online questionnaires (see Appendix A). Each questionnaire consisted of approximately 120 questions. The two questionnaires were administered to two different groups of participants – no participants filled out both questionnaires. The participants were drawn from a panel from AMR, the market research company that collected all data. Participants were selected from this panel on the basis of several stratification criteria to ensure that the sample would be representative for the overall population of each country. Table 1 presents these criteria.

Table 1: Stratification criteria

Criterion
Gender
Age
Household income
Education level
Marital status
Number of persons in household

Participants
In total, 15.414 individuals participated in this study. Questionnaire I was completed by 7.703 participants, while 7.711 participants completed Questionnaire II. However, not all completed questionnaires were suitable for inclusion in the data analysis phase. To filter out the questionnaires that were unsuitable for inclusion, the following criteria were used:

- Participants who answered all questions identically were removed from the data set.
- Participants who answered more than 2/3 of all questions from one question battery identically were removed.
- Quality-control questions that request participants to fill out a number: Participants who fill out improbable answers were removed.

Most participants who were removed from the data set prior to the analysis phase failed on more than one criterion, indicating that they did not complete the questionnaire in a serious manner. Tables 2 and 3 show how many participants completed the questionnaires and how many participants were included in the analysis phase per country.

An analysis of possible differences between the participants who were included and the ones who were not showed no clear differences between the two groups. It is therefore assumed that the removal of the participants who did not meet the criteria listed above did not affect the representativeness of the samples used in this study.

Table 2: Participants in questionnaire I

	Total number of participants	Number of removed participants	Participants included in data analysis
Norway	1100	257	843
United Kingdom	1102	253	849
Netherlands	1100	342	758
France	1100	219	881
Switzerland	1100	160	940
Hungary	1100	244	856
Greece	1101	183	918
Total	**7703**	**1658**	**6045**

Table 3: Participants in questionnaire II

	Total number of participants	Number of removed participants	Participants included in data analysis
Norway	1102	237	865
United Kingdom	1100	313	787
Netherlands	1104	354	750
France	1102	316	786
Switzerland	1100	187	913
Hungary	1101	261	840
Greece	1102	268	834
Total	**7711**	**1936**	**5775**

Psychological antecedents

The psychological antecedents included in the questionnaires were based on widely-used psychological models to predict behavior. For car use, use of energy from sustainable sources, purchasing light bulbs, and short-distance car use, the psychological antecedents were based on the theory of planned behavior (Aizen, 1991), and the norm-activation model (Schwartz, 1977; Schwartz & Howard, 1981).

The theory of planned behavior posits that behavior is the result of a cost/benefit analysis. Because people are motivated to maximize possible benefits, they will engage in those behaviors that are most beneficial (Aizen, 1991). According to the theory, individuals take three distinct sets of beliefs into account when assessing the costs and benefits of engaging in certain behavior: behavioral beliefs, normative beliefs, and control beliefs. Behavioral beliefs produce a favorable or unfavorable *attitude toward the behavior*; normative beliefs result in perceived social pressure or *subjective norm*; and control beliefs give rise to *perceived behavioral control* (Aizen, 2006). The more favorable the attitude and subjective norm, and the greater the perceived control, the more likely a person is to engage in the behavior. Attitude, subjective norm, and perceived behavior control will be measured on a behavior-specific level for each of the behaviors listed above.

The norm-activation model states that behavior is the result of feelings of moral obligation to engage in behavior (Schwartz, 1977). Schwartz calls this feeling of moral obligation a personal norm. The strength of these personal norms depends on two main factors: The extent to which individuals are aware of the problems caused by not engaging in the behavior (problem awareness) and the extent to which the individuals believe they can resolve these problems by engaging in the behavior (outcome efficacy). As problem awareness and outcome efficacy increase in strength,

so does the personal norm to engage in behavior. The likelihood that individuals will engage in certain behavior increases with the increasing strength of personal norms. In this survey, problem awareness, outcome efficacy, and personal norms are measured for each of the behaviors listed above, using multi-question scales.

Because turning off the lights when vacating an unoccupied room is likely to be an automatic rather than a conscious decision, the psychological factors from the theory of planned behavior and the norm-activation model (which presume a conscious choice process) are not suitable for explaining light use. Instead, a psychological factor that measures to what extent people engage in behavior automatically is introduced: Habit. This concept is also measured using several questions, which together form a single scale 'habit strength' (Verplanken & Orbell, 2003).

Results

The results section consists of six chapters: One chapter for each behavior. The order in which the results are discussed is similar for all behaviors. First, the extent to which individuals in each country engage in the behavior is displayed. This is followed by more detailed information about differences in behavioral uptake between different levels of demographic factors (e.g. the extent to which male participants engage in the behavior compared to the extent to which female participants engage in it). The strength of the psychological antecedents of behavior per country is displayed next, followed by an in-depth analysis of the strength of the psychological antecedents of behavior for a small number of selected demographic factors. Demographic factors were selected for this analysis if clear differences occurred in the extent to which individuals engage in the behavior between levels of the demographic factor. Finally, a regression analysis of the psychological antecedents on the behavior is performed to assess which psychological antecedents predict behavior best.

Car use

Private car use is an important cause of environmental problems. Participants were asked to indicate for which percentage of their trips they use a car. There were seven answering options, ranging from 'I only travel by car' to 'I only use alternative modes of transport'. Figure 1 shows the percentages of all participants that chose each answering option.

Figure 1: Proportion of car use.

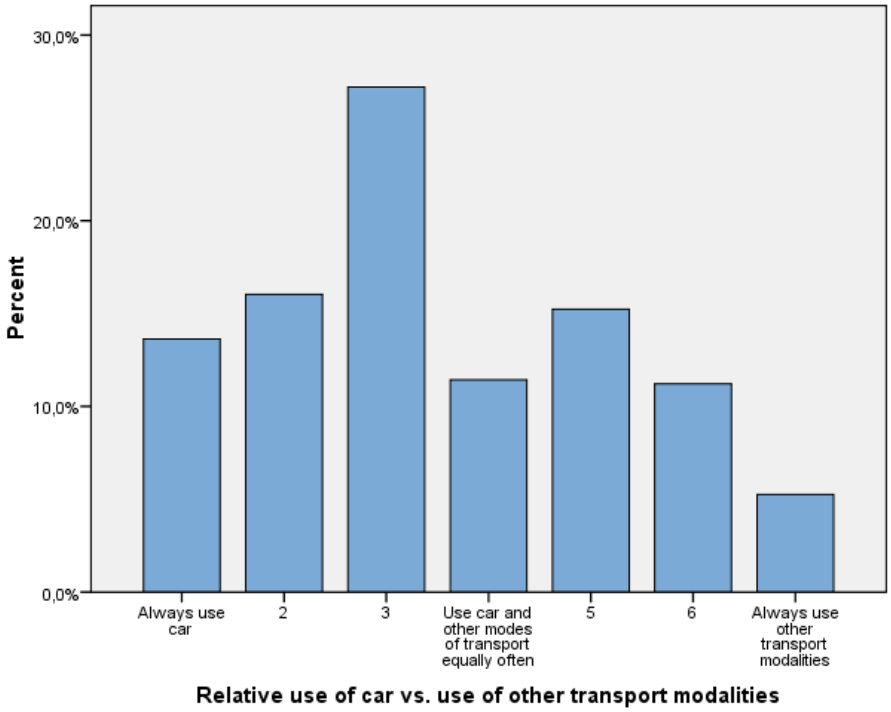


Figure 1 indicates that the majority of participants use a car for more than half of their journeys. Very few participants do not use a car at all (<5%), while approximately 13% of all participants indicate that they use a car for all their traveling. Roughly 53% of all participants indicate that they use both cars and other transport modalities relatively often (by selecting answering option 3, 4, or 5).

Table 4 shows that most participants use the car for more than half of their journeys. Regarding the demographic factors, most differences were found between individuals who live in rural areas and individuals who live in urban areas: People in rural area use a car for a larger percentage of their journeys than people who live in urban areas. Income level also seems to have an effect on car use, as people with lower incomes use the car relatively less than people with higher incomes. A third clear effect was found for political orientation, with left-wing oriented individuals using a car for a lower percentage of all journeys than right-wing oriented individuals. Smaller effects were found for gender, with men using the car relatively more than women, age, with young people (18-30 years old) using the car relatively less than older people, and education level, with people with little or no education using the car relatively less than people with more education. A final comparison shows that people who live on their own use a car relatively less than people from multi-person households. However, the effects of education level and household composition may be related to differences in income between these groups.

Table 4: Differences in proportion of car use between levels of demographic factors.

	I always travel by car	I almost always travel by car and hardly ever use other modes of transport.	I mainly travel by car and sometimes use other modes of transport	I travel by car and by other modes of transport in equal measure.	I sometimes travel by car and mainly use other modes of transport.	I hardly ever travel by car and almost always use other modes of transport.	I always travel by other modes of transport.
All countries	14%	15%	27%	11%	15%	11%	5%
Gender							
Male	15%	18%	29%	12%	13%	9%	4%
Female	12%	15%	25%	11%	17%	13%	6%
Age							
18-29	9%	12%	21%	12%	21%	18%	7%
30-39	14%	17%	29%	12%	14%	10%	5%
40-49	16%	19%	28%	9%	14%	9%	5%
50-59	15%	16%	27%	13%	15%	10%	4%
60-70	15%	16%	33%	12%	12%	8%	5%
>70	12%	21%	27%	12%	13%	11%	5%
Urbanization level							
Rural	20%	19%	28%	10%	13%	8%	4%
Small town	13%	16%	29%	12%	15%	10%	6%
Large town/city	8%	13%	25%	13%	18%	16%	7%
Political orientation							
Left	12%	14%	27%	12%	17%	13%	6%
Centre	14%	16%	26%	12%	15%	12%	5%
Right	15%	19%	30%	11%	14%	8%	4%
Education level							
No education / primary school	20%	15%	18%	12%	10%	14%	12%
Secondary School	15%	16%	25%	11%	17%	11%	7%
High school	14%	16%	26%	9%	17%	14%	5%
Vocational education	15%	16%	28%	12%	14%	10%	5%
University	11%	17%	30%	14%	15%	11%	4%
Household composition							
1	12%	13%	22%	10%	16%	17%	11%
2	13%	16%	31%	11%	14%	11%	4%
3	14%	16%	27%	12%	16%	11%	4%
4	14%	17%	28%	12%	16%	9%	4%
5 or more	16%	17%	25%	13%	16%	9%	4%
Income Level*							
Low income	13%	14%	22%	10%	16%	16%	9%
Middle income	14%	17%	28%	12%	15%	10%	4%
High income	14%	17%	32%	13%	14%	7%	3%

* Relative income level based on distribution of incomes per country. 'Low income' = 1/3 of the lowest incomes in the country, 'High income' = 1/3 of the highest incomes in the country.

Differences in car use between the countries

Table 5 displays mean car use scores per country. The category 'all participants' shows the mean car use of all participants in a country. The other categories show mean car use per country per demographic group. Mean values were used in Table 6 because they offer a clearer, more concise overview of the results per country than a table of proportions such as Table 4.

Table5: Mean relative car use per country

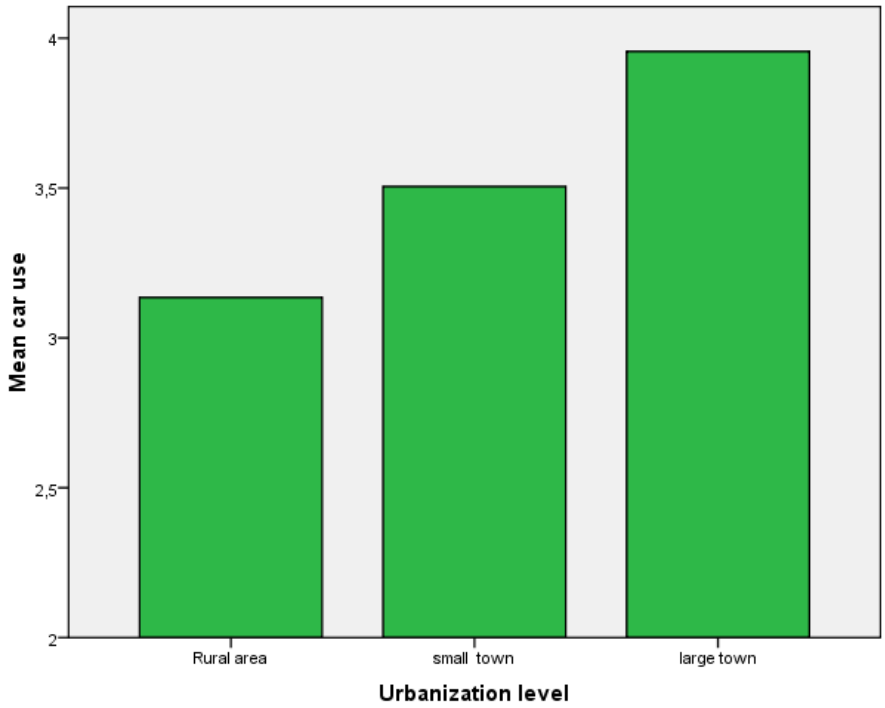
	UK	**FR**	**NL**	**GR**	**CH**	**NO**	**HU**	**Total**
All participants	3.3	3.2	3.6	3.5	3.8	3.3	4.1	3,5
Gender								
Male	3,2	3,0	3,4	3,3	3,8	3,1	3,7	3,4
Female	3,4	3,3	3,8	3,8	3,8	3,5	4,4	3,7
Age								
18-29	3,8	3,7	4,3	3,7	4,3	4,0	4,6	4,0
30-39	3,1	3,2	3,5	3,3	3,7	3,2	3,9	3,4
40-49	3,1	2,8	3,4	3,4	3,6	3,1	3,9	3,4
50-59	3,1	3,0	3,3	3,7	3,7	3,2	3,9	3,4
60-70	3,3	2,9	3,4	3,6	3,7	3,1	3,8	3,3
>70	3,4	3,2	3,5	4,7	3,4	3,3	3,8	3,5
Urbanization level								
Rural	2,9	2,3	3,1	3,2	3,5	2,8	4,2	3,1
Small town	3,2	3,1	3,6	3,5	4,0	3,3	3,8	3,5
Large town/city	3,7	4,0	4,2	3,7	4,2	4,0	4,2	4,0
Political orientation								
Left	3,5	3,4	3,9	3,7	4,2	3,6	4,0	3,7
Centre	3,3	3,2	3,5	3,5	3,6	3,4	4,2	3,5
Right	3,0	2,8	3,2	3,4	3,6	3,1	4,0	3,3
Education level								
No education / primary school	4,0	3,0	3,3	4,2	4,1	2,6	5,1	3,6
Secondary School	3,4	3,3	3,6	3,6	3,8	3,4	4,1	3,6
High school	3,3	2,9	3,6	3,5	4,1	3,6	4,0	3,6
Vocational education	3,1	3,0	3,5	3,6	3,5	3,2	4,3	3,4
University	3,3	3,4	3,5	3,5	3,9	3,4	3,8	3,5
Household composition								
1	3,8	3,7	4,1	4,0	4,3	3,8	4,5	4,0
2	3,3	3,2	3,4	3,6	3,6	3,3	4,0	3,5
3	3,3	3,1	3,4	3,5	3,8	3,2	4,0	3,5
4	3,0	3,0	3,4	3,5	3,7	3,2	4,0	3,4
5 or more	3,0	2,9	3,4	3,2	3,9	3,1	4,0	3,4
Income Level								
Low income	3,5	3,4	4,1	3,9	4,3	3,6	4,4	3,9
Middle income	3,2	2,9	3,4	3,4	3,7	3,3	4,0	3,5
High income	3,1	3,1	3,1	3,3	3,6	3,2	3,5	3,3

Table 5 shows that most findings displayed in table 4 are relatively stable across countries: The differences between urbanization levels, income levels, and political orientations in relative car use occur in all countries except Hungary. In Hungary, no clear differences in relative car use were found between urbanization levels and between political orientation groups.

Urbanization level and car use

Tables 4 and 5 show clear differences in relative car use between participants from rural and urban environments. Participants living in the countryside use cars relatively more than participants in the city (see Figure 2). This difference may be caused by differences in the availability of alternatives for car use, with cities generally offering more alternatives than rural areas.

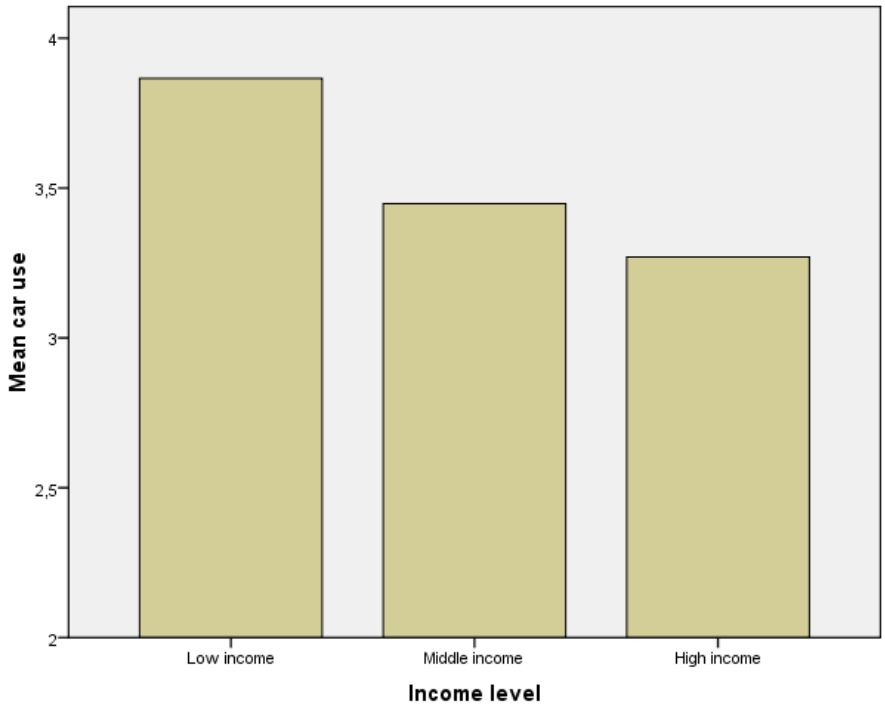
Figure 2: Mean car use per urbanization level.



Income level and car use

Table 4 showed that participants from different income groups differed in their relative car use. Participants with higher income levels tended to use the car more than participants with lower income levels (see also Figure 3). This difference is stable across all seven countries included in this study (see Table5). One reason for this difference is likely to be that car use is relatively expensive compared to other modes of transport, meaning that individuals from higher income groups can more easily afford to use cars relatively often than participants from lower income groups. Another reason may be that due to differences in lifestyles between individuals from lower and higher income groups, higher income groups (perceive that they) need to use cars relatively more than lower income groups. The possibility of differences in psychological antecedents of car use, which can be indicative of differences in perceived need to drive a car, will be discussed at a later point in this chapter.

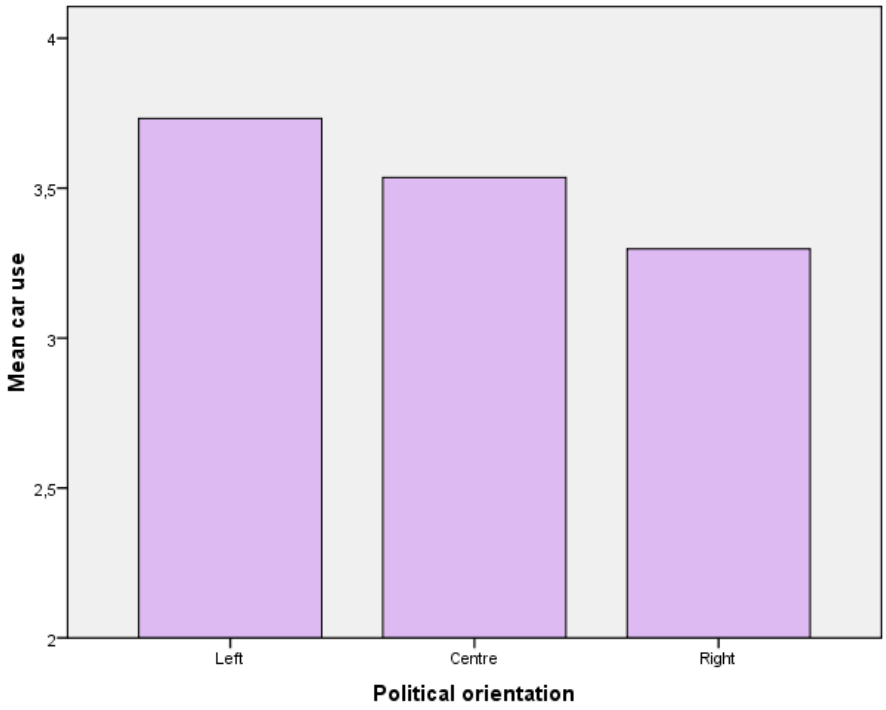
Figure 3: Mean car use per income group.



Political orientation and car use

A clear difference between participants with different political orientations appeared in Table 4. Participants with left-wing political orientations used cars relatively less than participants with right-wing political orientations (see also Figure 4). This effect may be caused by differences in perceived desirability of driving a car and perceived severity of environmental problems associated with car use between individuals with different political orientations – this possibility will be explored further in the discussion of psychological antecedents of car use below.

Figure 4: Mean car use for participants with different political orientations.



Psychological antecedents of car use

In the introduction, we stated that the extent to which individuals engage in energy-saving behaviors is influenced by both demographic and psychological factors. In Table 6, the six psychological factors that were included in the questionnaire to measure the extent to which participants are motivated to reduce their relative car use are displayed, along with a brief explanation of each factor.

Table 6: Psychological antecedents of relative car use included in the questionnaire.

Concept	**Meaning**
Attitude towards reducing car use	Evaluation of reducing car use as positive or negative
Subjective norm towards reducing car use	Perceived social costs and benefits of reducing car use
Perceived behavior control regarding reducing car use	Perceived ability to reduce car use
Problem awareness regarding car use	Extent to which individuals believe that car use leads to negative environmental consequences
Outcome efficacy regarding car use	Extent to which individuals believes they can contribute to preventing negative environmental consequences caused by car use by reducing their own car use.
Personal norm to reduce car use	Extent to which individuals feel morally obliged to reduce car use

All six concepts are measured using several questions. Cronbach's alpha is calculated for each concept to test whether the individual questions can be assumed to form one reliable scale (see Table 7). All questions consisted of a statement with which individuals can indicate whether they agree or disagree on a seven-point scale (1: completely disagree; 7: completely agree), with the exception of the attitude questions,

which consisted of seven-point scales ranging from a positive to a negative consequence of reducing car use (e.g. Reducing my car use would be… 1 (good) – 7 (bad)).

Results

On average, participants in all countries report moderately positive attitudes towards reducing their car use. There are however considerable differences between the countries: The French and Swiss participants have more positive attitudes towards reducing car use, especially compared to the Hungarian and Norwegian participants. Participants in all countries perceive a weak subjective norm to reduce their car use, indicating that they do not feel that important others expect them to reduce their car use. Subjective norms to reduce car use are especially weak in Norway. Participants report weak perceived behavior control believes, indicating that they feel that reducing their car use would be quite difficult. Participants do believe that car use causes serious environmental problems (although Dutch and Norwegian participants report lower problem awareness than participants in other countries), and they appear convinced that they can contribute to solving these problems by limiting their own car use. Again, Dutch and Norwegian participants appear to be less convinced that they can contribute than participants from other countries. On average, participants do not feel a strong moral obligation to reduce their car use, with Greek, French, Swiss, and Hungarian participants perceiving a stronger moral obligation than participants from the United Kingdom, the Netherlands, and Norway. Overall, participants in the Netherlands and Norway tend to score relatively low on the psychological antecedents of car use.

Table 7: Cronbach's alpha and mean scores for psychological antecedents of car use per country.

	α	**UK**	**FR**	**NL**	**GR**	**CH**	**NO**	**HU**	**Total**
Attitudes	0,76	4,1	4,6	4,1	4,3	4,4	3,9	3,9	4,2
Subjective norm	0,77	2,7	2,8	2,7	3,1	2,8	2,4	3,0	2,8
Perceived behavior control	0,86	3,9	3,6	3,4	4,1	3,9	3,5	3,9	3,8
Problem awareness	0,87	4,4	5,1	4,1	5,4	4,9	4,2	4,9	4,7
Outcome efficacy	0,85	4,2	4,7	3,9	4,9	4,8	3,8	4,9	4,5
Personal norm	0,81	3,5	3,9	3,4	4,2	3,7	3,1	3,7	3,7

Tables 4 and 5 showed that relative car use differed considerably for different levels of the demographic factors urbanization level, income level, and political orientation. Below, differences in psychological antecedents of car use between levels of these demographic factors are displayed to study whether differences between levels of demographic factors are related to differences in psychological antecedents.

Urbanization level and psychological antecedents of car use

Table 8 displays the average scores on all six psychological antecedents for car use for participants living in rural areas, small towns, and large towns. Differences in the psychological antecedents between urbanization levels appear rather small. The largest differences are in perceived behavior control and problem awareness: Both these factors increase as urbanization level increases, but these differences are relatively small.

Table 8: Psychological antecedents for car use per urbanization level.

	UK	FR	NL	GR	CH	NO	HU	Total
Attitudes								
Attitudes – Rural	4,0	4,6	3,9	4,2	4,4	3,7	3,8	4,1
Attitudes – Small town	4,2	4,5	4,1	4,3	4,3	4,0	3,9	4,2
Attitudes – Large town	4,2	4,5	4,2	4,3	4,5	4,0	3,9	4,0
Subjective norm								
Subjective norm – Rural	2,8	2,7	2,7	3,3	2,7	2,4	3,1	2,7
Subjective norm – Small town	2,6	2,9	2,7	3,1	2,9	2,4	3,0	2,8
Subjective norm – Large town	2,6	2,8	2,7	3,0	3,0	2,4	3,0	2,8
Perceived behavior control								
PBC – Rural	3,8	3,3	3,4	4,1	3,7	3,1	3,8	3,6
PBC – Small town	3,8	3,7	3,5	4,1	3,9	3,6	3,9	3,8
PBC – Large town	3,9	3,8	3,4	4,1	4,1	3,8	3,9	3,9
Problem awareness								
Problem awareness – Rural	4,4	5,1	4,0	5,4	4,7	4,0	4,9	4,6
Problem awareness – Small town	4,3	5,1	4,1	5,3	4,9	4,2	4,9	4,7
Problem awareness – Large town	4,5	5,1	4,3	5,4	5,2	4,5	5,0	4,9
Outcome efficacy								
Outcome efficacy – Rural	4,2	4,6	3,9	4,8	4,7	3,6	4,9	4,4
Outcome efficacy – Small town	4,1	4,8	4,0	4,8	4,9	3,9	4,8	4,5
Outcome efficacy – Large town	4,3	4,6	3,8	5,0	4,8	3,9	4,8	4,5
Personal norm								
Personal norm – Rural	3,6	3,8	3,4	4,1	3,6	3,0	3,8	3,5
Personal norm – Small town	3,4	4,0	3,4	4,2	3,9	3,1	3,7	3,7
Personal norm – Large town	3,5	4,0	3,4	4,2	3,6	3,2	3,7	3,7

Table 9 shows the average values for the psychological antecedents for car use per income group per country. As can be seen in this table, the differences between income groups regarding the psychological antecedents of car use are minimal. The largest difference between the groups is the decrease in problem awareness as income level increases, but even this effect is small. This lack of clear differences shows that the motivation to reduce car use is of similar levels for all income groups, indicating that non-psychological factors are likely to be the reason for the differences in relative car use between the income levels.

Table 9: Strength of psychological antecedents for car use per income level.

	UK	FR	NL	GR	CH	NO	HU	Total
Attitudes								
Attitudes – Low income	4,2	4,7	4,1	4,4	4,4	4,0	4,3	4,2
Attitudes – Middle income	4,2	4,5	4,0	4,3	4,4	3,9	3,8	4,1
Attitudes – High income	4,1	4,4	3,9	4,1	4,4	3,9	3,7	4,1
Subjective norm								
Subjective norm – Low income	2,8	2,6	2,8	3,0	2,6	2,3	3,1	2,8
Subjective norm – Middle income	2,6	3,0	2,7	3,2	2,9	2,4	3,0	2,8
Subjective norm – High income	2,7	2,9	2,7	3,0	2,9	2,4	2,8	2,8
Perceived behavior control								
PBC – Low income	4,0	3,6	3,5	4,2	3,9	3,6	4,2	3,9
PBC – Middle income	3,8	3,6	3,5	4,2	3,8	3,4	3,8	3,7
PBC – High income	3,8	3,5	3,3	3,9	3,9	3,6	3,7	3,7
Problem awareness								
Problem awareness – Low income	4,5	5,2	4,4	5,4	4,8	4,5	5,2	4,9
Problem awareness – Middle income	4,3	5,2	4,0	5,4	4,9	4,1	4,9	4,7
Problem awareness – High income	4,2	4,9	3,9	5,4	5,0	4,1	4,6	4,6
Outcome efficacy								
Outcome efficacy – Low income	4,3	4,7	4,0	4,9	4,8	3,9	5,1	4,6
Outcome efficacy – Middle income	4,2	4,7	3,9	4,9	4,7	3,8	4,8	4,4
Outcome efficacy – High income	4,0	4,6	3,9	4,8	4,9	3,8	4,7	4,4
Personal norm								
Personal norm – Low income	3,6	4,1	3,5	4,2	3,6	3,2	3,9	3,8
Personal norm – Middle income	3,5	4,0	3,3	4,2	3,7	3,0	3,7	3,6
Personal norm – High income	3,4	3,7	3,3	4,1	3,8	3,1	3,6	3,6

Table 10 shows that the differences in psychological antecedents for car use between political orientations are relatively large, certainly compared to the differences between income groups and urbanization levels. The largest difference was found for problem awareness, which is higher for left-wing oriented participants than for others. Similar effects were also observed for attitudes towards reducing car use, outcome efficacy, and personal norm. This indicates that left-wing oriented participants tend to be more motivated to reduce their car use than right-wing oriented participants.

Table 10: Psychological antecedents of car use per political orientation

	UK	FR	NL	GR	CH	NO	HU	Total
Attitudes								
Attitudes – Left-wing	4,2	4,7	4,1	4,4	4,4	4,0	4,3	4,2
Attitudes – Centre	4,2	4,7	4,0	4,2	4,4	4,0	4,0	4,2
Attitudes – Right-wing	4,0	4,3	4,0	4,3	4,2	3,7	3,9	4,0
Subjective norm								
Subjective norm – Left-wing	2,8	2,9	2,7	3,0	2,9	2,5	2,9	2,9
Subjective norm – Centre	2,6	2,8	2,8	3,1	2,7	2,3	3,1	2,8
Subjective norm – Right-wing	2,6	2,7	2,6	3,2	2,8	2,2	3,0	2,7
Perceived behavior control								
PBC – Left-wing	3,8	3,9	3,4	4,2	3,9	3,7	3,7	3,8
PBC – Centre	3,9	3,6	3,5	4,1	3,8	3,5	4,0	3,8
PBC – Right-wing	3,8	3,3	3,3	4,2	3,8	3,3	3,8	3,6
Problem awareness								
Problem awareness – Left-wing	4,6	5,3	4,3	5,5	5,2	4,8	4,7	5,0
Problem awareness – Centre	4,4	5,2	4,2	5,3	4,7	4,2	5,1	4,8
Problem awareness – Right-wing	4,0	4,9	3,7	5,3	4,7	3,7	4,8	4,4
Outcome efficacy								
Outcome efficacy – Left-wing	4,3	4,8	4,0	5,0	5,1	4,1	4,6	4,6
Outcome efficacy – Centre	4,1	4,7	4,0	4,8	4,8	3,9	5,0	4,5
Outcome efficacy – Right-wing	4,1	4,4	3,7	4,8	4,6	3,5	4,8	4,2
Personal norm								
Personal norm – Left-wing	3,6	4,2	3,5	4,2	3,9	3,5	3,6	3,8
Personal norm – Centre	3,5	4,0	3,5	4,1	3,6	3,0	3,8	3,7
Personal norm – Right-wing	3,4	3,6	3,1	4,1	3,6	2,8	3,8	3,4

Regression analysis car use

To analyze which psychological factors predict relative car use best, a regression analysis was conducted in which the psychological factors are regressed upon the relative car use behavior measure. The outcomes of this analysis are displayed in Tabke 11. The size of the beta weight indicates the strength of the relationship between a psychological factor and car use behavior. If the beta weight is positive, a positive relationship exists between the psychological factor and the relative car use measure. For example, an increase in attitudes towards reducing car use is predictive of an increase in the use of alternative modes of transport.

The psychological factors explain 10% of all variance in relative car use (see Table 11). This indicates that psychological factors have limited predictive power: Most of the variance in car use behavior is explained by non-psychological factors. Problem awareness contributes most to the explanation of relative car use. This means that individuals who believe that car use causes severe environmental problems are more likely to use alternatives modes of transport than individuals who do not believe this. It also means that of all six psychological antecedents, an increase of problem awareness is most likely to lead to an increase in the use of alternative modes of transport. A similar relationship, though less strong, can be found for attitudes towards reducing car use, indicating that individuals who think positively about reducing their car use use the car relatively less than individuals who think less positively about this, and perceived behavior control, indicating that individuals' who believe that they are able to reduce their car use use cars relatively less than others.

The beta weight for subjective norm, outcome efficacy, and personal norm are less strong, indicating that these factors add little to the explanation of relative car use.

Table 11: Regression analysis psychological antecedents of car use.

Psychological factor	**Beta weight**	**Sign.**
Attitudes	**0,19**	**<0,0005**
Subjective norm	**-0.07**	**<0,0005**
Perceived behavior control	**0,15**	**<0,0005**
Problem awareness	**0.24**	**<0,0005**
Outcome efficacy	**-0.09**	**<0,0005**
Personal norm	**-0.09**	**<0,0005**
Overall model	**R^2**	
Explained variance	**.10**	

Use of energy from sustainable sources

One way to reduce the environmental impact of household energy use is to switch from the use of energy that is generated by burning fossil fuels to sustainable energy sources. Participants were asked whether they currently use energy from sustainable sources (they were instructed to answer 'yes' both if they only use energy from sustainable sources and if they partly use sustainable energy). The proportion of participants who use energy from sustainable sources in each country can be seen in Table 12.

Table 12 shows that more participants in the Netherlands and Norway use energy from sustainable sources than participants in other countries. Nearly 40% of all participants use energy from sustainable sources; in the Netherlands and Norway, this figure is close to 60%. In Hungary, the United Kingdom, and France, relatively few participants used energy from sustainable sources (approx. 24%).

In most countries, relatively more participants living in rural areas use sustainable energy than participants living in urban areas. An exception is Switzerland, where a larger proportion of participants in urban areas use energy from sustainable sources (see Figure 5). Another demographic factor that appears to influence sustainable energy use is income level: The use of energy from sustainable energy sources increases with income level in most countries (see Figure 6). Hungary and the Netherlands are exceptions to this trend. The use of energy from sustainable sources also varies with political orientation: In most countries, participants with left-wing political orientations are most likely to use energy from sustainable sources, but in Switzerland and Hungary, this effect is reversed and participants with right-wing political orientations are most likely to use sustainable energy.

Table 12: Proportion of participants who use energy from sustainable sources

	UK	**FR**	**NL**	**GR**	**CH**	**NO**	**HU**	**Total**
All participants	0,24	0,24	0,58	0,41	0,44	0,58	0,22	0,38
Gender								
Male	0,25	0,26	0,64	0,42	0,50	0,68	0,26	0,43
Female	0,23	0,22	0,53	0,40	0,38	0,49	0,18	0,34
Age								
18-29	0,33	0,26	0,46	0,44	0,40	0,59	0,25	0,39
30-39	0,27	0,19	0,50	0,37	0,40	0,54	0,21	0,35
40-49	0,16	0,26	0,64	0,44	0,44	0,57	0,15	0,38
50-59	0,19	0,23	0,63	0,41	0,47	0,59	0,20	0,40
60-70	0,22	0,25	0,62	0,39	0,49	0,63	0,30	0,40
>70	0,25	0,28	0,77	0,36	0,38	0,71	0,60	0,42
Urbanization level								
Rural	0,24	0,31	0,60	0,46	0,42	0,62	0,27	0,43
Small town	0,25	0,23	0,58	0,42	0,42	0,54	0,22	0,38
Large town/city	0,23	0,19	0,57	0,39	0,50	0,59	0,18	0,35
Political orientation								
Left	0,27	0,25	0,62	0,46	0,44	0,62	0,19	0,41
Centre	0,24	0,26	0,57	0,39	0,41	0,56	0,21	0,36
Right	0,20	0,21	0,56	0,35	0,47	0,56	0,24	0,38
Education level								
No education / primary school	0,22	0,29	0,57	0,32	0,35	0,59	0,40	0,38
Secondary School	0,21	0,20	0,57	0,46	0,43	0,57	0,27	0,39
High school	0,24	0,23	0,62	0,39	0,47	0,58	0,15	0,34

Vocational education	0,24	0,23	0,58	0,44	0,41	0,57	0,32	0,40
University	0,25	0,27	0,58	0,36	0,47	0,61	0,18	0,40
Home ownership								
Owns home	0,23	0,29	0,62	0,45	0,47	0,61	0,21	0,40
Rents home from private person/company	0,28	0,18	0,52	0,31	0,40	0,52	0,27	0,36
Rents home from state agency	0,25	0,11	0,55	0,43	0,46	0,53	0,27	0,37
Income Level								
Low income	0,24	0,22	0,59	0,37	0,31	0,59	0,26	0,35
Middle income	0,21	0,22	0,57	0,45	0,46	0,52	0,17	0,38
High income	0,27	0,29	0,59	0,41	0,48	0,67	0,24	0,43

Figure5: Differences in proportion of respondents using sustainable energy sources per urbanization level per country

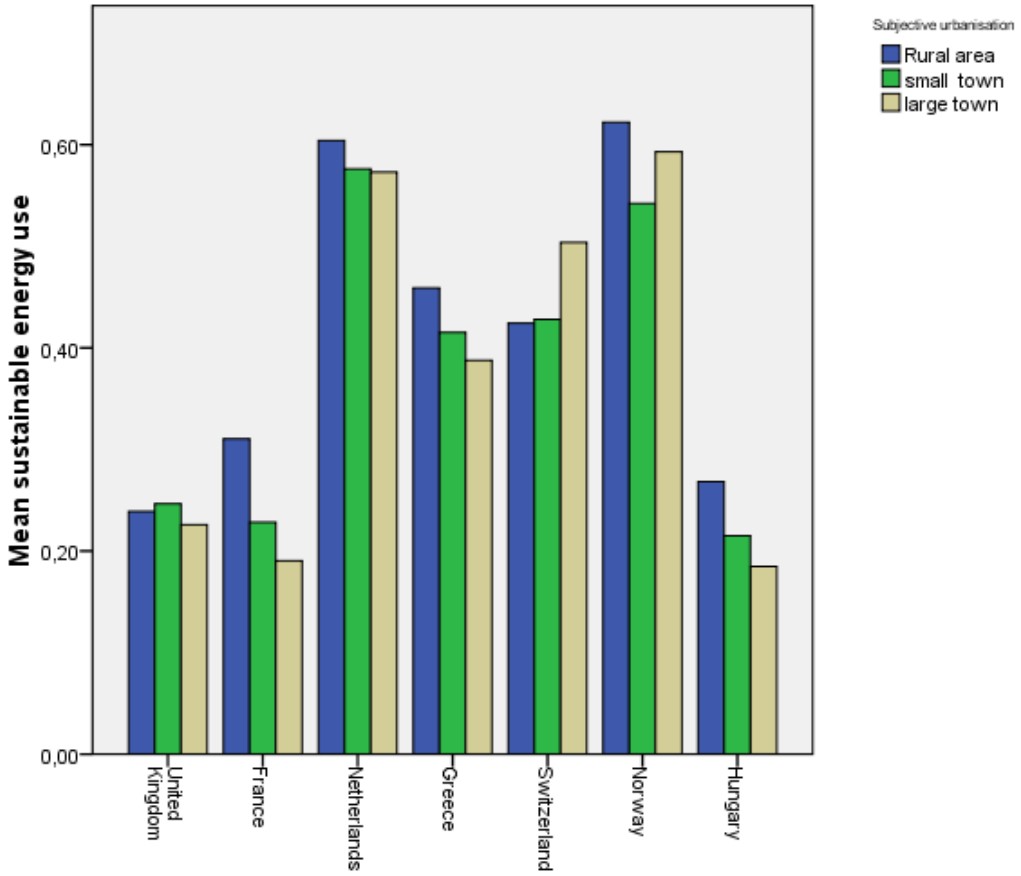
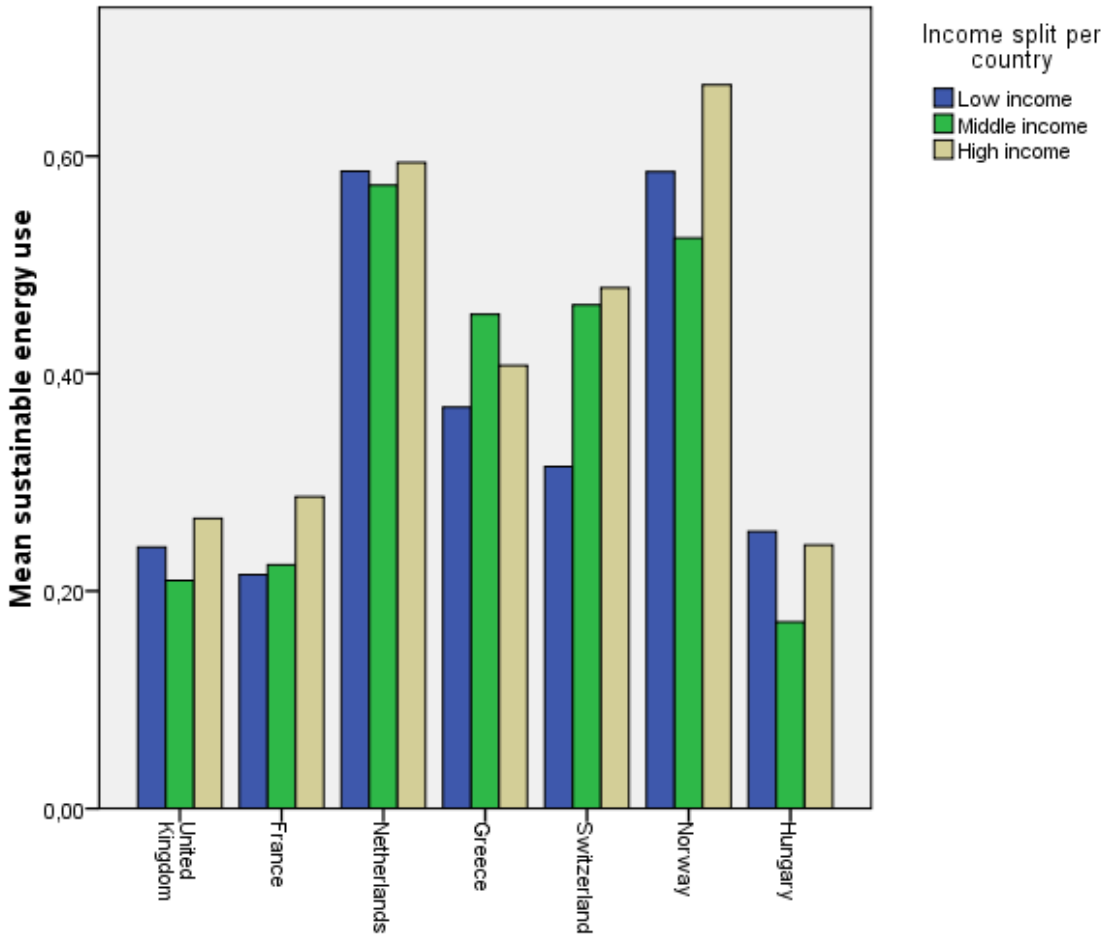


Figure 6: Differences in proportion of respondents using sustainable energy sources per income level per country



Psychological antecedents of use of energy from sustainable sources

Table 13 lists the six psychological antecedents of sustainable energy use that have been measured to assess participants' motivation to increase their use of sustainable energy. These antecedents are based on the same theoretical background as the antecedents of relative car use, but because they are measured on a behavior-specific level, the actual questions are different. The questions did have an identical format as the questions included for the psychological antecedents of relative car use.

Table 13: Psychological antecedents of relative car use included in the questionnaire.

Concept	**Meaning**
Attitude towards increasing sustainable energy usage	Evaluation of increasing the use of energy from sustainable sources as positive or negative
Subjective norm towards increasing the use of sustainable energy	Perceived social costs and benefits of increasing the use of energy from sustainable sources
Perceived behavior control regarding increasing the use of sustainable energy	Perceived ability to increase the use of energy from sustainable sources
Problem awareness regarding sustainable	Extent to which individuals believe that the use of non-sustainable energy leads to negative environmental

energy use	consequences
Outcome efficacy regarding sustainable energy use	Extent to which individuals believes they can contribute to preventing negative environmental consequences caused by the use of non-sustainable energy by increasing their own use of energy from sustainable energy sources
Personal norm to increase use of sustainable energy	Extent to which individuals feel morally obliged to increase their use of energy from sustainable sources

Table 14 shows the mean values for all six Participants in all countries report clearly favorable attitudes towards increasing the use of energy from sustainable energy sources. Participants did not feel that important others expect them to increase their use of energy from sustainable sources, as shown by the low scores on subjective norm. Perceived behavior control varies per country: In Norway and the Netherlands, the two countries in which most participants use energy from sustainable sources, perceived behavior control is higher than in the other countries. In Hungary, where sustainable energy use is low, perceived behavior control is also low. Problem awareness is lower in the Netherlands and Norway than in other countries, but even in these two countries, it is relatively high (4,4 and 4,5 on a seven-point scale). This indicates that on average, participants believe that using non-sustainable energy sources leads to negative environmental consequences. Outcome efficacy is also relatively high, indicating that participants believe that they can contribute to preventing these negative environmental consequences by increasing their use of sustainable energy. Most participants appear to feel a moral obligation to increase their use of energy from sustainable sources: Averages in all countries are well above the mid-point of the scale, with participants in Greece reporting the highest average score on personal norm.

Table 14: Cronbach's alpha and mean scores for psychological antecedents of sustainable energy use per country.

	α	**UK**	**FR**	**NL**	**GR**	**CH**	**NO**	**HU**	**Total**
Attitudes	0,86	5,0	5,5	5,0	5,7	5,3	5,2	5,2	5,3
Subjective norm	0,82	2,6	3,0	3,0	3,4	3,1	2,8	2,9	3,0
Perceived behavior control	0,85	3,2	3,3	4,1	4,0	3,6	3,9	3,0	3,6
Problem awareness	0,70	5,0	5,1	4,4	5,5	4,9	4,5	5,1	4,8
Outcome efficacy	0,76	4,3	4,6	4,6	5,3	4,9	4,4	4,9	4,7
Personal norm	0,83	4,0	4,6	4,6	5,2	4,2	4,0	4,5	4,3

Urbanization level and psychological antecedents of sustainable energy use.

Table 12 showed that in most countries, more participants living in rural areas use sustainable energy than participants living in small towns or urban areas. To assess whether psychological antecedents of the use of sustainable energy also differ between urbanization levels, differences between psychological antecedents of sustainable energy use per urbanization level were calculated (see Table 15).

Table 15 shows that for participants from Switzerland, perceived behavior control increases with urbanization level, while for participants from all other countries, the opposite effect is observed. An effect that is visible in all countries is the increase of problem awareness with urbanization level; we found the same effect in the analysis of problem awareness regarding car use. A remarkable finding is the strong drop in both perceived behavior control and outcome efficacy as urbanization level increases in France; a similarly strong effect does not occur in other countries.

Table 15: Psychological antecedents for sustainable energy use per urbanization level per country.

	UK	FR	NL	GR	CH	NO	HU	Total
Attitudes								
Attitudes – Rural	5,1	5,8	4,9	5,8	5,3	5,2	5,1	5,3
Attitudes – Small town	5,1	5,5	5,0	5,7	5,4	5,2	5,2	5,3
Attitudes – Large town	5,0	5,4	5,1	5,8	5,4	5,2	5,2	5,3
Subjective norm								
Subjective norm – Rural	2,7	3,1	3,0	3,4	3,0	2,9	2,9	3,0
Subjective norm – Small town	2,6	3,0	3,0	3,4	3,3	2,7	2,8	3,0
Subjective norm – Large town	2,5	2,9	3,2	3,4	3,3	2,8	2,9	3,0
Perceived behavior control								
PBC – Rural	3,3	3,6	4,1	4,2	3,6	4,0	3,1	3,7
PBC – Small town	3,2	3,2	4,1	4,0	3,6	3,8	3,0	3,6
PBC – Large town	3,1	3,0	4,1	4,0	3,8	3,8	2,9	3,5
Problem awareness								
Problem awareness – Rural	4,6	5,0	4,2	5,5	4,7	4,0	5,1	4,7
Problem awareness – Small town	4,4	5,0	4,5	5,4	5,0	4,1	5,1	4,8
Problem awareness – Large town	4,7	5,0	4,6	5,5	5,1	4,2	5,1	5,0
Outcome efficacy								
Outcome efficacy – Rural	4,4	4,8	4,5	5,3	4,8	4,3	4,9	4,7
Outcome efficacy – Small town	4,3	4,6	4,7	5,2	4,9	4,4	4,9	4,7
Outcome efficacy – Large town	4,4	4,4	4,7	5,3	5,0	4,3	4,8	4,7
Personal norm								
Personal norm – Rural	4,2	3,9	4,1	5,2	4,0	4,0	4,6	4,2
Personal norm – Small town	3,9	4,1	4,3	5,1	4,3	3,9	4,4	4,3
Personal norm – Large town	3,9	4,0	4,4	5,2	4,2	4,0	4,5	4,4

Income level and use of energy from sustainable sources

The use of energy from sustainable energy increases with income level in most countries (see Table 11). In Table 16, the psychological antecedents of use of energy from sustainable sources for each income level are displayed.

The strongest effect that can be found in Table 16 is the increase in perceived behavior control as income level increases. This indicates that participants with higher incomes have more confidence in their ability to increase their use of energy from sustainable sources than participants from lower income groups. The decrease in problem awareness as income level increases is an effect that was also observed with problem awareness regarding car use. Personal norm increases in Switzerland with increasing income, while in other countries, it decreases. This means that in Switzerland, participants from higher income groups feel a stronger moral obligation to increase their use of sustainable energy than participants from low-income groups, while in other countries, feelings of moral obligation tend to decrease as income level increases.

Table 16: Psychological antecedents of sustainable energy use per income level per country.

	UK	FR	NL	GR	CH	NO	HU	Total
Attitudes								
Attitudes – Low income	5,1	5,6	5,1	5,7	5,3	5,3	5,1	5,3
Attitudes – Middle income	5,0	5,6	4,9	5,8	5,3	5,2	5,2	5,3
Attitudes – High income	5,0	5,5	5,0	5,7	5,4	5,2	5,3	5,3
Subjective norm								
Subjective norm – Low income	2,6	2,8	3,1	3,4	2,9	2,8	2,9	2,9
Subjective norm – Middle income	2,6	3,1	3,0	3,5	3,2	2,7	2,9	3,0
Subjective norm – High income	2,6	3,1	3,1	3,4	3,3	2,8	2,8	3,0
Perceived behavior control								
PBC – Low income	3,2	3,1	3,9	4,0	3,4	3,8	3,1	3,5
PBC – Middle income	3,1	3,2	4,0	4,0	3,7	3,8	2,9	3,5
PBC – High income	3,3	3,5	4,3	4,2	3,8	4,0	2,9	3,8
Problem awareness								
Problem awareness – Low income	4,6	5,1	4,6	5,5	4,8	4,3	5,1	4,9
Problem awareness – Middle income	4,5	5,0	4,2	5,5	4,8	4,1	5,1	4,8
Problem awareness – High income	4,5	4,8	4,3	5,5	5,0	4,0	5,1	4,7
Outcome efficacy								
Outcome efficacy – Low income	4,4	4,5	4,7	5,2	4,8	4,3	4,8	4,7
Outcome efficacy – Middle income	4,3	4,7	4,4	5,3	4,9	4,4	4,8	4,7
Outcome efficacy – High income	4,3	4,7	4,7	5,3	5,0	4,3	5,0	4,7
Personal norm								
Personal norm – Low income	4,2	4,1	4,4	5,1	4,0	4,1	4,5	4,4
Personal norm – Middle income	3,9	4,0	4,0	5,2	4,2	4,0	4,5	4,3
Personal norm – High income	3,8	3,9	4,2	5,1	4,3	3,8	4,4	4,2

Regression analysis use of energy from sustainable sources

To assess which psychological factors are most predictive of sustainable energy use, we conducted a binary logistic regression analysis in which we regressed the psychological factors upon the measure for sustainable energy use. The outcome of this analysis is shown in Table 17.

The psychological antecedents of sustainable energy use explain 20% of all variance in sustainable energy use. Perceived behavior control has most predictive power, followed by personal norm. This means that participants who feel they are able to increase their use of sustainable energy are more likely to use it than participants who feel less able to increase their sustainable energy use. The predictive value of personal norm indicates that participants who feel a strong moral obligation to increase their use of sustainable energy are more likely to use sustainable energy than participants who do not feel a strong moral obligation to do so. The third-most important explanatory variable is subjective norm, which indicates that the more important others expect an individual to use sustainable energy, the likelier the person is to start using it. The importance of perceived behavior control as an explanatory variable highlights the importance of providing households with relatively easy access to sustainable energy in order to increase sustainable energy use.

Table 17: Regression analysis psychological antecedents of sustainable energy use

Psychological factor	**Wald test**	**Exp. B**	**Sign.**
Attitudes	**20,8**	**0,86**	**<0,0005**
Subjective norm	**35,2**	**1,18**	**<0,0005**
Perceived behavior control	**622,1**	**1,80**	**<0,0005**
Problem awareness	**22,5**	**0,86**	**<0,0005**
Outcome efficacy	**6,1**	**0,92**	**0.01**
Personal norm	**53,1**	**1,26**	**<0,0005**
Overall model	**R^2**		
Explained variance	**.20**		

Questionnaire II

Purchasing energy-efficient light bulbs

Purchasing energy-efficient light bulbs was chosen as a purchase behavior because it is a behavior that is both relatively common (many individuals engage in the behavior) and relatively frequently occurring (compared to for example purchasing a clothes dryer or a television set). These characteristics mean that most individuals can give informed answers, based on relatively recent experiences, about their purchase behavior. Participants were asked to indicate which percentage of all currently working light bulbs in their home was energy-efficient. This way of measuring the purchase and use of energy-efficient light bulbs was selected because it is (implicitly) a measure of purchase behavior (in order for energy-efficient light bulbs to be used in a household, they must have been purchased at some point), and it provides a question that any member of the household can answer, not just the individual who purchases light bulbs.

Table 18 displays the average percentage of light bulbs that is energy-efficient in each country. This table shows that in Norwegian households, the average percentage of energy-efficient households is lower than in households in other countries. In Norway, the average percentage is 33%, while in the other countries, the average percentage is around 50%. Some differences in the percentage of energy-efficient light bulbs exist between income groups, with lower income groups in the United Kingdom having a higher percentage of energy-efficient light bulbs than higher income groups, while the reverse effect occurs in Norway and Hungary, but these effects are confined to these three countries. Otherwise, relatively small differences were found between levels of demographic factors, indicating that the demographic situation a household is in has relatively little influence on light bulb purchase behavior.

Figure 7: Mean percentage of light bulbs that is energy-efficient per country

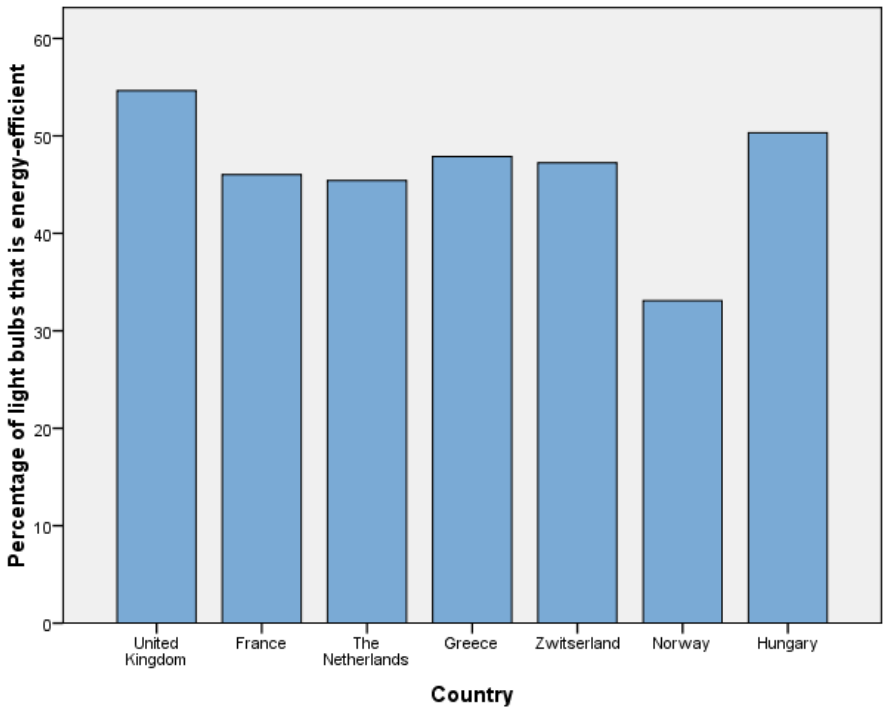


Table 18: Differences in percentages of all working light bulbs that are energy-efficient between countries.

	UK	FR	NL	GR	CH	NO	HU	Total
All participants	54%	46%	45%	48%	47%	33%	50%	46%
Gender								
Male	53%	46%	45%	48%	47%	37%	52%	47%
Female	56%	46%	45%	48%	48%	29%	49%	46%
Age								
18-29	51%	47%	39%	50%	43%	28%	48%	43%
30-39	54%	54%	40%	50%	51%	34%	50%	48%
40-49	57%	46%	49%	47%	52%	32%	51%	47%
50-59	59%	43%	49%	47%	46%	37%	52%	48%
60-70	53%	44%	51%	41%	47%	37%	56%	47%
>70	54%	27%	42%	24%	33%	40%	39%	42%
Urbanization level								
Rural	58%	47%	48%	45%	48%	36%	49%	47%
Small town	51%	44%	42%	48%	47%	32%	50%	45%
Large town/city	57%	47%	46%	48%	47%	32%	52%	47%
Political orientation								
Left	52%	48%	47%	50%	49%	33%	50%	46%
Centre	58%	46%	45%	48%	46%	33%	53%	48%
Right	50%	44%	45%	44%	47%	33%	46%	43%
Education level								
No education / primary school	52%	43%	40%	44%	43%	25%	40%	39%
Secondary School	57%	50%	45%	50%	44%	35%	49%	48%
High school	55%	44%	41%	46%	45%	29%	51%	45%
Vocational education	54%	46%	50%	48%	47%	37%	47%	47%
University	53%	47%	44%	47%	50%	34%	53%	46%
Household composition								
1	57%	48%	43%	48%	46%	33%	54%	45%
2	53%	39%	48%	47%	45%	32%	48%	45%
3	55%	46%	44%	46%	49%	34%	52%	47%
4	55%	51%	49%	52%	48%	33%	49%	48%
5 or more	56%	51%	39%	46%	52%	36%	51%	48%
Income Level								
Low income	59%	46%	47%	47%	46%	31%	48%	46%
Middle income	54%	47%	45%	49%	49%	31%	51%	48%
High income	49%	45%	44%	47%	47%	36%	53%	45%

Psychological antecedents of light bulb purchase behavior

In Table 19, the six psychological factors that were included in the questionnaire to measure the extent to which participants are motivated to purchase energy-efficient light bulbs are displayed, along with a brief explanation of each factor.

Table 19: Psychological antecedents of relative car use included in the questionnaire.

Concept	Meaning
Attitude towards purchasing energy-efficient light bulbs	Evaluation of purchasing energy-efficient light bulbs as positive or negative

Subjective norm towards purchasing energy-efficient light bulbs	Extent to which individuals believe important others expect them to purchase energy-efficient light bulbs
Perceived behavior control regarding purchase of energy-efficient light bulbs	Perceived ability to purchase energy-efficient light bulbs
Problem awareness regarding purchase of energy-efficient light bulbs	Extent to which individuals believe that using inefficient light bulbs leads to negative environmental consequences
Outcome efficacy regarding purchase of energy-efficient light bulbs	Extent to which individuals believes they can contribute to preventing negative environmental consequences caused by use of inefficient light bulbs by purchasing energy-efficient ones
Personal norm to purchase energy-efficient light bulbs	Extent to which individuals feel morally obliged to purchase energy-efficient light bulbs

All six concepts are measured using several questions. Cronbach's alpha is calculated for each concept to test whether the individual questions can be assumed to form one reliable scale (see Table 20). All questions consisted of a statement with which individuals can indicate whether they agree or disagree on a seven-point scale (1: completely disagree; 7: completely agree), with the exception of the attitude questions, which consisted of seven-point scales ranging from a positive to a negative consequence of reducing car use (e.g. Reducing my car use would be… 1 (good) – 7 (bad)).

Results

Table 20 shows that on average, participants have very positive attitudes towards purchasing energy-efficient light bulbs. Participants indicate moderate agreement with the subjective norm items, which means that they feel that important others might expect them to purchase energy-efficient light bulbs. Subjective norms are strongest in the United Kingdom and Greece, while in Norway, subjective norm is weakest, indicating that Norwegians feel a weaker expectation from others to purchase energy-efficient light bulbs than participants from other countries. Most participants feel that they are able to purchase and use energy-efficient light bulbs, as shown by the high mean values on perceived behavior control. Participants' problem awareness is moderate; it appears that most participants do not think that the use of inefficient light bulbs causes serious environmental problems. However, most participants do seem convinced that they will be able to contribute to solving these problems by using energy-efficient light bulbs. Both problem awareness and outcome efficacy are lower in the Netherlands and Norway than in the other five countries. Participants' do not perceive a strong moral obligation to use energy-efficient light bulbs. Norwegian participants in particular report no strong sense of moral obligation to use energy-efficient light bulbs.

Table 20: Cronbach's alpha and mean scores for psychological antecedents of light bulb purchase behavior per country.

	α	UK	FR	NL	GR	CH	NO	HU	Total
Attitudes	0,84	5,3	5,4	5,0	5,8	5,7	5,2	5,8	5,5
Subjective norm	0,76	4,3	4,1	3,8	4,3	4,1	3,5	4,0	4,0
Perceived behavior control	0,82	5,8	5,7	5,2	5,8	5,7	5,5	5,6	5,6
Problem awareness	0,81	4,4	4,7	3,9	5,3	4,5	3,8	4,6	4,4
Outcome efficacy	0,85	5,1	5,3	4,7	5,4	5,2	4,7	5,3	5,1
Personal norm	0,79	4,3	4,5	4,2	4,7	4,4	3,7	4,3	4,3

Regression analysis purchasing light bulbs

To analyze which psychological factors predict light bulb purchase behavior best, a regression analysis was conducted in which the psychological factors are regressed upon the percentage of energy-efficient light bulbs. The outcomes of this analysis are displayed in Table 21. The size of the beta weight indicates the strength of the relationship between a psychological factor and car use behavior. If the beta weight is positive, a positive relationship exists between the psychological factor and the relative car use measure.

Table 21 shows that the psychological antecedents of light bulb purchase behavior explain 23% of all variance in the behavior. Attitudes towards purchasing energy-efficient light bulbs are the main predictor of energy-efficient light bulb use. This means that participants who evaluate purchasing energy-efficient light bulbs favorably are more likely to have a high percentage of energy-efficient light bulbs than participants who evaluate this behavior less favorably. Perceived behavior control, personal norm, and subjective norm add to the prediction of the percentage of energy-efficient light bulbs participants have in their home. Problem awareness and outcome efficacy add little or no predictive power. These outcomes indicate that making attitudes towards purchasing energy-efficient light bulbs more favorable could be an effective way to increase the use of energy-efficient light bulbs.

Table 21: Regression analysis psychological antecedents of light bulb purchase behavior

Psychological factor	**Beta weight**	**Sign.**
Attitudes	**0,27**	**<0,0005**
Subjective norm	**0,14**	**<0,0005**
Perceived behavior control	**0,17**	**<0,0005**
Problem awareness	**-0,06**	**0,002**
Outcome efficacy	**-0,05**	**0.013**
Personal norm	**0,14**	**<0,0005**
Overall model	**R^2**	
Explained variance	**.23**	

Short-distance car use

Short-distance car use was included in the study because car use is one of the main contributors to environmental problems caused by households. Short-distance car use differs from overall car use in the sense that feasible alternatives for short-distance car trips are generally easier to find than alternatives for longer car trips. Relative short-distance car use was measured with a question similar to the one used to measure overall car use: Participants were asked to indicate how often they use a car to travel short distances on a scale ranging from 1 (I always travel short-distances by car) to 7 (I never use a car for short-distance travel). Participants were told that short-distance trips were trips of less than 5 km. Figure 8 shows the distribution of answers on this seven-point scale

Table 22 displays the mean relative short-distance car use scores per country. This table shows that the extent to which people use a car to travel short distances differs considerably between countries and for different groups. Participants in Hungary, the Netherlands, and Switzerland tend to use alternatives for cars to travel short distances more often than participants in the United Kingdom, France, and Norway. Whether someone lives in a rural area or an urban area matters considerably: In rural areas, people are far more likely to use a car for short-distance travel than in urban areas (see Figure 9). This difference is particularly pronounced in France and Norway (two large countries with an extensive, thinly populated countryside). A clear difference is also visible between people with different income levels: People with lower income levels tend to use alternatives for cars more often than people with higher incomes (see Figure 10). Political orientation also affects transport mode choice, with left-wing oriented people more likely to seek alternatives for short-distance car travel than right-wing oriented people in all countries except for Hungary. The only exception to this is Norway, where income level appears to be unrelated to short-distance car use. There is also an effect of household composition, with single people relying less on the car for short-distance travel than people living in multi-person households.

Figure 8: Short-distance car use

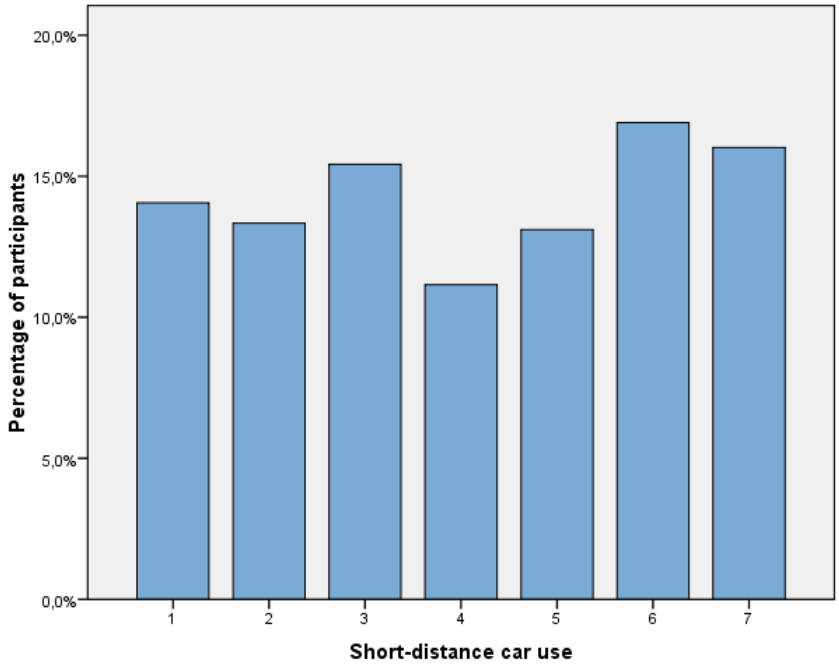


Table 22: Extent to which participants use a car for short-distance trips per country

	UK	FR	NL	GR	CH	NO	HU	Total
All participants	3,8	3,7	4,5	4,0	4,4	3,6	4,8	4,1
Gender								
Male	3,6	3,8	4,2	3,9	4,3	3,4	4,6	4,0
Female	4,0	3,6	4,7	4,2	4,5	3,7	5,1	4,2
Age								
18-29	4,2	4,2	5,1	4,5	4,8	4,3	5,4	4,6
30-39	3,7	3,4	4,6	3,9	4,3	3,3	4,6	4,0
40-49	3,8	3,5	4,3	3,6	4,5	3,2	4,6	4,0
50-59	3,6	3,7	4,2	4,4	4,1	3,4	4,9	4,0
60-70	3,8	3,6	4,1	3,6	4,0	3,3	4,3	3,8
>70	3,5	3,6	4,2	2,8	4,3	3,2	5,2	3,8
Urbanization level								
Rural	3,1	3,0	4,0	3,3	4,0	3,0	4,7	3,6
Small town	4,0	3,6	4,5	3,9	4,6	3,3	4,8	4,1
Large town/city	4,2	4,6	4,9	4,3	5,1	4,6	5,0	4,6
Political orientation								
Left	4,1	3,9	4,7	4,2	4,7	3,8	4,5	4,3
Centre	3,7	3,7	4,4	4,1	4,3	3,4	5,1	4,1
Right	3,7	3,5	4,3	3,7	4,1	3,4	4,7	3,9
Education level								
No education / primary school	3,9	4,2	4,6	3,5	4,8	3,3	5,1	4,1
Secondary School	4,1	3,6	4,4	4,1	4,2	3,5	5,3	4,2
High school	3,7	3,5	4,8	3,9	4,5	3,8	4,7	4,2
Vocational education	3,6	3,6	4,5	3,9	4,3	3,4	4,8	4,0
University	3,8	3,8	4,3	4,2	4,5	3,5	4,7	4,1
Household composition								
1	4,2	4,5	4,9	4,5	4,7	3,8	4,5	4,5
2	3,5	3,5	4,2	4,0	4,4	3,5	4,0	4,0
3	4,0	3,9	4,7	4,0	4,4	3,4	4,2	4,2
4	3,7	3,4	4,2	4,0	4,3	3,7	4,0	4,0
5 or more	3,8	3,3	4,1	3,9	4,1	3,1	3,9	3,9
Income Level								
Low income	4,1	3,9	5,0	4,3	4,8	3,5	5,2	4,4
Middle income	3,7	3,5	4,3	3,9	4,2	3,7	4,7	4,1
High income	3,5	3,5	3,9	3,8	4,2	3,5	4,5	3,8

Figure 9: Average short-distance car use per urbanization level

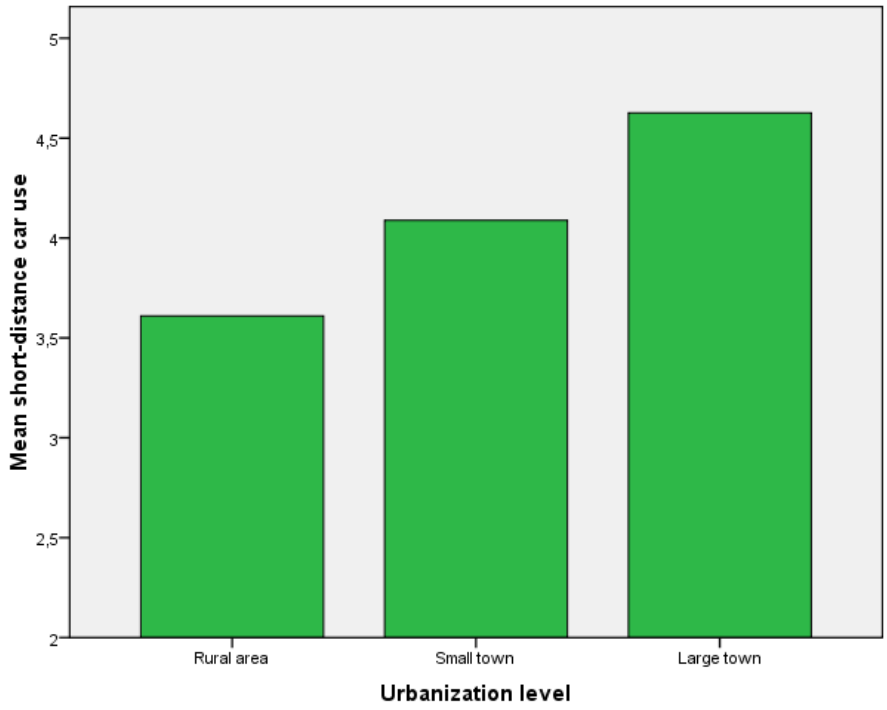
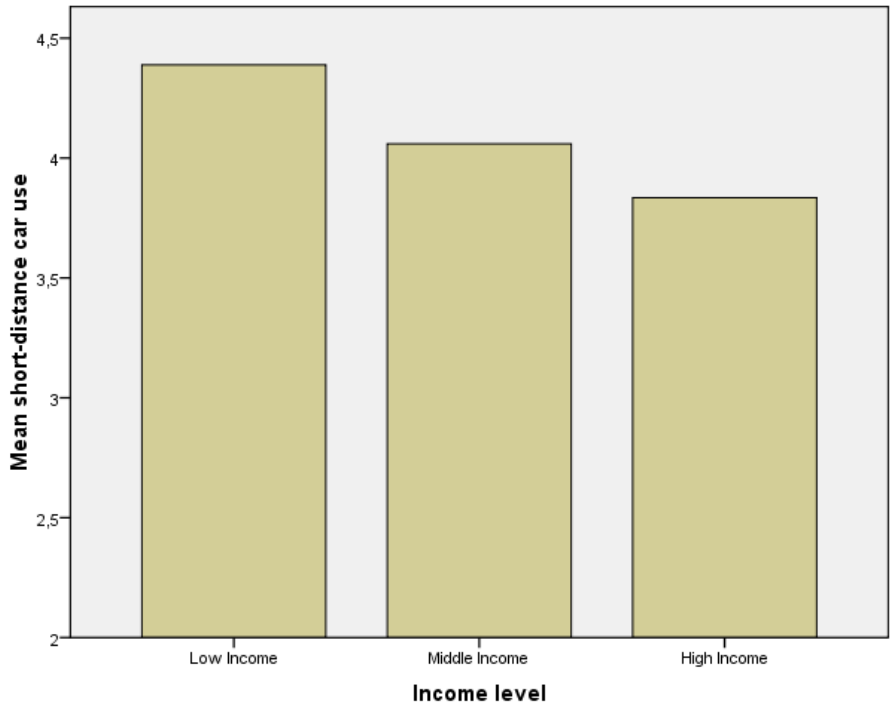


Figure 10: Average short-distance car use per income group



Psychological antecedents of short-distance car use

In Table 23, the six psychological factors that were included in the questionnaire to measure the extent to which participants are motivated to reduce their relative short-distance car use are displayed, along with a brief explanation of each factor.

Table 6: Psychological antecedents of relative car use included in the questionnaire.

Concept	**Meaning**
Attitude towards reducing short-distance car use	Evaluation of reducing short-distance car use as positive or negative
Subjective norm towards reducing short-distance car use	Extent to which individuals believe important others expect them to reduce their short-distance car use
Perceived behavior control regarding reducing short-distance car use	Perceived ability to reduce short-distance car use
Problem awareness regarding short-distance car use	Extent to which individuals believe that short-distance car use leads to negative environmental consequences
Outcome efficacy regarding short-distance car use	Extent to which individuals believes they can contribute to preventing negative environmental consequences caused by short-distance car use by reducing their own short-distance car use.
Personal norm to reduce short-distance car use	Extent to which individuals feel morally obliged to reduce short-distance car use

All six concepts are measured using several questions. Cronbach's alpha is calculated for each concept to test whether the individual questions can be assumed to form one reliable scale (see Table 24). All questions consisted of a statement with which individuals can indicate whether they agree or disagree on a seven-point scale (1: completely disagree; 7: completely agree), with the exception of the attitude questions, which consisted of seven-point scales ranging from a positive to a negative consequence of reducing car use (e.g. Reducing my car use would be… 1 (good) – 7 (bad)).

The results

Table 24 shows that, on average, participants report favorable attitudes towards reducing their short-distance car use. Norwegians report slightly less favorable attitudes than participants from other countries. Participants report moderately strong subjective norms, indicating that they do not feel that important others expect them to reduce their short-distance car use. Norwegian participants report weaker subjective norms than participants from other countries. Participants in all countries apart from the Netherlands and Norway are convinced that they are in principle able to reduce their short-distance car use, indicated by the relatively high scores on perceived behavior control. In the Netherlands and Norway, perceived behavior control believes are weaker than in other countries. Short distance car use is regarded as a problem in all countries (although less so in the Netherlands and Norway than elsewhere), and participants are generally convinced that they can contribute to solving this problem by reducing their own short-distance car use. Finally, participants report moderate feelings of moral obligation to reduce their short-distance car use, with the French reporting relatively high levels of perceived moral obligation.

Table 24: Cronbach's alpha and mean scores for psychological antecedents of short-distance car use per country

	α	UK	FR	NL	GR	CH	NO	HU	Total
Attitudes	0,82	4,6	4,8	4,4	4,9	4,7	4,1	4,8	4,6
Subjective norm	0,81	3,7	4,0	3,8	4,2	3,9	3,1	3,9	3,8
Perceived behavior control	0,80	4,5	4,7	4,3	5,1	4,7	4,1	4,7	4,6
Problem awareness	0,84	4,6	5,1	4,5	5,5	4,9	4,3	5,0	4,8
Outcome efficacy	0,83	4,7	5,1	4,5	5,4	5,1	4,2	5,3	4,9
Personal norm	0,84	3,9	4,5	4,0	4,6	4,2	3,4	4,1	4,1

Zooming in on differences between urbanization levels in Table 25, we can see that the scores on psychological antecedents are similar across urbanization levels. An exception is the subjective norm towards reducing short distance car use: The results show that participants in an urban environment perceive a stronger expectation from important others to reduce their car use than participants in rural settings. Perceived behavior control also increases slightly as urbanization level increases, but this effect is surprisingly limited considering the differences in availability of alternatives for car use between urban and rural areas. The difference in perceived behavior control believes between urbanization levels is largest in the United Kingdom and France. Problem awareness scores are higher in urban environments than in rural environments; this is perhaps indicative of the environmental problems cars create in urban environments. This increase in problem awareness with increasing urbanization level is especially clear in Switzerland, while in Hungary, a small reversed effect can be observed.

Table 25: Average short-distance car use per urbanization level per country

	UK	FR	NL	GR	CH	NO	HU	Total
Urbanization level: Rural								
Attitudes	4,4	4,7	4,4	4,8	4,5	4,1	4,8	4,5
Subjective norm	3,5	3,7	3,7	4,0	3,7	3,0	4,0	3,6
Perceived behavior control	4,2	4,5	4,2	4,8	4,5	3,9	4,8	4,4
Problem awareness	4,5	5,1	4,4	5,5	4,7	4,2	5,2	4,7
Outcome efficacy	4,6	5,0	4,5	5,3	5,0	4,2	5,5	4,8
Personal norm	3,8	4,4	3,9	4,7	3,9	3,5	4,3	4,0
Urbanization level: Small town								
Attitudes	4,7	4,8	4,4	4,9	4,8	4,1	4,8	4,7
Subjective norm	3,6	4,0	3,8	4,1	4,1	3,0	3,8	3,8
Perceived behavior control	4,6	4,7	4,3	5,1	4,8	4,3	4,7	4,7
Problem awareness	4,6	5,1	4,5	5,4	5,0	4,2	5,2	4,9
Outcome efficacy	4,7	5,1	4,5	5,4	5,3	4,4	5,5	5,0
Personal norm	3,9	4,5	4,0	4,5	4,5	3,4	4,3	4,1
Urbanization level: Large town								
Attitudes	4,5	4,9	4,5	4,9	4,9	4,4	4,7	4,7
Subjective norm	3,9	4,2	3,9	4,3	4,3	3,3	3,8	4,0
Perceived behavior control	4,5	4,9	4,3	5,1	4,6	3,9	4,6	4,6
Problem awareness	4,8	5,1	4,7	5,5	5,5	4,4	4,9	5,0
Outcome efficacy	4,8	5,1	4,6	5,4	5,4	3,9	5,2	4,9
Personal norm	4,1	4,5	4,0	4,7	4,6	3,4	3,9	4,2

Table 26 shows that income is only weakly related to psychological factors influencing short-distance car use. Participants with higher incomes tend to score slightly lower on the psychological factors than participants with middle or lower incomes, but these differences remain small.

Table 26 : Average short-distance car use per income group per country

	UK	FR	NL	GR	CH	NO	HU	Total
Income level: Low income								
Attitudes	4,6	4,9	4,5	5,0	4,7	4,1	5,0	4,7
Subjective norm	3,7	4,0	3,8	4,2	3,9	3,1	4,0	3,8
Perceived behavior control	4,2	4,7	4,3	5,2	4,7	4,0	4,9	4,6
Problem awareness	4,7	5,2	4,6	5,6	4,8	4,3	5,2	4,9
Outcome efficacy	4,6	5,2	4,5	5,4	5,1	4,1	5,5	4,9
Personal norm	4,0	4,6	4,0	4,6	4,0	3,4	4,4	4,1
Income level: Middle income								
Attitudes	4,6	4,8	4,5	4,9	4,7	4,2	4,7	4,6
Subjective norm	3,7	3,9	3,7	4,2	4,0	2,9	3,8	3,8
Perceived behavior control	4,6	4,7	4,3	5,0	4,7	4,0	4,6	4,6
Problem awareness	4,6	5,0	4,6	5,5	4,9	4,4	4,9	4,9
Outcome efficacy	4,8	5,0	4,6	5,4	5,2	4,3	5,2	5,0
Personal norm	4,0	4,4	3,9	4,6	4,3	3,4	3,9	4,1
Income level: High income								
Attitudes	4,5	4,7	4,3	4,7	4,6	4,1	4,6	4,5
Subjective norm	3,6	4,1	3,8	4,3	3,9	3,2	3,7	3,8
Perceived behavior control	4,7	4,5	4,4	5,0	4,6	4,2	4,5	4,5
Problem awareness	4,6	5,0	4,4	5,4	4,9	4,3	4,9	4,7
Outcome efficacy	4,8	5,0	4,5	5,3	5,1	4,2	5,2	4,8
Personal norm	4,0	4,5	3,9	4,6	4,2	3,5	3,9	4,1

Regression analysis short-distance car use

To examine which psychological antecedents of short-distance car use have most explanatory power, the psychological antecedents were regressed on the short-distance car use measure (see Table 27). The size of the beta weight indicates the strength of the relationship between a psychological factor and short-distance car use behavior. If the beta weight is positive, a positive relationship exists between the psychological factor and the relative short-distance car use measure. For example, an increase in attitudes towards reducing short-distance car use is predictive of an increase in the use of alternative modes of transport for traveling short distances.

Table 27 shows that the psychological factors explain 21% of all variance in relative short-distance car use. Attitudes towards reducing car use are by far the most important predictor of travel mode choice, indicating that individuals with strongly favorable attitudes towards reducing their short-distance car use rely less on cars to travel short distances than individuals with less favorable attitudes. Another variable with clear predictive power is problem awareness: The extent to which participants believe that short-distance car use causes environmental problems is positively related to their transport-mode choice. The relationships between the other four psychological factors and the measure of relative short-distance car use are weak.

Table 27: Regression analysis psychological antecedents of short-distance car use

Psychological factor	**Beta weight**	**Sign.**
Attitudes	**0,39**	**<0,0005**
Subjective norm	**0,08**	**<0,0005**
Perceived behavior control	**-0,02**	**0,23**
Problem awareness	**0,15**	**<0,0005**
Outcome efficacy	**-0,09**	**<0,0005**
Personal norm	**0,01**	**0,59**
Overall model	**R^2**	
Explained variance	**.21**	

Using light bulbs

Light use was included in the questionnaire as a curtailment behavior that every member of a household can engage in. To focus on the curtailment aspect of light use, we measured how often people turn off the lights when they vacate unoccupied rooms. Participants were asked to indicate how often they turn off the light when leaving unoccupied rooms on a scale of 1 (never) to 7 (always). The results are shown in Figure 11 and Table 28.

Figure 11: Frequency with which participants turn off the lights when vacating an empty room

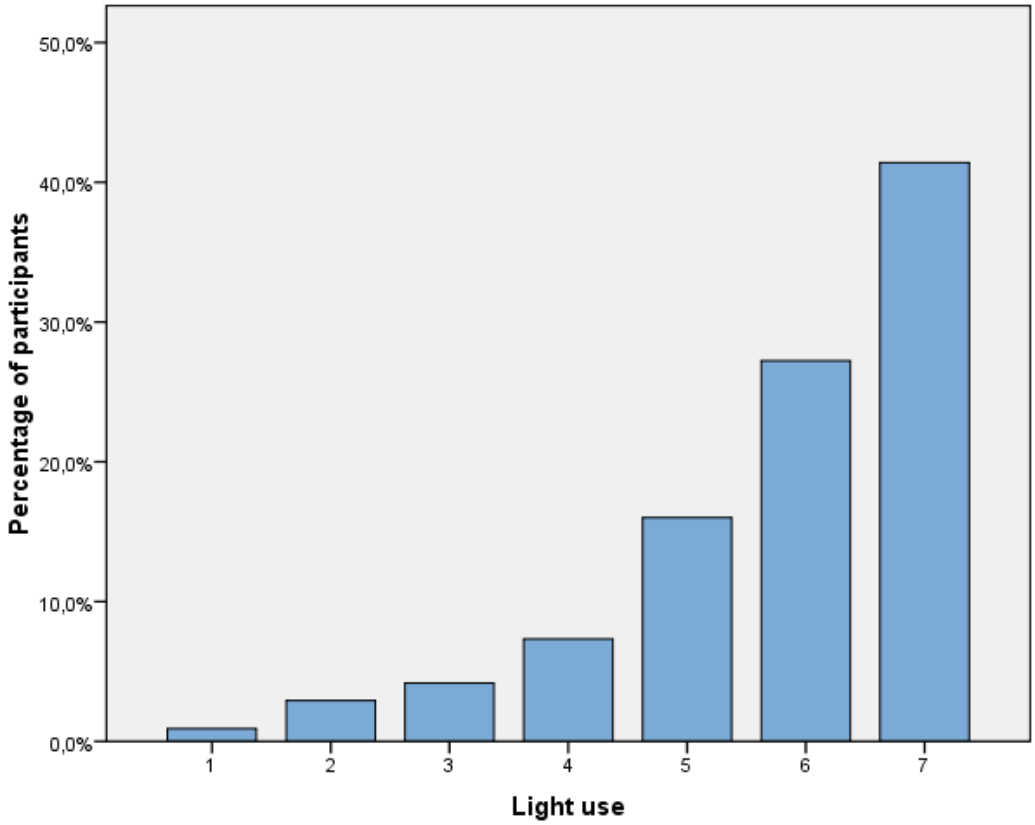


Figure 11 shows that most participants turn off the lights most of the time: Roughly 70% of participants report that they always or nearly always turn off the lights when they vacate an unoccupied room. Almost no participants report that they do never turn off the lights when vacating an unoccupied room.

Table 28: Frequency with which participants turn off lights when leaving unoccupied rooms

	UK	FR	NL	GR	CH	NO	HU	Total
All participants	5,8	6,1	6,0	5,8	5,9	5,3	5,9	5,8
Gender								
Male	5,7	6,0	6,0	5,8	5,8	5,3	5,9	5,8
Female	5,9	6,2	6,0	5,8	6,0	5,4	5,9	5,9
Age								
18-29	5,5	6,0	5,8	5,8	5,7	5,5	6,0	5,8
30-39	5,7	6,1	5,5	6,0	6,1	5,3	6,0	5,8
40-49	5,7	6,3	6,2	5,8	6,0	5,3	6,0	5,9
50-59	5,9	6,1	6,4	5,9	6,0	5,3	5,9	5,9
60-70	6,0	6,1	6,1	5,6	5,6	5,3	5,6	5,8
>70	5,7	5,2	5,2	5,2	5,3	4,8	4,4	5,2
Urbanization level								
Rural	5,7	6,1	6,1	6,0	6,0	5,3	6,0	5,9
Small town	5,8	6,2	5,9	5,9	5,8	5,2	5,9	5,8
Large town/city	5,8	5,9	5,9	5,8	5,7	5,5	5,9	5,8
Political orientation								
Left	5,7	6,0	5,8	5,8	5,9	5,2	5,8	5,8
Centre	5,9	6,1	6,1	5,9	5,9	5,5	6,0	5,9
Right	5,6	6,2	6,0	5,8	5,9	5,3	5,9	5,8
Education level								
No education / primary school	5,4	6,1	6,4	5,4	5,7	5,2	5,6	5,7
Secondary School	5,9	6,0	6,1	5,8	5,8	5,4	6,0	5,9
High school	5,7	6,2	5,9	5,9	5,5	5,3	5,8	5,8
Vocational education	5,8	6,1	6,0	5,9	6,0	5,3	6,0	5,9
University	5,8	6,0	6,0	5,8	5,9	5,3	5,9	5,8
Household composition								
1	5,9	6,3	6,0	6,0	5,9	5,4	5,9	5,9
2	5,8	6,0	6,0	5,9	5,9	5,2	5,8	5,8
3	5,8	6,1	6,2	5,8	5,9	5,4	6,0	5,8
4	5,7	6,1	6,0	5,7	5,8	5,3	5,9	5,8
5 or more	5,7	6,2	5,6	6,0	6,1	5,4	5,9	5,9
Income Level								
Low income	5,8	6,2	6,0	5,8	5,8	5,3	6,0	5,9
Middle income	5,8	6,0	6,1	5,9	5,8	5,3	5,9	5,8
High income	5,7	6,0	5,8	5,8	6,0	5,3	5,9	5,8

Table 28 shows that most participants report that they always or nearly always turn off the lights. The average value is around six in all countries apart from Norway. Differences between demographic groups are small in all countries, indicating that demographic factors are only weakly related with light use behavior.

Psychological antecedents light use

Turning off the light when vacating unoccupied rooms is a highly automatic behavior. Therefore habit, which is the extent to which individuals engage in behavior automatically, is included as a psychological antecedent of light use behavior. Table 29 shows a list of the included psychological antecedents and a brief overview of their meaning.

Table 29: Psychological antecedents of light use

Concept	Meaning
Habit to turn off lights when vacating an unoccupied room	The strength of an individuals' habit to turn off the lights when vacating an unoccupied room
Subjective norm to turn off lights when vacating an unoccupied room	The extent to which individuals feel important others expect them to turn off the lights when vacating unoccupied rooms
Personal norm to turn off lights when vacating an unoccupied room	The extent to which individuals feel morally obliged to turn off the lights when vacating unoccupied rooms

Results

Table 30 shows that participants in all countries except Norway report a strong habit of turning off the light in unoccupied rooms. In Norway, this habit appears to be less strong, but Norwegian participants still report a moderately strong habit of turning off the light in unoccupied rooms. Subjective and personal norms to turn off the light in unoccupied rooms are relatively strong, certainly compared to the scores that were reported for other behaviors. Norwegian participants report weaker personal and subjective norms to turn off the lights than participants from other countries.

Table 30: Differences in psychological antecedents of light use between countries

	α	UK	FR	NL	GR	CH	NO	HU	Total
Habit	0,94	5,3	5,6	5,5	5,4	5,5	4,7	5,4	5,3
Subjective norm	0,78	4,5	4,9	4,6	4,9	4,6	3,7	4,7	4,5
Personal norm	0,86	4,6	5,4	5,0	5,0	4,8	4,0	4,6	4,7

Regression analysis light use

To assess to what extent the psychological antecedents of light use predict behavior, a regression analysis was conducted. The results of this analysis are displayed in Table 31. The results show that the psychological antecedents of light use behavior explain 49% of all variance in the behavior. Habit has most predictive power, indicating that whether or not individuals turn off the lights in unoccupied rooms is indeed influenced by the strength of their habit to do so. Individuals with stronger habits turn off the lights more often than individuals with weaker habits. Personal and subjective norms are less influential.

Table 31: Regression analysis light use

Psychological factor	Beta weight	Sign.
Habit	**0,67**	**<0,0005**
Subjective norm	**-0,04**	**<0,0005**
Personal norm	**0,06**	**<0,0005**
Overall model	**R^2**	
Explained variance	**.49**	

Participants' evaluation of the acceptability of energy policy measures

The participants evaluated six policy measures. These policy measures differ on a number of characteristics. Some are pull measures, aimed to encourage behavior change by making energy-saving behaviors attractive (measures 3, 4, and 5), while others are push measures, aiming to create change by making energy-intensive practices less attractive (measures 1, 2, and 6). Some measures aim to change transport behavior (measures 1 & 4), while others focus on home insulation (measures 2 & 3), or the use of sustainable energy sources (measures 4 & 6).

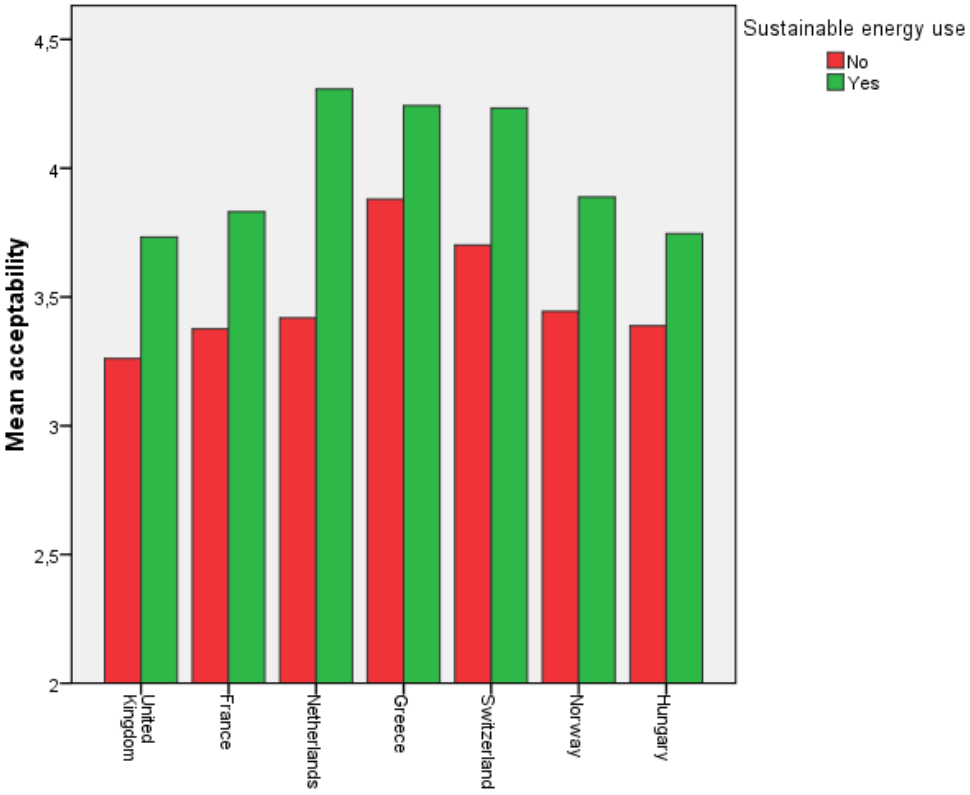
Each policy measure was evaluated on four aspects: The extent to which the measure is acceptable, fair, likely to be effective, and likely to influence the life of the participant positively or negatively. Participants used seven-point scales to evaluate the policy measures. These scales ranged from a negative evaluation (e.g. totally unacceptable - 1) to a positive evaluation (totally acceptable - 7). Table 32 shows the mean evaluations per country.

Table 32: Mean evaluation of energy policy measures per country.

	UK	FR	NL	GR	CH	NO	HU	Total
1. An increase of car use costs (through taxes on car ownership and car fuel) of 30%.								
Acceptability	2,6	2,2	2,6	2,5	2,9	2,5	2,5	2,6
Fairness	2,5	2,1	2,8	2,5	2,8	2,5	2,5	2,5
Effectiveness	3,2	2,8	3,2	2,8	3,4	3,0	2,7	3,0
Affects life	2,8	2,5	2,9	2,5	2,9	2,5	2,5	2,6
2. Stricter norms on the energy efficiency of new houses, meaning that cheap, energy-inefficient houses will no longer be build.								
Acceptability	4,9	4,8	4,8	5,0	5,2	4,9	5,0	4,9
Fairness	4,7	4,3	4,6	4,7	4,8	4,4	4,6	4,6
Effectiveness	4,7	4,7	4,8	5,0	5,3	4,7	4,9	4,9
Affects life	4,3	4,5	4,5	4,7	4,7	4,4	4,7	4,6
3. Subsidies on installation measures, meaning that investments in home insulation will be recouped within two years.								
Acceptability	5,7	6,1	5,6	4,9	5,8	5,6	6,0	5,7
Fairness	5,4	5,7	5,4	4,7	5,6	5,4	5,6	5,4
Effectiveness	5,3	5,8	5,4	4,8	5,6	5,4	5,6	5,4
Affects life	5,0	5,8	5,3	4,8	5,4	5,2	5,6	5,3
4. Improvement of public transport – increased frequency of public transport service and the opening of new public transport routes.								
Acceptability	5,9	6,1	5,9	6,4	6,0	6,1	6,3	6,1
Fairness	5,8	5,9	5,7	6,3	5,9	5,9	6,0	5,9
Effectiveness	5,3	5,8	5,5	6,2	5,7	5,7	5,7	5,7
Affects life	5,3	5,6	5,5	6,1	5,7	5,7	5,9	5,7
5. Subsidies on the installation of solar panels, meaning that the cost associated with the installation of the panels will be recouped within two years.								
Acceptability	5,8	6,3	5,9	5,5	6,0	5,7	6,2	5,9
Fairness	5,6	6,0	5,6	5,3	5,9	5,4	5,9	5,7
Effectiveness	5,4	5,9	5,7	5,4	5,8	5,3	5,9	5,6
Affects life	5,2	5,9	5,5	5,4	5,4	5,3	5,9	5,5
6. An increase in governmental taxes on non-sustainable energy sources, resulting in a 20% increase in the price of energy from non-sustainable sources.								
Acceptability	3,4	3,5	3,9	4,0	3,9	3,7	3,5	3,7
Fairness	3,2	3,2	3,8	3,8	3,7	3,4	3,2	3,5
Effectiveness	3,6	3,6	4,1	4,0	4,1	3,8	3,4	3,8
Affects life	3,2	3,4	3,8	3,8	3,7	3,4	3,2	3,5

Table 32 shows that there is a clear difference in the evaluation of pull and push measures. Pull measures are generally deemed very acceptable, fair, and effective, while push measures are regarded as unacceptable, unfair, and ineffective. Differences between countries are generally small; there seems to be an agreement between inhabitants of all countries on which measures are acceptable and which are not. On average, participants expect to benefit most from public transport improvements, while they expect to suffer most from an increase in car use costs. Surprisingly, participants perceive an increase in the cost of non-sustainable energy as both reasonably acceptable and effective, indicating that such a policy measure may be accepted by the general public as a means of increasing the use of sustainable energy. However, as Figure 12 shows, there is a clear difference in the extent to which users and non-users of sustainable energy find this policy measure acceptable: Users of sustainable energy find this policy measure more acceptable than non-users.

Figure 12: Acceptability of measure 6 'tax increase grey energy' for users and non-users of sustainable energy



Summary of main results

Car use

- On average, participants travel slightly more by car than by other means of transport. In Norway, France, and the United Kingdom, participants travel more by car than in other countries, while in Switzerland and Hungary, participants more often use alternative modes of transport.
- Participants in rural areas use the car more often than urban residents.
- Higher-income groups use the car for a larger percentage of all their travel than lower income groups.
- Left-wing oriented participants more likely to use other modes of transport than right-wing oriented participants.
- Psychological factors predict car use poorly, indicating that other factors influence car use as well.
- The extent to which participants believe that car use causes environmental problems is the best predictor of actual car use.

Use of energy from sustainable sources

- The extent to which households use energy from sustainable energy differs strongly between European countries. In the Netherlands and Norway, more than half of all participants use sustainable energy, while in France, the United Kingdom, and Hungary, less than a quarter of the population does so.
- Individuals in rural areas more likely to use sustainable energy in most countries. In Switzerland, however, urban residents are more likely to use sustainable energy.
- Participants from higher income groups are more likely to use sustainable energy than participants from lower income groups. In the Netherlands and Hungary, no relationship between income and sustainable energy use was found.
- Psychological factors explain sustainable energy use moderately well. Perceived behavior control is the main psychological predictor of sustainable energy use, indicating that the extent to which participants believe they are able to increase their sustainable energy use is an important barrier for increasing the use of energy from sustainable sources. This may point at the existence of institutional barriers: If switching to sustainable energy is perceived as too difficult, individuals will not make the change.

Purchasing energy-efficient light bulbs

- In most countries, an average of 50% of all light bulbs in a household is energy-efficient. In Norway, however, this percentage is only 33%.
- Participants report strongly favorable attitudes towards purchasing energy-efficient light bulbs.
- Participants in all countries report that they feel able to purchase energy-efficient light bulbs, indicating that availability is not a great barrier.
- Attitudes towards purchasing energy-efficient light bulbs are the main predictor of actual use of energy-efficient light bulbs.
- Perceived behavior control is also an important predictor of light bulb purchase, indicating that the extent to which individuals feel able to purchase energy-efficient light bulbs influences their actual use of energy-efficient light bulbs. This finding means shows that the use of energy-efficient light bulbs could increase as it becomes easier to purchase the light bulbs.

Short-distance car use

- Average short-distance car use differs considerably between countries. In the Netherlands, Switzerland, and Hungary, participants tend to use the car less for short distances than in the United Kingdom, France, and Norway.
- Participants in rural areas use the car relatively more for short trips than participants in urban areas.
- Individuals from lower income groups tend to use cars less for short-distance travel than individuals from higher income groups.
- Short distance car use is reasonably well explained by psychological factors, indicating that the extent to which people are motivated to engage in the behavior can be an important barrier for reducing short-distance car use.
- Attitudes towards reducing short-distance car use are by far the most important predictor of actual short-distance car use, indicating that participants with strongly favorable attitudes towards reducing short distance car use use the car less to travel short distances than individuals with less favorable attitudes.

Using light bulbs

- Almost all participants report that they turn off lights in unoccupied rooms 'always' or 'nearly always'. Participants in Norway turn off the lights in unoccupied rooms less often than participants in other countries.
- Differences in demographic backgrounds are not translated into differences in light use behavior.
- Habit strength predicts actual light use behavior well, indicating that participants with strong habits to turn off the lights turn the lights off when vacating an unoccupied room more often than participants with weaker habits.

Acceptability of policy measures

- Pull measures are evaluated as highly acceptable, fair, and effective. Participants are in favor of measures that increase the attractiveness of engaging in energy saving behaviors over measures that make energy consuming behaviors less attractive.
- Participants expect to personally benefit most from improvements of public transport, while they expect to suffer most from increases in car use costs.
- Participants evaluate an increase in the cost of energy from non-sustainable sources neutrally, indicating that there may be some support for such a measure to increase sustainable energy use. There are however clear differences in the evaluation of this measure between sustainable energy users (who are not negatively affected by it) and non-users, with current users evaluating this measure as more acceptable than non-users.