Testing CO2/Car labelling options and consumer information

Annex II Technical Compendium

GLOSSARY OF TECHNICAL TERMS/CONCEPTS

ANOVA

Analysis of Variance is a collection of linear statistical models (with their associated procedures), providing a statistical test of whether or not the means of several variable are all equal. Put it differently it is a way to partition the observed variance in a particular variable into components attributable to different sources of variation. In its simplest form ANOVA generalizes t-test (see *infra*) to more than two variables at a time.

Binary variable

A discrete variable (see *infra*) possessing only two possible values as a result of the natural characteristic of the variable (i.e. gender: Female or Male) or of the coding imposed by the researcher. A dummy variable (see *infra*) is a particular case of binary variable. For binary dependent variables (*see infra*) a logit (see *infra*) or probit (see *infra*) regression may be preferable to, or used as a robustness check for, traditional OLS regression (see *infra*).

Categorical and non-categorical variables)

Discrete multinomial variables (*see infra*) can either be categorical or non-categorical. A **discrete multinomial categorical variable** is one that categorises a variable into a finite number of values (example: y=1 if household annual income is less than € 5.000; y=2 if household annual income is between € 5.000 and € 15.000; y=3 if household annual income is less greater than € 15.000). A **non-categorical variable** is discrete and multinomial but without classification (example: number of cars in a household, 1,2,3, etc. with no classification).

Categorical ordered variable

This is a categorical multinomial discrete variable embedding a natural ordering or sequence. The example above about household income is a case of categorical ordered multinomial discrete variables. Respondents' answers to questions based on scales typically produce **categorical ordered multinomial discrete variables**. On the contrary a variable for transport mode defined as – y=1 if using a car, y=2 if using bus, y=3 if using train – is an unordered categorical multinomial discrete variable. For categorical ordered dependent variables (*see infra*) a ordered logit (see *infra*) or ordered probit (see *infra*) regression may be preferable to, or used as a robustness check for, traditional OLS regression (see *infra*).

Coefficient (typically b)

In a linear relationship, the marginal effect of the independent variable on the outcome variable

Cons.

Reported in all regression table indicate the constant or intercept value of the regression.

Continuous variable

A variable whose range of variation is a subset of the Real numbers.

Dependent/ independent variables

A **dependent variable** is a variable that we try to explain in terms of other variables called **independent variables**. We refer to them interchangeably as 'response variables' or 'outcome measures' (other expression used in the literature include "measured variable", "responding variable", "explained variable", "outcome variable", "experimental variable", and "output variable"). In our study the response variables for the laboratory and online experiments are the various psychometric scales used and the behavioural measures obtained through the simulated purchase choice. An **independent variable** is a variable assumed to be the cause, or tested to ascertain whether it is the cause, of some other dependent variables. Independent variables are often referred to as a "predictor variables", "regressors", "controlled variables", "manipulated variables", "explanatory variables", "exposure variables", etc. In our case the independent variables are the treatments and the control conditions that enter

	the regression analysis as a **Dummy Variable** (with value 1 for exposure to treatment and value 0 for exposure to control condition).
Discrete variable	A variable that can have only a finite number of possible values. The discreteness can be a natural characteristic of the variable (i.e. number of children in a family) or can be imposed on a otherwise continuous variable by the researchers (i.e. coding family income into a finite number of ranges).
Dummy variable	A particular case of discrete binary variable taking value 1, 0 to indicate the absence or presence of some categorical effect that may be expected to impact on the response variable(s).
Factor Analysis (FA)	Factor Analysis: is a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables, called factors. In other words it is possible that variations in three or four observed variables mainly reflect the variations in fewer unobserved variables. Factor analysis searches for such joint variations in response to unobserved latent variables and can group variables in terms of a latent common underlying component.
Friedman and Kendall Tests	Friedman Test is a statistical test that a ranking of options across distributions is not randomly generated. Kendall's version is simply a normalization, constraining the test statistics to belong to the zero-one interval.
F-Test	A goodness-of-fit test whose distribution under the null hypothesis (the hypothesis to be tested) is an F-distribution. Usually the null hypothesis is the equality to zero of the coefficients, namely that there is no relationship between any of the independent variables and the dependent variable. In the Table of regressions we report the F-test of equality to zero of all the coefficients of the variables used in the regression. A specific version of this test is the Wald test that we run in post regression analysis in order to test equality of the coefficients among two treatments.
Logit and probit	A logit model is a type of regression specification used for predicting the outcome of a categorical dependent variable based on one or more independent variables. A probit model is a type of regression specification much used for ordinal or binary response variables. Although the assumptions for correct identification of the relationship are stricter than OLS (i.e. exogeneity of the regressors, plus specific functional form), logit and probit models force the predicted outcome to be between zero and one, while OLS has no restriction on the dominion.
Obs.	Reported in all tables summarising the regressions, it indicates the number of observations upon which the analysis is based. The number varies depending on: a) the randomisation rounds; and/or b) the routing to smokers and non-smokers.
OLS	Ordinary Least Square (or linear least squares) is the most traditional linear regression model. This method minimizes the sum of squared vertical distances between the observed responses in the dataset and the responses predicted by the linear approximation. The OLS estimator correctly identifies the effect of the independent variables if the latter are exogenous. The OLS are also the best linear estimator (i.e. they show minimum variance) if the errors are homoscedastic and serially uncorrelated.
Ordered logit and probit	Ordered logit and probit models are variation of logit and probit specified for treating categorical ordered variables (see above). They are used as robustness checks of OLS regressions with ordered categorical variables.

Principal Component Analysis (PCA)	The PCA is a mathematical technique used to reduce the dimensions of variations of a set of observation. While the original set of observation is generally correlated, the components that are generated through the analysis are orthogonal among them and are usually interpreted as the latent dimensions that the observations try to capture.
P-value	Reported and calculated automatically by any standard statistical software package it indicates the probability of obtaining a test statistic at least as extreme as the one that was actually observed, assuming that the null hypothesis is true. A p-value equal for instance, to: a) 0.09 corresponds to 10% significance level b) 0.04 corresponds to 5% significance level; c) 0.009 corresponds to 1% significance level.
R2 (R-square)	Reported in all tables summarising the regressions, it is the percentage of the total variance of the outcome variable that is explained by the estimated relationship.
Robust regression	A regression technique used to reduce the variance of the estimators when the error term is not homoscedastic or show autocorrelation.
Standard errors	The square root of the variance of a random variable. In a regression output, the standard error is a measure of the variability of the estimated coefficient.
Statistical significance	Statistical significance is a statistical assessment of whether observations reflect a pattern rather than just chance. With statistical tests a result is deemed statistically significant if it is so strong that it could occur simply by chance only in rare circumstances. Hence the result provides enough evidence to reject the hypothesis of 'no effect' or 'null hypothesis'. Most used level of significance are at 10% (0.1) indicated with "*", 5% (0.05) indicated with "**", 1% (0.01) indicated with "***". If a test of significance gives a p-value (see above) lower than a given significance level α, then the null hypothesis is rejected. Such results are informally referred to as 'statistically significant'. The lower the significance level chosen, the stronger the evidence required. The choice of significance level is somewhat arbitrary, but for many applications, a level of 5% is chosen by convention. Depending on the circumstances choosing one level or another of significance may lead to Type I or Type II errors. a Type I error is the incorrect rejection of a true null hypothesis. A Type II error is the failure to reject a false null hypothesis. When comparing two means, concluding the means were different when in reality they were not different would be a Type I error; concluding the means were not different when in reality they were different would be a Type II error. From the Bayesian point of view, a type I error is one that looks at information that should not substantially change one's prior estimate of probability, but does. A type II error is one that looks at information that should change one's estimate, but does not. It is evident that fixing the needed threshold level of statistical significance can, depending on the situations, lead to either two of the errors
Structural Equation Model (SEM)	SEM combines theoretical assumptions and statistical techniques. The aim of SEM is to assess empirically a causal relationship among variables. The SEM identifies the latent variables, which are not observables, and the strength of association among the observed and unobserved variables.
Tobit	The Tobit model is a regression model proposed by James Tobin (1958). The term Tobit was derived from Tobin's name by truncating and adding -it by analogy with the probit model. This model is particularly useful to run regressions as robustness checks for OLS using series that are "*censored*".

Treatment effect

Under counterfactual experimental design the treatment effect is the mean difference in the value of any given outcome measures comparing the response of the individuals exposed to the treatment to that of the individuals exposed to the control condition. So, the treatment effect corresponds to the average causal effect of the exposition to the treatment on the outcome variable, with respect to a counterfactual calculated using the recorded data from the exposition to the control condition.

Treatments abbreviations (laboratory experiment)

Abs.	It refers to the "Absolute" classification system.
ComConInfo	It stands for "Combined Information about Consumption" and concerns hybrid vehicle.
Comb.	It refers to the "Combined" classification system.
Graphical 1	It refers to the vertical layout.
Graphical 1	It refers to the horizontal layout
LSF	It stands for "Information on Lost Savings on Fuel"
RC	It stands for Running Costs.
Rel.	It refers to the "Relative" classification system
SepConInfo	It stands for "Separate Information about Consumption" and concerns hybrid vehicles.
Tailpipe	It indicates that the label reports information only about tailpipe emissions.
Tailpipe/upstream	It indicates that the label reports information about both tailpipe and upstream emissions. It concerns electric and hybrid vehicles

Response variables abbreviations (laboratory experiment)

B Emis.	It stands for Behavioural measure in terms of score in emissions.
B LSF	It stands for Behavioural measure in terms of score in lost savings in fuel.
C	It indicates Cognitive and is added to the following specific cognitive measures.
CEM	Cognitive measure of recall of the CO2 emission information contained in the labels.
CFE	Cognitive measure of recall of the Fuel Economy information contained in the labels.
CCO2T	Cognitive measure of recall of the CO2 emission tax information contained in the labels.
CRC	Cognitive measure of recall of the Running Costs information contained in the labels
CEC	Cognitive measure of recall of the Electric Consumption information contained in the labels (concerns electric cars)
CCCI	Cognitive measure of recall of the Combined Consumption Information contained in the labels (concerns hybrid cars)
CWTP	It stands for Change in Willingness to Pay.
Notic.	Noticeability
NoticE	Noticeability response variable obtained from answers to the following question: (1) How environmental friendly is the car you selected?
NoticFE	Noticeability response variable obtained from answers to the following question:

	(2) How fuel-efficient is the car you selected?
NoticT	Noticeability response variable obtained from answers to the following question: (3) Think about how much CO2 car tax you will pay for the selected car compared with others. These taxes will be…(higher, lower, etc.)?
NoticRC	Noticeability response variable obtained from answers to the following question: (4) How do you think the car you selected scores in terms of running costs compared to the other options available?
NoticEC	Noticeability response variable obtained for electric engine cars from answers to the following question: How do you think is the car you selected scores in terms of electricity consumption?
NoticECO	Noticeability response variable obtained for electric engine cars from answers to the following question: How do you think is the car you selected scores in terms of emissions compared to a car of the same class with diesel or gasoline engine?
NoticTCO	Noticeability response variable obtained for hybrid engine cars from answers to the following question: How do you think the car you selected scores in terms of total consumption (fuel and electricity)?
NoticHCO	Noticeability response variable obtained for hybrid engine cars from answers to the following question: How do you think the car you selected scores in terms of emissions compared to a car of the same class with diesel/ gasoline engine?

Treatments abbreviations (online experiment)

RC_L1	Running costs per mile/km
RC_L3	Running costs per 5 years
LSF	Lost Saving on fuel with respect to the best in class expressed as additional costs
LSF Loss	Lost Saving on fuel with respect to the best in class expressed as “you lose” and the amount
Fuel	Fuel economy (litres per 100 km/miles)
Battery	Battery life
German	It refers to German classification system of emissions
Absolute	It refers to Absolute classification system of emissions
CO2class_IN	Image of CO2 absolute classification system in promotional material
CO2text_IN	Explanatory text for the absolute classification system in promotional material
RCnote	Footnote accompanying running costs in promotional material and indicating the unit of measurement
RC_Salience	Large text on running costs in promotional material

RCsmall	Small text format for running costs in promotional material
weblink_IN	Weblink in promotional material that opens up a full label

Response variables abbreviations (online experiment)

WTP	Willingness to Pay. Elicited price divided by the price of the car in the country.
Visualizations	Number of visualizations of blurred images from the process tracing metrics.
At least one Visualization	Dummy variable equal to one if at least one part of the label (promotional material) has been visualized and zero otherwise
Complete Visualization	Dummy variable equal to one if the label (promotional material) has been fully visualized
Fuel Consumption	Answer to the question: How do you think the car you selected scores in terms of fuel consumption with respect to other cars in the market?
Fuel Efficiency	Answer to the question: How fuel efficient do you think is this car with respect to other cars of the same class?
Running Costs	Answer to the question: How do you think the car you selected scores in terms of running costs with respect to the other cars in the market?
Fuel consumption versus standard vehicles	Answer to the question: How fuel efficient do you think is this car with respect to a similar vehicle with diesel or gasoline engine?
Electricity Consumption	Answer to the question: How do you think the car you selected scores in terms of electricity consumption with respect to other cars in the market?
Environmental Friendliness	Answer to the question: how environmental friendly is the car you have just seen?
Ranking	Dummy: 1 - the ranking in terms of emission is correct; 0 – otherwise
Score running costs	Dummy: 1 – the score in terms of running costs is correct or the error is less than 25%; 0 - otherwise
Score fuel consumption	Dummy: 1 – the score in terms of fuel consumption is correct or the error is less than 25%; 0 - otherwise
Score electricity consumption	Dummy: 1 – the score in terms of electricity consumption is correct or the error is less than 25%; 0 - otherwise
Score environmental friendliness	Dummy: 1 – the score in terms of emissions is correct or the error is less than 25%; 0 - otherwise

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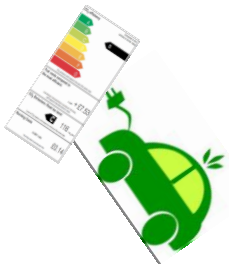


1 Introduction

1.1 Introduction

This compendium is the technical companion to the Final Report of this study, where we decided not to include all the technicalities that are instead presented in full details here. These technicalities include:

- **Literature review**. The extensive review of the literature that shaped subsequent design and methodological choices;
- **Design**. All the details about the experimental conditions tested and about randomisation and experimental procedures and protocol;
- **Response variables**. Detailed illustration and explantion of the response variables used to measure the effectiveness of the experimental conditions tested;
- **Samples**. Detail about the samples used and related descriptive summary statistics;
- **Analysis performed**. Technicalities on the econometric and multivariate statistical analyses performed on the data gathered;
- **Regression and multivariate statistics analyses results tables**. As in the Final Report we presented the main results mainly in narrative fashion, all the technical tables and graphs supporting such account are contained in this compendium;
- **Car database illustration**. The illustration of the car database we built (Annex VIII available as separate files) and how we used it to produce the visual stimuli (Annex IV available as separate files) through which we administered the treatments to the subjects of the experiments.

In the remaining part of this chapter we first indicate the policy objectives and how they have been explored and tested empirically (§ 1.2) and then anticipate a high level snapshot of the overall research design (§ 1.3). In Chapter 2 we summarise the finding of the literature review. The next three chapters (chaps. 3, 4, 5) cover each one of our three empirical components (respectively: preliminary survey, laboratory experiment, online experiment) and they are structured mostly along the same dimensions (design, response variables, sample, analysis performed, and results tables and graphs). Finally in chapter 6 we describe the car database we constructed and how it has been used to produce the visual stimuli that rendered the experimental conditions.

1.2 Objectives and experimental conditions

A stepping-stone in the EU policy-making process to achieve the objective of reducing the CO_2 emission in the transport sector has been the Directive 1999/94/EC ('CO_2 Car labelling directive'). The directive contains four provisions:

1) A label on fuel efficiency and CO_2 emissions to be displayed near each passenger car at the point of sale (Art. 3 and Annex I). The Directive provides few prescriptions on the design (A4-size and what kind of information to include). Currently the following types of label are in use in the EU:
    a. Textual;
    b. Graphic (i.e. EU energy label with colour coded scale, a comparative continuous scale). Graphical labels can be further broken down into:
        i. Classification based on absolute rating (car categorised using as reference all cars);
        ii. Classification based on relative rating (car categorised using as reference similar cars);
        iii. Variations of the above two classification systems;
    c. Labels including additional information;
2) A guide on fuel economy and CO_2 emissions (Art. 4 and Annex II);
3) A poster or display showing the fuel consumption data and CO_2 emissions of all car models displayed at the point of sale (Art. 5 and Annex III). This has been amended by the Commission Directive 2003/73/EC to also include any electronic display;
4) All promotional literature has to contain fuel consumption and specific CO_2 emissions data of the car models to which it refers (Art. 6 and Annex IV)

Two recent studies, one commissioned by the European Parliament(Grunig *et al.*, 2010) and one by DG CLIMA of the European Commission(Branningan *et al.*, 2011), show that non-compliance of car manufacturers with the directive is low, but they also point out: a) the need for gathering more evidence on the effect that the directive has had on consumers awareness and purchasing behaviour; b) the fact that there is wide variability in the way Member States have implemented the directive; c) lack of clarity as to what is requested for promotional material. It is worth noting that variability in the form and

quality of labels and promotional material undermine the relevance and usefulness of environmental information (Yates, 2009). As for the text of promotional material one should also bear in mind that consumers tend to think that 'if it is hard to read then it is hard to do' (Song & Schwarz, 2008). In other words unclear or generic promotional material may end up be ignored and have no effect whatsoever. Against this background and challenges, with this study DG CLIMA aimed to test:

- **The effectiveness of car labels**. Test the effectiveness of alternative car labels, with specific reference to their content and layout, in terms of informing potential car buyers about, and raising awareness of, CO2 emissions, fuel efficiency, and running costs of new cars;
- **The effectiveness of mandatory information in promotional material.** Test the effectiveness of mandatory information in promotional material in terms of informing potential car buyers about, and raising awareness of, CO2 emissions, and fuel efficiency of vehicles.

In order to achieve the two objectives three main empirical tasks were undertaken:

- **Task 1: Preliminary survey**. Conducted in 10 countries (BE=Belgium;DE= Germany; FR= France; IT= Italy; NL= Netherlands; PL= Poland; RO= Romania; ES= Spain; SE= Sweden; UK= United Kingdom) with a large sample (N= 8000 respondents) with the aim of exploring the car purchase process as to inform the design of the laboratory experiment;
- **Task 2: Laboratory experiment**. Conducted in London at the LSE Behavioural Lab (N=405 respondents) to test different variants of car labels;
- **Task 3**: **Online experiment.** This was realised conducting a online experiment in 10 countries (BE=Belgium;DE= Germany; FR= France; IT= Italy; NL= Netherlands; PL= Poland; RO= Romania; ES= Spain; SE= Sweden; UK= United Kingdom) with a large sample (N= 8000 respondents), with the aim of: a) re-testing some aspects of the car labels in view of the results of the lab; and b) testing variants of promotional material;

The preliminary survey focussed on:

- **Car purchase process**. Explored in detail the car-purchase process and the specific (main attributes such as price, safety, fuel efficiency, etc.) and contextual (self-reported attitudes and intentions) parameters shaping it;
- **Environmental Awareness**. Investigated the awareness among consumers about the environmental impact of car usage;
- **Labels awareness**. Included a set of questions to assess consumers' awareness and assessments of existing labels;
- **Preliminary split ballot test**. We used a split ballot for a preliminary test of four classification systems (absolute, relative, combined, and German) as to inform the design of the laboratory experiment.

For the Labels we tested the following dimensions (against a control condition represented by the conventional car label in use in the UK) in the laboratory experiment (see more details in § 4.1):

1. **Label graphic layout**;
2. **Alternative classification systems**;
3. **Additional information for conventional cars (running costs, taxation, etc.)**;
4. **Additional information for electric cars (as above but opportunely adapted)**;
5. **Additional information hybrid cars**;

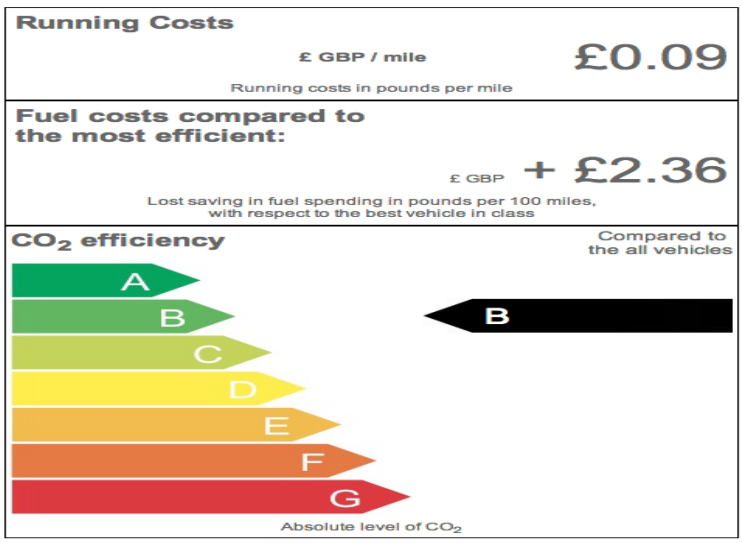
For the information contained in the promotional material the experimental conditions tested were:

1. **Control condition**. The control group has been presented the information notes in the format in which they are currently available on the market: only text, small fonts, no graphic features, and no additional elements (i.e. information about running costs);
2. **General Format**. This dimension refers to how the information about CO2 emissions is reported and with respect to the control condition we tested two variations: using only a graphic element for the class in terms of emission (i.e. A, B, C, etc.), using both this graphic element and the textual illustration of the CO2 emission class;
3. **Additional Element (AE)**. The additional element has been tested in three variations: a) only the CO2 emission class; b) containing the CO2 emission class plus a small text indicating running costs; c) containing the CO2 emission class plus larger running cost element.
4. **Web link**. The presence or absence of clickable web link to a web page that contains detailed information was also tested;

A very important aspect must be illustrated here right after listing the experimental conditions tested, in order to avoid any possible misunderstanding on the design and what it claims to test, as well as on the statements contained in the Final Report as to the finding of the analysis performed. We have designed our experiments as randomised control trials as to recover the statistically significant effects of the various possible options (experimental conditions tested) that could be included in labels and promotional materials on the dependent variables (later referred to as response variables) selected as measure of effectiveness such as for instance noticeability effects (elements are noted and used to express judgements), cognitive effects (capacity to understand and recall the information conveyed by different elements in the labels), and behavioural measures (choices in simulated purchase conditions). So, for instance, for the factor running costs

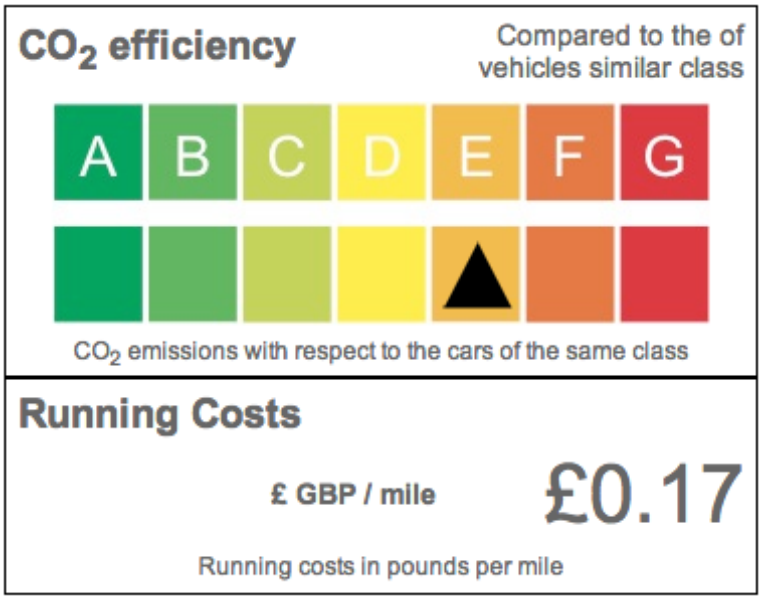
we have three experimental conditions: running cost per mile, running cost per year, and running cost per five years. We aim to test whether the experimental condition *'running cost per mile'* (and also the other two) has '*a statistically significant effect on the response variable noticeability'*. Depending of the results of the experiments and of the analysis performed the reader will find in the Final Report statements such as ''*running cost per mile does not seem to have a statistically significant effect on the response variable noticeability for hybrid cars'.* It is absolutely important that statement such as this one are understood and interpreted correctly. This statement concerns only the experimental condition (treatment) '*running cost per mile*' and not any particular label taken as a whole. Because of the extremely high number of treatments we were requested to test, we could not test labels as one single and holistic treatment. If we state that '*running cost per mile*' is effective or non effective on response variable "*noticeability*" this means that we processed all the participants' answers to the questions used to measure noticeability for all cases where the treatment '*running cost per mile*' was included in the visual stimuli produced as labels. These answers, however, are not elicited by one unique label but by the several different labels through which the treatment '*running cost per mile*' was tested. Therefore, we simply conclude that this treatment is effective or ineffective and we cannot draw any conclusion on the labels as a whole. Since this is an important aspect let us further explain it using the next graphic illustrations.

Figure 1 Visual stimuli example 1



In the figure above the item '*running cost per mile*' appears in a label together with the vertical graphic layout, the indication of lost savings in fuel, and using the absolute classification system. On the other hand, in next figure the item '*running cost per mile*' appears in a label together with the horizontal graphic layout, no indication of lost savings in fuel, and using the relative classification system.

Figure 2 Visual stimuli example 2

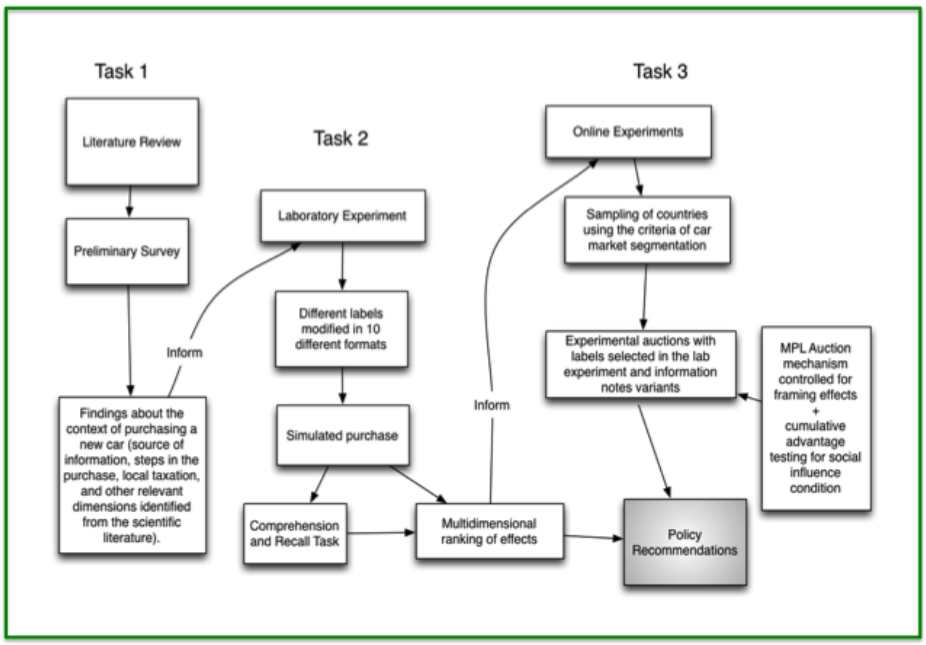


Therefore, if we make the statement "*running cost per mile is effective on noticeability*" we do not refer in general to any of the two labels shown above, we only refer to the item '*running costs per mile*' that respondents saw in different combination depending on the randomisation protocol.

1.3 High level view of research design

The figure below provides a graphic snapshot of the overall design followed in the study.

Figure 3 General overview of research design



- **Three empirical components**. It included three different empirical steps: a) the preliminary online survey (8000 respondents in 10 countries), b) the laboratory experiment (400 respondents in UK, LSE Behavioural Lab); and c) an online experiment (8000 respondents in 10 countries);
- **Stop & Watch consultative approach**. These three empirical steps have been linked in a "stop and watch" fashion, flexibly allowing for feed-back and adjustments when moving from one step to the next. The design of each of the three steps has been completed in full consultation with DG CLIMA:
    - The preliminary survey has provided information on the context of purchasing a new car (sources of information considered important, steps in the purchase decision, local taxes, other items identified from the systematic review of the literature), thus, shaping the subsequent operationalisation of the laboratory experiment design. In particular through the split ballot included at the end of the preliminary survey and discussed with DG Clima it was agreed to: a) test in the laboratory experiment only the Absolute, Relative, and Combined, classification systems; b) to use the German classification system for the online experiment and test it against the most effective of the three system according to the results of the laboratory experiment;

- The laboratory experiment has tested the effectiveness of the labels in a controlled environment and using randomized controlled trial design through a simulated purchase task (behavioural) and through a comprehension and recall task (cognitive). The experiment was designed resting on: a) the finding from the literature review and confirmed by the preliminary survey that consumers first select a class and only when choosing the model they consider eco-information; b) the preliminary test through the split-ballot mentioned above; c) adjustments made to take into account the input received from DG Clima and from other Commission experts who participated to the kick-off;
- After the presentation and discussion of the results of the laboratory experiment we agreed with DG CLIMA to re-test some aspects of the label in the online experiment and also finalised the detailed of the testing of the promotional material (see details in chapter 5)

- **Theoretically and methodologically robust**. The design was informed by our strong knowledge of main insights from behavioural economics (biases and nudges) and by the results of a throrough review of the relevant literature (see chapter 2). We used sophisticated randomisation algorhythms and procedures to ensure the internal and external validity of the two experiments and we performed state of the art econometric and statistical analysis (see chapters 3,4, and 5).

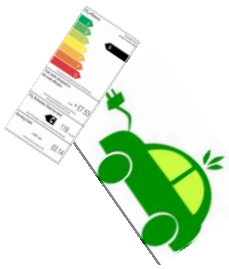
Three key strengths of our design are:

- **Beyond self-reported attitudes.** Using the beavioural experimental approach we explored the inconsistency between self-reported attitudes and aimed at revealing priors that are not reported (for social desirability reasons or because they work at the unconscious level);
- **Nudges to cope with eco-ignorance**. We searched for biases and tested nudges that may de-bias eco-ignorance;
- **Importance of the preliminary survey**. We appropriately explored the complexity of the purchase decision process through the preliminary survey as to ensure the most efficient and effective design for the behavioural experiments;

Finally, the overall design rested upon two important instrumental activities and their outputs (see more on these in chapter 6).

- **Car database**. We have built a comprehensive database containing for 450 different cars the information on several items (prices, running costs, CO2 emissions, taxes, etc.) that we used to compose the visual stimuli used in the two experiments (labels and promotional material).
- **Programming and visual stimuli design**. The questionnaire of the survey, the experimental tasks of the two experiments, and the pre and post treatment small questionnaires included in the two experiments, were all programmed and rendered

into an output that could be shown on a screen in the laboratory or online. This programming included sophisticated randomisation algorhytms for our double randomisation approach (of subjects and of treatments).



2 Review of the literature

2.1 Literature review

2.1.1 General findings

Whereas several market-based studies document the potential of eco-labels for goods and services that are relatively inexpensive and subject to frequent purchase (e.g., canned tuna or household detergents), considerably fewer contributions have focussed on relatively expensive durable goods, such as eco-labelled vehicles (Teisl*, et al.*, 2008, 141). Therefore, the field of interest to us is still relatively unexplored and characterised by only a limited number of scientific articles and several reports commissioned by national and international public bodies.

Overall, our literature review reveals that at a primary and generic level consumers' concern regarding the environmental impact of cars is high. In 2000 respondents to a UK survey indicated that traffic, air pollution, and climate change are the main concerns of the new century (DEFRA, 2002). In 2007 the majority of EU citizens were reported as being aware about the environmental impact of their car (Eurobarometer, 2007), and in 2011: a) 68% of EU citizens said they would compromise on a car's speed in order to reduce emissions; and b) 62% would be likely to compromise on the car's size and 56% said the same about the car's range – i.e. the distance that one could drive before needing to refuel/recharge the vehicle (Eurobarometer, 2011).

If we go deeper than these general self-reported attitudes and intentions, however, the picture changes substantially. Consumers of all types have very poor understanding of low carbon technologies and fuel-efficient vehicles (Lane & Potter, 2007, 1088; LowCVP, 2005). A systematic review commissioned by The Low Carbon Vehicle Partnership (LowCVP, 2005)[1] reports that when it comes to car purchasing, environmental issues have a very low priority for private and fleet consumers. Another review conducted for DG Environment reached similar conclusions: consumers' awareness of fuel economy and

[1] The Low Carbon Vehicle Partnership includes organisations from the automotive and fuel industries, Government, academia, environmental NGOs and other stakeholders. Its mission is to take the lead in the shift to clean low carbon vehicles and fuels in the UK

other environmental issues was not high, although it was growing (PSI *et al.*, 2009). Other parameters seem to be ranked higher than fuel economy, such as reliability, safety, comfort and price (COWI, 2002; Lane & Potter, 2007). On the other hand, a distinction should be made between more strictly defined environmental information (i.e. CO2 emissions) and aspects of the fuel economy. While the gaps between attitudes and gaps concern both, as does lack of full understanding, it has been recently suggested on the basis of a survey conducted for the Low Carbon Vehicle Partnership (Lane *et al.*, 2012) that the attention of respondents' in the survey was captured more by information on running costs than by information on CO2 emissions.

Another important issue that emerges from the findings of our literature review is the paradox between the reported importance of fuel economy and the little efforts made during the purchase process to compare cars on fuel consumption. Possibly this is due to consumers' assuming there is little difference in fuel consumption among cars within the same class. An alternative explanation is that consumers see fuel consumption as linked to car design and, thus, think that less consumption is achievable only at the expense of performance and safety. Also possible is that many consumers have little confidence in published fuel economy data (Kurani & Turrentine, 2002). There is also some evidence that the issue of fuel economy only gains importance after the purchase has been made. It has also been noted that consumers' responses suggest that they are not aware of the correlation between fuel economy (running costs) and CO_2 emission (ADAC, 2005; PSI*, et al.*, 2009), while Anable *et al.* concluded that the link between, knowledge and awareness of climate change on the one hand, and travel behaviour on the other, is weak (2006). A majority of individuals state they think most vehicles pollute about the same when driven, which is in stark contrast to the reality of car and truck pollution (Teisl *et al.*, 2005). This show little awareness about the fact that It is clearly documented that trucks and sport utility vehicles (SUV's), on average, are the worst polluters whereas regular cars are the least. This eco-ignorance may partially explain the dramatic shift in demand from cars to light-duty trucks (including SUVs, minivans, and pickup trucks) witnessed in the United States between 1979, when light-duty trucks had a market share of about 10%, to 2003, when their market share rose to 50% (NHTSA, 2004, Table II-6)[2]. UK based evidence also suggests that consumers have little awareness about the tax implications of CO_2 emissions (Department for Transport, 2003)[3].

[2] Reported in (Teisl*, et al.*, 2008, 141)

[3] In the UK the government has set the target that low carbon cars should represent 10% of all car sales by 2012 (Inland Revenue, 2004). To achieve this target, the Government has introduced a set of coordinated economic incentives including preferential Fuel Excise Duties to reduce the cost of cleaner vehicle fuels, Vehicle Excise Duty (VED or 'road tax') rates that are grouped into vehicle CO2 emission bands, and a system of company car tax designed to provide financial incentives for employers and company car drivers to choose cars which produce lower levels of CO2 emissions'; congestion charge discounts for the cleanest vehicles; and PowerShift capital grants to assist with the purchase of cleaner cars (Inland Revenue, 2004). Yet, understanding that VED is based on carbon

All of these findings are at odds, both with the high level of concern declared by members of the public, and with the increasing importance of environmental issues within the business sector (Lane & Potter, 2007, 1090). Trying to explain the gap existing between what consumers state they consider important and how they act in relation to the purchase of cleaner vehicles, Lane and Potter (2007) conclude that consumers have a low understanding of fuel economy and the real costs of cars. Hence, while fuel economy is reported as a key factor in consumers' consideration of new cars, consumers often make little effort to compare the fuel economy of different models when making their decision.

2.1.2 Car purchase as a two steps process

A very important finding that shaped our design choices concerns the two-stage nature of the car purchase process.

As part of a research for the "Clean car for Main" programme, whose findings have been later published in two separate articles (Noblet *et al.*, 2006; Teisl*, et al.*, 2008), Teisl and colleagues have first explored the issue through a focus group where they discovered that:

> "*Most participants liked the idea of including a reference value in addition to the value presented for the specific vehicle. However, they preferred the reference to be based upon vehicles within the same class of vehicle rather than being based upon all vehicles. This was because participants felt that most people shop for a type of vehicle and would like to know how the vehicle they are considering rated relative to other close substitutes. Participants continued to desire this method of referencing even when it was pointed out that this method might make some vehicles appear environmentally better when in fact they were environmentally worse compared to all other vehicles. Most participants felt that the scores should still be referenced to class of vehicle since that is what the person is looking for/ needs; they felt it was more important to help people buy the "best of the worst" because it was unlikely that the environmental information would drive most people out of their chosen class of vehicle*" (Teisl, *et al*., 2004, 6)

This result from a qualitative exploration was confirmed through a representative sample of the population of car owners in the state of Main and the authors concluded that eco-information is considered in the vehicle purchase decision, but is generally not considered at the class-level decision (Noblet*, et al.*, 2006; Teisl*, et al.*, 2008). In other words when consumers choose a class (i.e. city car or SUV) they consider other parameters, and look at eco-information only when they consider different car models within the chosen class. This finding is confirmed in several systematic review of evidence (COWI, 2002; Grunig*, et al.*, 2010; LowCVP, 2005), and is presented as one of the main findings in the report commissioned by the European Parliament (Grunig*, et al.*, 2010, 41).

emissions is patchy and awareness of (the former) PowerShift grants for bi-fuel vehicle conversion is minimal (Department for Transport, 2003).

In sum, our review of the literature strongly supports the conclusion that CO2 emissions and fuel economy parameters might be a secondary consideration, as consumers tend to narrow down their choices to a class of vehicle first and then apply secondary criteria, such as fuel consumption, within this class.

2.1.3 A complex and multidimensional context

When moving to the specific task of car purchase, research again shows that information provision faces clear challenges given the complex and multi-dimensional context influencing car-purchasing decisions(Kurani & Turrentine, 2002; UK Energy Research Center, 2009).

Social psychologists identify several steps in the process of behavioural change in response to information, and some of the factors that influence the steps in the process (Thøgersen, 2002). This literature highlights that the effectiveness of an eco-label is influenced by the way the information is presented and by the capacity of the consumer to absorb and act on it. Current studies on eco-labelling have been limited in that they all focus on either measuring how information effectiveness varies depending on the characteristics of the consumer, or on measuring how such effectiveness varies depending on the modality of information provision. The exception to this practice is the most systematic attempt of developing and testing empirically a holistic model that explains how the characteristics of the individual and the modality of information provision simultaneously influence several metrics known to be important to an information program's success(Teisl*, et al.*, 2008).

As anticipated, a large number of factors influence the car-purchasing behaviour of consumers. These include situational factors such as the economic and regulatory environments, vehicle performance and application and the existing fuel/road infrastructure. However, in addition to such objective factors, equally important are subjective psychological factors such as attitudes, lifestyle, personality and self-image (Choo & Mokhtarian, 2004). In social psychology there is a rich literature focusing on what constitutes tastes and preferences. This literature suggests a person's eco-behaviour is positively influenced by his/her level of environmental involvement (Thøgersen, 2002) and by an increased specificity in their involvement (Grankvist & Biel, 2001; Thøgersen, 2000). The construct of involvement can be understood as personal relevance or importance which can affect consumer attention and comprehension (Celsi & Olsen, 1988). A related construct, level of environmental concern, is also found to positively influence a person's eco-behaviour(Bamberg, 2003). Other positive influences

include the consumer's perceived effectiveness of their choices[4](Thøgersen, 2000, 2002). Personal norms and an individual's beliefs about interpersonal (social) norms have also been found to positively influence a person's eco-related behaviours (Ajzen *et al.*, 2004; Stern, 2005). Faith in the eco-behaviour of others also increases the importance of the information(Berger & Corbin, 1992). For example, Gould and Golob (1998) indicate drivers often feel no personal responsibility for vehicle air pollution when they note worse offenders (i.e., observing free-ridership leads to a decreased faith-in-others and to a decrease in own socially beneficial behaviour). Furthermore, an increased faith-in-others should help alleviate the assurance problem normally associated with the voluntary provision of public goods (Bougherara *et al.*, 2005). Respondents should place lower importance on eco-information if they feel there is very little eco-differentiation across vehicles.

Although social factors such as higher levels of education and income are associated with greater energy-saving activities (Brohmann, 2009), the role of socioeconomics characteristics is somewhat less consistent in determining eco-attitudes and behaviours for consumer goods. In general, women are found to be more eco-conscious than men(Johnston *et al.*, 2001) possibly because females are more socialized to help others. Finding on the impact of education are inconclusive with different studies finding positive (Blend & Van Ravenswaay, 1999) , negative (Johnston*, et al.*, 2001), or no impact (Moon *et al.*, 2002). The same applies for age with positive (Clark *et al.*, 2003; Rice, 2006) , negative (Moon*, et al.*, 2002), or no impact (Loureiro *et al.*, 2001). Income has little impact (Loureiro*, et al.*, 2001; Moon*, et al.*, 2002) (Blend & Van Ravenswaay, 1999).

An increase in the perceived credibility of information can also positively impact the effectiveness of information (Thøgersen, 2002). Perceived credibility can be influenced by perceived discrepancies between the information and consumers' prior beliefs of the product or the information source (Teisl, 2003).

The effectiveness of a label is increased when consumers can adequately rank competing products by key attributes and increasing the amount of information can improve a person' ability to correctly identify eco-friendly products (Teisl & Roe, 2005; Teisl*, et al.*, 2005). Consumer choice is often driven by recognition of products, brands, logos or labels. Often, it suffices that consumers recognise a popular label (e.g. the EU Eco label) or a well-known name brand (e.g. Sony, Nike) to purchase the product, as opposed to buying the product based on the information conveyed (PSI*, et al.*, 2009). Hence, labels can be generally considered as a more effective nudge to influence consumers' behaviours compared to other traditional information provision measures, for they go in

[4] This construct measures the consumer's perception of their own impact as a consumer; it is also referred to as 'Ascription of Responsibility to Self' (Stern, 2000)

the direction of 'less is better'. Yet, their design and optimisation are challenging and there are a number of parameters to be considered. Comparative labels, in particular, have been shown to be effective as they allow consumers to easily assess the efficiency of a product in relation to an absolute scale, by means of a simple numerical or ranking system (Harrington, 2004). However, the increasing number of labels and the complexity of labels often hinder the consumer to accurately interpret the information displayed. Therefore, the challenge is to find a balance between providing enough information to inform discerning consumers, while also meeting regulatory requirements (on information that has to be provided) and ensuring less concerned consumers are not overwhelmed by information. The use of scaled comparative labels, as in the case of the EU energy efficiency label provide many advantages, however, some disadvantages are also apparent. The use of specific classes or categories means that though products may fall into different classes, ultimately the difference in efficiency or CO_2 emissions may be minimal. Because placing products into specific classes or categories makes a basic judgment about a product, consumers may be encouraged to spend more on products in a higher class. However, the increased (financial) benefits of purchasing a product in a higher class may not compensate for the (possible) higher initial purchase cost. Consumers may have a high recognition of a label but also a poor understanding of it. For instance, it has been shown that the US Energy Guide label –a comparative label with black lettering on a yellow background in a continuous-scale format that does not use specific scales or numbering –is badly understood (Thorne & Egan, 2002). Finally, consumer acceptance of eco-labelled products is likely to differ across product classes, demographics, and consumer preferences (Johnston*, et al.*, 2001).

When sourcing information, car buyers collect information from a wide range of sources including manufacturer brochures, the Internet, car magazines, sales staff, consumer guides, family and friends, TV programmes and radio and newspaper advertising (Department for Transport, 2004; Inland Revenue, 2004; Lane & Potter, 2007). Peers, e.g. friends and relatives, still play an important role as a source of information and advice during the purchase decision process(PSI*, et al.*, 2009).

In sum, we can draw the following conclusion from the review of the literature:

- **General awareness**. At a primary and generic level consumers' concern, and awareness about, the environmental impact of cars seems high;
- **Eco-ignorance and inconsistent attitudes**. In contrast to such concern and awareness, when moving deeper in analysing the purchase process consumers show a sort of eco-ignorance and inconsistent attitudes/preferences, including little comparative efforts on key parameters (i.e. fuel consumption, tax implications, maintenance costs);

- **"Attitudes-action" gap**. We are in a clear situation of "attitudes-action" gap, whereby awareness about the environmental impact of cars does not translate into environmentally conscious purchase decisions;
- **Fuel economy is a secondary factor**. The existing evidence shows that the fuel economy might be a secondary consideration, as consumers tend to narrow down their choices to a class of vehicle first on the basis of other parameters (price, quality, safety, etc.) and then apply secondary criteria, such as fuel consumption, within this class;
- **Multi-dimensional context shape purchase choices**. The car purchasing decision and the effectiveness of information provision in influencing it are shaped by a complex and multi-dimensional context, including:
    - Objective situational parameters (i.e. economic and regulatory environments, vehicle performance, the existing fuel/road infrastructure, etc.)
    - Subjective psychological factors (i.e. attitudes, environmental involvement/relevance, lifestyle, personality and self-image);
    - Inter-subjective social-psychological factors (i.e. environmental perception of one's effectiveness as consumer, faith in the eco-behaviour of others, perceived credibility of the information, etc.);
    - Socio-demographic characteristics (gender, education, age, income, family structure);
    - The modality of information provision (type of label and/or type of information);
- **Personal characteristics and information provision both matter.** Hence, once should consider the interaction between the quality of the label / information text as such and the personal characteristics of individuals (subjective especially pre-existing attitudes toward the environmental impact of buying and using a type of car as opposed to another; inter-subjective; socio-demographics)**;**
- **A plurality of information sources.** Consumers use a wide range of information sources, including the Internet but not only the Internet. Peers and relatives play an important role;

2.2 The need for a behavioural approach

In view of the findings of the literature review it is evident how the insight from behavioural economics can help improve information provision to better inform consumers choices when purchasing cars. These choices are affected by cognitive biases that, if understood, can be de-biased through opportunely selected nudges.

Most consumer policy measures are based on the standard assumption that sub-optimal consumers' choices are caused by the lack of provision of reliable information and, accordingly, aim to fill information gaps. Yet, it is clear today - thanks to the wider availability and divulgation of insights from behavioural sciences - that more information does not always help consumers, unless is conveyed in the most effective and efficient way. Consumer empowerment conducted only through classical information provision is likely to fail due to informational overload and distorted information processing by consumers (heuristic and biases). As a result, scholars of consumer policy increasingly recognise that information provision is needed but there are clear limits to its capacity to empower consumers for sometimes 'less is more' (Howells, 2005; Nordhausen, 2004; Wendlandt, 2004). Consumer policy based only on unstructured and not well-designed provision of information can favour suppliers who 'are often happy to cover their backs by over-supplying information' (Howells, 2005), because consumers are overloaded with such information. For instance, it has been shown that manufacturers are aware of the importance of labels and tend to manipulate them to their advantage by: a) building products to fall within specific classes, often within a small margin of the class values (Waide, 2001); b) creating 'better' categories (i.e., A+, A++, etc.) instead of shifting previous products down into lower categories (i.e., B), following technological improvements and/or introduction of entirely new products, this practice has been shown to be difficult to understand by consumers (Heinzle & Wüstenhagen, 2009).

While amply studied and theorised, the links between consumer values, knowledge, beliefs, attitudes, intentions and behaviour are far from simple. Particularly loose is the link between intentions and action, an issue also known as the 'attitude-action gap' (Kollmuss & Agyeman, 2002). Overall, our literature review reveals that the level of consumer concern regarding the environmental impact of cars is high. In a UK survey taken at the beginning of the 21st century, for instance, respondents indicated as the top three environmental worry up to 2020 traffic, air pollution and climate change (DEFRA, 2002). Nonetheless, in the first decade of this century purchase of most polluting cars (i.e. SUV) has risen steadily (Teisl *et al.*, 2008). As noted in a report by the UK Department of Transport commenting survey results: ''*Concern for the environment in general and the environmental impact of cars, which is evident, does not often translate into behavioural change at an individual level*''(2004, 7).

The variation to the label follow the rationale of implementing several 'nudges' that can lead consumers to purchasing greener products, based on human cognition heuristics. The latter have been selected on the basis of the reviewed literature. It is necessary to present a brief description of the cognitive principles that act as 'nudges' but clearly for

each there is a vast scientific literature that is inappropriate to summarize in this context for the sake of synthesis.

We identified five decision biases/processes/heuristics that are relevant to car purchasing, which label nudges may exploit. These five biases and nudges are the following:

1. ***Loss Aversion and 'Loss nudge'***. Prospect theory (Kahneman & Tversky, 1979; Thaler, 1980; Thaler, 1988) suggests that it is more important for people to prevent a loss rather than to seek an equivalent gain. In other words, people tend to be risk seeking when a loss is involved (or the frame is a loss) and risk averse when a gain is involved, where gains and losses are not defined in absolute terms, but rather as deviation from a reference points, e.g. a baseline scenario which can be the default option, the status quo etc. As a result, the behaviour of people changes depending on the framing of the choice, namely what is the reference point and how are gains and losses evaluated. In the present context, it matters whether the reference point is some "green" choice (which can be incorporated as default option), but also if subjects are nudged with regards to the gain and losses: once asked to evaluate Life Time Value, subjects react differently to stimuli such as "LTV value is X" and "you are actually gaining $\underline{\underline{\Delta X}}$" although the final outcomes are exactly the same.
2. ***Discounting too much the future and 'Now nudges'***. This phenomenon suggests that immediacy is a major factor in our responsiveness to offers (Frederick *et al.*, 2002). We place more weight on the short-term than on the long-term effects of our decisions. This decrease of discount rates once larger time spans are considered is dubbed *magnitude effect* (Benzion *et al.*, 1989; Loewenstein & Prelec, 1992). If people were about to gain something, they would rather do so now than later. In other words, people overweigh short-term consumption while discounting the greater long-term gains that could be made by delaying consumption, creating outcomes that are suboptimal both from an individual and a collective perspective. Keeping into account the existence of the magnitude effect in framing the choice setup is an important and effective form of nudge.
3. ***Social norms and 'bandwagon nudges'***. People seek social approval for their behaviour (Schultz *et al.*, 2007) through adhering to social norms and avoid isolation or discrimination. In addition, peer support can be a powerful motivator for individuals to adopt a behaviour that alone will not endorse. Social norms can act as "reference point" as defined sub 1 above and thus direct behaviour towards (or far from) the desired outcome, even in absence of monetary incentives. The inclusion of images and text that evoke social norms can be an example of nudging in the domain of green behaviour.
4. ***Difficulty to evaluate numerical information and 'easy to evaluate nudge'***. The work of Peters and colleagues (Peters *et al.*, 2009) suggests that decision makers are often quite poor at using numeric information in decisions. Their experimental

results demonstrate that a manipulation of evaluative meaning (i.e., the extent to which an attribute can be mapped onto a good/bad scale; this manipulation is accomplished through the addition of visual boundary lines and evaluative labels to a graphical format) has a robust influence in health judgments and choices and across diverse adult populations. Numeric information is often provided in decisions, but may not be usable by consumers without assistance from information providers. As a consequence the use of meaningful and easy to understand scales may be an effective form of nudge.

5. ***Difficulty to compare and 'one-dimensional nudge'***. Related to the previous point is the fact that the use of different metrics and classification systems can induce a consumer in error (Fasolo *et al.*, 2010). Specifically for car labels, providing additional quantitative information to the eco-label leads to decreases in the eco-rating of the product; this is consistent with individuals having incorrect priors of a vehicle's cleanliness. One potential measure of the effectiveness of an information policy is if consumers can adequately rank competing products by key attributes when faced with incomplete or imperfect information (Lee & Olshavsky, 1997).

There is, thus, an evident "attitude-action" gap in the domain of car buying and related environmental issues that can partly be addressed by providing more effective information, provided this gap is tackled also from the perspective of behavioural sciences, through experiments going beyond self-reported attitudes. Uncovering heuristic processes and related bias, the behavioural approach can help design 'nudges' (effective levers) to raise awareness and influence actual behaviours. This implies the need to triangulate measurements based on self-reported attitudes (being they cognitive or conative[5]) with simulated behavioural measurements. To appreciate the difference between the two, imagine the case in which a label is effective for promoting a higher average purchase of more environmental friendly cars (in the simulated environment) but later the respondent has difficulty recalling the information that the same label contains. How would this be possible? The answer lies in the fact that a label might affect a user unconsciously[6] and therefore the self-reported measurement does not capture such effect. This is indeed what happens in many 'nudges' that work with the heuristics of human cognition very often below the level of awareness. On the other hand, it is also possible that in self-reported answers a respondent (as a result of "social desirability effect", i.e. please the researcher and/or provide an answer that puts him/her in a good perspective) may exaggerate the impact of a label on his/her intention to buy a more environmental friendly car, whereas later in the simulated purchase the same label has no impact on the actual choice of a car. Implementing in the research design both kinds

[5] Intentionally behavioural, that is to say self-reported intentions to act.

[6] The unconscious here referred is what is intended in cognitive science as any computational operations that the human minds do of which we are aware only of its outcomes.

of measurements ensure that both the conscious and unconscious level are considered and tested.

2.3 Research design rationale

Looking at these findings from the literature review we can make the following considerations that support our behavioural perspective and design choices:

- **Beyond self-reported attitudes**. The noted "attitudes-action" gap is a case in point of the mentioned inconsistency between self-reported attitudes and behavioural choices. Our research design:
    - Explored such inconsistency;
    - Aimed at revealing/eliciting pre-existing attitudes that are not accurately self-reported (because of social desirability effects and/or because they work at the unconscious level);
- **Nudges to cope with eco-ignorance**. Whereas some of the screened sources talk about eco-ignorance that would imply the need for a lot more provision of information, our behavioural approach aimed at testing opportunities for effective nudges that may influence consumers decisions without imposing too much information burden;
- **Importance of the preliminary survey**. Given the complexity of the purchase decision process and of the factors influencing it, however, it was appropriate to conduct the preliminary survey exploration as to ensure the most efficient and effective design for the behavioural experiments;
- **Two stage process**. It is clear that the most effective and efficient solution for designing the experiment was that of following the two stage process suggested in the literature, whereby consumers first choose a class and only within the chosen class they may consider fuel economy and eco-friendly related parameters.

In view of the analysis of the literature and of the above list of implication, we provide here a further illustration of the rationale of the overall design briefly anticipated in § 1.3. The table in next page summarises the main aspects in the design, rationale, and validation of the three empirical components of the study.

The preliminary survey, informed by the review of the literature, has produced new primary data and fresh insights about important dimensions that were later considered in the subsequent randomized controlled trials experiments, both in the laboratory and online. The results of this survey provide information on the context of purchasing a new car and also on specific issues such as: a) the main factor(s) considered when choosing a car; b) further tested and explored the two stage process (first choose the class and then the model, with eco-information being considered only in the second stage).

Table 1 Data collections, their rationales, and types of measurements

Stages	Response variables	Dimension of responses	Rationale	Validation
Preliminary survey	Self-reported measures	Cognitive, Conative, socio-demographics	Explore the role of different variables in the purchase decision	Pilot test, built in design that ensured maximum reliability of data (e.g. random orders, scale inversions, etc.)
Laboratory experiment (Labels)	Behavioural choice Self-reported measures	Behavioural (WTP) Cognitive (Noticeability, capacity to recall information)	Testing the effect of car labels varied by content and layout with a behavioural choice, complemented by cognitive measures	Selected labels variants validated using the larger online experiment
Online experiment (Labels and promotional material)	Behavioural choice Self-reported measures	Behavioural (WTP, preferred format, process tracing) Cognitive (Ranking task, capacity to recall information)	Testing the effect of labels and promotional material variations in a behavioural choice, complemented by cognitive measures	Validation come from the use of a very large sample

The survey is based on self-reported cognitive (attitudes, preferences, awareness and assessment of existing labels), conative (intentions to act),[7] and socio-demographic measures.

This information has shaped the design of the laboratory experiment to be conducted at the LSE Behavioural Research Lab. In this experiment we tested the various the various dimensions of the labels' variants illustrated in § 1.2 (see more details on the treatments in par. 4.1) compared to the control condition represented by the conventional car label

[7] In psychology, a conative variable refers to the declared intention to perform an action, such as quit smoking. A conative attitude is the tendency or disposition to act in certain ways toward something. Emphasis is on the tendency to act, not the actual action

in use in the UK. The laboratory experiment studied the effect of labels from a behavioural perspective presenting the respondents with a simulated purchase task. This was complemented with self-reported cognitive measures of noticeability and of comprehension and recall that assessed the effective retention of the information contained in the labels after the simulated purchase. All of this was achieved with the robustness and level of details that is typical of a carefully designed randomized controlled trial.

In the online experiment, also designed as a randomised controlled trial, we split the sample in two sub-samples to test again some aspects of the labels in addition to testing the promotional material. For labels some respondents were randomly assigned a task that compared the Absolute and German classification system (indirectly producing a ranking), whereas other where randomly assigned to perform the purchase task (although in this case we elicit Willingness To Pay, WTP, through a Multiple Price List task, see § 5.1). For the promotional material respondents have been randomly allocated to test the dimensions illustrated in § 1.2 using a procedure similar to that applied for the laboratory (but with Multiple Price list to elicit willingness to pay, plus some cognitive measures obtained with the post-treatment set of questions). In this experiment, however, we introduced two variations that produced additional measures of a broadly defined behavioural nature. First, some respondents randomly selected could choose what type of information the promotional material should contain, which provided an indication about the information the consumers value the most through a behavioural choice. Second, other randomly selected respondents were exposed to the process tracing technique. We have randomly shown versions of the promotional material where information items (e.g. with the classification, the running costs, etc.) are blurred. The respondents were clearly instructed that moving the mouse over the items then they could correctly visualise the needed information. In this way we recorded the type of information that is “searched for” by the respondents. This is a behavioural measure of preferred information items since we could record the number of times respondents moved the mouse over each information component of the promotional material.

Figure 4 Example of mock up with process tracing

The overall research design we adopted is an optimal solution to gather different but complementary kinds of data and triangulate them to produce a robust assessment of the effectiveness and influence of labels and information notes on the purchase of a new car. The rationale for using different data and triangulate them is inscribed both in the foundations of the behavioural approach and in the main findings of the literature review.

It is also worth clarifying the rationale for using both a laboratory experiment and an online experiment and for testing different conditions in the two experiments. This requires a brief methodological digression. Before the advent of the Internet, experiments in behavioural economics and other behavioural disciplines were carried out in laboratories mostly using university students as participants. The table below provides a synthetic overview of the pros and cons of the online experiment where the laboratory experiment is the implicit benchmark against which pros and cons are identified.

The main strategic advantage of an online experiment compared to a laboratory one is the increasing possibility to make inference about the population of reference (external validity). Online experiments, by having larger and non-selected samples, usually have greater power than lab studies. Data quality can be defined by variable error, constant error, reliability, or validity. Comparisons of power and of certain measures of quality have found cases where online data are higher in quality by one or another of these definitions with respect to lab data, though this is not a systematic result (Birnbaum, 2004, 825). Many researchers are convinced that data obtained via the Web can be “better” than those obtained from students (Reips 2000), despite the obvious advantage that the lab offers for environmental control.

Table 2 Pros and Cons of online experiments

Pros	Cons
Wider sampling access. Ease of access to a large number of demographically and culturally diverse participants	**Multiple submissions**. They can be avoided or controlled by collecting personal identification items (evidence is that multiple submission, however, is rare).
Generalizability /quality of data. Better basis for generalising the findings to the general population and to more settings and situations (because of high external validity). Greater power and quality of data[8].	**Less experimental control**. Variability of environments (lighting, noise, technical features of equipment used, i.e. browser type, connection speed). In absence of Lab assistants' controls participants may provide 'noisy' answers (provided without paying attention). These problems are less of an issue with between-subjects designs with random distribution of participants to experimental conditions
Better efficiency and logistics. Experimental procedures automation reduces costs and increases the uniformity of the procedure across participants.	**Self-selection**. Only interested and motivated participants may start and complete the experiment. Using the multiple site entry technique can reduce self-selection.
Detectability of motivational confounding. See opposite cell about dropout.	**Dropouts**. This is always an issue in Web experiments. However, dropout can be turned into a detection device for motivational confounding.
Reduction of experimenter effects and demand characteristics[9].	**Lack of interaction**. This may cause misunderstanding among participants, but can be avoided with pre-test and pilot testing

Source: extracted in condensed fashion from, among others, key references (Batinic, Reips, & Bosnjak, 2002; Birnbaum, 2000; Birnbaum, 2004; Dandurand, Shultz, & Onishi, 2008; Gosling & Johnson, 2010; Reips, 2000, 2002a; Reips & Krantz, 2010; Reips, 2002b).

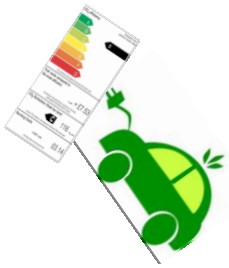
The main drawback of an online experiment compared to a laboratory one is the lack of full environmental control. Participants in online experiments may answer questions and accomplish behavioural tasks in very different settings (a room with light and silence, versus one's desk at work in less light and a lot of noise) and with different equipment (a participant may use a browser that does not correctly show a visual stimuli or may have a slow connection delaying the completion of the tasks and increasing fatigue, frustration, and 'noisy' answers). Most importantly, since lab assistants do not control participants, there are more chances that they engage in automatic answering and completion of tasks, which introduce noise in the data. This can be controlled for with check questions and is less of an issue for between subject design with randomisation of treatments and control conditions.

[8] Data quality can be defined by variable error, constant error, reliability, or validity. Comparisons of power and of certain measures of quality have found cases where Web data are higher in quality by one or another of these definitions than are comparable lab data

[9] Demand characteristic is a subtle cue that makes participants aware of what the experimenter expects to find or how participants are expected to behave. Demand characteristics can change the outcome of an experiment because participants will often alter their bahaviour to conform to the experimenters expectations

There are other technical/tactical issues that can be controlled for in the online experiment (multiple submissions, dropouts, self-selection), but the main trade-off between online and lab experiment is the exchange of greater generalizability and data power for less experimental control. It is then not surprising that often experiments are repeated with the same outcome measures both online and in laboratory settings for checking the quality of the data.

In view of this main trade off, our choice of using first a laboratory experiment and then an online experiment is justified both from a methodological and from a policy perspective. Methodologically, we decided to explore in more depth the effectiveness of the labels in a Lab where respondents could be controlled and stayed between 40 minutes and 1 hour. It must, in fact, be recalled that according to the literature benchmark an online experiment cannot last more than 20-25 minutes, else there is no guarantee on the quality of the answer provided by respondents when time exceeds this limit. Therefore, we could test more items in the laboratory and we did so with the aim of screening and deciding which aspects concerning the labels could be carried out to the online experiment, considering the limit of 25 minutes and the fact that in this experiment also promotional material had to be tested. In addition, given the large N available in the online experiment (8000 versus 400 in the Lab), the Lab served the purpose of identifying issues that could be tested online using sub-samples, as not to increase burden on each respondent. From a policy perspective it is clear that we needed greater external validity and capability to generalise, which are offered by the online experiment. So, again we used the lab as a first screening, so that we could then test with greater external validity the issues where we aimed to provide policy recommendations with greater external validity.

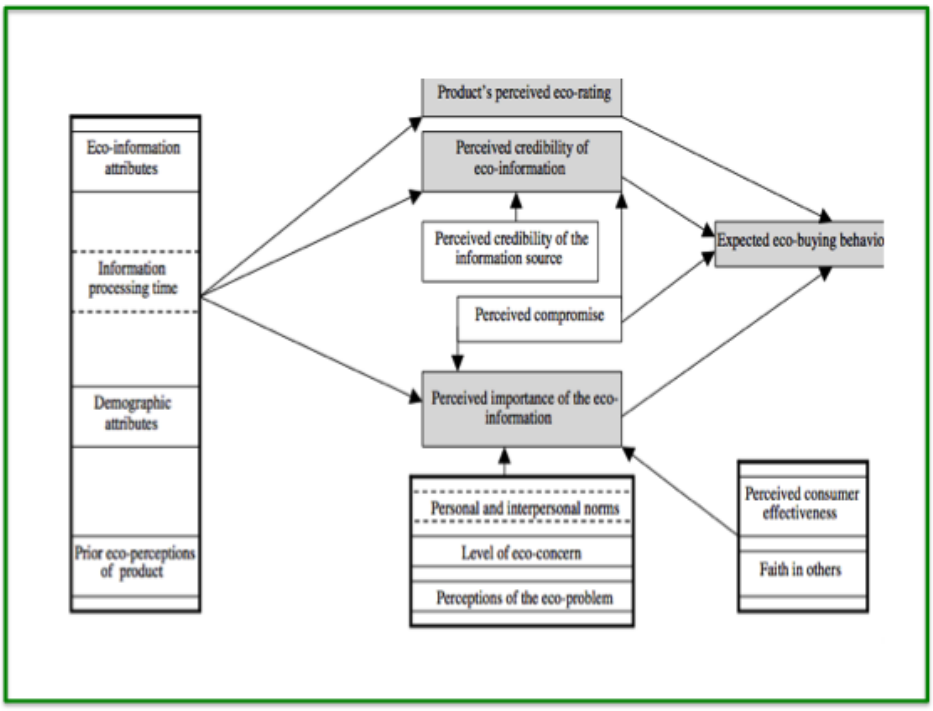


3 Preliminary survey

3.1 Inspiring model for the survey questionnaire

As anticipated, Teisl, Noblet, and colleagues have developed and tested empirically the most comprehensive and holistic model to explain how the characteristics of the individuals and the modality of information provision simultaneously influence several metrics known to be important for the success of an eco-information policy intervention (Noblet*, et al.*, 2006; Teisl*, et al.*, 2008). We started from this model (whose structure is summarised in the figure below), adapted it to our objectives, and derived from it the rationale for the preliminary survey questionnaire (see **Annex V**)

Figure 5 Eco-buyer model (Teisl et al 2008)[10]



This model rests on a number of important features and hypotheses that we summarise below:

[10] Reproduction permitted.

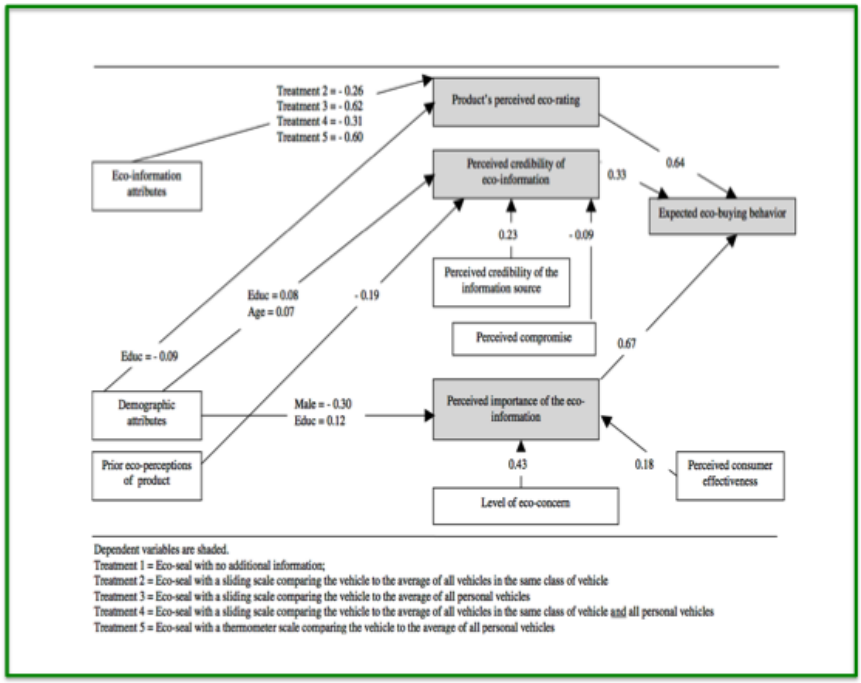
- **Cars' eco-friendliness is a credence attribute**. Whereas attributes such as cars' colour or number of cylinders are objectively measurable and other can be directly experienced (road handling, acceleration), the eco-friendliness of a car is a 'credence attribute' not easily verifiable by the consumers[11]. This means that: a) choices are not always optimal; b) simple provision of additional information has not a linear impact and is mediated by perceptions, attitudes, experiences, and other personal characteristics;
- **Eco-behaviour is a function of perceived eco-friendliness and loss**. The expected eco-behaviour of consumers is a function of the perceived eco-friendliness of the vehicle, and the perceived losses (perceived compromises) in other attributes (e.g. lower acceleration) related to the level of eco-friendliness. The assumption being that all else equal, individuals are more likely to choose products they perceive to have higher levels of eco-friendliness and lower level of perceived compromises;
- **Perceived credibility and importance of information**. Two additional variables impact eco-behaviour: the perceived credibility of the eco-information presented to the individual, and the perceived importance the individual places on the eco-information;
- **Positive information and priors**. The perceived eco-rating of a car should increase when the individual is presented with positive eco-information or when they hold positive environmental priors of the car. Respondents should provide more negative eco- ratings when the presented eco-information is incongruent to their priors (i.e., eco-labels imply eco-differentiation which is counter to the prior that all vehicle pollute about the same);
- **Demographic characteristics and information**. It is also hypothesized that the perceived credibility of the information may differ across individuals based on demographic differences, and increase with positive perceptions of the information source or car. An increased perception that eco-friendly vehicles entail a compromise in price or quality should decrease the individual's perception that the eco-information is credible. As in previous point it is expected that respondents will place lower credibility on eco-information that is incongruent to their priors;
- **Perception of environmental problems**. Information importance is assumed to increase with increased perceptions of environmental degradation, increased levels of environmental concern and increased positive prior perceptions of the car. The information should also be more important to individuals with higher perceptions of their consumer effectiveness (if I buy eco-car I make a change) and if they perceive that society expects them to behave in an eco-conscious manner;
- **Eco-behaviour of others**. Very importantly an increased faith in the eco-behaviour of others should increase the importance of the information. As mentioned earlier, drivers often feel no personal responsibility for vehicle air pollution when they note

[11] Fuel efficiency is directly correlated with CO2 and is verifiable, but of course it represents only a part of eco-friendliness.

worse offenders (i.e., observing free-ridership leads to a decreased faith-in-others and to a decrease in own socially beneficial behaviour).

The figure below reports the results of the survey (treated through a structural equation model approach)

Figure 6 Eco-buyer model results (Teisl et al 2008)[12]



We comment the most noteworthy:

- The eco-seal by itself (a logo without information) apparently led respondents to ''incorrectly'' assess the vehicle as being environmentally better than when they were faced with more quantitative information;
- There is no difference in respondents' reactions when they are presented only baseline information about the same vehicle class and when they are presented both the class baseline and the all-vehicle baseline;
- However, there is a significant difference in respondents' reactions when they only receive baseline information about all vehicles and when they receive both the class baseline and the all-vehicle baseline. This suggests respondents' eco-ratings of vehicles are primarily driven by comparisons between a given vehicle and other vehicles within the same class;
- The perceived credibility of the label is positively related to the respondent's faith-in-the information source and negatively related to individuals' perceptions of the product: namely, the perception that all vehicles pollute about the same and that eco-

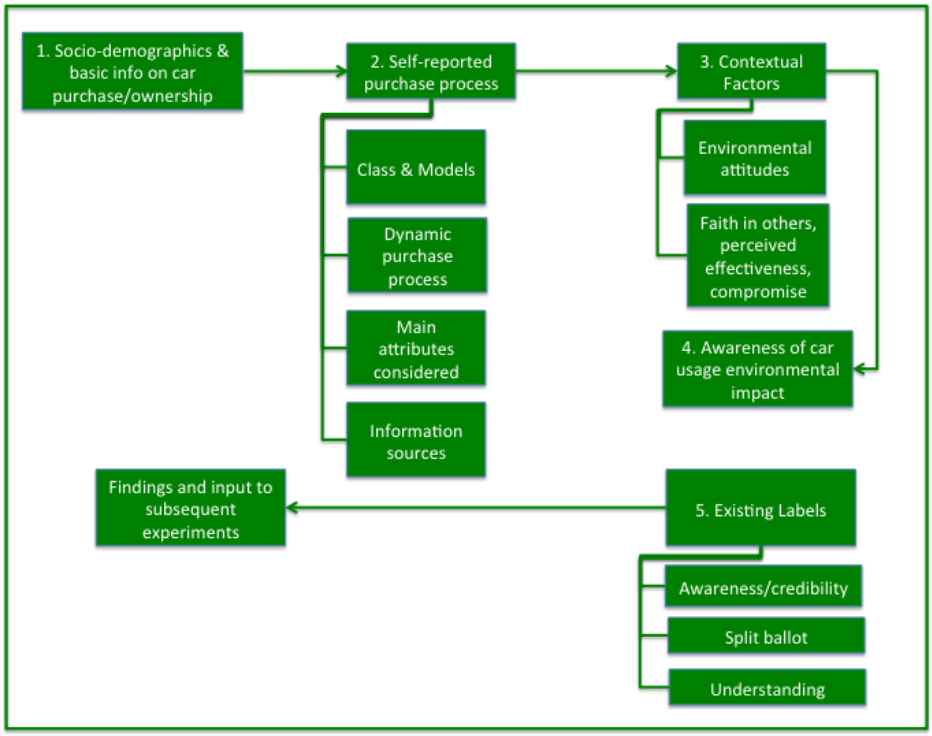
[12] Reproduction permitted.

friendly vehicles are perceived as being inferior in other quality attributes (e.g., poor acceleration).

3.2 Design of our survey questionnaire

In order to pursue the research objectives described in § 1.2, the survey instrument (see **Annex V**) was designed as described in the figure below, reflecting the state of the art in the scientific literature reviewed in chapter 2 and the approach of Teisl et al (2008) described in the previous paragraph.

Figure 7 Conceptual structure of the preliminary survey



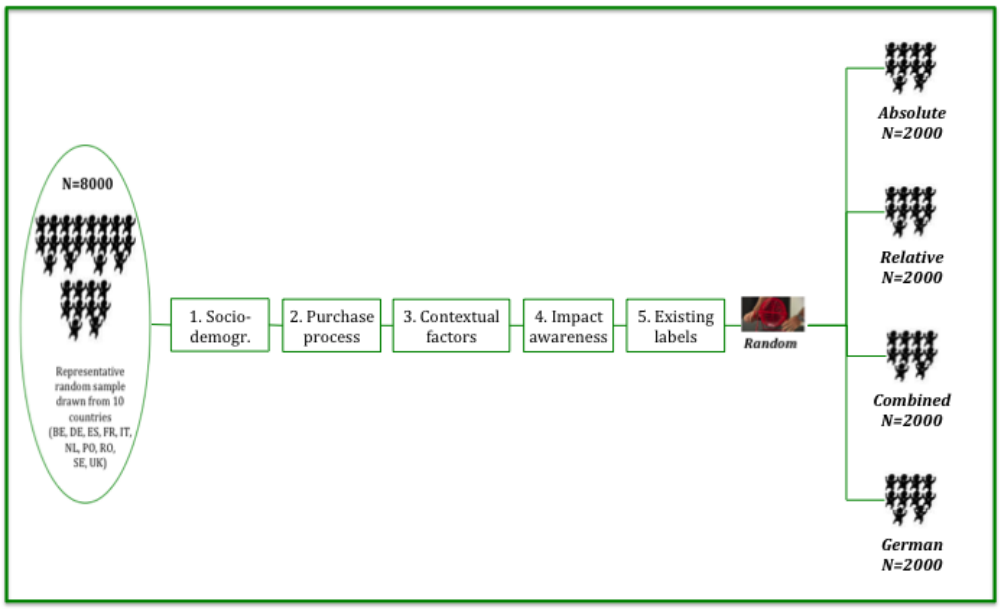
Below we illustrate the five blocks of the survey, where in parenthesis we indicate the corresponding questions in the survey questionnaire (**Annex V**):

- **Section I: Socio-demographics (Q1 to Q8a).** It covered standard socio-demographics variables (it was worth checking any potential differentiation due to socio-demographic background despite the fact that the literature reviewed does not show any conclusive results as to the impact of age, gender, education, and income) plus a few questions on who make car purchase decisions, possession of a car, and its usage;
- **Section II: Self-Reported Purchase process (Q9 to Q21)**. It investigated the "consumer journey" or the self-reported steps and factors that consumers follow/consider in the process of purchasing a car (class and model; dynamic of purchase process; main attributes considered; information sources);
- **Section III: Contextual factors (Q22 to Q28)**. It addressed environmental attitudes through consolidated scales, respondents' faith in the eco-baehviours of others and in

the effectiveness of their behaviours as consumers, perceived compromise (i.e. between choosing eco-friendly and performance);

- **Section IV: Awareness about car impact (Q29 to Q31)**. It explored the extent to which consumers are aware of the environmental impacts of car usage;
- **Section V: Existing labels (Q32 to Q36) and split ballot**. This section focused on existing labels and then included the split ballot (Q37a, Q37b, Q37c, Q38).

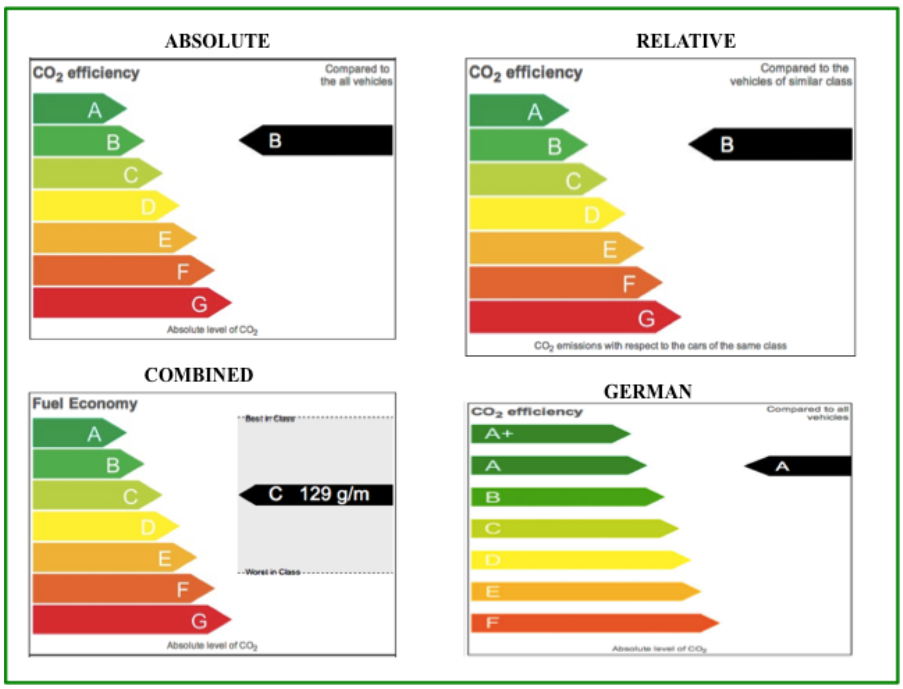
Figure 8 Procedure of the preliminary survey



After all respondents answered the last question of section V then they were randomly split into four sub-sample each allocated to see the same car (a VW Polo) but matched to four different simplified labels containing only the CO2 emissions using four different classification systems (see Figure 9):

1. Participants were shown a variant of VW Polo associated with a simplified Car Label including the Relative Classification system (i.e. a vehicle is rated compared to vehicles belonging to the same class);
2. Participants were shown a variant of VW Polo associated with a simplified Car Label including the Absolute Classification system (i.e. a vehicle is rated according to the absolute level of CO2 emissions);
3. Participants were shown a variant of VW Polo associated with a simplified Car Label including the Combined Classification system (i.e. a combination of absolute and relative rating);
4. Participants were shown a variant of VW Polo associated with a simplified Car Label including the German classification system (a sub-variant of relative classification).

Figure 9 Classification systems used for CO2 emissions



Then they were asked four questions about the car model they had just seen associated with one of the four classification systems:

- Q37a: 'How environmental friendly do you think this car is?'
- Q37b: 'How fuel efficient do you think this car is?'
- Q37c: 'How environmentally-friendly do you think this car is compared to other similar type of cars?'
- Q37d: 'How environmentally friendly do you think this car is compared to the car/s in your household?'

With respect to the split ballot an important disclaimer is needed here to ensure a correct reading of its results. This was not a test of the effectiveness of the labels based on classification systems but a simple preliminary exploration to help finalise the design of the laboratory experiment. First, the stimuli presented to the respondents were, in fact, simplified compared to the versions used in the laboratory experiment. Second, for reasons of feasibility, the four simplified labels were associated only to one car that may have had an influence in affecting how the different classification systems influenced respondents' perception. Third, the split ballot tested the classification systems along only one measure (noticeability). The split ballot was a good enough exploratory instrument to shape the design of the laboratory experiment, but we cannot draw generalised conclusions from its results.

3.3 Key variables measured

In Annex V the reader can see all the questions used in the survey and, thus, in this paragraph we only selectively summarise the most important aspects.

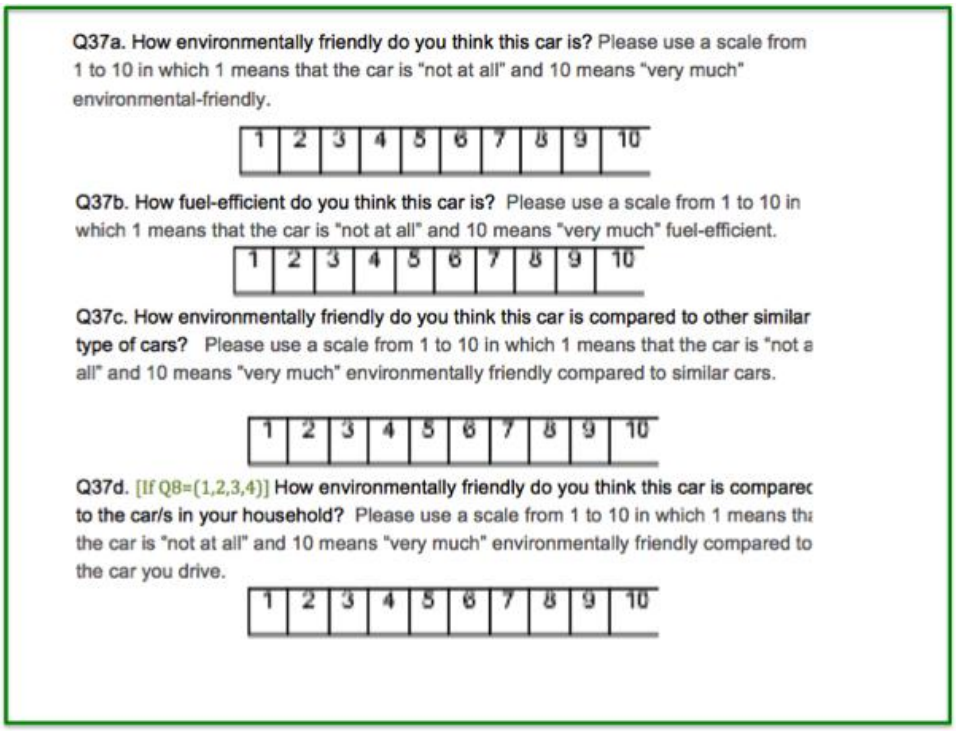
For several items we used 5 points Likert-like ratings, for instance, for credibility: 1 = not credible, 5 = very credible. We used several statements to elicit for the constructs of 'perceived consumer effectiveness', 'faith-in-others' and 'perceived compromise'. Responses to such questions are also from a five-point Likert scale where 1 = 'strongly disagree', 2 = 'somewhat disagree' 3 = 'neutral' 4 = 'somewhat agree' and 5 = 'strongly agree'. To control for individuals' general trust in government (important in relation to the reported credibility of the source of the labels) we use respondents' level of agreement to the following statement: ''I trust the government to protect the environment'' (with 1 = 'strongly disagree', 2 = 'somewhat disagree' 3 = 'neutral' 4 = 'somewhat agree' and 5 = 'strongly agree'). For prior eco-perception we asked respondents to indicate which type of vehicle produces the most air pollution when driven: 0 = respondent indicate a class, 1= respondent thin all different class pollute in the same way. The environmental attitudes and values of the respondent were measured using the New Ecological Paradigm scale (Dunlap *et al.*, 2000), which is the most reliable way of measuring such construct. This scale (Q23) uses 15 statements and asks respondents to express agreement or disagreement (also using a 5 points Likert scale). We complemented this scale with a question (Q22) presenting respondents with several statements about their attitudes toward the future.

The key blocks of questions, which we also used in the same format or in slightly revised fashion in the two experiments as part of the short questionnaires preceding and following the experimental tasks, are the following:

- Q1 to Q8a for socio-demographics and car possession and usage;
- Q9 to Q12 for vehicle class and models and type of engines;
- Q22 and Q23 for key attitudes about the future and the environment;
- Q32 to Q36 about existing labels;
- Q37a, Q37b, Q37c, Q37d, and Q38 to measure noticeability and retention of information with respect to the labels shown during the split ballot.

We report below screenshots of this last group of questions:

Figure 10 Questions: Q37a, Q37b, Q37c, Q37d



Q37a. How environmentally friendly do you think this car is? Please use a scale from 1 to 10 in which 1 means that the car is "not at all" and 10 means "very much" environmental-friendly.

1	2	3	4	5	6	7	8	9	10

Q37b. How fuel-efficient do you think this car is? Please use a scale from 1 to 10 in which 1 means that the car is "not at all" and 10 means "very much" fuel-efficient.

1	2	3	4	5	6	7	8	9	10

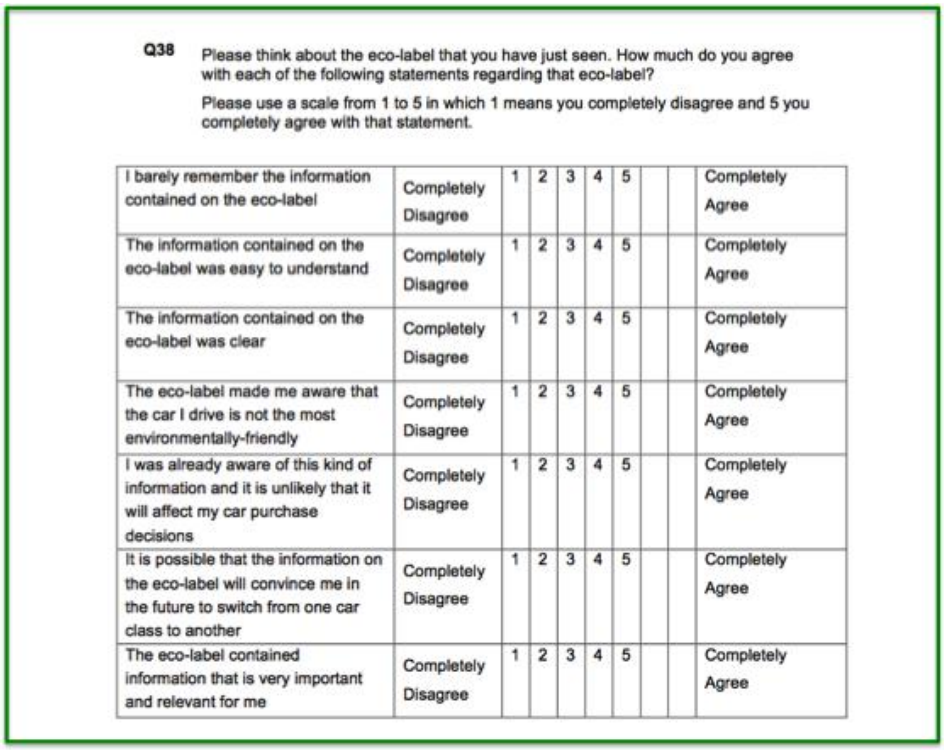
Q37c. How environmentally friendly do you think this car is compared to other similar type of cars? Please use a scale from 1 to 10 in which 1 means that the car is "not a all" and 10 means "very much" environmentally friendly compared to similar cars.

1	2	3	4	5	6	7	8	9	10

Q37d. [If Q8={1,2,3,4}] **How environmentally friendly do you think this car is compared to the car/s in your household?** Please use a scale from 1 to 10 in which 1 means tha the car is "not at all" and 10 means "very much" environmentally friendly compared to the car you drive.

1	2	3	4	5	6	7	8	9	10

Figure 11 Questions: Q37a, Q37b, Q37c, Q37d



Q38 Please think about the eco-label that you have just seen. How much do you agree with each of the following statements regarding that eco-label?

Please use a scale from 1 to 5 in which 1 means you completely disagree and 5 you completely agree with that statement.

I barely remember the information contained on the eco-label	Completely Disagree	1	2	3	4	5		Completely Agree
The information contained on the eco-label was easy to understand	Completely Disagree	1	2	3	4	5		Completely Agree
The information contained on the eco-label was clear	Completely Disagree	1	2	3	4	5		Completely Agree
The eco-label made me aware that the car I drive is not the most environmentally-friendly	Completely Disagree	1	2	3	4	5		Completely Agree
I was already aware of this kind of information and it is unlikely that it will affect my car purchase decisions	Completely Disagree	1	2	3	4	5		Completely Agree
It is possible that the information on the eco-label will convince me in the future to switch from one car class to another	Completely Disagree	1	2	3	4	5		Completely Agree
The eco-label contained information that is very important and relevant for me	Completely Disagree	1	2	3	4	5		Completely Agree

3.4 Sample

The preliminary survey is based on a sample including 800 individuals per country in the 10 countries selected for a total of 8000 respondents. The countries included are: BE=Belgium; DE= Germany; FR= France; IT= Italy; NL= Netherlands; PL= Poland; RO= Romania; ES= Spain; SE= Sweden; UK= United Kingdom.

The sample has three essential features:

1. The selection of countries follows the car market segmentation analysis (see chapter 6). Ten countries are selected according to four groups of countries (Nordic, Continental, Mediterranean, Eastern) with different car markets;

2. An equal size sample has been chosen for each one of the countries being studied. This will lead to an equal level of reliability in the results obtained in each one of the countries.

3. The choice was made to use a fully representative sample for the distribution of the target population, according to gender and age group, which means that there is no need for any weighting to be applied to interpret the data within countries.

Table 3 Sample: summary technical parameters

Population	General population aged 18 to 65 years old
Scope	10 EU countries: Belgium, Germany, France, Italy, Netherlands, Poland, Romania, Spain, Sweden, United Kingdom
Methodology	Online (quantitative survey)
Sample size	N=8,000 (n=800 per country)
Quotas	Country; Gender; Age group; Experience in purchasing cars
Sampling error	±1.12% for overall data and ±3.54% for country-specific data. In all cases, a maximum indeterminate probability (p=q=50), for a confidence level of 95.5% is applicable for each one of the reference populations
Sampling	Random

The following graphs show the ex post key demographics of the sample, to which we add that 92.4% of respondent possessed/bought a car and only 7.6% had never possessed/bought a car.

Figure 12 Sample characteristics by country: gender (survey)

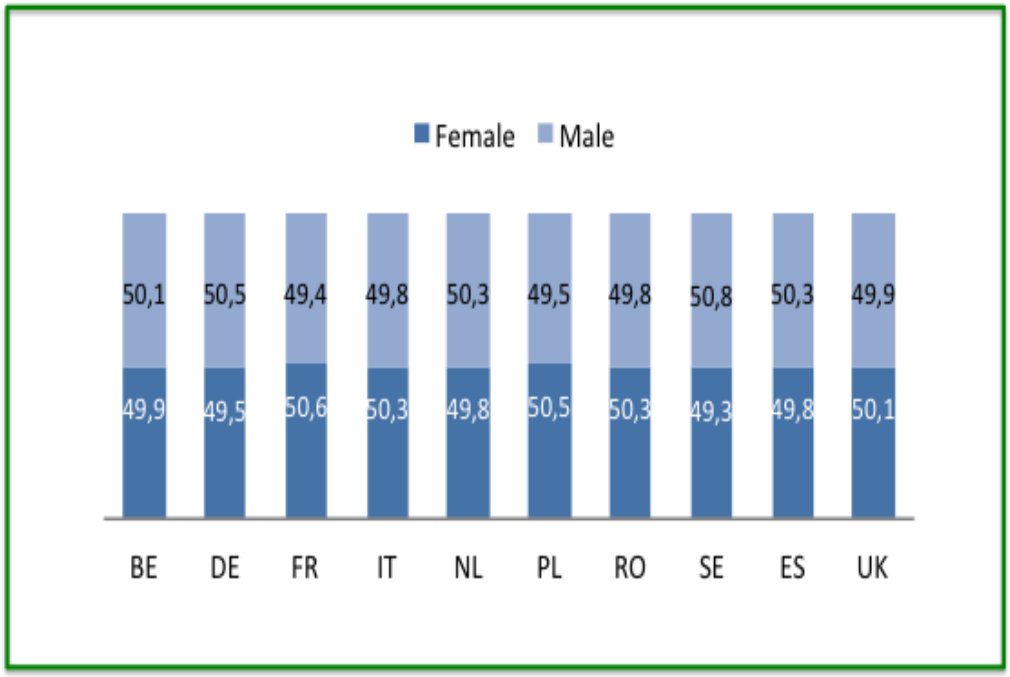


Figure 13 Sample characteristics by country: age (survey)

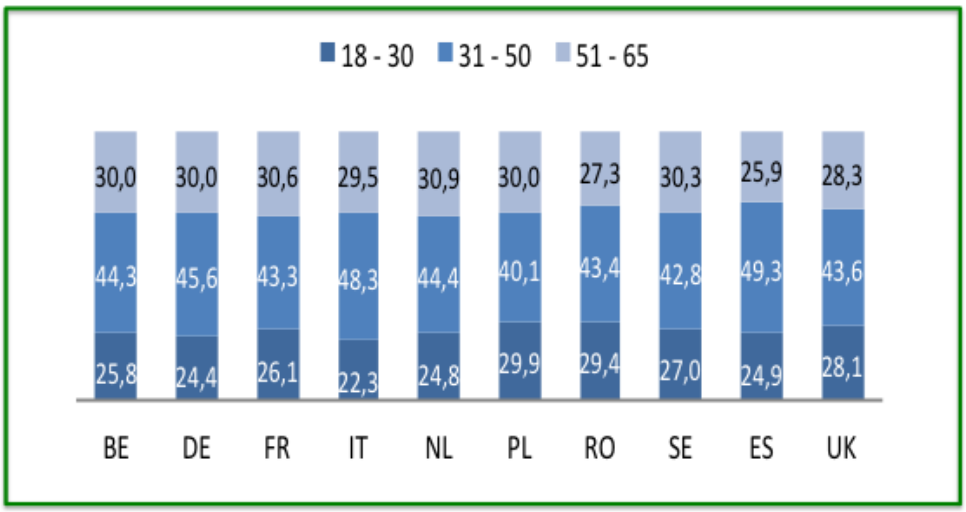
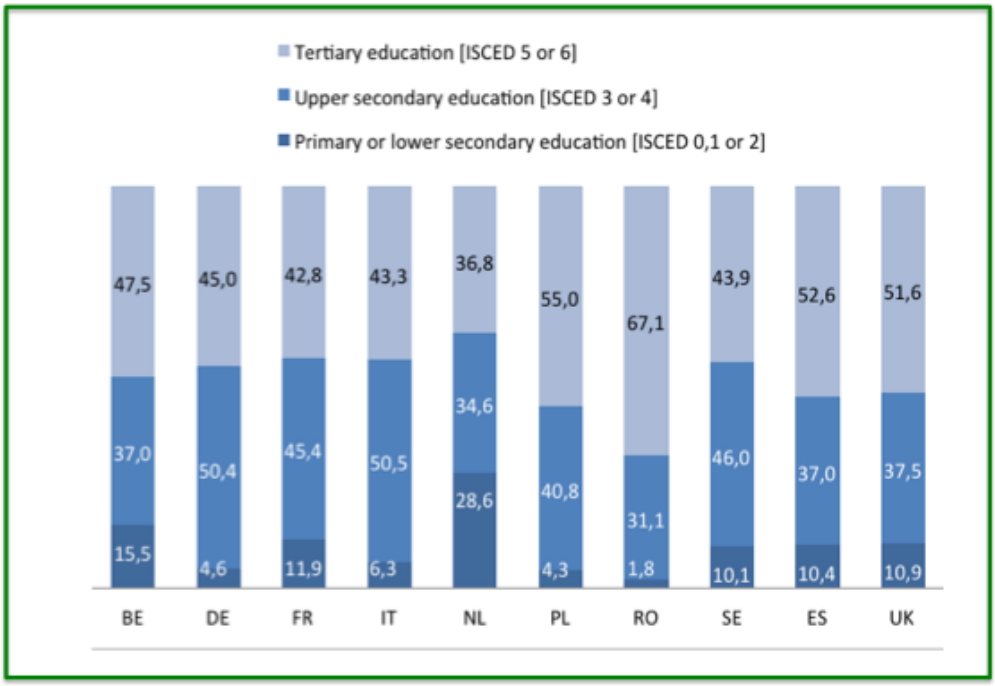


Figure 14 Sample characteristics by country: education (survey)



3.5 Analysis performed

For the preliminary survey our analysis has been very selective for in our overall design the preliminary survey was mainly instrumental to validate and set the stage for the two core experiments (laboratory and online). Accordingly we have produced some general descriptive findings and focussed especially on the part of the questionnaire that explicitly tested the four classification systems and shaped the choices for the laboratory experiment. The full set of descriptive tables and graphs are reported in **Annex III**. This descriptive analysis basically uses the frequencies at all of sample level, and then we looked at how these results are spread by main socio-demographic parameters, and by countries. For the latter we used a simple T-Test of the mean differences to have a rough measure of statistical significance of such differences.

We performed also some multivariate statistical analysis on the results of the split ballot and on some of the measures obtained from the survey. We used ANOVA (Analysis of Variance) on questions related to the split ballot (Q37a, Q37b, Q37c, Q37d, and Q38) to test if there were any statistically significant difference between the ballots in shaping the dependent variables items. This means testing whether the four different classification systems (absolute, relative, combined, and German) had significant effects in the way respondents judge the car model they have seen in terms of the measures obtained from the cited questions. Additionally, we considered the scales obtained from questions Q22 “attitudes toward the future” and Q23 “attitudes toward the environment” and test their

impacts on the items measured by Q37a and Q37b by Q36 (scale about usage of information contained in environmental labels). We first identified the factorial latent structure of these two scales (using Factor Analysis, FA and/or Principal Component Analysis, PCA) and then test the impact of the identified factors on the dependent variables.

3.6 Multivariate analysis graphs and tables

3.6.1 Split ballots results

Once all respondents in the sample completed Q36 the programmed randomisation algorithm split them into four sub-samples (each including 25% of the overall sample, that is 2000 respondents). Each sub-sample was also randomly allocated to see the same car (A Polo) but matched to four different simplified labels:

1. Participants were shown a variant of VW Polo associated with a simplified Car Label including the Relative Classification system (i.e. a vehicle is rated compared to vehicles belonging to the same class);
2. Participants were shown a variant of VW Polo associated with a simplified Car Label including the Absolute Classification system (i.e. a vehicle is rated compared to vehicles from the whole fleet);
3. Participants were shown a variant of VW Polo associated with a simplified Car Label including the Combined Classification system (i.e. a combination of absolute and relative rating);
4. Participants were shown a variant of VW Polo associated with a simplified Car Label including the German classification system (a sub-variant of relative classification).

Then they were asked four questions about the car model they had just seen associated with one of the four classification systems:

- Q37a: 'How environmental friendly do you think this car is?'
- Q37b: 'How fuel efficient do you think this car is?'
- Q37c: 'How environmentally-friendly do you think this car is compared to other similar type of cars?'
- Q37d: 'How environmentally friendly do you think this car is compared to the car/s in your household?'

All four questions are a self-reported measure of the noticeability effect the label had on the respondents' perception. It does not matter whether the answers to the four

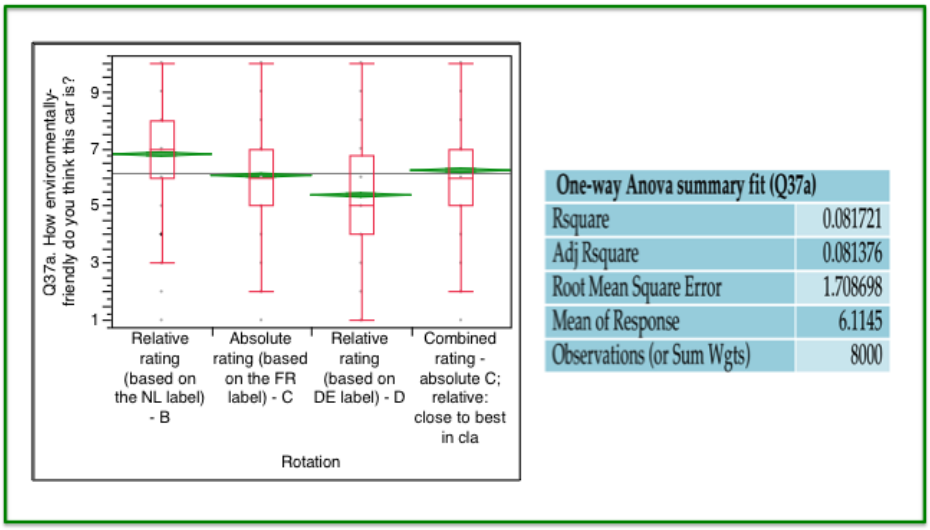
questions above correspond or not to the objective parameter of the car. What matters is whether we can identify systematic differences in the way the four different classification systems shape the answers to the four questions.

To this purpose we performed ANOVA (Analysis of Variance) between the split ballots. In other words, we test if there were any statistically significant difference between the ballots (four sub-sample each associated with one of the four classification systems) in the way respondents answered each one of the four questions listed above measured on a scale 1 to 10. The technical tables are reported in § 3.6.1.5 below, whereas in the next sub-paragraphs we briefly report the key findings with the support of one figure for each of the four questions above. In the following figures we include for the four ballots to be compared with each other: a) distributions; b) means; c) scatter plots; c) summary of fits (more details in the tables placed in § 2.4). We explain this for the first figure only, and then for the other three we only present the results of the analysis.

3.6.1.1 Q37a: 'How environmental friendly do you think this car is?'

In the graphical part on the vertical axis we have the question and the value of the scale used (1-10) representing the response variable whereas on the horizontal one we have the four classification systems to which each ballot (Sub-N=2000) was exposed representing the independent variable.

Figure 15 One-way ANOVA for Q37a (with summary of fit)



One-way Anova summary fit (Q37a)	
Rsquare	0.081721
Adj Rsquare	0.081376
Root Mean Square Error	1.708698
Mean of Response	6.1145
Observations (or Sum Wgts)	8000

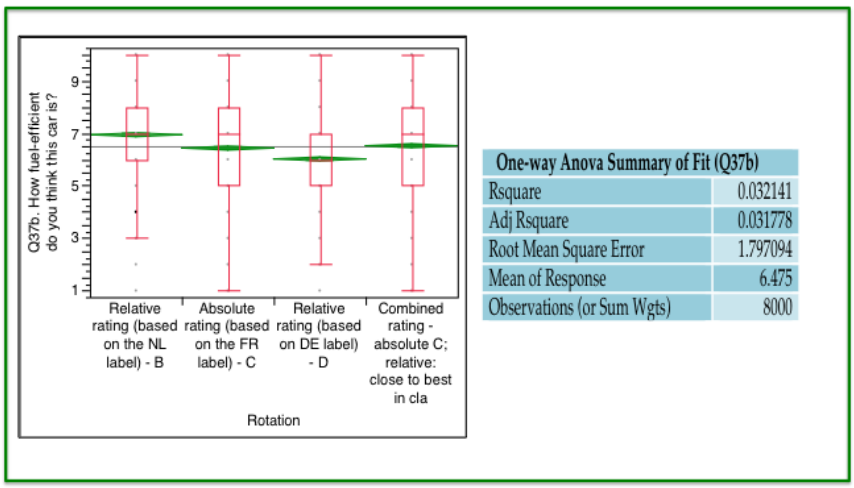
It is important to add that the absolute classification system is used as the baseline against which the others are compared. The graphic part provides the distribution and means of the answers and their scattered plot. In the green box we have the summary of fit parameters. From this information we can conclude that: the relative classification system induced systematically higher evaluation in terms of environmentally friendliness

with also a smaller variance (see scatterplot). The lowest evaluation was elicited by the German classification system (with the highest variance), while the 'combined' one did not have any particular effect compared to the benchmark. On the other hand, from the summary of fit and from other tables placed in § 2.4 we can see that the differences are statistically significant but that the effects of the tested classification systems is small (R^2=0.08).

3.6.1.2 Q37b: 'How fuel efficient do you think this car is?'

For Q37b exactly as in the previous case, we can observe that the relative classification system induced systematically higher evaluation in terms of fuel efficiency (Figure 16). Once again, lowest evaluations were elicited by the German classification system.

Figure 16 One-way ANOVA for Q37b (with summary of fit)



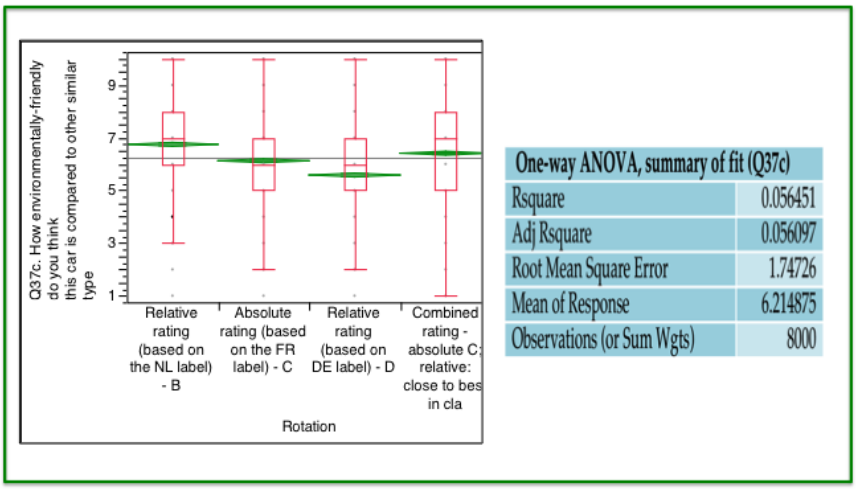
One-way Anova Summary of Fit (Q37b)	
Rsquare	0.032141
Adj Rsquare	0.031778
Root Mean Square Error	1.797094
Mean of Response	6.475
Observations (or Sum Wgts)	8000

Also in this case the 'combined' one did not have any particular effect compared to the benchmark (the absolute classification system) and, moreover, it had a large variance, as much as the absolute classification system. Overall effect of classification systems is statistically significant but small (R^2=0.03).

3.6.1.3 Q37c: 'How environmentally-friendly do you think this car is compared to other similar type of cars?'

Looking quickly at next figure (Q37c 'How environmentally-friendly do you think this car is compared to other similar type of cars?'), we see basically the same pattern as in the previous two cases with relative classification system having the highest effect, with the effect being statistically significant but small.

Figure 17 One-way ANOVA for Q37c (with summary of fit)

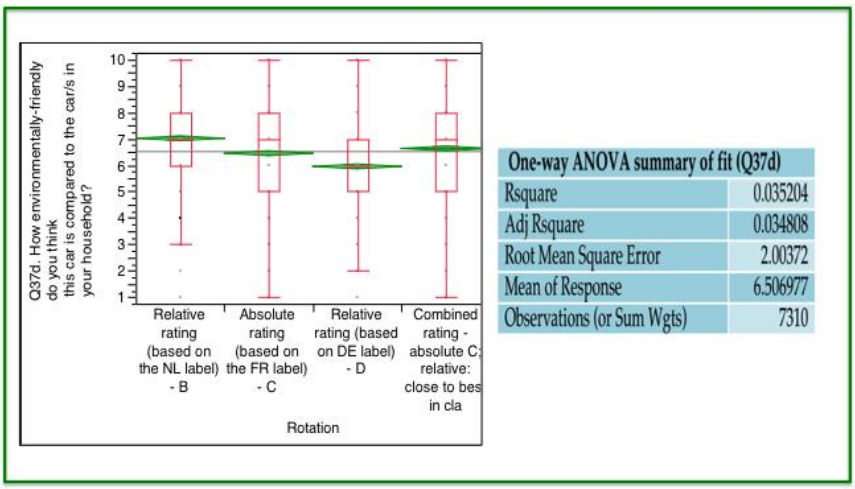


One-way ANOVA, summary of fit (Q37c)	
Rsquare	0.056451
Adj Rsquare	0.056097
Root Mean Square Error	1.74726
Mean of Response	6.214875
Observations (or Sum Wgts)	8000

3.6.1.4 Q37d: 'How environmentally friendly do you think this car is compared to the car/s in your household?'

Looking quickly at next figure (Q37d 'How environmentally friendly do you think this car is compared to the car/s in your household?'), we see basically the same pattern as in the previous three cases with relative classification system having the highest effect, with the effect being statistically significant but small.

Figure 18 One-way ANOVA for Q37d (with summary of fit)



One-way ANOVA summary of fit (Q37d)	
Rsquare	0.035204
Adj Rsquare	0.034808
Root Mean Square Error	2.00372
Mean of Response	6.506977
Observations (or Sum Wgts)	7310

3.6.1.5 Split ballot ANOVA tables

Table 4 Split Ballot Analysis of Variance (Q37a)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Rotation	3	2077.602	692.534	237.1977	<.0001 *
Error	7996	23345.516	2.920		
C. Total	7999	25423.118			

Table 5 Split Ballot Means for one-way ANOVA (Q37a)

Level	N.	Mean	Std Error	Lower 95%	Upper 95%
Relative rating (based on the NL label) - B	2000	6.7980	0.0382	6.7231	6.8729
Absolute rating (based on the FR label) - C	2000	6.0570	0.0382	5.9821	6.1319
Relative rating (based on DE label) - D	2000	5.3700	0.03821	5.2951	5.4449
Combined rating - absolute C; relative: close to best in class	2000	6.2330	0.0382	6.1581	6.3079

Table 6 Split Ballot Analysis of Variance (Q37b)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Rotation	3	857.547	285.849	88.5106	<.0001*
Error	7996	25823.453	3.230		
C. Total	7999	26681.000			

Table 7 Split Ballot Means for one-way ANOVA (Q37b)

Level	N.	Mean	Std Error	Lower 95%	Upper 95%
Relative rating (based on the NL label) - B	2000	6.93700	0.04018	6.8582	7.0158
Absolute rating (based on the FR label) - C	2000	6.42800	0.04018	6.3492	6.5068
Relative rating (based on DE label) - D	2000	6.01550	0.04018	5.9367	6.0943
Combined rating - absolute C; relative: close to best in class	2000	6.51950	0.04018	6.4407	6.5983

Table 8 Split Ballot Analysis of Variance (Q37c)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Rotation	3	1460.491	486.830	159.4639	<.0001*
Error	7996	24411.139	3.053		
C. Total	7999	25871.630			

Table 9 Split Ballot Means for one-way ANOVA (Q37c)

Level	N.	Mean	Std Error	Lower 95%	Upper 95%
Relative rating (based on the NL label) - B	2000	6.74600	0.03907	6.6694	6.8226
Absolute rating (based on the FR label) - C	2000	6.12150	0.03907	6.0449	6.1981
Relative rating (based on DE label) - D	2000	5.58150	0.03907	5.5049	5.6581
Combined rating - absolute C; relative: close to best in class	2000	6.41050	0.03907	6.3339	6.4871

Table 10 Split Ballot Analysis of Variance (Q37d)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Rotation	3	1070.318	356.773	88.8623	<.0001*
Error	7306	29332.826	4.015		
C. Total	7309	30403.144			

Table 11 Split Ballot Means for one-way ANOVA (Q37d)

Level	N.	Mean	Std Error	Lower 95%	Upper 95%
Relative rating (based on the NL label) - B	1827	7.01040	0.04688	6.9185	7.1023
Absolute rating (based on the FR label) - C	1823	6.44487	0.04693	6.3529	6.5369
Relative rating (based on DE label) - D	1824	5.94572	0.04692	5.8538	6.0377
Combined rating - absolute C; relative: close to best in class	1836	6.62527	0.04676	6.5336	6.7169

3.6.2 NEP scale tables: Q23

We analyse here how individual cultural characteristics in terms of environmental values affect the response of two dependent variables: Q37a and Q37b that are the direct evaluative questions about the environmental friendliness and fuel efficiency of the car evaluated. Naturally, answers to these question varied depending on the ballot (i.e. classification system) to which respondent were randomly assigned.

Environmental values are measured using the earlier cited New Ecological Paradigm scale (NEP scale) on which respondents values were elicited using Q23 (see **Annex V**). Technical tables and figures are placed at the end of this sub-paragraph.

We first explored the latent factorial structure of the answers respondent provided to Q23 and, as in many other studies, we reduce the 10 items in the scale to a 3-factors

structure that organizes people environmental basic attitudes. The three factors can be labelled as: 'Values of high environmental concerns, about preserving a balance with Nature' (simplified as 'Concerned'); 'Values that are about respecting nature but at the same time preserve human progress' (simplified as 'slightly concerned'); 'Values that are about human progress only and trust technology to solve environmental issues' (simplified as 'not concerned').

Next, we performed a statistical test to check whether these factors have a statistically significant impact on the dependent variable Q37a ('How environmental friendly do you think this car is?') in each of the four ballots. The impact is significant in most of the cases, with exceptions for: a) the absolute classification system and the 'slightly concerned' environmental values; and b) for the 'not concerned' with both absolute and German classification systems.

We proceed in the same way using as dependent variable Q37b ('How fuel-efficient do you think this car is?) in each of the four ballots. The impact was significant most of the cases, except for the absolute and combined classification systems and the 'concerned'
It must be notes, however, that the impact is significant but small suggesting a multidimensional process of decision making in which each various elements play a role

Figure 19 Factors Screen Plot of the NEP scale

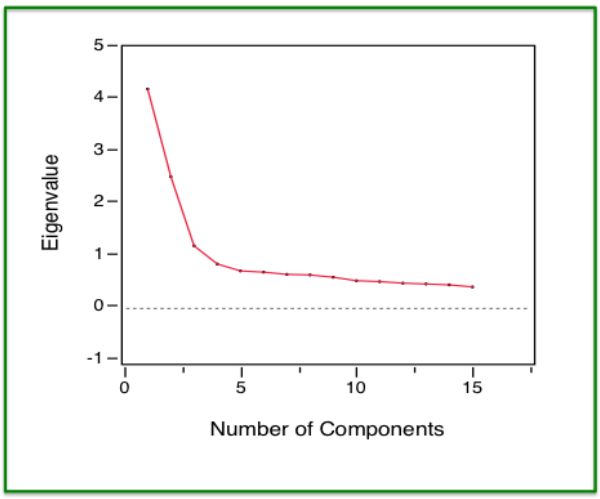


Figure 20 Scatterplot 3D of the NEP scale

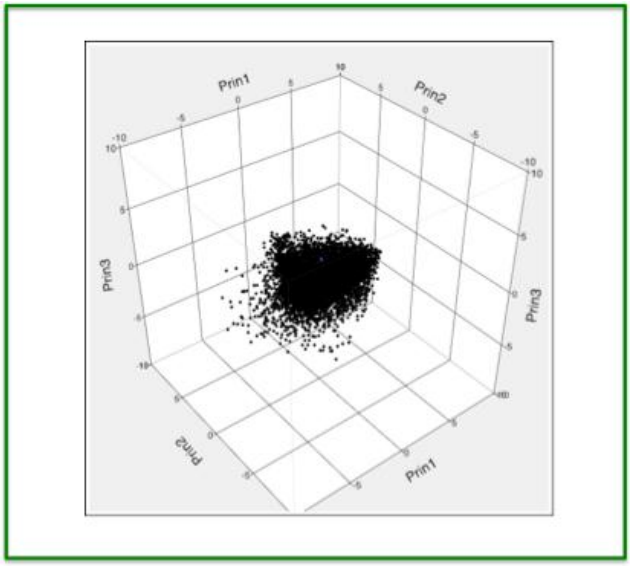


Table 12 NEP scale Principal Component Analysis (CPA)

N.	Eigenvalue	%	%	Cum Percent	ChiSquare	DF	Prob> ChiSq
1	4.2113	28.075		28.075	32667.5	103.379	<.0001*
2	2.5290	16.860		44.936	14998.7	96.013	<.0001*
3	1.2040	8.027		52.962	4441.23	85.998	<.0001*
4	0.8549	5.699		58.661	2116.00	74.431	<.0001*
5	0.7220	4.814		63.475	1402.33	63.185	<.0001*
6	0.6976	4.651		68.126	1103.79	52.688	<.0001*
7	0.6557	4.371		72.497	816.549	43.068	<.0001*
8	0.6445	4.297		76.794	598.365	34.443	<.0001*
9	0.6009	4.006		80.800	347.470	26.635	<.0001*
10	0.5348	3.565		84.365	165.168	19.806	<.0001*
11	0.5168	3.445		87.811	106.233	13.887	<.0001*
12	0.4878	3.252		91.063	56.944	8.923	<.0001*
13	0.4710	3.140		94.203	33.553	4.907	<.0001*
14	0.4545	3.030		97.233	16.397	1.937	0.0003*
15	0.4151	2.767		100.000	0.000	0.037	1.0000

Table 13 NEP Factors and Q37a: test of impact

	FAC2_3 Q23s concerned									
	1	2	3	4	5	6	7	8	9	10
Relative	-0.032	-0.458	-0.238	-0.172	-0.101	0.009	0.092	0.002	0.012	0.288
Absolute	-0.083	-0.077	0.117	-0.007	-0.106	-0.016	0.045	-0.003	0.117	0.165
German	0.209	0.187	0.130	0.116	-0.025	-0.120	-0.045	0.031	0.098	0.264
Combined	-0.324	0.147	0.120	-0.020	-0.018	-0.065	-0.034	0.022	0.189	0.575
	FAC1_3 Q23s slightly concerned									
	1	2	3	4	5	6	7	8	9	10
Relative	0.224	-0.271	-0.188	-0.146	0.043	0.002	-0.073	0.040	0.238	0.966
Absolute	-0.291	-0.049	-0.319	-0.216	0.047	-0.002	-0.026	0.173	0.492	1.101
German	-0.136	-0.203	-0.352	-0.270	-0.052	0.120	0.185	0.381	0.385	1.063
Combined	-0.058	-0.190	-0.423	-0.355	-0.121	-0.052	-0.111	0.145	0.704	1.026
	FAC3_3 Q23s non concerned									
	1	2	3	4	5	6	7	8	9	10
Relative	-0.238	-0.159	0.557	-0.047	-0.087	0.004	-0.067	0.025	0.134	0.283
Absolute	-0.044	0.032	-0.056	0.075	-0.028	-0.061	-0.024	0.052	0.095	-0.022
German	0.131	0.233	-0.128	-0.035	0.009	-0.011	0.019	0.098	0.008	0.524
Combined	-0.138	0.270	0.203	-0.104	-0.064	-0.050	-0.071	0.042	0.165	0.450

Table 14 NEP Factors and Q37b: test of impact

	FAC2_3 Q23s concerned									
	1	2	3	4	5	6	7	8	9	10
Relative	0.079	-0.119	-0.185	-0.107	-0.259	0.034	0.033	0.061	-0.010	0.217
Absolute	0.116	0.173	-0.079	-0.048	-0.035	-0.044	0.022	0.034	0.043	0.022
German	-0.358	-0.292	-0.353	-0.202	-0.125	0.067	0.093	0.185	0.304	0.418
Combined	-0.281	0.090	0.259	0.008	-0.001	-0.007	-0.053	-0.059	0.104	0.240
	FAC1_3 Q23s slightly concerned									
	1	2	3	4	5	6	7	8	9	10
Relative	-0.019	0.011	-0.276	-0.115	-0.105	-0.031	0.004	0.015	0.307	0.345
Absolute	-0.308	-0.496	-0.120	-0.113	-0.006	-0.040	-0.031	0.125	0.163	0.477
German	-0.239	0.324	0.155	0.060	-0.102	0.026	0.025	-0.048	0.007	0.218
Combined	-0.107	-0.344	-0.378	-0.282	-0.143	-0.104	-0.017	0.066	0.139	0.518
	FAC3_3 Q23s non concerned									
	1	2	3	4	5	6	7	8	9	10
Relative	-0.012	-0.109	-0.141	0.127	-0.115	-0.011	-0.134	0.065	0.163	0.580
Absolute	-0.065	0.206	0.020	0.045	-0.086	-0.155	-0.053	0.028	0.323	0.441
German	0.049	0.298	-0.090	-0.021	-0.144	-0.066	-0.011	0.167	0.300	0.355
Combined	-0.059	0.334	0.067	0.050	-0.160	-0.123	-0.114	0.078	0.278	0.306

3.6.3 CFC scale tables: Q22

We analyse here how individual cultural characteristics in terms of attitudes toward control of future consequence affect the response of the same two dependent variables as those used for the NEP scale: Q37a and Q37b. These values are measured using the Control of Future Consequences scale (CFC scale) on which respondents values were elicited using Q22 (see **Annex V**). Technical tables and figures are placed at the end of this sub-paragraph. Similarly with what we have done for the environmental values, we performed a factor analysis (Principal Components Analysis or PCA) on the CFC scale. In this particular case, we found a two factors solution that can be labelled as: 'Selfish and short term oriented'; and 'Conscious and Midterm oriented'. We tested the impact of these factor scores on the dependent variable Q37a and Q37b in each of the four ballots. The impact was significant in all cases except for the German classification systems and the 'Conscious mid-term oriented' and their evaluation of environmental friendliness (Q37a). As in the case of the NEP scale results are mostly statistically significant but small.

Table 15 CFC Factors and Q37a: test of impact

	FAC1_4 Q22s Selfish - short term									
	1	2	3	4	5	6	7	8	9	10
Relative	0.348	0.086	-0.091	0.020	0.039	-0.032	-0.032	0.002	0.170	0.882
Absolute	-0.377	0.166	-0.122	-0.242	0.027	-0.015	-0.060	0.196	0.591	1.105
German	0.081	-0.275	-0.218	-0.234	-0.051	0.038	0.084	0.221	0.505	0.878
Combined	0.083	-0.225	-0.302	-0.158	-0.112	-0.023	-0.052	0.080	0.428	0.611
	FAC2_4 Q22s Conscious - middle term									
	1	2	3	4	5	6	7	8	9	10
Relative	0.166	-0.118	-0.032	-0.270	-0.171	-0.002	0.032	0.010	0.242	0.408
Absolute	-0.438	-0.154	-0.142	0.081	-0.148	-0.057	0.071	0.149	0.188	0.428
German	-0.068	-0.088	-0.081	-0.050	-0.047	-0.001	0.027	0.150	-0.048	0.293
Combined	-0.444	0.243	0.130	-0.173	-0.168	0.003	-0.006	0.072	0.150	0.850

Table 16 CFC Factors and Q37b: test of impact

	FAC1_4 Q22s Selfish - short term									
	1	2	3	4	5	6	7	8	9	10
Relative	0.481	-0.025	-0.160	-0.046	-0.065	0.048	0.061	-0.039	0.137	0.328
Absolute	-0.090	0.000	-0.231	-0.082	-0.012	-0.041	-0.024	0.061	0.273	0.487
German	-0.078	-0.347	-0.172	-0.140	-0.027	0.061	0.008	-0.086	0.197	0.420
Combined	0.088	-0.147	-0.135	-0.229	-0.157	-0.041	0.010	0.032	0.216	0.148
	FAC2_4 Q22s Conscious - middle term									
	1	2	3	4	5	6	7	8	9	10
Relative	0.265	0.309	-0.245	-0.225	-0.245	-0.017	0.001	0.037	0.187	0.540
Absolute	-0.371	-0.068	-0.082	0.050	-0.195	-0.107	0.002	0.159	0.246	0.611
German	-0.601	-0.066	-0.067	-0.146	-0.133	-0.032	0.061	0.119	0.203	0.230
Combined	-0.520	-0.309	-0.116	-0.093	-0.172	-0.076	-0.049	0.158	0.292	0.351

3.6.4 UEI scale tables: Q36

We analyse here how respondents use eco-labels (Usage of Environmental Information, UEI scale) according to their self-reported answers (Q36) to identify latent factors and test if the have impact same two dependent variables as those used for the previous two scales: Q37a and Q37b. Technical tables and figures are placed at the end of this sub-paragraph. Q36 asked "When you actually use the information of environmental labels, how much do you agree with the following statements?":

1) I check if what is claimed in advertising is actually true
2) I select a brand
3) I compare different classes of vehicles
4) I get a general idea of the product
5) I get an idea about consumption
6) I get info on whether I can get a tax exemption or tax credit

A PCA analysis revealed a very interesting 2 factors structure: "concerned usage" and "utilitarian usage", which means self-reported attitudes seem to focus either on items related to a clear advantage to the individual or on more general concerns. We tested the impact of these factor scores on the dependent variable Q37a and Q37b in each of the four ballots. The impact was significant in all cases for both the evaluation of environmental friendliness (Q37a) and fuel efficiency (Q37b).

Table 17 UEI scale PCA

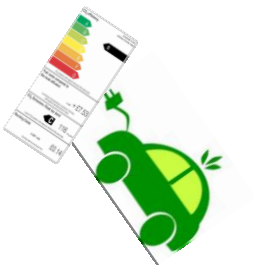
N	Eigen-value	%	%	Cum %	Chi Square	DF	Prob> ChiSq
1	3.2740	54.566		54.566	16999.5	12.743	<.0001*
2	0.7708	12.847		67.413	2229.11	12.018	<.0001*
3	0.6884	11.473		78.885	1505.10	7.903	<.0001*
4	0.5233	8.721		87.607	733.587	4.375	<.0001*
5	0.4551	7.585		95.192	411.647	1.622	<.0001*
6	0.2885	4.808		100.000	0.000	.	.

Table 18 UEI Factors and Q37b: test of impact

	FAC1_2 Q36s concerned usage									
	1	2	3	4	5	6	7	8	9	10
Relative	-0.642	-0.092	0.191	-0.183	-0.343	-0.095	0.028	0.062	0.272	0.140
Absolute	-0.270	-0.370	-0.016	0.024	-0.141	-0.071	0.078	0.132	0.332	-0.051
German	-0.079	0.318	-0.047	0.003	-0.039	-0.065	-0.034	-0.067	-0.170	0.961
Combined	-0.473	0.107	0.315	-0.081	-0.097	-0.054	0.050	0.108	0.073	0.571
	FAC2_2 Q36s utilitarian usage									
	1	2	3	4	5	6	7	8	9	10
Relative	-0.554	0.110	0.025	-0.197	-0.052	0.006	0.023	-0.007	0.104	0.702
Absolute	-0.039	-0.243	-0.198	-0.146	-0.009	-0.020	0.003	0.160	0.382	0.584
German	0.011	0.107	-0.066	-0.029	-0.090	-0.057	0.109	0.142	0.468	0.321
Combined	-0.395	-0.316	-0.151	-0.163	-0.006	-0.024	-0.060	0.046	0.309	0.989

Table 19 UEI Factors and Q37a: test of impact

	FAC1_2 Q36s concerned usage									
	1	2	3	4	5	6	7	8	9	10
Relative	-0.378	-0.388	-0.160	-0.301	-0.347	-0.112	-0.016	0.097	0.243	0.590
Absolute	0.148	-0.458	-0.132	-0.106	-0.057	-0.138	0.028	0.134	0.231	0.418
German	0.123	0.164	-0.045	0.054	-0.209	-0.048	-0.056	-0.004	0.277	0.534
Combined	-0.583	0.113	0.150	-0.027	-0.138	-0.094	-0.001	0.125	0.318	0.315
	FAC2_2 Q36s utilitarian usage									
	1	2	3	4	5	6	7	8	9	10
Relative	-0.262	-0.210	-0.185	-0.212	-0.065	0.010	-0.011	-0.013	0.184	0.447
Absolute	-0.046	-0.045	-0.216	-0.110	-0.074	-0.101	-0.015	0.173	0.246	0.240
German	-0.144	0.013	-0.002	0.003	-0.072	-0.043	-0.010	-0.061	0.357	0.420
Combined	-0.293	-0.212	-0.277	-0.336	-0.041	-0.039	-0.006	0.000	0.198	0.746



4 Laboratory experiment

4.1 Design and procedure

The laboratory experiment has been conducted at the LSE Behavioural Research Lab with 405 participants (N=405), designed as a randomised controlled trial with random allocation of participants to either a treatment or to the control condition, in a classical between-subject design with partial repetition of measures (each subject is exposed to more than one experimental conditions): twelve different sets of treatments and one control condition were randomly allocated in order to test the effectiveness of variants in the labels.

It is important to anticipate that the treatments differed depending on whether they were shown in conjunction with: a) conventional engine cars (henceforth simply conventional cars); b) electric cars; or c) hybrid cars.

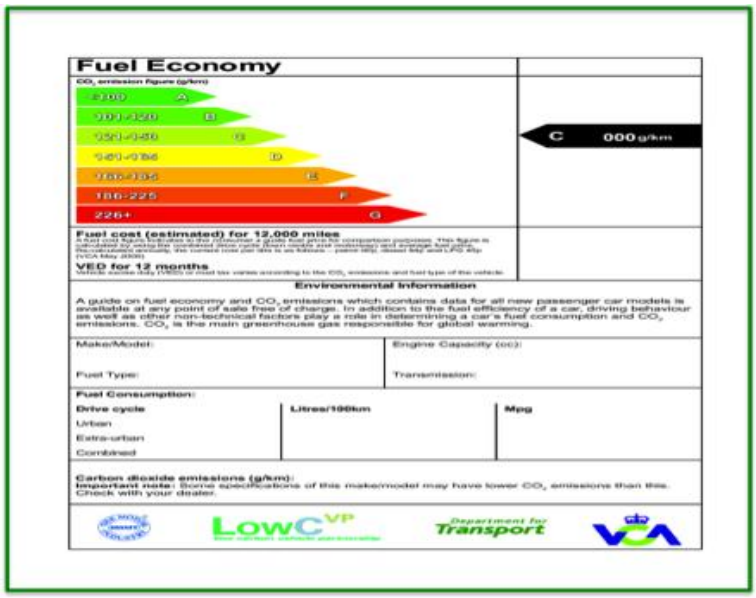
We have, thus, produced different visual stimuli to render the 12 treatments of each of the three types of engines, and for each run of the randomisation we have 3-4 cars randomly drawn from the database. This means that we produced and showed more than one hundred different labels (in Annex IV we reported as examples only 36 one for each of the 12 treatments for the three engine types).

Note, however, that these are the ex post visual stimuli depending on the actual cars that were randomly selected and shown in the experiment. This means that the specific information they contain on C02 emissions, running costs, etc., concerns the specific cars that were randomly selected and shown to respondents. This observation applies also to the online experiment with the addition that there we have to multiply by 10 the number of labels (different for each of the 10 countries) and will not be repeated in chapter five. The visual stimuli were mock-ups: once the cars were randomly selected the templates of the labels were filled with the information about the specific cars and then shown to respondent.

We tested the following dimensions (whose variants are the actual experimental conditions) in the laboratory experiment

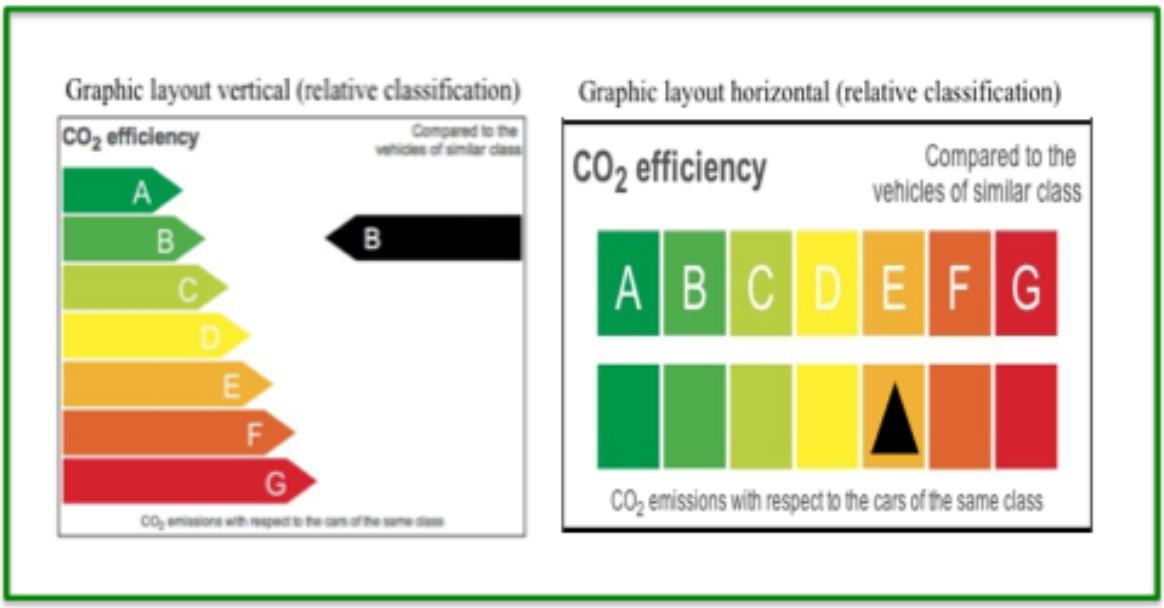
1. **Control condition (placebo)**: In the laboratory experiment (conducted in London) we tested the standard label currently in use in the United Kingdom (see next figure)

Figure 21 Control condition: UK standard label



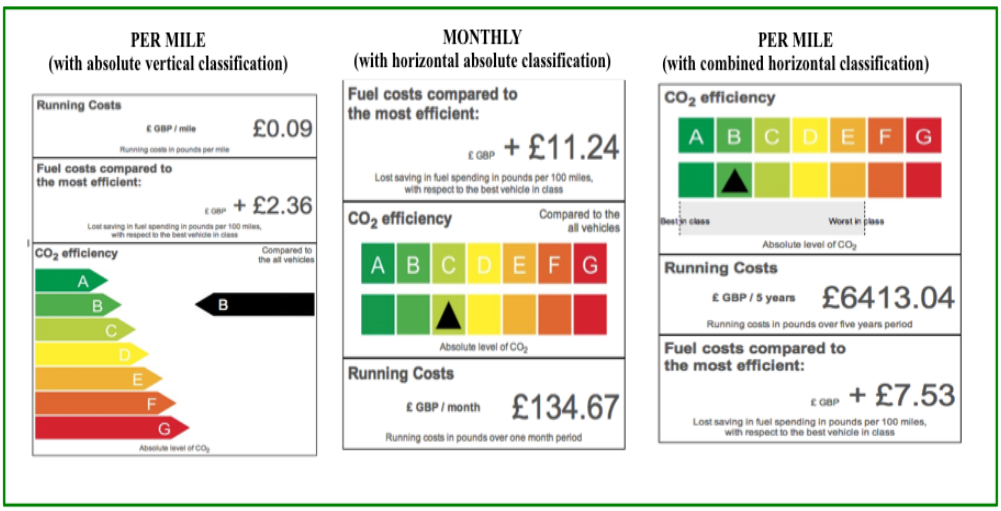
2. **Graphic layout of the classification system**:
    a. Vertical
    b. Horizontal;

Figure 22 Graphic layout (example based on relative classification)



3. **Alternative classification systems in terms of CO2 emissions**: (see Figure 9, page 47)
    a. Absolute, car compared to all cars;
    b. Relative, car compared to cars of similar class;
    c. Combined, combination of the two;
4. **Additional Information: running costs** (three possible levels, see figure below)[13]:
    a. Per mile[14];
    b. Monthly;
    c. Per 5 years;

Figure 23 Exemplification of running costs levels

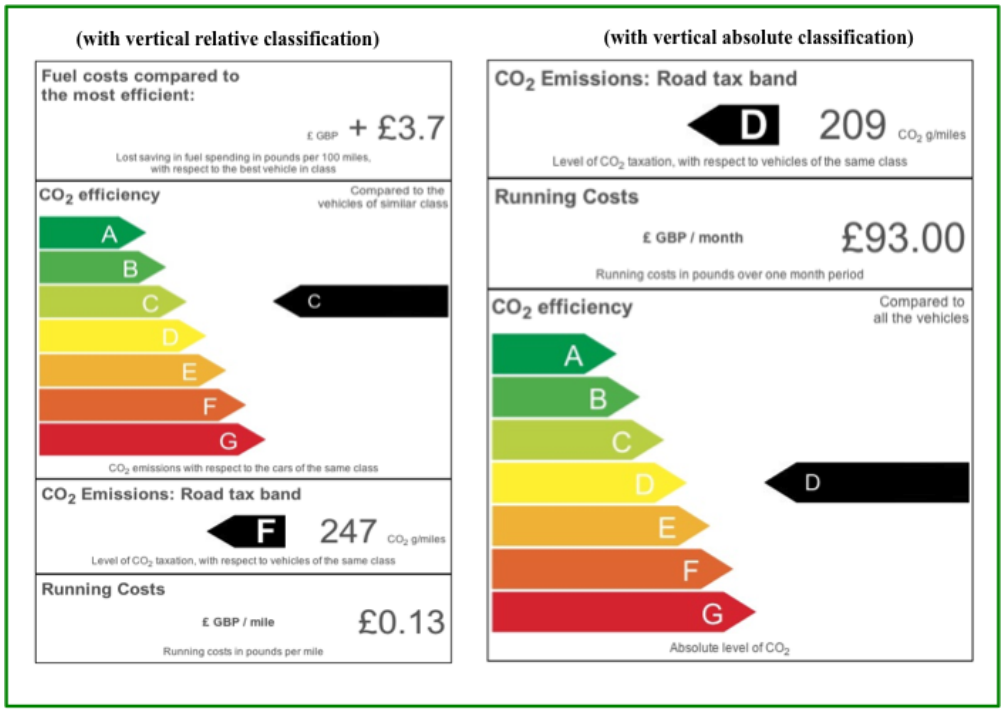


5. **Additional information: Lost savings on fuel spending.** Present or absent (see in figure above). The information is always formulated in terms of lost saving per mile compared to best vehicle in class and is independent of the classification system used and of the running costs format;
6. **Additional information (for conventional cars)**: **Level of CO2 taxation.** Present or absent. The information is always formulated in terms of level of taxation compared to best vehicle in class and is independent of the classification system used and of the running costs format (see Figure 24)

[13] The three labels reported in the figure are only exemplificative of the way the three running costs levels above appeared in the various labels shown to respondents in conjunction with the cars randomly assigned to them in relation with the simulated purchase task. This comment on the exemplificative and non-exhaustive nature of the figures applies for all other experimental conditions and will not be repeated.

[14] The laboratory was held in London. In Online experiment this condition is Euro/Km (or other currency where necessary), except for the samples of participants from UK.

Figure 24 Exemplification of CO2 taxation (conventional cars only)



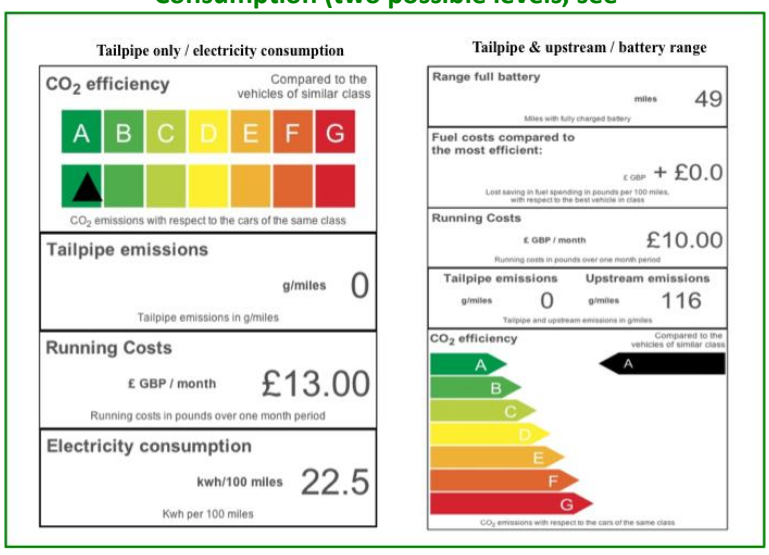
7. **Additional information for electric cars**:

   a. Tailpipe and upstream emissions (two possible levels, see Figure 25):

      i. 'Tailpipe only'

      ii. 'Tailpipe and Upstream' (as two separate items);

Consumption (two possible levels, see



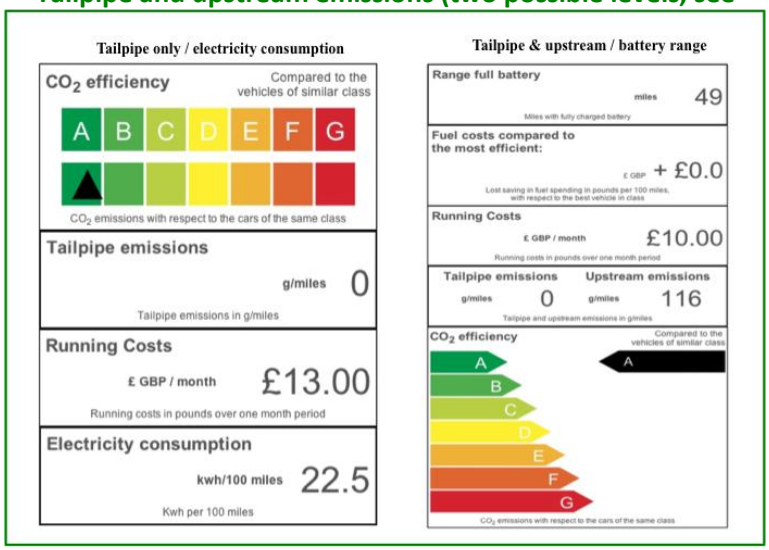
   b. Figure 26):

      i. Range in distance covered with fully charged battery;

ii. Electricity consumption;

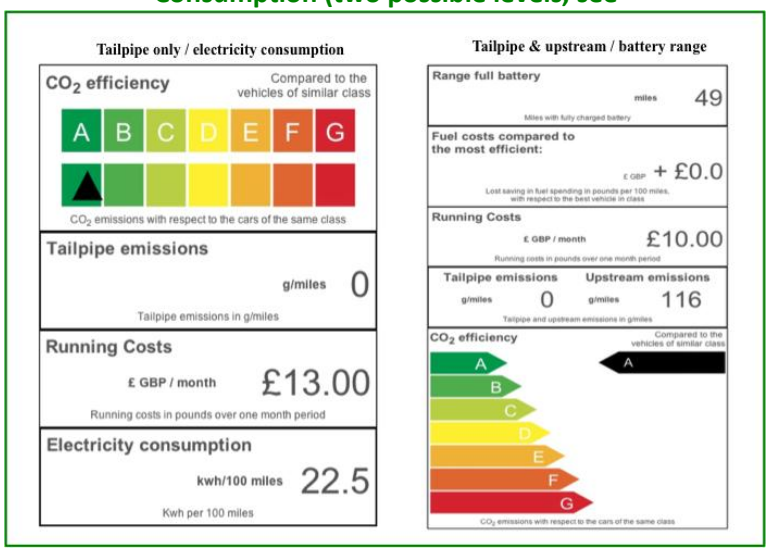
8. **Additional information for hybrid cars**:

Tailpipe and upstream emissions (two possible levels, see



a. Figure 26):
   i. 'Tailpipe only'
   ii. 'Tailpipe and Upstream (as two separate items);

Consumption (two possible levels, see



b. Figure 26):
   i. Two separate figures for fuel consumption and other source of consumptions (Separate);
   ii. One synthetic indicator for the two (Combined)

Figure 25 Exemplification of additional information: electric cars

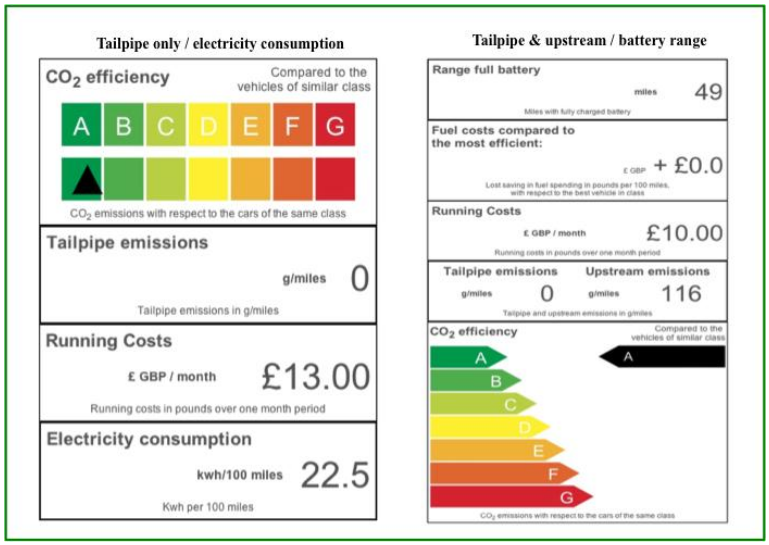
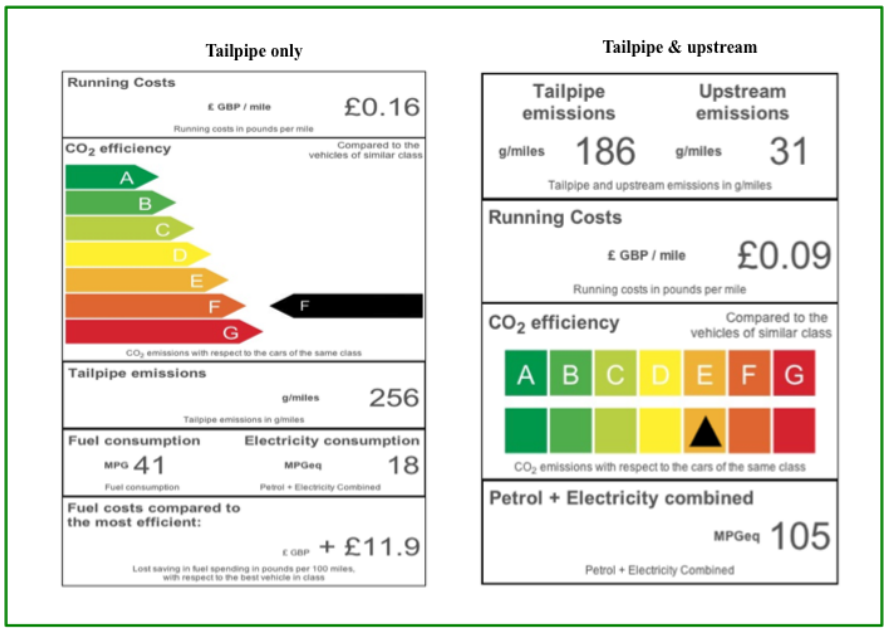


Figure 26 Exemplification of additional information: hybrid cars



It is worth stressing once more that the examples of labels presented so far and all others that can be found in Annex IV are not holistic treatments tested as such, but rather the visual 'vehicle' through which the various experimental conditions illustrated so far are randomly administered to subjects and tested in 'isolation'. This concerns a main limitation of the design that needs to be clarified. Due to the high number of experimental conditions that we were requested to test and the limits of statistical power implicit in the sample, we could not test the interaction effects. This means, for instance, that for conventional cars we tested the effectiveness of the three possible formats of running costs in terms of behavioural and cognitive response variables as such, but we

could not test the effects of all the possible combinations of these 3 items with the 3 different classification systems, the two different graphic layout, the presence or absence of information on lost saving on fuel, the presence or absence of information of CO2 taxation. What we have actually done is summarised in the following three tables.

Table 20 Factorial design of treatments: conventional engine cars

Run	Graphical Layout	Classification system	Running costs	Level of C02 taxation	Lost savings fuel
1	Vertical	Absolute	Per mile	No	Yes
2	Horizontal	Relative	Monthly	Yes	Yes
3	Vertical	Relative	Per mile	Yes	Yes
4	Horizontal	Combined	Per 5 years	No	Yes
5	Vertical	Combined	Monthly	No	No
6	Horizontal	Absolute	Monthly	No	Yes
7	Vertical	Relative	Per 5 years	No	No
8	Horizontal	Absolute	Monthly	Yes	No
9	Vertical	Combined	Per 5 years	Yes	Yes
10	Horizontal	Relative	Per mile	No	No
11	Horizontal	Combined	Per mile	Yes	No
12	Horizontal	Absolute	Per 5 years	Yes	No

Table 21 Factorial design of treatments: electric cars

Run	Graphical Layout	Running costs	Tailpipe / Upstream	Lost savings	Electric specific info
1	Horizontal	Monthly	Tailpipe only	No	El. consumption
2	Vertical	Per mile	Tailpipe + upstream	No	El. consumption
3	Horizontal	Per 5 years	Tailpipe only	Yes	Range full battery
4	Horizontal	Monthly	Tailpipe + upstream	Yes	El. consumption
5	Vertical	Per 5 years	Tailpipe only	Yes	El. consumption
6	Vertical	Monthly	Tailpipe + upstream	Yes	Range full battery
7	Vertical	Per mile	Tailpipe only	Yes	El. consumption
8	Horizontal	Per mile	Tailpipe + upstream	Yes	Range full battery
9	Vertical	Per 5 years	Tailpipe + upstream	No	Range full battery
10	Horizontal	Per mile	Tailpipe only	No	Range full battery
11	Horizontal	Per 5 years	Tailpipe + upstream	No	El. consumption
12	Vertical	Monthly	Tailpipe only	No	Range full battery

Table 22 Factorial design of treatments: hybrid cars

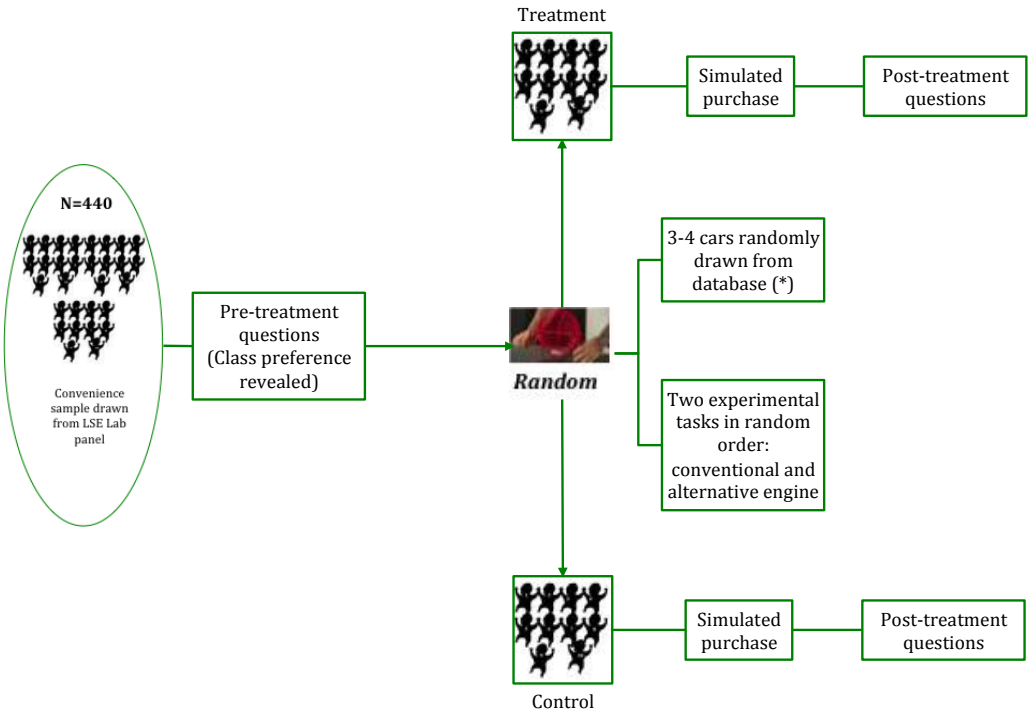
Run	Graphical layout	Running costs	Tailpipe and upstream	Lost savings in fuel	Consumption layout
1	Horizontal	Per mile	Tailpipe + upstream	No	Combined
2	Vertical	Per mile	Tailpipe + upstream	Yes	Combined
3	Vertical	Per 5 years	Tailpipe only	Yes	Combined
4	Vertical	Per mile	Tailpipe only	Yes	Separate
5	Horizontal	Per 5 years	Tailpipe only	No	Combined
6	Vertical	Per 5 years	Tailpipe + upstream	No	Separate
7	Horizontal	Per 5 years	Tailpipe + upstream	Yes	Separate
8	Horizontal	Monthly	Tailpipe + upstream	Yes	Separate
9	Vertical	Monthly	Tailpipe only	No	Separate
10	Horizontal	Per mile	Tailpipe only	No	Separate
11	Horizontal	Monthly	Tailpipe only	Yes	Combined
12	Vertical	Monthly	Tailpipe + upstream	No	Combined

For all of the three types of car engines we have randomly drawn 13 runs (12 for the various combination of treatments illustrated in the three tables plus one for the control condition) by which subjects were exposed to one of the combinations of the various items that are explained by the content of the rows in the table. As a result, we obtained a large enough amount of observations (i.e. partial repetition of measures nature of the design) for each treatment.

Next Figure 27 provides the graphic illustration of the experiment protocol that we briefly illustrate below.

1) **Pre-treatment questions**. Before randomisation all respondents answered a set of questions. Using mostly the same set of questions as in the preliminary survey questionnaire, we collected several information on the participants socio-demographics and car possession / usage, on their environmental consciousness and attitudes, on familiarity and trust with eco-labels, use they make of such labels, and on the class of car they posses or intend to buy. This latter is an important element that impact on the randomisation algorithm for the allocation of the visual stimuli that render the treatments;

Figure 27 Laboratory experiment protocol



(*) Each subject was allocated randomly 3 or 4 car extracted from our database within their declared class of preference

2) **Randomisation**. A complex randomization algorithm was applied:

   a. **Subjects**. They were randomly assigned to treatments and/or control;

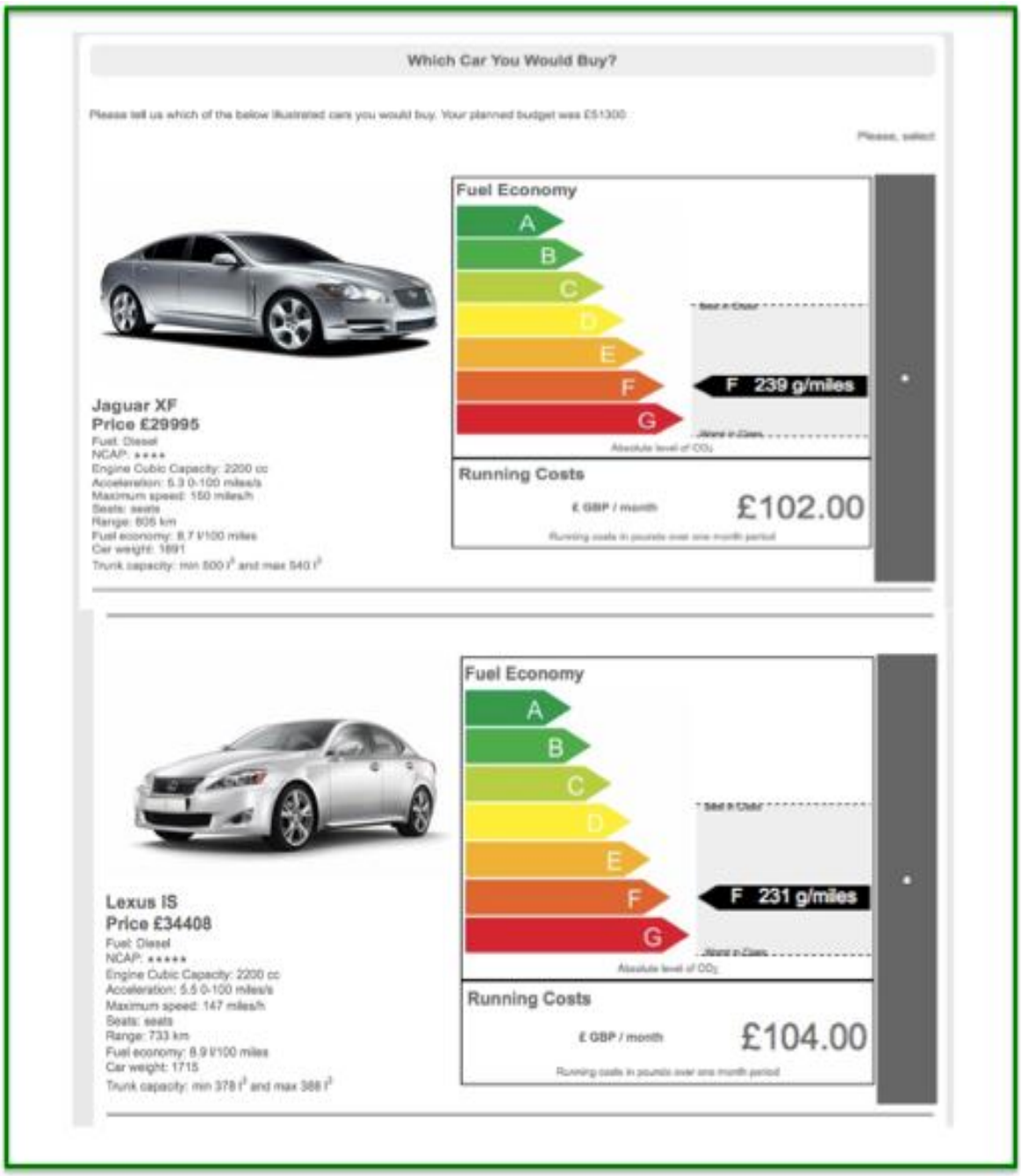
   b. **Class and cars shown.** The cars shown for the simulated purchase tasks (in conjunction either with a treatment or with control) where also randomly selected from our car database ensuring, however, that such cars fall within the class of preference subjects had previously revealed. Subjects were presented with either 3 or 4 cars (see *infra*);

   c. **Order of tasks allocation.** Each participant performed two experimental tasks: a) one in relation to conventional cars; b) one in relation to alternative engine, subdivided in two subtasks, one for electric and one for hybrid cars. The order of the two tasks is also randomly allocated to avoid order effects;

   d. **Order of subtasks for alternative vehicles.** The task for alternative engine cars is divided into two sub-tasks, one for electric and one for hybrid also with randomization as to whether hybrid or electric came first so to avoid also in this case order effects.

e. **Number of cars shown for conventional cars.** For conventional cars, respondents were either shown three or four cars and also this was done randomly (for alternative engine cars the number is always three). For the subjects allocated to see four cars instead of three, the fourth car was chosen randomly from the classes immediately above or immediately below the class from which the other three vehicles are selected. The rationale for this is to test the extent to which labels may lead respondents to switch from their class of preference and choose a model in another class;

Figure 28 Experimental task screenshot[15]



3) **Experimental tasks**. The basic experimental task (repeated twice) consisted in showing to respondents a set of cars together with labels and basic information

15 For the sake of graphic resolution we have placed only two cars in the figure above, but in practice in the simulated purchase subjects were shown 3 cars (and in a few cases 4 according to randomisation design). Please note also that the first car has higher emissions but lower running costs compared to the second due to the fact that it consumes less fuel (8.7 litres per 100 miles versus 8.9 litres per 100 miles).

on the car attributes (including its market price) and asking them to buy one. When respondents are asked to buy they are reminded of their self-declared budget (provided in answering the pre-treatment questions). As shown in the figure above respondents are asked "which car" would they buy in a screenshot where they see 3 (or 4) cars each matched by a randomly allocated label. As anticipated, participants were asked to perform two experimental tasks. The use of repeated measures depended on the need to ensure the required statistical power to test the conditions;

4) **Post-treatment questionnaire**. After they accomplished the experimental tasks, respondents answered a short set of questions to recover noticeability and other cognitive measures of the effectiveness of labels:

   a. **Noticeability.** The block of questions shown in the Figure below (which basically corresponds with slight modification to those used in the survey, i.e. Q37a, Q37b, Q37c, Q37d), provide a measure of noticeability in that, regardless of whether or not the answers correspond precisely to the actual characteristics of the cars shown, labels positively influence (or not) the perceived eco-friendliness and fuel efficiency of the shown cars;

   b. **Cognitive.** At the same time, the answers to the questions below can be used as a "revealed ranking" of cars. When subjects report a score of ten in a question asking about how the chosen car scores with respect to the other options available, they are implicitly ranking the car as first. By using the car database we can compute the real ranking and compare the revealed one with the true one. Whenever the two are different by less than one position (i.e. the declared best performer is no less than second performer, to account for computational errors), the cognitive variable is equal to one, zero otherwise.[16] We built the following set of cognitive variables: fuel efficiency, running costs, CO2 taxation, environmental friendliness (conventional); running costs, fuel efficiency, electricity consumption (electric); running costs, fuel efficiency, combined consumption (hybrids).

[16] Technically speaking, the response variables are on 1-10 scale, so by diving 10 for the number of cars shown we can get the interval to interpret the self reported information as a raking. For example, with three cars, less than 3.33 mean scoring third, between 3.33 and 6.67 second and above first. The ranking with the correct information can be easily calculated and normalized to a ten points scale. Finally, the two can be compared to built the cognitive dummy.

Figure 29 Post-treatment questions

How environmentally friendly do you think is the car you selected

How environmentally friendly do you think is the car you selected compared to other options available

How fuel efficient do you think is this car compared to other options available ?

How fuel efficient do you think is this car?

How do you think the car you selected scores in terms of running costs compared to the other options available

How do you think the car you selected scores in terms of CO2 emissions compared to the other options available

How do you think the car you selected scores in terms of total consumption compared to the other options available

Not at all — Very much

Much worse — Much better

4.2 Response variables

Our independent variables are dummies, equal to one if participant has been exposed to the treatment. The omitted category is the control condition. In simple terms our independent variables are the 13 experimental conditions (12 treatments and one control) tested.

The dependent variables are those measures with respect to which we assess the effectiveness of the treatments (different variants of the labels) in comparison to the control condition. Dependent variables are referred to in the literature with various other expressions. We refer to them as "response variables" or alternatively as "outcome measures".

As should be clear from the illustration of the experiment procedure we have three basic response variables:

- **Willingness to Pay**. Obtained from the simulated purchase tasks;
- **Comprehension and recall**. We further explain how we constructed the cognitive measure of comprehension and recall comparing the answers from our respondents (in the post-treatment questionnaire, Figure 29) to the information of our database. We exploited the possibility offered by the cross tabulation of the car database we have constructed and the experiment's results. In very simple terms what we do is checking the answers respondents provide after they have seen the labels and check their correctness in terms of the 'objective' information in our database. We, thus,

assess the capacity of the respondents to correctly recall the information they have seen in the labels for the car they selected to purchase. The post-treatment questions reported in Figure 29 ask respondents to compare the car they selected to buy with the other options available, in terms of emissions, fuel efficiency, CO2 taxation and running costs. In making this comparison the respondents should indicate a value between one and ten. In parallel we take the information from the car database and rendered the relevant continuous metric (i.e. CO2 emission, fuel efficiency, CO2 taxation, etc.) into a score scale also from one to ten (where ten would be less CO2 emission and so more eco-friendly). We then compared for each item the 1 to 10 'subjective' score assigned by the respondents to the 1- to 10 'objective' score obtained from the database. At this point, if the difference is less than 3.33 or 2.5 (if four cars are shown) this means that the respondent is wrong at most by one position and we consider that he/she correctly recall the information. This means that we use a very generous threshold before deeming an answer from the respondent wrong. So, if the difference is less than this threshold the answer is deemed correct (good comprehension and recall of information in the labels), else the answer is wrong. From this procedure we built a dummy variable capturing this cognitive measure of the effectiveness of labels with respect to processing of the information. In the end we have cognitive scores for: fuel efficiency, running costs, CO2 taxation, environmental friendliness (conventional); running costs, fuel efficiency, electricity consumption (electric); running costs, fuel efficiency, combined consumption (hybrids).

- **Noticeability**. Obtained from the block of questions in Figure 29.

From the data of obtained through the experiment in combination with information contained in our database of cars, however, we could construct a few other behavioural measures reported and explained below:

- **Change in Willingness to Pay (CWTP)**. In the pre-treatment questionnaire, before randomisation is applied and the experimental tasks performed, we ask the subjects to indicate a planned budget when choosing the class of the car they may buy in the future. However, when people simulate the purchase, they can deviate from the planned budget (as it happens in real life, when choices are many times inconsistent with plans). By computing the logarythmic deviation from the declared budget (Change in Willingness To Pay, CWTP hereafter) we can capture the "green" behaviour that may have been nudged by the labels shown next to the cars to be selected for purchase. This occurrence is interpreted as showing that a subject is willing to pay more because this is reflected in future savings on fuel or lower emission. By calculating the deviation, we are implicitly controlling for the price of the other options that come from the same class. Moreover, we add a dummy for the subjects that see four instead of three cars, since in that case one of the options come from another class where the average price is clearly different;
- **Score in terms of emissions**. The simulated purchase can be used as an indicator of "green" behaviour also in the following way. Since in our database we have the

information about the CO2 emissions of the cars, we can compute a "score" variable going from one to ten, essentially rescaling the relative position of the purchased car with respect to the other options. The higher the score, the lower the emissions, and the greener the choice. So, we can test whether the labels have the effect of leading to buy a car in the simulated purchase that is greener than the other options;

- **Score in terms of lost savings**. Here we replicate the logic of the previous test using as indicator of "fuel efficient " behaviour the score in terms of lost saving on fuel spending. Again the variable is going from one to ten, normalizing to ten the relative position of the purchased car with respect to the other options: the higher the score, the higher the savings, and the more fuel efficient the choice;

4.3 Sample

Since the laboratory experiment aims to recover treatment effects, then in determining the size of the sample we needed to address the issue of Minimum Detectable Treatment Effect (MDT).

Testing hypotheses about differences across experimental treatments the minimum sample size clearly increases with the number of experimental treatments in the experiment. In determining the sample size for each treatment we followed a precautionary principle: we wanted to detect a sizable effect under relatively mild assumptions, in order to guarantee effectiveness of a policy intervention.

As of today, we could not derive from the available literature empirically tested parameters of the cognitive and behavioural effects for car-labels for two simple reasons: a) this literature is rather recent and limited and mostly based on cross-sectional survey without experimental design with randomisation across treated and control group; b) there is no single study that has tested exactly the treatment conditions we are interested in.

We had, thus, to develop an *ex ante* hypothetical reasoning and we assumed a dyadic context where the labels have either an effect or no effect. In this context a relatively simple assumption is that, in absence of treatment, the average effect is 50%, which can be considered equivalent to choosing in a completely randomized way. Since we want to keep the setup general, we can assume that the standard deviation is also 50%, in such a way that the prior assumptions we are doing on the characteristics of the population are completely uninformative. Randomization theory tells us that there is a clear relationship among the main parameters of the experiment, as expressed in Equation 1, which holds for one treatment and one control condition:

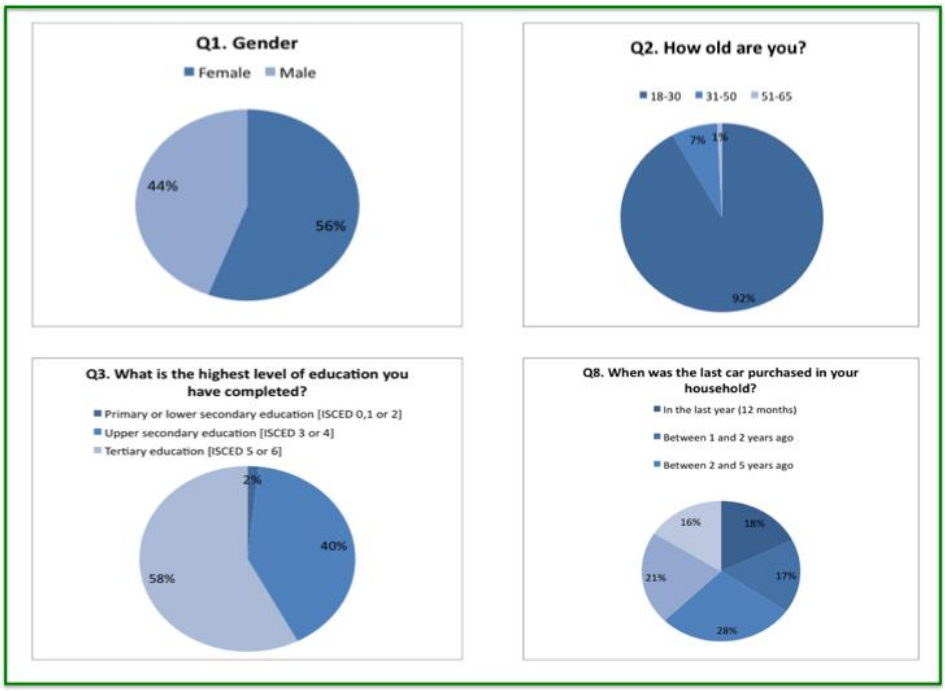
$$\left(z^{*}_{1-\alpha/2} + z^{*}_{1-\beta}\right)^{2} \sigma^{2}(n) = \left(\mu^{A} - \mu_{0}\right)^{2};$$

Where alpha represents significance, one minus beta the power, zeta is the well known standardized normal variable, sigma is the standard deviation, n is the sample size and the right hand size is the Minimum Detectable Treatment Effect (MDT). The MDT represents in simple terms the minimum level of effect you can aim at testing, which is evidently also a function of the sample size. While significance and power can be fixed at standard values (i.e. 5% and 10% in our case), the MDT is a more discretionary choice. We think that a 20% effect would corresponds to a rather effective policy intervention, or stated differently to a real success of modified labels especially in view of what the review of the literature reveals. With some tedious algebra and extending the example above as a rule of thumb, we get that for ensuring a MDT of at least 20% we need a value for N around 60 (where N= both treated and non treated), from which we can deduce the rule of thumb of at least 30 subjects per treatment.

In our case, with one control condition and twelve treatments, we need a sample of at least 390 subjects (13*30). Our sample size has been of 405 subjects, thus, ensuring we met the MDT derived threshold of 30 subjects per treatment.

For the laboratory experiment within the scope of this project, the subjects were recruited from a panel managed by LSE and created specifically for the Behavioural Research Lab needs. It is comprised of nearly 3000 contacts, which have expressed an interest in participating in paid research. Pool of subjects consists primarily of LSE students and staff, but also from surrounding universities. Once the laboratory experiment has been set up in the participant sign-up system, timeslots created and approved by the Lab Administrator, an email was sent advertising the study, and participants were free to sign up for an available timeslot.

Figure 30 Laboratory experiment sample main characteristics



Typically, timeslots for an experimental study will fill up within an hour. Each participant is paid £5 per half hour and £10 per hour depending on the time needed to complete the instrument. The panel includes persons from all European countries but stratification is not possible. Based on statistics gathered in early 2012, the participants are 69% LSE affiliated, 89% from Higher Education generally, 62% female, with 40% being 18-21 years old, 49% being 22-29 years old, with 35% originating from the UK/Ireland, 31% originating from Asia/Pacific and 19% from the rest of Europe. Subjects, that took part in this laboratory experiment, are characterized as follows. 56% are females with 59% and 39% of them having respectively Tertiary Education and Upper Secondary levels of Education. Education level of male participant was similar to females with 56% and 43% of them having respectively Tertiary Education and Upper Secondary levels of education achieved. Majority of the subjects were from 18-31 age group totalling 92% of all participants. Only 5% of the subjects were married and have children. 84% of subjects have the car purchased in their household within the last 5 years time period or earlier.

4.4 Analysis performed

As we have a classical counterfactual experimental design (randomized control trial) we used regression analysis to recover the 'treatment effect'. This corresponds to the average causal effect of the exposition to the treatment on the response variable, with respect to a counterfactual calculated using the recorded data from the exposition to the control condition. Randomized Control Trials guarantee "internal validity", namely that

the difference in mean outcome between the treated and the untreated groups is a consistent estimator of the causal effect. Econometrically, the latter difference in means is equivalent to running a regression in which the dependent variable is the response variable, and the independent variables are dummies, equal to one if the subject has been exposed to the treatment. The omitted category is the control condition. The 'b' coefficient estimated by the regression analysis is, thus, equal to the treatment effect or the difference in mean of a given response variable "y" for those exposed to treatment and those exposed to control. We have, thus, run regressions where the independent variables are the treatments (variants of the labels, with the control condition represented by the conventional car label in use in the UK been accounted residually) and the dependent variables are the various response variables listed earlier.

For the sake of full clarity let us make a concrete example and look at the first cell in Table 23 at p. 84. There we find the "b" coefficient "0.73" (followed by two asterisks telling us it is significant at 5% level) produced by the regression analysis for the effect of vertical graphic layout on the first measure of "Noticeability" obtained through a post-treatment question ("How environmental friendly is the car you selected?") respondents answer after selecting the car they intend to buy being 'nudged' by a label. Let us recall that this dimension of noticeability is measure on a 1-10 scale. So, what does this "0.73" b coefficient tell us? It tells us that the responses participants who selected a car being exposed to a new label with vertical graphical layout gave to this question were on average 0.73 higher (stronger perception of eco-friendliness) than the responses given to the same question by those who selected a car being exposed to the UK standard label (the control condition). Hence, we conclude that graphic layout vertical is effective for it has a positive and statistically significant coefficient with regard to the response variable. If the coefficient was equal to zero than there was not treatment effect (treatment and control had the same average effect), whereas if it were negative it would have meant that the control condition was more effective than the treatment. If the coefficient was not statistically significant this meant that we could not reject the null hypothesis that the same coefficient could have resulted just by chance. On the other hand, lack of statistical significance does not imply that the control condition is better than the treatment, it is just an inconclusive result.

We have run different regressions specification including Ordinary Least Square (OLS), OLS with robust standard errors, Logit/Probit and Ordered Logit. We have run all these regressions for all response variables as a way of a robustness check, although we report the results (validate through checks) of the regressions best suited to each type of variables (linear regression for continuous variables, logit for binary variables, ordered logit and/or Tobit for categorical variables). In all regressions specification we always

controlled for all demographic variables (so results are net of any possible differentiation on such variables). When we found more than one statistically significant coefficient per treatment (i.e. on classification system finding significant all of the three or at e least two) we run T-test pairwise comparisons to identify the more effective of them.

4.5 Regression Results tables

Below each table we have placed notes explaining technicalities about the different regressions used. When we found more than one statistically significant coefficient per treatment (i.e. on classification system finding significant all of the three or at least two) we run T-test pairwise comparisons to identify the more effective of them. The tables contains the following notation:

- Standard errors are indicated in (parentheses);
- In the last line of each table we report F-test scores among the coefficients whenever we have more than one case of statistically significant effect;
- Next to the parentheses the asterisks indicates different level of statistical significance as follows:
  - **One * indicates statistical significance at 10%;**
  - **Two ** indicate statistical significance at 5%;**
  - **Three *** indicate statistical significance at 1%;**

4.5.1 Conventional engine cars

4.5.1.1 Noticeability tables

Table 23 Noticeability effect: Graphical layout (conventional)

How environmental friendly is the car you selected?					
	(1)	(2)	(3)	(4)	(5)
Graphical 1	.73 (.35)**	.73 (.33)**	.60 (.28)**	.77 (.36)**	.66 (.29)**
Graphical 2	.79 (.34)**	.79 (.33)**	.68 (.28)**	.84 (.36)**	.75 (.28)**
Age					Yes
Education					Yes
Income					Yes
Female					Yes
Married					Yes
Children					Yes
R2	.01	.01	.01	.01	.01
F-test: GR1=GR2	.07	.07	.17	.09	.21

Note: (1) Ordinary Least Squares, (2) is Ordinary Least Squares with Robust Standard Errors, (3) is ordered Logit, (4) is Tobit, (5) is ordered Logit. Standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

Table 24 Noticeability effect: Classification System (conventional)

How environmental friendly is the car you selected?					
	(1)	(2)	(3)	(4)	(5)
Absolute	.69 (.36)*	.69 (.35)*	.63 (.30)**	.73 (.38)*	.67 (.30)**
Relative	1.12 (.36)***	1.12 (.36)***	1.00 (.31)***	1.20 (.38)***	1.10 (.31)***
Combined	.52 (.35)	.52 (.33)	.42 (.29)	.54 (.37)	.47 (.29)
Age					Yes
Education					Yes
Income					Yes
Female					Yes
Married					Yes
Children					Yes
R2	.02	.02	.01	.01	.01
F-test: Abs=Rel	2.46	2.18	2.47	2.58	3.15*
F-test: Abs=Comb	.41	.42	.87	.47	.77
F-test: Rel=Comb	4.95**	5.05**	6.47**	5.33**	7.28**

Note: (1) Ordinary Least Squares, (2) is Ordinary Least Squares with Robust Standard Errors, (3) is ordered Logit, (4) is Tobit, (5) is ordered Logit. Standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

Table 25 Noticeability effect: Lost Saving on Fuel Information (conventional)

How fuel efficient is the car you selected?					
	(1)	(2)	(3)	(4)	(5)
Information on Fuel Lost Saving	-.17 (.19)	-.17 (.19)	-.00 (.17)	-.00 (.19)	-.01 (.17)
Control for Age					Yes
Education					Yes
Income					Yes
Female					Yes
Married					Yes
Children					Yes
Obs.	405	405	405	405	405
R2	.01	.02	.01	.01	.01

Note: (1) Ordinary Least Squares, (2) is Ordinary Least Squares with Robust Standard Errors, (3) is ordered Logit, (4) is Tobit, (5) is ordered Logit. Standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%.

Table 26 Noticeability effect: CO2 Taxation (conventional)

Think about how much CO2 car tax you will pay for the selected car compared with others. These taxes will be…(higher, lower, etc)?					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
CO2 taxation	-.27 (.30)	-.27 (.30)	-.20 (.28)	-.33 (.31)	-.29 (.29)
Control for:					
Age					Yes
Education					Yes
Income					Yes
Female					Yes
Married					Yes
Children					Yes
Obs.	167	167	167	167	167
R2	.01	.01	.01	.01	.02

Note: (1) Ordinary Least Squares, (2) is Ordinary Least Squares with Robust Standard Errors, (3) is ordered Logit, (4) is Tobit, (5) is ordered Logit. Standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

Table 27 Noticeability effect: Running Costs (conventional)

How do you think the car you selected scores in terms of running costs compared to the other options available?					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
RC per Mile	.37 (.45)	.37 (.44)	.25 (.40)	.47 (.47)	-.02 **(.41)****
RC per Month	.42 (.44)	.42 (.43)	.30 (.39)	.50 (.46)	.24 **(.39)*****
RC per 5 years	-.06 (.44)	-.06 (.42)	-.08 (.39)	-.00 (.46)	-.13 (.40)
Control for					
Age					Yes
Education					Yes
Income					Yes
Female					Yes
Married					Yes
Children					Yes
Obs.	167	167	167	167	405
R2	.01	.01	.01	.01	.01
F-test: Ab=Rel.	.01	.01	.02	.00	.49
F-test: Ab=Co.	1.10	1.01	.85	1.25	.07
F-test: Rel.=Co.	1.42	1.39	1.15	1.43	.99

Note: (1) Ordinary Least Squares, (2) is Ordinary Least Squares with Robust Standard Errors, (3) is ordered Logit, (4) is Tobit, (5) is ordered Logit. Standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

4.5.1.2 CWTP table

Table 28 Behavioural measure: change in Willingness to Pay (conventional)

	CWTP	CWTP	CWTP	CWTP	CWTP
Graphical 1	.00 (.08)				
Graphical 2	.14 (.08)*				
Absolute		.12 (.09)			
Relative		.06 (.08)			
Combined		.06 (.09)			
CO2 taxation			-.05 (.07)		
Information on fuel lost saving				.03 (.06)	
RC per Mile					.06 (.09)
RC per Month					.14 (.09)
RC per 5 years					.03 (.08)
Four Cars	Yes	Yes	Yes	Yes	Yes
Control for Age	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes
Income	Yes	Yes	Yes	Yes	Yes
Female	Yes	Yes	Yes	Yes	Yes
Married	Yes	Yes	Yes	Yes	Yes
Children	Yes	Yes	Yes	Yes	Yes
Obs.	403	403	403	403	403
R2	.04	.05	.04	.05	.05

Note: The Dependent Variable is the log difference between the price paid and the declared budget. Ordinary Least Squares Regression. Robust standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

4.5.1.3 Behavioural choices tables

Table 29 Score of the purchase cars in terms of emissions (conventional)

	Score Emission	Score Emission	Score Emission	Score Emission	Score Emission
Graphical 1	.18 (.45)				
Graphical 2	.08 (.44)				
Absolute		.06 (.47)			
Relative		-.17 (.47)			
Combined		.44 (.46)			
CO2 taxation			.03 (.26)		
Information LSF				.35 (.26)	
RC per Mile					.11 (.47)
RC per Month					-.14 (.47)
RC per 5 years					.44 (.46)
Control for Age	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes
Income	Yes	Yes	Yes	Yes	Yes
Female	Yes	Yes	Yes	Yes	Yes
Married	Yes	Yes	Yes	Yes	Yes
Children	Yes	Yes	Yes	Yes	Yes
Obs.	403	403	403	403	403
R2	.02	.02	.01	.02	.02

Note: The Dependent Variable is the score of the selected car in terms of emission. We start from the rank that goes from one to four, where one if the one with highest emissions and then we normalize to base 10. Ordinary Least Squares Regressions. Robust standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

Table 30 Score in terms of lost saving on fuel spending (conventional)

	LSF Score	LSF Score	LSF Score	LSF Score	LSF Score
Graphical 1	.76 (.44)*				
Graphical 2	.77 (.42)*				
Absolute		.78 (.45)*			
Relative		.47 (.46)			
Combined		1.01 (.44)**			
CO2 taxation			.26 (.27)		
Information LFS				.81 (.27)***	
RC per Mile					.90 (.46)*
RC per Month					.40 (.45)
RC per 5 years					1.06 (.45)**
Age	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes
Income	Yes	Yes	Yes	Yes	Yes
Female	Yes	Yes	Yes	Yes	Yes
Married	Yes	Yes	Yes	Yes	Yes
Children	Yes	Yes	Yes	Yes	Yes
Obs.	403	403	403	403	403
R2	.01	.01	.01	.03	.01
F test GR1=GR2	.00				
F test Abs=Rel		.64			
F test Rel=Com		2.05			
F test Abs=Com		.42			
F test RC1=RC2					1.79
F test RC2=RC3					3.36*
F test RC1=RC3					.22

Note: The Dependent Variable is the score of the selected car in terms of emission. We start from the rank that goes from one to four, where one if the one with highest lost savings and then we normalize to base 10. Ordered Logit Regressions. Standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

4.5.1.4 Cognitive effects table

Table 31 Score in terms of correct evaluation (conventional)

	(1) Emissions	(2) Emissions	(3) Fuel Efficiency	(4) CO2 taxation	(5) RC
Graphical 1	.14 (.36)				
Graphical 2	.15 (.36)				
Absolute		-.10 (.37)			
Relative		.53 (.40)			
Combined		.10 (.37)			
CO2 taxation				-.12 (.35)	
Info on LSF			.15 (.21)		
RC per Mile					.00 (.48)
RC per Month					1.07 **(.52)****
RC per 5 years					1.22 **(.51)****
demographics	Yes	Yes	Yes	Yes	Yes
Obs.	405	405	405	167	403
R2	.01	.01	.01	.03	.01

Note: The Dependent Variable in (1)-(5) is a dummy variable equal to one if the declared ranking of the car chosen with respect to the other options is correct or wrong by one position. Logit Regressions. Robust standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

4.5.1.5 Two stage process and classification systems table

Table 32 Treatment effects for the classification system: 3 vs. 4 cars (conventional)

	(1) Noticeability	(2) CWTP	(3) Emissions	(4) Fuel Effic.	(5) Cognitive
Absolute (4 cars)	.60 **(.35)***	.05 (.15)	-.54 (.55)	.33 (.52)	-.18 (.42)
Absolute (3 cars)	.75 **(.33)****	.15 (.11)	.70 (.50)	1.24 (.51)**	-.01 (.43)
Relative (4 cars)	.89 (.42)**	.10 (.12)	-.75 (.57)	-.24 (.54)	.45 (.48)
Relative (3 cars)	1.24 **(.32)*****	.01 (.09)	.27 (.50)	1.02 (.53)**	.59 (.45)
Combined (4 cars)	.46 (.29)	-.06 (.09)	.36 (.51)	.63 (.48)	-.17 (.40)
Combined (3 cars)	.49 (.31)	.18 (.12)	.54 (.50)	1.47 **(.53)****	.49 (.45)
Demographics	Yes	Yes	Yes	Yes	Yes
Obs	405	397	403	403	405
R2	.01	.04	.05	.05	.02
F test Absolute (3 versus 4)	.17				
F test Relative (3 versus 4)	.69				

Note: Dependent Variables: (1) "How environmental friendly is the car you selected?"; (2) Log-Difference between paid price and declared budget in the simulated purchase; (3)-(4) Score of the selected car in terms of (respectively) emission and fuel efficiency. We start from the rank that goes from one to four, where one if the one with highest lost savings and then we normalize to base 10; (5) Dummy variable equal to one if the declared ranking of the car chosen in terms of emissions with respect to the other options is correct or wrong by one position. Estimation: (1) Ordered Logit, (2)-(4) OLS, (5) Logit Regression. Robust standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

4.5.2 Regressions tables: electric engine cars

4.5.2.1 Noticeability table

Table 33 Noticeability Measures for Electric cars task (electric)

	(1) How environmental friendly is the car you selected?	(2) How do you think is the car you selected scores in terms of running costs	(3) How fuel-efficient is the car you selected?	(4) How do you think is the car you selected scores in terms of electricity consumption?	(5) How do you think is the car you selected scores in terms of emissions compared to a car of the same class with diesel or gasoline engine?
Graphical 1	-.77 **(.38)****				
Graphical 2	-.34 (.39)				
Tailpipe					.30 (.44)
Tailpipe/Upstream					-.09 (.40)
Electricity Consumption				-.55 (.40)	
Battery Range				-.44 (.33)	
Information on fuel lost saving			-.35 (.27)		
RC per Mile		-.33 (.42)			
RC per Month		-.08 (.35)			
RC per 5 years		-.21 (.46)			
Control for all demographics	Yes	Yes	Yes	Yes	Yes
Obs.	406	166	167	167	167
R2	.01	.01	.02	.03	.01

Note: The Dependent Variable in (1)-(5) is in scale from one to ten. Ordered Logit Regressions. Robust standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

4.5.2.2 CWTP table

Table 34 Behavioural measure: change in Willingness to Pay (electric)

	CWTP	CWTP	CWTP	CWTP	CWTP
Graphical 1	.16 (.12)				
Graphical 2	.07 (.11)				
Tailpipe		.10 (.12)			
Tailpipe/Upstream		.13 (.12)			
Electricity Consumption			.00 (.12)		
Battery Range			.23 **(.12)****		
Lost Saving On fuel Information				-.09 (.08)	
RC per Mile					.10 (.12)
RC per Month					.03 (.12)
RC per 5 years					.21 **(.13)***
Four Cars	Yes	Yes	Yes	Yes	Yes
Control for all demographics	Yes	Yes	Yes	Yes	Yes
Obs.	401	395	401	401	395
R2	.05	.04	.07	.05	.04

Note: The Dependent Variable is the (log) difference between the price paid and the declared budget. Ordinary Least Squares Regression. Robust standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

4.5.2.3 Behavioural choices table

Table 35 Score in terms of lost saving on fuel spending (electric)

	Score in terms of lost savings	Score in terms of lost savings	Score in terms of lost savings	Score in terms of lost savings	Score in terms of lost savings
Graphical 1	.80 (.47)*				
Graphical 2	1.25 (.46)***				
Tailpipe		.85 (.47)*			
Tailpipe/Upstream		1.18 (.46)**			
Electricity Consumption			1.38 (.46)***		
Battery Range			.70 (.47)		
Information on fuel lost saving				.62 (.26)**	
RC per Mile					1.01 (.49)**
RC per Month					1.25 (.47)***
RC per 5 years					.84 (.49)*
Four Cars	Yes	Yes	Yes	Yes	Yes
Control for all demographics	Yes	Yes	Yes	Yes	Yes
Obs.	403	403	403	403	403
R2	.04	.04	.05	.03	.03
F test GR1=GR2	2.64				
F test TP=US		3.37*			
F test RC1=RC2					.57
F test RC2=RC3					1.53
F test RC1=RC3					.24

Note: The Dependent Variable is the score of the selected car in terms of emission. We start from the rank that goes from one to four, where one if the one with highest lost savings and then we normalize to base 10. Ordinary Least Squares Regression. Robust standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%.

4.5.2.4 Cognitive effects table

Table 36 Score in terms of correct evaluation of the chosen car (electric)

	(1) Running Costs	(2) Fuel Efficiency	(3) Fuel efficiency	(4) Fuel efficiency	(5) Electricity Consumption
Electricity Consumption			1.30 **(.54)****		.36 (.49)
Range			.65 (.46)		-.25 (.44)
Information on fuel lost saving		.41 (.40)			
RC per Mile	1.00 **(.52)***			1.22 **(.55)****	
RC per Month	.62 (.46)			.40 (.47)	
RC per 5 years	.58 (.56)			1.70 **(.74)****	
Control for all demographics	Yes	Yes			Yes
Obs.	167	167	167	167	160
R2	.05	.03	.05	.07	.03
F test RC1=RC3			.39		

Note: The Dependent Variable in (1)-(5) is a dummy variable equal to one if the declared ranking of the car chosen with respect to the other options is correct or wrong by one position. Logit Regressions. Robust standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

4.5.3 Regressions tables: hybrid engine cars

4.5.3.1 Noticeability table

Table 37 Noticeability Measures for Hybrid cars task (hybrid)

	(1) How environmental friendly is the car you selected?	(2) How do you think is the car you selected scores in terms of running costs	(3) How fuel-efficient is the car you selected?	(4) How do you think is the car you selected scores in terms of total consumption (fuel and electricity)?	(5) How do you think the car you selected scores in terms of emissions compared to a car of the same class with diesel/ gasoline engine?
Graphical 1	-.57 (.30)*				
Graphical 2	-.59 (.30)*				
Tailpipe					-.45 (.35)
Tailpipe/Upstream					-.39 (.38)
Combined cons. info				-.30 (.29)	
Separate consumption info				-.19 (.29)	
Information FLS			-.41 (.19)**		
RC per Mile		-.03 (.42)			
RC per Month		-.13 (.38)			
RC per 5 years		-.17 (.42)			
Control for all demographics	Yes	Yes	Yes	Yes	Yes
Obs.	406	166	406	406	403
R2	.01	.01	.01	.01	.01
F test GR1=GR2	.00				

Note: The Dependent Variable in (1)-(5) is in scale from one to ten. Ordered Logit Regressions. Robust standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

4.5.3.2 CWTP table

Table 38 Behavioural measure: change in Willingness to Pay (hybrid)

	CWTP	CWTP	CWTP	CWTP	CWTP
Graphical 1	.13 (.11)				
Graphical 2	.10 (.11)				
Tailpipe		.14 (.12)			
Tailpipe/Upstream		.10 (.11)			
Combined Consumption			.13 (.11)		
Separate consumption figures			.10 (.11)		
Information on fuel lost saving				.09 (.08)	
RC per Mile					.20 (.13)
RC per Month					.07 (.12)
RC per 5 years					.05 (.12)
Four Cars	Yes	Yes	Yes	Yes	Yes
Control for all demographics	Yes	Yes	Yes	Yes	Yes
Obs.	403	403	403	403	403
R2	.04	.04	.04	.04	.04

Note: The Dependent Variable is the (log) difference between the price paid and the declared budget. Ordinary Least Squares Regression. Robust standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

4.5.3.3 Behavioural choices table

Table 39 Score in terms of lost saving on fuel spending (hybrid)

	Score in terms of lost savings	Score in terms of lost savings	Score in terms of lost savings	Score in terms of lost savings	Score in terms of lost savings
Graphical 1	1.14 **(.42)*** **				
Graphical 2	.66 (.43)				
Tailpipe		.80 (.43)*			
Tailpipe/Upstream		1.02 **(.46)** **			
Combined Consumption			.97 **(.42)** **		
Separate consumption figures			.86 **(.43)** **		
Information on fuel lost saving				.26 (.25)	
RC per Mile					.62 (.44)
RC per Month					1.18 **(.44)*** **
RC per 5 years					1.04 **(.44)** **
Four Cars	Yes	Yes	Yes	Yes	Yes
Control for all demographics	Yes	Yes	Yes	Yes	Yes
Obs.	403	403	403	403	403
R2	.03	.04	.02	.01	.03
F test TP=US		2.94*			
F test com=sep			2.69*		
F test RC2=RC3					.18

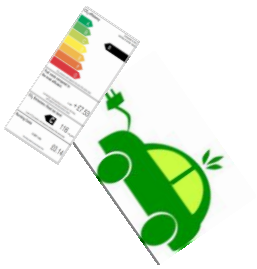
Note: The Dependent Variable is the score of the selected car in terms of emission. We start from the rank that goes from one to four, where one if the one with highest lost savings and then we normalize to base 10. Ordinary Least Squares Regression. Robust standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

4.5.3.4 Cognitive effects table

Table 40 Score in terms of correct evaluation of the chosen car (hybrid)

	(1) Running Costs	(2) Fuel Efficiency	(3) Fuel efficiency	(4) Fuel efficiency	(5) Combined Consumption
Combined Consumption			.12 (.47)		-.78 (.53)
Separate consumption figures			.06 (.51)		-.70 (.52)
Information on fuel lost saving		1.44 **(.46)*** **			
RC per Mile	-.46 (.51)			.00 (.53)	
RC per Month	-.54 (.49)			.26 (.57)	
RC per 5 years	.70 (.68)			.05 (.52)	
Control for all demographics	Yes	Yes			Yes
Obs.	167	167	167	167	160
R2	.05	.03	.05	.07	.03

Note: The Dependent Variable in (1)-(5) is a dummy variable equal to one if the declared ranking of the car chosen with respect to the other options is correct or wrong by one position. Logit Regressions. Robust standard errors in parenthesis. * indicates statistical significance at 10%, ** at 5% and *** at 1%

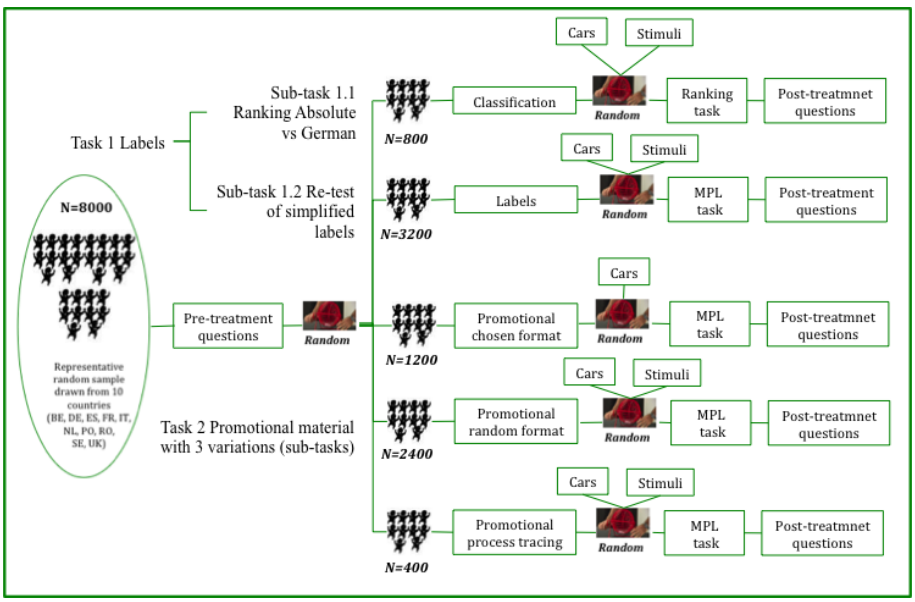


5 Online experiment

5.1 Design and procedure

The online experiment has been conducted in 10 countries (the same as those of the preliminary survey) designed as a randomised controlled trial with random allocation of participants to either a treatment or to the control condition, in a classical between-subject design. The aims of the experiment were: both to re-test the labels in view of the results of the laboratory experiment and to test the variants of the promotional material.

Figure 31 Online experiment procedure



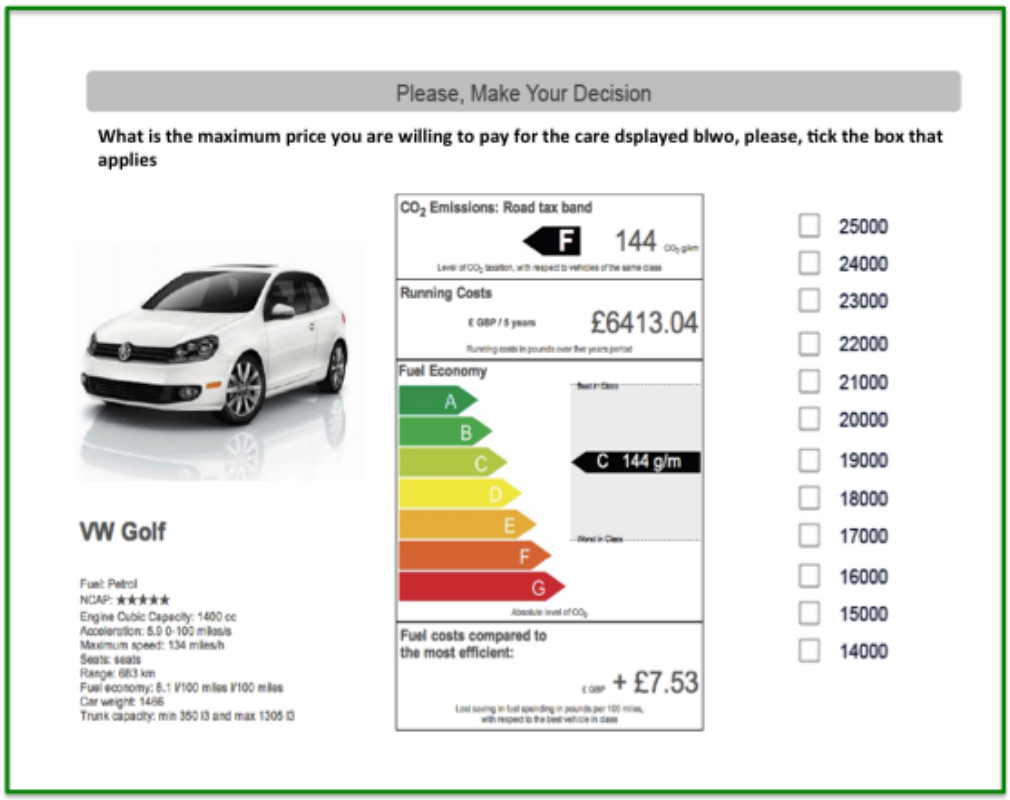
In order not to overburden respondents with too many tasks and questions and to stay within 25 minutes (the benchmark maximum duration for an online survey and/or experiment), while testing both labels and promotional materials, we exploited the large N and split the sample into two sub-samples (see figure above) of 4000 participants (50% of total N) randomly allocated either to the labels related task (Task 1) or to promotional material related task (Task 2). Furthermore both of the two tasks were further broken down into sub-tasks (2 for labels and 3 for promotional material) to which other sub-sub-samples of participants were also randomly allocated. On the other hand, regardless of

the sub-task assigned, all participants answered the same pre-treatment and post-treatment questionnaires (structured pretty much as the ones used in the laboratory experiment and containing many questions taken from the preliminary survey).

We point out the following three principles upon which the design of the online experiment rests:

1) **Between subjects treatment allocation**. The laboratory experiment, conducted before the online one, had shown that labels imposed a substantial cognitive load on the respondents. Given less control on the experimental settings in the online experiment, we wanted to avoid as much as possible noise: answers/tasks provided/performed automatically by respondents without much consideration of what is requested of them. Whereas this is controlled for in a laboratory settings (where respondents are controlled/assisted by lab assistants), the same does not apply in an online experiment where respondents accomplish the task and answer the questions online using their own device at home or in their offices. A between subject design (as opposed to a within subject one) requires less tasks/answers of the respondents, thus reducing the cognitive load and the time required to accomplish the experiment (stay within the 25 minutes limit);
2) **Split sample**. We took full advantage of the large overall sample size (N=8000) and split it into sub-samples with random allocation of different tasks. This allowed us to test different aspects without increasing the cognitive load on respondent and the overall duration of the experiment for them;
3) **Focus on behavioural measures**. We opted for an experiment that maximised the gathering of behavioural measures with respect to self-reported preferences. As the laboratory experiments had shown, such coherence in the scale of measurement is necessary given that the labels do not work consistently across scales. We do this by: a) using a Multiple Price List to elicit WTP (see next figure); b) applying the process tracing technique (see Figure 4, page 38 and below Figure 38 with further illustrative comments); c) asking the respondents to select the format of the promotional material they want to see.

Figure 32 Example of Multiple Price List used



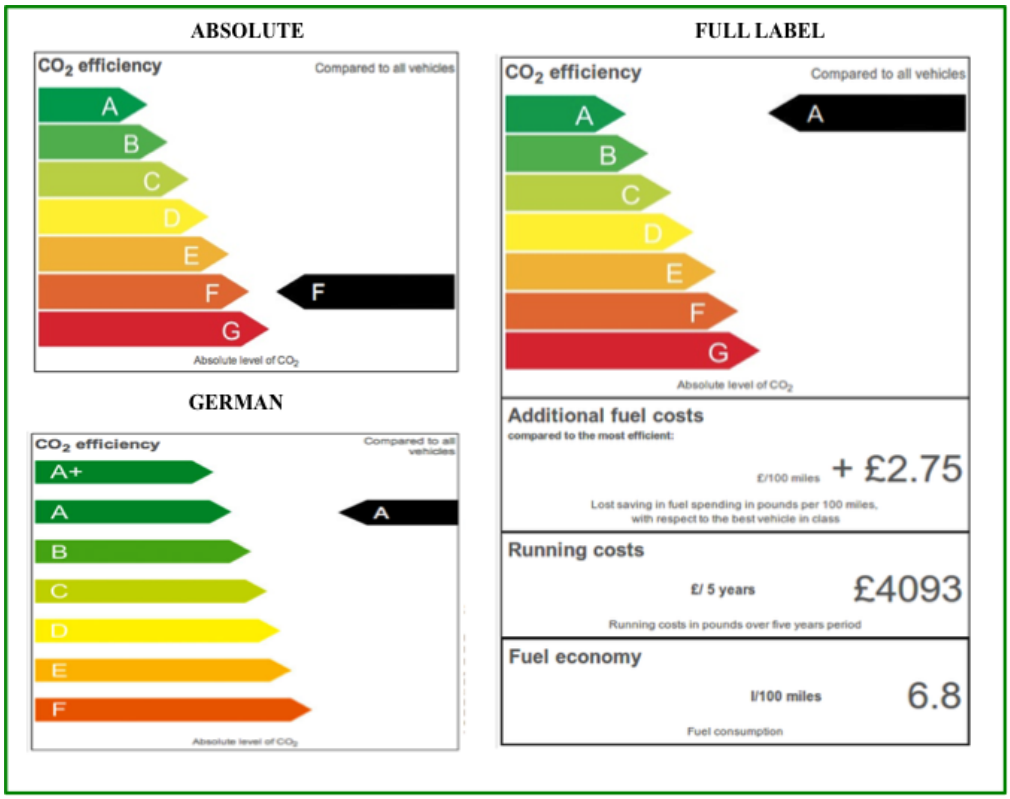
We illustrate this in a more detailed and granular fashion below:

- **Pre-treatment questions**. Before respondents entered the randomisation loop they have all answered a set of pre-treatment questions (same as those used both the in the preliminary survey and in the laboratory experiment);
- **Random split of the sample**. Hence they were randomy allocated to:
  - Sub-task 1.1 (N=800): ranking task Absolute versus German classification system;
  - Label sub-task 1.2 (N=3200): further testing of simplified labels;
  - Promotional material sub-task 2.1 (N=1200): test with format self-selected;
  - Promotional material sub-task 2.2 (N=2400): test with format randomly allocated;
  - Promotional material sub-task 2.3 (N=400): test with format self-selected & process tracing (see *infra*);

Task 1: Labels

- **Sub-Task 1.1**: **classification system.** We tested the German classification versus the Absolute. This subtask is limited to conventional engine vehicles. Respondents performed a ranking task of three cars with a control for information overload:

Figure 33 Absolute vs. German simplified label vs. full label (exemplification)[17]

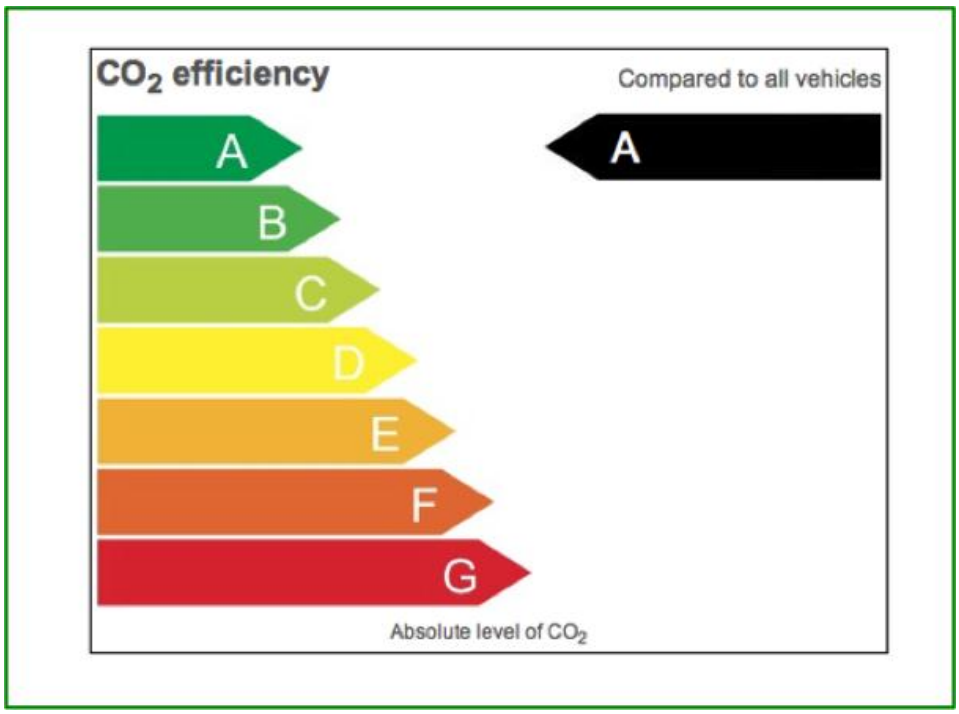


- **Ranking Task main parameters**:
  - Respondents saw three cars, vertically disposed with a label and they were asked to rank them in terms of growing emissions. The cars were randomly selected from a subset of our database (three or four cars per class);
  - With 50% probability the label included only the classification system (and it is equally likely to include a German or an Absolute classification), while with 50% probability the label contained a full set of information;
  - The comparison of the results of the former (only classification system) versus the latter (full label) is a test of information overload;
- **Post treatment questions**: After completing the MPL task, respondents answered post-treatment questions of the kind used in the laboratory experiment used to record noticeability;

[17] Based on UK label (absolute rating).

- **Sub-task 1.2: further test of labels**. Labels have been tested in simplified fashion compared to those used in the laboratory experiment and they all used the absolute classification system and the vertical graphic layout. The CO2 taxation treatment is removed, and for running costs only two levels are retained:
  - **Control condition**: a standardised label[18] using the absolute classification system and the vertical graphic layout and containing no other information;

Figure 34 Control condition (re-test of labels, online experiment)



  - **Treatments for conventional and hybrid cars**:
    - Running costs (two versions tested: 'cost per mile/km' and 'cost per 5 years', see next figure);
    - Lost saving on fuel as compared to the most efficient model in a class (two versions tested: as additional costs or adding the text "you lose" and showing the additional costs);
    - Fuel economy (litres per km or miles per gallon depending on the country);

[18] There is no standard car label in use across the EU, so we preferred to use a standardised format we produced for all to ensure same conditions across the sample, rather than using different formats. The reader should consider that respondents are allocated to treatments on the basis of randomisation regardless of their country of origins.

Figure 35 Treatments for conventional and hybrid (online experiment)

- **Treatments for electric cars**: (see Figure 36)
  - Running costs (two version tested: 'cost per mile/km' vs. 'cost per 5 years'),
  - Lost saving on fuel with regards to the best electric car or saving with respect to the best conventional car, expressed with the text “you save” and the money value,
  - Battery life;
- **Randomisation within the sub-task**:
  - The labels are randomly allocated between subjects and filled in with the car data whose image is also shown in order to perform elicited WTP (randomly selected from a subset of our database: three or four cars per class);
  - Subjects have been also randomly allocated to conventional, electric, hybrid, and process tracing (see *infra*);
- **Experimental task**:
  - Some subjects perform a simple Multiple Price List (MPL) task (see Figure 37);
  - Other perform a MPL task with process tracing (see Figure 38)
- **Post treatment questions**: After completing the MPL task, respondents answer post-treatment questions of the kind used in the laboratory experiment used to measure noticeability variables;

Figure 36 Treatments for electric (re-test of labels, online experiment)[19]

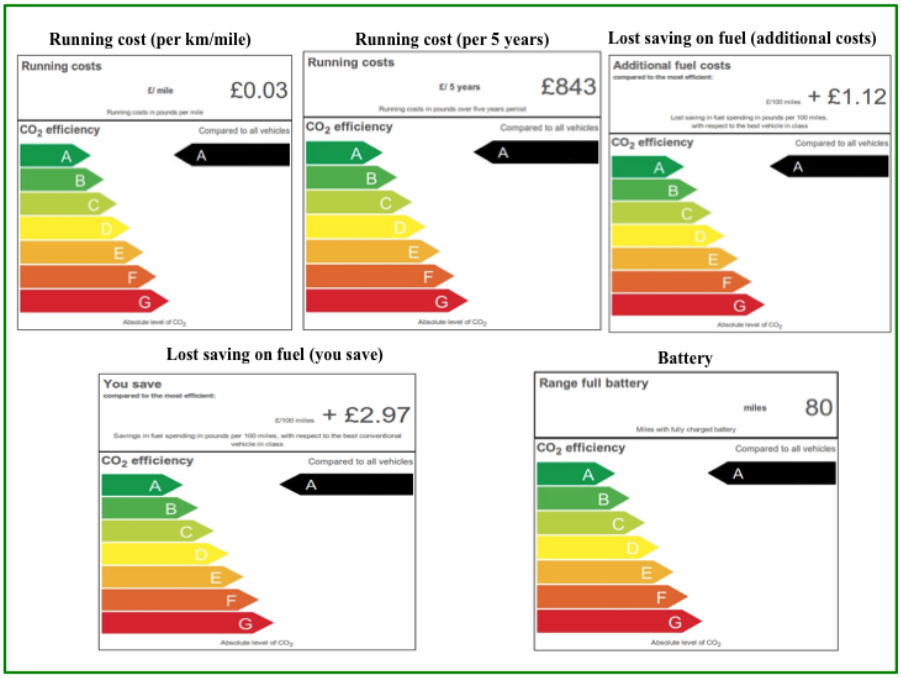
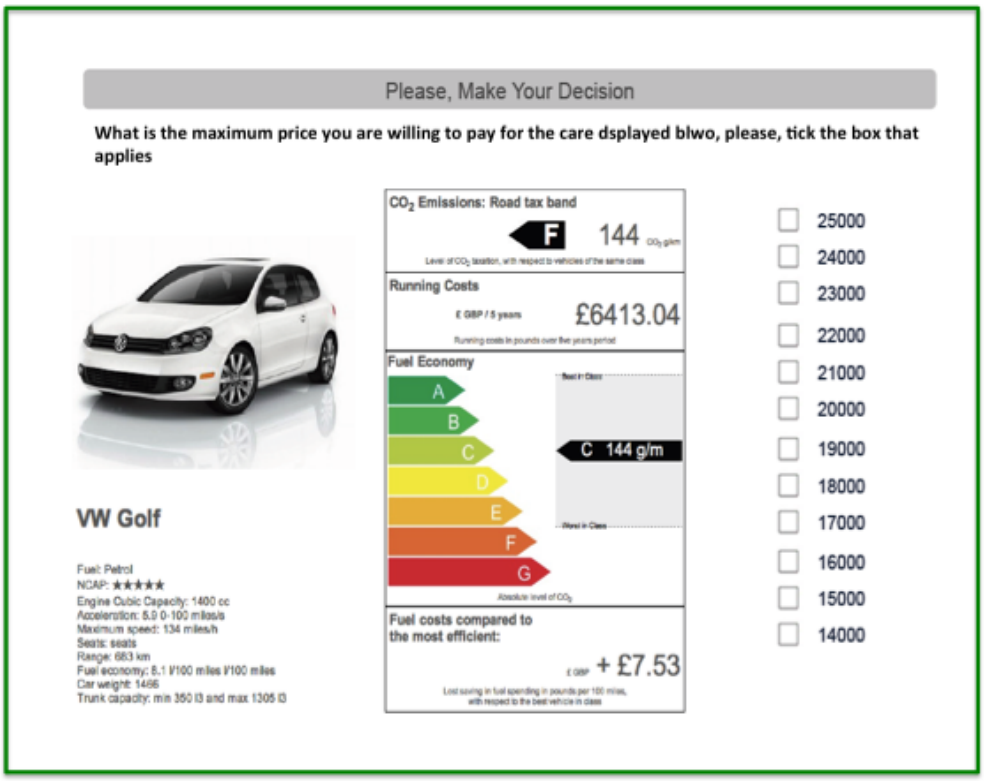


Figure 37 MPL task



[19] The third label in the first row and the first label in the second row represent the two treatments for fuel saving, respectively the additional fuel costs with respect to the best electric and the saving with respect to the best conventional vehicle in class.

Figure 38 MPL task with process tracing

Illustrative comment. The process tracing technique consists in showing to respondents a blurred picture of the label and car with respect to which the MPL must be completed. In order to see the above, the respondents randomly assigned to the MPL with process tracing are provided with instructions explaining them to mouse over the items they are interested to fully see in order to complete the task. When they do so, the respondents leave 'behavioural' traces of the information they need/prefer, which were automatically captured by our supporting software. The same technique has been used for one sub-task related to the testing of promotional material and this illustration applies in this case as well.

Task 2: Promotional material experimental conditions tested. The treatments and control condition remain the same across the three sub-tasks and are illustrated here. Please note that: a) the seven pictures reported in the following pages are exemplificative of the 13 different visual stimuli produced for the promotional material (all reported in Annex IV); b) they all report the same car, but in the experiment different cars were shown in the promotional material, according to the randomization procedure.

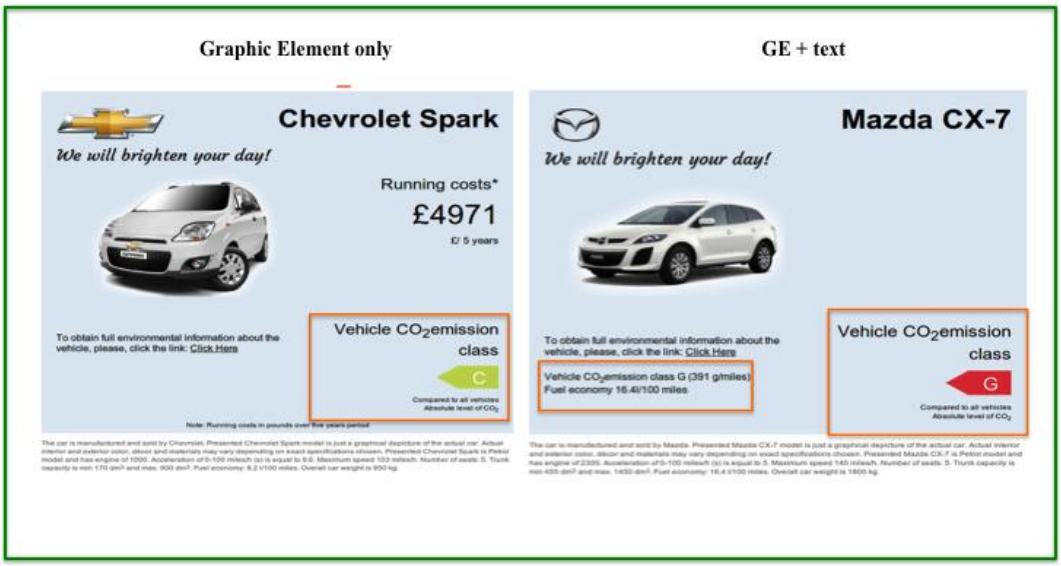
- **Control condition**. It was presented with the promotional material in the format in which they are currently available on the market: only text, small fonts, no graphical element, and no information about running costs;

Figure 39 Control condition (promotional material, online experiment)

► **Treatments**. For promotional materials we tested the following treatments;

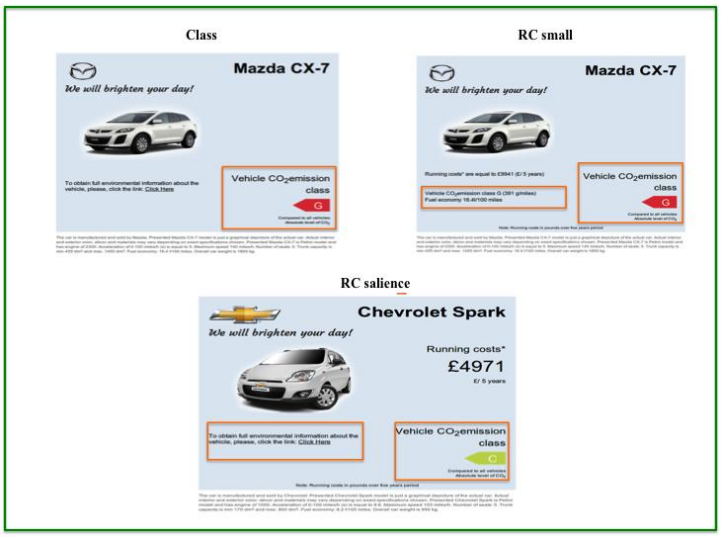
- **General format**: This dimension refers to how the information about CO2 emissions is reported. With respect to the control condition we tested two variations (see Figure 40):
  - Using only a Graphic Element (GE) for the class in terms of emission (i.e. A, B, C, etc.);
  - Using both a GE and a textual illustration of the CO2 emission class;

Figure 40 General Format (promotional material, online experiment)



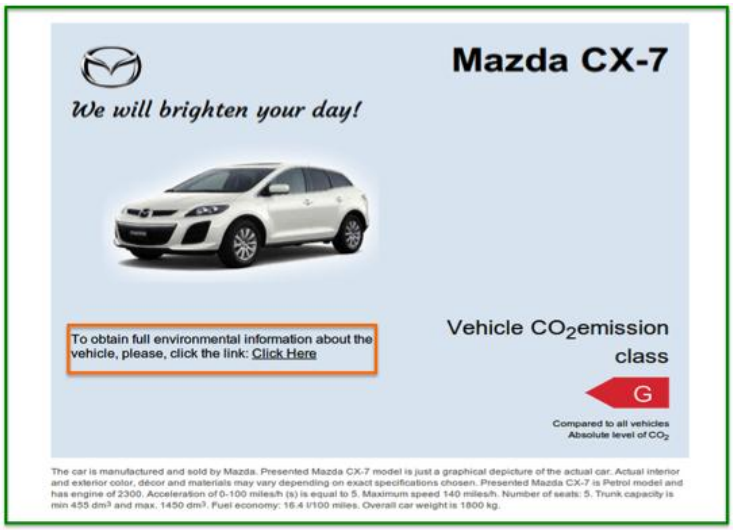
- **Additional Element**: tested in three variants (see Figure 41 below):
  - Containing only the CO2 emission class (Class);
  - Containing the CO2 emission class plus a small text indicating running costs (RC small) ;
  - Containing the CO2 emission class plus a larger running cost element (RC salience)
  - Please notice that whenever a running costs treatment is shown also a footnote indicating the unit of measurement is shown at the very bottom of the promotional material, this is a further element of variation and as such we provide an estimation of the effect (RC_note).

Figure 41 Additional element (promotional material, online experiment)



- **Web link**: The presence or absence of clickable web link, which opens a pop up window with a full label with all detailed information, was tested;

Figure 42 Web link (promotional material, online experiment)



Task 2: Promotional material experimental sub-tasks and protocol. For all the three sub-tasks the cars shown to respondents were randomly selected from a subset of our database (three or four cars per class)

- **Sub-Task 2.1: test with format self-selected**. Limited to conventional engine cars.
  - **Instructions**. Before the experimental task start respondents have been shown the various possible formats of the promotional materials and asked to choose which one they prefer;
  - **Experimental task**. They perfom the MPL task with regard to a randomly selected car matched with the promotional material format they selected;
  - **Post treatment questions**: After completing the MPL task, respondents answered post-treatment questions of the kind used in the laboratory experiment used to measure noticeability variables;
- **Sub-Task 2.2: test with format randomly allocated**.
  - **Random allocation**. Respondents are randomly shown one of the variants of the promotional material, with equal chances to be assigned to conventional, hybrid, or electric engine cars;
  - **Experimental task**. They perfom the MPL task with regard to a randomly selected car;
  - **Post treatment questions**: After completing the MPL task, respondent answered post-treatment questions of the kind used in the laboratory experiment used to measure noticeability variables;
- **Sub-Task 2.3: test with format self-selected & process tracing.** Limited to conventional engine cars.
  - **Instructions.** Before the experimental task start respondents: a) have been shown the various possible formats of the promotional materials and asked to choose which one they prefer; b) have been instructed on how fully visualise the blurred picture shown to them;
  - **Experimental task.** They perfom the MPL task with regard to a randomly selected car using the elements they decided to fully visualize with the mouse;
  - **Post treatment questions**: After completing the MPL task, respondent answered post-treatment questions of the kind used in the laboratory experiment used to measure noticeability variables.

The next three tables report the treatments runs illustrated so far for all of the four sub-tasks (excluding the one on the ranking of classification systems).

Table 41 Labels factorial design of treatments (conventional and hybrids)

Treatments	Basic	Running Costs	Lost Saving on Fuel	Fuel Economy
1	Vertical layout and Absolute classification	Per mile or Km	No	No
2	Vertical layout and Absolute classification	Per 5 years	No	No
3	Vertical layout and Absolute classification	No	Additional costs	No
4	Vertical layout and Absolute classification	No	Loss	No
5	Vertical layout and Absolute classification	No	No	Yes
Control	Vertical layout and Absolute classification	No	No	No

Table 42 Labels factorial design of treatments (electric)

Treatments	Basic	Running Costs	Lost Saving on Fuel	Battery
1	Vertical layout and Absolute classification	Per mile or Km	No	No
2	Vertical layout and Absolute classification	Per 5 years	No	No
3	Vertical layout and Absolute classification	No	Additional costs[20]	No
4	Vertical layout and Absolute classification	No	Gain[21]	No
5	Vertical layout and Absolute classification	No	No	Yes
Control	Vertical layout and Absolute classification	No	No	No

[20] With respect to the best electric vehicle.

[21] With respect to the best conventional vehicle.

Table 43 Promotional material factorial design of treatments

Treatments	General Format	Additional Element (AE)	Web Link
1	Only GE	Class	Yes
2	Text + GE	RC salience	Yes
3	Text + GE	RC small	No
4	Only GE	RC small	No
5	Only GE	Class	No
6	Text + GE	Class	Yes
7	Only GE	RC salience	Yes
8	Only GE	RC salience	Yes
9	Only GE	RC salience	No
10	Text + GE	Class	No
11	Text + GE	RC small	Yes
12	Text + GE	RC salience	No
Control	Text Only	No	No

We conclude by further discussing some of the choices made in the testing of the promotional material.

In the evaluation of promotional material we allowed a subset of the respondents to choose which type of information would be displayed to them in the MPL task. We argue that asking this question could be particularly informative to understand (1) the information processing of the agents, and (2) how effective the policy would be. The reason is that the answer to this question would make us understand which information subjects would like to have, and think that will be important, as opposed to which information subjects consider redundant or unimportant. The rationale for this last point is that once combined with the information about the effectiveness of the promotional material variants obtained from other sub-tasks, we can then understand whether subjects desire information that will influence their choice, or, by contrast, if they would not request it. This could be very important to understand the impact of the policy. Let us illustrate this point by means of an example. Suppose that there are only 2 types of promotional material variants, “Effective Variant” and “Ineffective Variant” (effectiveness or not being an empirical results from other parts of Task 2), and suppose that we observe that the “Effective Variant” strongly affects the choice of the car, while the “Ineffective Variant” does not. Knowing whether subjects would like to receive information in the “Effective Variant” or “Ineffective Variant” format could then be used as follows:

1. If subjects prefer the “Effective Variant” to the Ineffective one: this means that they know which information is important for them. This provides a strong support for the use of the “Effective Variant” – it is what subjects want, and, in addition, it is the most effective one. At the same time, it shows that such note could potentially have a more limited impact in the real world, since, if subjects

know that they would like to have this information, they could seek it before making an actual purchase. That is, even if this information is not shown following a policy, subjects would seek it anyway;

2. If subjects prefer the "Ineffective Variant": this means that they do not know which information is truly important for them. This also provides a strong support for the "Effective Variant", but for different reasons: it tells us that this variant provides subjects with knowledge that not only they did not have, but that they did not even think they needed. We can therefore expect that the use of this variant would have a strong impact in the real market, as it would provide subjects with information that not only they didn't have, but that they might not even otherwise have sought. As such, providing with this information could have important effects.

5.2 Response variables

We will analyse the following response variables, reported in the synoptic Table 44.

1) Behavioural variables: these are variable that measure a concrete action taken by the respondents.
   a) Elicited Willingness to Pay, i.e. the price selected in the simulated purchase task (MPL);
   b) Number of visualizations of blurred portions of labels (promotional material), in process tracing task;
   c) Dummy variable equal to one if the full label (promotional material) is visualized, in process tracing task;
   d) Dummy equal to one if at least one blurred portion of the label (promotional material) is visualized, in process tracing task;
2) Noticeability variables: these response variables are answer to specific questions (see Table below for details);
3) Cognitive variables: these variables measure cognitive processing of information;
   a) Score in ranking task (1 if the ranking is correct, 0 otherwise);
   b) Score of running cost: dummy equal to one if the implicit score determined by the answer to the question "How do you think the car you selected scores in terms of running costs with respect to the other cars in the market?" has an error margin lower than 25%. The implicit score is determined by looking at the score of the car across the entire database in terms of running costs;
   c) Score of fuel consumption: dummy equal to one if the implicit score determined by the answer to the question "How do you think the car you selected scores in terms of fuel consumption with respect to other cars in the market?" has an error

margin lower than 25%. The implicit score is determined by looking at the score of the car across the entire database in terms of fuel economy;

d) Score of electricity consumption: dummy equal to one if the implicit score determined by the answer to the question "How do you think the car you selected scores in terms of electricity consumption with respect to other cars in the market?" has an error margin lower than 25%. The implicit score is determined by looking at the score of the car across the entire portion of electric vehicles of the database in terms of electricity consumption;

e) Score of environmental friendliness: dummy equal to one if the implicit score determined by the answer to the question "How environmental friendly is the car you have just seen?" has an error margin lower than 25%. The implicit score is determined by looking at the score of the car across the entire database in terms of emissions.

Table 44 Synoptic Table on response variables online experiment

Type	variable	Description/ or question
Behavioural	WTP (Willingness to Pay)	Elicited price divided by the price of the car in the country
	Visualizations (related to process tracing)	Number of visualizations of blurred images from the process tracking metrics
	At least one Visualization	Dummy variable equal to one if at least one part of the label (promotional material) has been visualized and zero otherwise
	Complete Visualization (related to process tracing)	Dummy variable equal to one if the label (promotional material) has been fully visualized
Noticeability	Fuel Consumption	How do you think the car you selected scores in terms of fuel consumption with respect to other cars in the market?
	Fuel Efficiency	How fuel efficient do you think is this car with respect to other cars of the same class?
	Running Costs	How do you think the car you selected scores in terms of running costs with respect to the other cars in the market?
	Fuel consumption versus conventional vehicles	How fuel efficient do you think is this car with respect to a similar vehicle with diesel or gasoline engine?
	Electricity Consumption	How do you think the car you selected scores in terms of electricity consumption with respect to other cars in the market?
	Environmental Friendliness	How environmental friendly is the car you have just seen?
Cognitive	Ranking	Dummy: 1 - the ranking in terms of emission is correct; 0 – otherwise
	Score running costs	Dummy: 1 – the score in terms of running costs is correct; 0 - otherwise
	Score fuel consumption	Dummy: 1 – the score in terms of fuel consumption is correct 0 - otherwise
	Score electricity consumption	Dummy: 1 – the score in terms of electricity consumption is correct; 0 - otherwise
	Score environmental friendliness	Dummy: 1 – the score in terms of emissions is correct; 0 - otherwise

5.3 Sample

The online experiment, exactly as the preliminary survey, is based on a sample including 800 individuals per country in the 10 countries selected for a total of 8000 respondents. The countries included are: BE=Belgium; DE= Germany; FR= France; IT= Italy; NL= Netherlands; PL= Poland; RO= Romania; ES= Spain; SE= Sweden; UK= United Kingdom.

The sample has three essential features:

1. The selection of countries follows the car market segmentation analysis (see chapter 6). Ten countries are selected according to four groups of countries (Nordic, Continental, Mediterranean, Eastern) with different car markets;

2. An equal size sample has been chosen for each one of the countries being studied. This will lead to an equal level of reliability in the results obtained in each one of the countries.

3. The choice was made to use a fully representative sample for the distribution of the target population, according to gender and age group, which means that there is no need for any weighting to be applied to interpret the data within countries.

Table 45 Sample: summary technical parameters

Population	General population aged 18 to 65 years old
Scope	10 EU countries: Belgium, Germany, France, Italy, Netherlands, Poland, Romania, Spain, Sweden, United Kingdom
Methodology	Online (quantitative survey)
Sample size	N=8,000 (n=800 per country)
Quotas	Country; Gender; Age group; Experience in purchasing cars
Sampling error	±1.12% for overall data and ±3.54% for country-specific data. In all cases, a maximum indeterminate probability (p=q=50), for a confidence level of 95.5% is applicable for each one of the reference populations
Sampling	Random

The following graphs show the ex post key demographics of the sample.

Figure 43 Share of respondents by country and gender

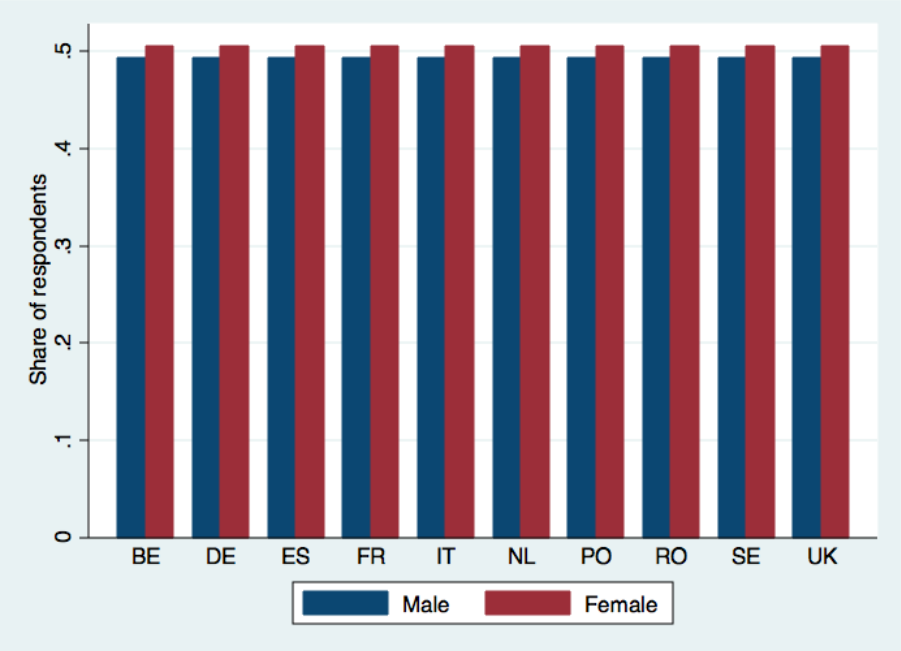


Figure 44 Share of respondents by country and age

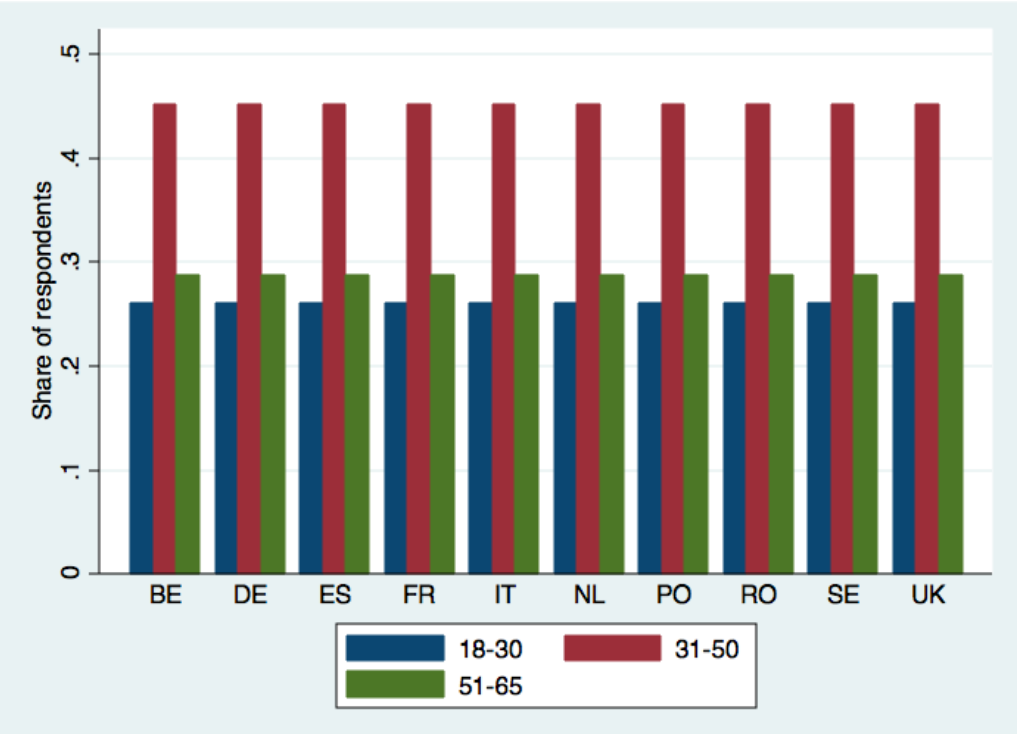
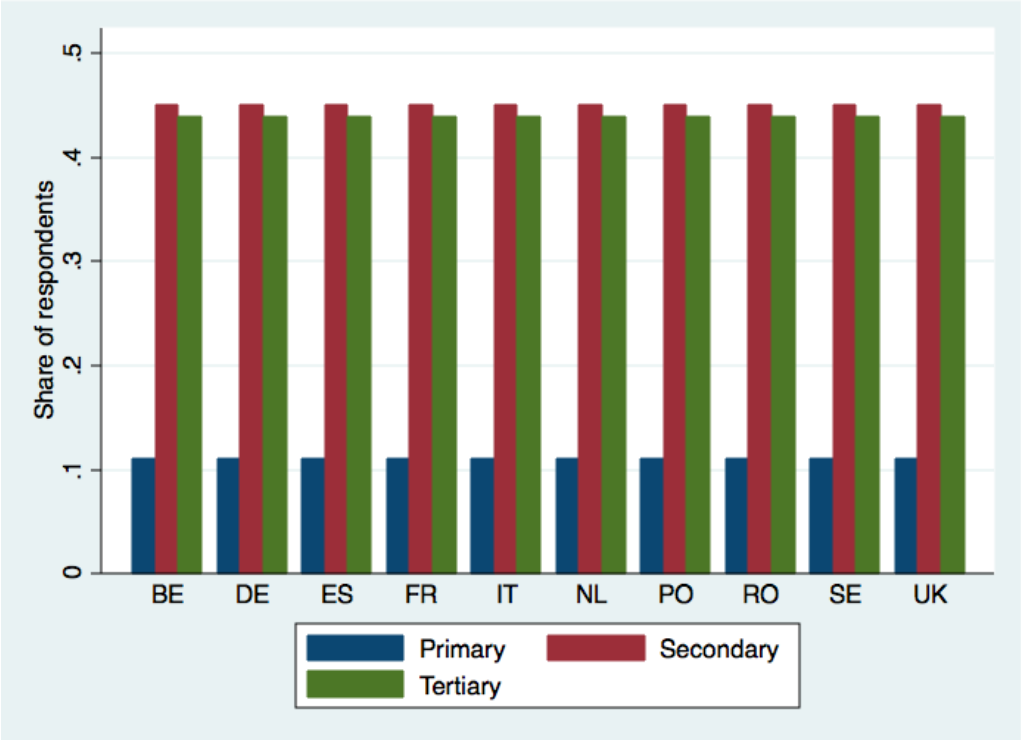


Figure 45 Share of respondents by country and educational level



5.4 Analysis performed

The main core of the analysis performed is focused on the estimation of the treatment effects using regression analysis. As we illustrated and justified this approach at some length in § 4.4 and the online experiment reproduce mostly the same design features as the laboratory experiment, we will shortly repeat here the main aspects of the analysis.

Under our design conditions treatment effects can be identified through a linear regression (Ordinary least Squares) where the independent variable is represented by the treatment dummy (equal to one if the subject is treated and zero otherwise). Consequently, our baseline technique is always OLS. Some alternative techniques are necessary when the response variable has a particular scale, as robustness check. In particular, we performed the following additional analysis: a) when the response variable is a dummy, we perform Logit and Probit, i.e. non-linear estimation techniques which keeps into account that the variable is constrained between zero and one; b) when the outcome is a 10 points discrete scales we perform also ordered logit regression, a non-linear technique that estimate the average effect of the independent variable on the likelihood of shifting the answer from n to n+1.

Moreover, in all the estimations, regardless of the technique, we proceed in the following way:

1. We add controls for sex, age group (the three age groups of the sampling quotas) and country. Although unnecessary (because of randomization), these controls perform two tasks:
    a. They are a robustness check;
    b. They help to estimate the counterfactual, which may be informative for policy discussion. In other words, once we know the effect of country, gender and age we can estimate the average differences among individuals when the subjects are not treated;
2. We estimated robust standard errors, i.e. we allow different observations (individuals) having differences in the variance. In this way we have a more efficient estimator, because we reduce the variance of our estimated coefficients;
3. We re-run regressions on highly educated only (respondents with tertiary education).

In Table 46 we sum up the analysis performed. All of the analysis performed and of the results presented for the online experiment come from regression analysis with only two exceptions.

First, the respondents' selection of the preferred format for the promotional material has been used to elicit a ranking of most useful information that we tested for statistical significance using Friedman and Kendall tests.

Second, we processed with Structural Equation Models (SEM) the answers provided by the entire sample of 8000 respondents to some items in the pre-treatment questionnaire. The items considered are: a) key aspects shaping the car purchase decision; b) understanding of existing labels; c) familiarity with existing labels; and d) trust in existing labels; and e) usage of existing labels.

This analysis does not concerns the effects of the treatments tested, since answers were given before randomisation and before respondents performed the experimental tasks and were exposed to the treatments or to the control condition. It is complementary to the treatment effect analysis and can help contextualised and interpret the results of such analysis since it explains instead which factors shape individuals usage of labels, with what strength, and through which channels. The results of this exercise are useful to provide a better, although indirect, interpretation of the treatment effect analysis and of the policy implications.

Table 46 The type of analysis performed per each outcome variable

Type of outcome variable	Response variable	Technique	Standard Errors	Controls
Behavioural	WTP	OLS	Robust	Gender, Age, Country
	Visualizations	OLS	Robust	Gender, Age, Country
	At least one Visualization	OLS, Logit, Probit	Robust	Gender, Age, Country
	Complete Visualization	OLS, Logit, Probit	Robust	Gender, Age, Country
Noticeability	Fuel Consumption	OLS, Ordered Logit	Robust	Gender, Age, Country
	Fuel Efficiency	OLS, Ordered Logit	Robust	Gender, Age, Country
	Running Costs	OLS, Ordered Logit	Robust	Gender, Age, Country
	Fuel consumption versus conventional vehicles	OLS, Ordered Logit	Robust	Gender, Age, Country
	Electricity Consumption	OLS, Ordered Logit	Robust	Gender, Age, Country
	Environmental Friendliness	OLS, Ordered Logit	Robust	Gender, Age, Country
Cognitive	Ranking	OLS, Logit, Probit	Robust	Gender, Age, Country
	Score running costs	OLS, Logit, Probit	Robust	Gender, Age, Country
	Score fuel consumption	OLS, Logit, Probit	Robust	Gender, Age, Country
	Score electricity consumption	OLS, Logit, Probit	Robust	Gender, Age, Country
	Score environmental friendliness	OLS, Logit, Probit	Robust	Gender, Age, Country

Structural Equation Modelling is a statistical technique that allows researchers to model unobserved variables (see for instance Skrondal & Rabe-Hesketh, 2004). This technique is often used to model latent constructs – abstract psychological variables such as "intelligence" or "attitude toward the brand" or " trust" – rather than the manifest variables that are instead used to measure these constructs. Measurement is recognized as difficult and error-prone. By explicitly modelling measurement error, SEM users seek to

derive unbiased estimates for the relations between latent constructs. To this end, SEM allows multiple measures to be associated with a single latent construct[22].

In our case we focussed on the answers provided by 8000 respondents in 10 different countries to the questions included in the pre-treatment phase of the online experiments (See questions Q1 to Q18 in Annex VII). These questions enable us to measure, among others, a number of manifest variables that can be used to model the following constructs: a) labels' comprehension; b) the multiple set of factors considered important in the purchase decision process other than eco-friendliness and fuel economy; c) familiarity with labels; d) trust in labels; e) usage of label.

Although this disclaimer was made already, it is worth recalling that the answers to the set of questions enabling us to measure and model the above were provided by all respondents before entering the randomisation loop and being exposed to the treatments embedded into the various variants of labels and promotional material. This means that: a) this SEM does not aim to, and cannot, model and explain the results of the experimental part; b) it models answers based only on the respondents previous experience with labels and, thus, are not influenced by possible effects (including social desirability) from expositions to the treatments of our experiment. With this SEM exercise we aimed simply at modelling the relations existing among the five constructs listed above. As we shall see in chapter, the results of this SEM exercise will provide an external 'triangulating' input to better interpret and draw policy implications from the experiments conducted.

22 A structural equation model implies a structure of the covariance matrix of the measures (hence an alternative name for this field, "analysis of covariance structures"). Once the model's parameters have been estimated, the resulting model-implied covariance matrix can then be compared to an empirical or data-based covariance matrix. If the two matrices are consistent with one another, then the structural equation model can be considered a plausible explanation for relations between the measures. We do not add further technical details here, neither we illustrate the process followed to achieve the final models presented. Such details can be provide upon requesting the authors to do so.

5.5 Regression Results tables

5.5.1 Willingness to Pay

In Table 47 below we report the analysis of the Multiple Price List:

1. First, we merge the car database with the online experiment data, in order to divide the declared price for the current market price of the car. In this way, we analyse only the variation of prices from market price and we eliminate the noise related with the heterogeneity of prices across car models and countries;
2. Secondly, we run Ordinary Least Squares (OLS) regressions. OLS identify the impact of variables under the assumption of exogeneity, which is guaranteed by randomization of the treatments;
3. We include Gender, country and age dummies as control variables, because they are the variables that are used to determined quotas in the sample stratification process;
4. In the subtasks where we have both the data with and without process tracing, we include a dummy equal to one if the subtask is with process tracing and zero otherwise;
5. We estimate robust standard errors to minimize the variance of the estimators.[23]

For socio-demographic variable the X in the cells indicate that we controlled for them.

[23] This is not needed to correctly identify the treatment effect, but it increases the efficiency of the estimator, increasing the precision of the figures for the treatment effect.

Table 47 OLS analysis for WTP (labels 1-3; promotional material 4-7)

	(1) Standard	(2) Hybrids	(3) Electric	(4) Promotional	(5) Promotional	(6) Promotional	(7) Prom. selected	(7) Prom. selected	(7) Prom. selected	(7) Prom. Select.
RC_L1	.01 (.02)	-.03 (.02)	-.08 (.05)*							
RC_L3	.00 (.02)	-.03 (.02)	-.05 (.05)							
LSF	-.00 (.02)	-.02 (.02)	-.05 (.04)							
LSF_loss	-.02 (.01)	.01 (.03)	-.05 (.05)							
Fuel	-.02 (.02)	-.06 (.02)								
Battery			.05 (.06)							
CO2class_IN				-.00 (.02)						
CO2text_IN				.02 (.01)					-.00 (.00)	
RC_note				-.00 (.01)						.01 (.01)
RC salience					-.00 (.01)		-.01 (.01)			
RC small					-.00 (.01)			.03 (.01)*		
weblink_IN						.00 (.01)				
Process tracing	-.00 (.01)						.02 (.01)**	.02 (.01)**	.02 (.01)**	.02 (.01)**
Gender	X	X	X	X	X	X	X	X	X	X
Age Groups	X	X	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X	X	X
R2	.10	.15	.26	.11	.10	.10	.09	.09	.09	.09
Obs.	1646	827	826	2398	2398	2398	1662	1662	1662	1662
F-test	9.03***	6.94***	24.23***	14.03***	14.78***	15.91***	9.01***	9.09***	8.98***	8.92***

Source: merge between On-line experiment database and Car database. In the first line we report the subsamples (subject who perform a specific task). All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

5.5.2 Analysis of Ranking Subtask

In Table 48 below, we report the analysis of the ranking subtask where the absolute classification is used as control condition, which means that the negative coefficients for the German one indicate that the latter is less effective than the former. Effectiveness is measured as the capacity of the respondents to correctly recall the information about the car they had seen that is contained in the label based on the different classification systems. So, negative and statistically significant coefficients indicate that respondents being shown the German classification system were less capable of correctly recall the information on the car than respondents being shown the Absolute classification system, which means the latter is cleared and easier to recall.

Table 48 OLS analysis of the classification ranking subtask

	(1)	(2)	(3)
German	-.63 (12)***	-1.01 (.20)***	-.23 (.05)***
Full	.01 (.09)	.02 (.17)	.00 (.04)
Gender	X	X	X
Age	X	X	X
Country	X	X	X
R2 (Pseudo R2)	.05	.05	.06
Obs.	840	840	840
Wald chi2	52.10***	49.76***	
F-test			4.43***

Source: merge between On-line experiment database and Car database. In the first line we report the subsamples (subject who perform a specific task). Column (1) is probit, Column (2) is logit, Column (3) is OLS, all the three with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

5.5.3 The analysis of Noticeability Variables

The noticeability variables refer to self-reported evaluation of the car shown in terms of environmental friendliness, running costs, fuel consumption, fuel efficiency, etc.

The response variables are the answers to the following questions:

1. Labels for conventional cars, hybrid cars, and conventional cars with process tracing:
    a. How do you think the car you selected scores in terms of fuel consumption with respect to other cars in the market? [Fuel consumption]
    b. How fuel-efficient do you think is this car with respect to other cars of the same class? [Fuel efficient]
    c. How do you think the car you selected scores in terms of running costs with respect to the other cars in the market? [Running costs]

2. Labels for electric vehicles:
    a. How do you think the car you selected scores in terms of electricity consumption with respect to other cars in the market? [Electricity consumption]
    b. How fuel efficient do you think is this car? [Fuel efficiency]
    c. How fuel efficient do you think this car with respect to a similar vehicle with diesel or gasoline engine? [Fuel consumption versus standard vehicles]
    d. How do you think the car you selected scores in terms of running costs with respect to the other cars in the market?
3. Promotional Material (all subtasks):
    a. How environmental friendly is the car you have just seen? [Environmental friendliness]
    b. How fuel efficient do you think is this car? [Fuel efficiency]
    c. How do you think the car you selected scores in terms of running costs with respect to the other cars in the market? [Running costs]

All the answers are in 10 points scales. We report OLS regressions with robust standard errors and controlling for gender, age groups and country in Table 49-Table 51. To check for the robustness of the results we run also ordered logit regressions and the results are confirmed (Table 52-Table 54).

Table 49 OLS analysis of noticeability for labels

	(1) Conventional Fuel cons	(2) Conventional Fuel efficiency	(3) Conventional Running Costs	(4) Hybrid Fuel consumption	(5) Hybrid Fuel efficiency	(6) Hybrid Running Costs	(7) Electric Electricity Consumption	(8) Electric Fuel efficiency	(9) Electric Fuel cons versus conventional	(10) Electric Running Costs
RC_L1	.51 (.17)***	.49 (.17)**	.51 (.16)***	.24 (.26)	.07 (.25)	.40 (.25)	.53 (.23)**	.33 (.23)	.19 (.25)	.55 (.23)**
RC_L3	.18 (.17)	-.03 (.16)	-.11 (.16)	-.31 (.26)	-.27 (.25)	-.60 (.23)**	.30 (.22)	.14 (.22)	-.11 (.24)	.18 (.23)
LSF	-.00 (.16)	.00 (.17)	-.17 (16)	-.35 (.25)	-.15 (.24)	-.07 (.23)	.32 (.22)	.12 (.24)	.06 (.25)	.20 (.24)
LSF_loss	.37 (.17)**	.23 (.17)	.15 (16)	-.01 (.24)	-.27 (.24)	-.22 (.23)	.12 (.23)	-.13 (.25)	-.25 (.26)	-.27 (.24)
fuel	.35 (.17)**	.27 (.17)	.25 (.16)	-.13 (.26)	.02 (.25)	-.04 (.25)				
battery							.28 (.23)	-.01 (.25)	-.04 (.25)	-.08 (.24)
Process tracing	.08 (.09)	.10 (.09)	.05 (.09)							
Gender	X	X	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X	X	X
R2	.06	.06	.05	.05	.06	.09	.07	.04	.02	.05
Obs	1656	1656	1656	827	827	827	826	826	826	826
F-test	5.60***	5.88***	5.51***	3.14***	3.22***	5.64***	3.87***	2.75***	1.27	2.68***

Source: merge between On-line experiment database and Car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 50 OLS analysis of noticeability for promotional material

	(1) Promotional Environmental friendliness	(2) Promotional Environmental friendliness	(3) Promotional Environmental friendliness	(4) Promotional Fuel Efficiency	(5) Promotional Fuel Efficiency	(6) Promotional Fuel Efficiency	(7) Promotional Running Costs	(8) Promotional Running Costs	(9) Promotional Running Costs
CO2class_IN	-.72 (.19)***			-.48 (.18)***			-.26 (.17)		
CO2text_IN	.00 (.10)			-.07 (.09)			.00 (.08)		
RC_note	-.21 (.10)**			-.18 (.10)*			-.24 (.09)**		
RC salience		-.37 (.11)***			-.32 (.11)***			-.36 (.10)***	
RC small		-.34 (.11)***			-.23 (.11)**			-.22 (.10)**	
weblink_IN			-.38 (.09)***			-.25 (.09)***			-.11 (.08)
Gender	X	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X	X
R2	.07	.06	.06	.06	.05	.05	.04	.04	.04
Obs	2398	2398	2398	2389	2398	2398	2398	2398	2398
F-test	13.63***	13.10***	14.47***	10.23***	10.54***	11.49***	8.57***	9.11***	8.79***

Source: On-line experiment database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 51 OLS analysis of noticeability for promotional material (selected)

	(1) Promotional, Selected Environmental friendliness	(2) Promotional, Selected Environmental friendliness	(3) Promotional, Selected Environmental friendliness	(4) Promotional, Selected Environmental friendliness	(5) Promotional, Selected Running Costs	(6) Promotional, Selected Running Costs	(7) Promotional, Selected Running Costs	(8) Promotional, Selected Running Costs	(9) Promotional, Selected Fuel Efficiency	(10) Promotional, Selected Fuel Efficiency	(11) Promotional, Selected Fuel Efficiency	(12) Promotional, Selected Fuel Efficiency
RC salience	-.43 (.13)***				-.21 (.11)*				-.37 (.13)***			
RC small		.20 (.16)				.13 (.14)				.16 (.16)		
RC_note			-59 (.19)***				-.25 (.16)				-.54 (.19)***	
CO2text_IN				-.54 (.11)***				-.21 (.09)**				-.47 (.11)***
Process tracing	.13 (.13)	.13 (.13)	.12 (.12)	.11 (.12)	-.04 (.11)	-.04 (.11)	-.04 (.11)	-.05 (.11)	.23 (.12)*	.24 (.12)*	.23 (.12)*	.23 (.12)*
Gender	X	X	X	X	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X	X	X	X	X
R2	.06	.06	.06	.06	.06	.06	.06	.06	.04	.04	.04	.04
Obs	1672	1672	1672	1672	1672	1672	1672	1672	1672	1672	1672	1672
F-test	7.77***	7.19***	7.75***	9.01***	5.49***	5.35***	5.47***	5.59***	7.75***	7.25***	7.80***	8.69***

Source: On-line experiment database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 52 Ordered logit analysis of noticeability for labels

	(1) Conventional Fuel cons	(2) Conventional Fuel efficiency	(3) Conventional Running Costs	(4) Hybrid Fuel consumption	(5) Hybrid Fuel efficiency	(6) Hybrid Running Costs	(7) Electric Electricity consumption	(8) Electric Fuel efficiency	(9) Electric Fuel cons versus standard	(10) Electric Running Costs
RC_L1	.41 (.15)***	.40 (.15)***	.44 (.15)***	.24 (.21)	.08 (.20)	.41 (.22)*	.48 (.22)**	.32 (.22)	.20 (.22)	.54 (.23)**
RC_L3	.12 (.15)	-.08 (.14)	-.11 (.15)	-.21 (.21)	-.20 (.21)	-.49 (.20)**	.33 (.21)	.16 (.20)	-.05 (.21)	.22 (.21)
LSF	-.00 (.15)	.01 (.15)	-.14 (.15)	-.31 (.20)	-.15 (.20)	-.08 (.20)	.29 (.21)	.25 (.20)	.15 (.21)	.30 (.22)
LSF_loss	.32 (.15)**	.21 (.15)	.14 (.15)	-.01 (.20)	-.24 (.20)	-.22 (.20)	.19 (.22)	-.03 (.21)	-.12 (.22)	-.20 (.22)
fuel	.29 (.15)	.26 (.15)*	.21 (.15)	-.06 (.21)	.06 (.21)	.01 (.22)				
battery							.27 (.21)	.12 (.12)	.01 (.21)	.02 (.22)
Process tracing	.07 (.08)	.09 (.09)	.03 (.09)							
Gender	X	X	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X	X	X
Pseudo R2	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01
Obs	1656	1656	1656	827	827	827	826	826	826	826
Wald chi2(18)	94.98***	100.22***	91.46***	47.00***	53.23***	83.46***	60.89***	44.03***	24.08	42.93***

Source: merge between On-line experiment database and Car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Ordered Logit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 53 Ordered logit analysis of noticeability of promotional material

	(1) Promotional Environmental friendliness	(2) Promotional Environmental friendliness	(3) Promotional Environmental friendliness	(4) Promotional Fuel Efficiency	(5) Promotional Fuel Efficiency	(6) Promotional Fuel Efficiency	(7) Promotional Running Costs	(8) Promotional Running Costs	(9) Promotional Running Costs
CO2class_IN	-.53 (.14)***			-.40 (.14)***			-.25 (.15)*		
CO2text_IN	.01 (.08)			-.08 (.08)			.01 (.08)		
RC_note	-.18 (.08)**			-.17 (.08)**			-.23 (.08)***		
RC salience		-.30 (.09)***			.27 (.09)***			-.34 (.09)***	
RC small		-.28 (.09)***			-.22 (.09)**			-.22 (.09)**	
weblink_IN			-.28 (.07)***			-.20 (.07)***			-.10 (.07)
Gender	X	X	X	X	X	X	X	X	X
Age	X	X	X				X	X	X
Country	X	X	X	X	X	X	X	X	X
R2	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Obs	2398	2398	2398	2398	2398	2398	2398	2398	2398
Wald chi2(15)	179.50***	160.86***	163.84***	136.94***	130.08***	127.95***	114.94***	114.67***	98.27***

Source: On-line experiment database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Ordered Logit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 54 Ordered logit analysis of noticeability of promotional material (selected)

	(1) Promotional, Selected Environmental friendliness	(2) Promotional, Selected Environmental friendliness	(3) Promotional, Selected Environmental friendliness	(4) Promotional, Selected Environmental friendliness	(5) Promotional, Selected Running Costs	(6) Promotional, Selected Running Costs	(7) Promotional, Selected Running Costs	(8) Promotional, Selected Running Costs	(9) Promotional, Selected Fuel Efficiency	(10) Promotional, Selected Fuel Efficiency	(11) Promotional, Selected Fuel Efficiency	(12) Promotional, Selected Fuel Efficiency
RC salience	-.35 (.11)***				-.19 (.11)*				-.30 (.10)***			
RC small		.17 (.13)				.16 (.13)				.13 (.13)		
RC_note			-.48 (.16)***				-.19 (.15)				-.43 (.15)***	
CO2text_IN				-.41 (.09)				-.17 (.09)*				-.36 (.09)***
Process tracing	.08 (.10)	.07 (.10)	.07 (.10)	.07 (.10)	-.03 (.10)	-.03 (.10)	-.03 (.10)	-.03 (.10)	.15 (.10)	.15 (.10)	.15 (.10)	.15 (.10)
Gender												
Age	X	X	X	X	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X	X	X	X	X
R2	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Obs	1662	1662	1662	1662	1662	1662	1662	1662	1662	1662	1662	1662
Wald chi2(14)	98.67***	90.13***	98.16***	112.86***	70.13***	69.00***	69.18***	70.92***	95.93***	88.73***	96.23***	108.44***

Source: On-line experiment database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Ordered Logit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

5.5.4 The analysis of Cognitive variables

By cognitive variables we mean the capacity of processing and correctly recalling the information provided through labels and promotional material. These variables are built as scores following this procedure:

1. We first merge the online experiment dataset with the car database to associate to the car shown with the information for running costs, emissions and fuel consumption;
2. We compare the car with all the other car of the database and estimate the ranking (from 1-the worse to N-the best):
    a. For electricity consumption we exclude non electric cars from the sample in which we are doing the comparison;
    b. For fuel economy, we exclude electric cars from the ranking of hybrids and standard because they are obviously ranked first and do not change relative position of hybrids and standard engine;
    c. After computing the position we divide by the number of cars and we multiply by ten to have the same scale as the self-reported measures;
3. We compare the objective ranking, thus obtained, with the answers that participants provided to following questions:
    a. For labels:
        i. Conventional and hybrids:
            1. How do you think the car you selected scores in terms of fuel consumption with respect to other cars in the market?
            2. How do you think the car you selected scores in terms of running costs with respect to the other cars in the market?
        ii. Electric:
            1. How do you think the car you selected scores in terms of electricity consumption with respect to other cars in the market?
            2. How do you think the car you selected scores in terms of running costs with respect to the other cars in the market?
    b. For promotional material the following questions:
        i. How do you think the car you selected scores in terms of running costs with respect to the other cars in the market?
        ii. How environmental friendly is the car you have just seen?

4. If the difference between the objective ranking and the answers provided by respondents to the questions above is less than 2.5 points the score is equal to one (meaning correct recall of information), otherwise it is zero (meaning respondents do not correctly recall the information). The ratio of this error margin is the following:
    a. The sample variance of the estimated ranking is obviously related with the variance in the population. The sample mean's standard error is the sample size at the power of minus 0.5 times the population standard error;
    b. If we assume that on a scale 1-10 we are in the maximum indeterminacy (5 points standard error[24]), the sample mean's variance is 5 divided by the square root of 442, which gives almost 0.25;
    c. We allow for an error margin, which is ten times bigger (2.5).

We report OLS, Probit and Logit regressions, controlling for Gender, Age dummies and country dummies.

[24] If is the rank is five, the rank plus/minus one standard error covers the entire range.

Table 55 OLS analysis of cognitive variables for labels

	(1) Standard, Score Fuel consumption	(2) Standard, Score Running costs	(3) Hybrid, Score Fuel consumption	(4) Hybrid, Score Fuel consumption	(5) Electric, Score Electricity Consumption	(6) Electric, Score Running Costs
RC_L1	-.11 (.04)***	-.02 (.04)	-.03 (.06)	-.06 (.06)	.05 (.05)	.09 (.06)
RC_L3	-.04 (.04)	.03 (.04)	.08 (.06)	.05 (0.6)	-.01 (.05)	.04 (.06)
LSF	.01 (.04)	.03 (.04)	.02 (.06)	-.01 (.06)	.10 (.05)*	.10 (.06)
LSF_loss	-.06 (.04)	.04 (.04)	-.01 (.06)	-.01 (.06)	-.03 (.05)	-.03 (.06)
fuel	-.06 (.04)	-.04 (.04)	.01 (.05)	.01 (.06)		
battery					.09 (.05)*	.06 (.06)
Process tracing	-.02 (.02)	-.01 (.02)				
Gender	X	X	X	X	X	X
Age	X	X	X	X	X	X
Country	X	X	X	X	X	X
R2	.04	.02	.04	0.03	.03	.04
Obs	1656	1656	827	827	826	826
F-test	3.96***	1.95***	2.01***	1.57*	1.47*	2.40***

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 56 Probit analysis of cognitive variables for labels

	(1) Standard, Score Fuel consumption	(2) Standard, Score Running costs	(3) Hybrid, Score Fuel consumption	(4) Hybrid, Score Fuel consumption	(5) Electric, Score Electricity Consumption	(6) Electric, Score Running Costs
RC_L1	-.30 (.11)***	-.07 (.11)	-.08 (.16)	-.15 (.16)	.16 (.17)	.24 (.16)
RC_L3	-.11 (.11)	.10 (.12)	.22 (.16)	.13 (.16)	-.05 (.17)	.10 (.15)
LSF	.03 (.11)	.11 (.12)	.05 (.15)	-.03 (.15)	.30 (.17)*	.25 (.16)
LSF_loss	-.17 (.11)	.12 (.11)	-.02 (.16)	-.02 (.15)	-.11 (.18)	-.10 (.16)
fuel	-.16 (.11)	-.12 (.11)	.02 (.15)	.02 (.15)		
battery					.29 (.17)*	.16 (.16)
Process tracing	-.05 (.06)	-.02 (.07)				
Gender	X	X	X	X	X	X
Age	X	X	X	X	X	X
Country	X	X	X	X	X	X
Pseudo R2	.03	.01	.03	.02	.03	.03
Obs	1656	1656	827	827	826	826
Wald chi2	65.74***	33.48**	28.79**	25.24*	23.65	36.67***

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Probit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 57 Logit analysis of cognitive variables for labels

	(1) Standard, Score Fuel consumption	(2) Standard, Score Running costs	(3) Hybrid, Score Fuel consumption	(4) Hybrid, Score Fuel consumption	(5) Electric, Score Electricity Consumption	(6) Electric, Score Running Costs
RC_L1	-.50 (.18)***	-.11 (.19)	-.15 (.26)	-.25 (.25)	.28 (.29)	.38 (.25)
RC_L3	-.17 (.18)	.18 (.20)	.35 (.07)	-.22 (.25)	-.08 (.30)	.17 (.25)
LSF	.06 (.18)	.18 (.20)	.07 (.25)	-.06 (.24)	.51 (.28)*	.41 (.26)
LSF_loss	-.28 (.18)	.21 (.19)	-.04 (.26)	-.04 (.25)	-.19 (.32)	-.15 (.26)
fuel	-.26 (.18)	-.20 (.11)	.02 (.25)	.03 (.24)		
battery					.49 (.28)	.26 (.25)
Process tracing	-.07 (.11)	-.02 (.11)				
Gender	X	X	X	X	X	X
Age	X	X	X	X	X	X
Country	X	X	X	X	X	X
Pseudo R2	0.03	0.01	0.0285	0.0234	0.0256	0.0321
Obs	1656	1656	827	827	826	826
Wald chi2	64.27***	33.02**	27.49*	24.61	23.19	35.80

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Logit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 58 OLS analysis of cognitive variables for promotional material

	(1) promotional, Score Environmental Friendliness	(2) promotional, Score Environmental Friendliness	(3) promotional, Score Environmental Friendliness	(4) promotional, Score Running costs	(5) promotional, Score Running Costs	(6) promotional, Score Running Costs
CO2class_IN	.16 (.04)***			.13 (.04)***		
CO2text_IN	.01 (.02)			.02 (.02)		
RC_note	.01 (.02)			.01 (.02)		
RC salience		.05 (.02)**			.05 (.02)**	
RC small		.04 (.02)			.02 (.02)	
weblink_IN			.05 (.02)***			-.01 (.02)
Gender	X	X	X	X	X	X
Age	X	X	X	X	X	X
Country	X	X	X	X	X	X
R2	.03	.02	.02	.03	.02	0.02
Obs	2398	2398	2398	2398	2398	2398
F-test	4.06***	3.22***	3.56***	4.37***	4.15***	4.13***

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 59 Probit analysis of cognitive variables for promotional material

	(1) promotional, Score Environmental Friendliness	(2) promotional, Score Environmental Friendliness	(3) promotional, Score Environmental Friendliness	(4) promotional, Score Running costs	(5) promotional, Score Running Costs	(6) promotional, Score Running Costs
CO2class_IN	.44 (.11)***			.34 (.11)***		
CO2text_IN	.01 (.06)			.04 (.06)		
RC_note	.04 (.06)			.03 (.06)		
RC salience		.16 (.07)**			.14 (.06)**	
RC small		.10 (.06)			.06 (.06)	
weblink_IN			.14 (.05)***			-.03 (.05)
Gender	X	X	X	X	X	X
Age	X	X	X	X	X	X
Country	X	X	X	X	X	X
Pseudo R2	.02	.02	.02	.02	.02	0.02
Obs	2398	2398	2398	2398	2398	2398
Wald chi2	58.31***	42.73***	43.80***	61.14***	53.83***	49.93***

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Probit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 60 Logit analysis of cognitive variables for promotional material

	(1) promotional, Score Environmental Friendliness	(2) promotional, Score Environmental Friendliness	(3) promotional, Score Environmental Friendliness	(4) promotional, Score Running costs	(5) promotional, Score Running Costs	(6) promotional, Score Running Costs
CO2class_IN	.71 (.18)***			.56 (.18)***		
CO2text_IN	.03 (.09)			.07 (.09)		
RC_note	.07 (.10)			.05 (.09)		
RC salience		.27 (.11)**			.23 (.11)**	
RC small		.16 (.11)			.09 (.10)	
weblink_IN			.24 (.09)***			-.05 (.09)
Gender	X	X	X	X	X	X
Age	X	X	X	X	X	X
Country	X	X	X	X	X	X
Pseudo R2	0.02	0.01	0.01	0.02	0.10	0.01
Obs	2398	2398	2398	2398	2398	2398
Wald chi2	57.54***	42.06***	43.12***	59.58***	52.6***	48.9***

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Probit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 61 OLS analysis of cognitive variables for promotional material (selected)

	(1) promotional, Score Environmental Friendliness	(2) promotional, Score Environmental Friendliness	(3) promotional, Score Environmental Friendliness	(4) promotional, Score Environmental Friendliness	(5) promotional, Score Running costs	(6) promotional, Score Running costs	(7) promotional, Score Running Costs	(8) promotional, Score Running Costs
RC salience	.04 (.02)*				.03 (.02)			
RC small		-.02 (.03)				-.06 (.03)**		
CO2text_IN			.05 (.02)**				.04 (.02)*	
RC_note				.05 (.02)**				-.02 (.03)
Process tracing	.02 (.02)	.02 (.02)	.02 (.02)	.02 (.02)	-.02 (.02)	-.02 (.02)	-.02 (.02)	-.02 (.02)
Gender	X	X	X	X			X	X
Age	X	X	X	X			X	X
Country	X	X	X	X			X	X
R2	.02	.02	.02	.02	.02	.02	.02	.01
Obs	1662	1662	1662	1662	1662	1662	1662	1662
F-test	2.79***	2.59***	2.99***	2.77***			4.15***	4.13***

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 62 Logit analysis of cognitive variables for promotional material (selected)

	(1) promotional, Score Environmental Friendliness	(2) promotional, Score Environmental Friendliness	(3) promotional, Score Environmental Friendliness	(4) promotional, Score Environmental Friendliness	(5) promotional, Score Running costs	(6) promotional, Score Running costs	(7) promotional, Score Running Costs	(8) promotional, Score Running Costs
RC salience	.22 (.12)*				.15 (.12)			
RC small		-.10 (.15)				-.30 (.14)**		
CO2text_IN			.26 (.10)**				.19 (.10)*	
RC_note				.29 (.17)**				-.10 (.17)
Process tracing	.10 (.12)	.10 (.12)	.10 (.12)	.10 (.12)	-.11 (.11)	-.11 (.11)	-.11 (.11)	-.11 (.11)
Gender	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X
Pseudo R2	.02	.02	.02	.02	.01	.01	.02	.01
Obs	1662	1662	1662	1662	1662	1662	1662	1662
Wald chi2	36.88***	34.38***	39.38***	36.65***	25.34***	28.16***	26.88***	24.67***

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Logit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 63 Probit analysis of cognitive variables for promotional material (selected)

	(1) promotional, Score Environmental Friendliness	(2) promotional, Score Environmental Friendliness	(3) promotional, Score Environmental Friendliness	(4) promotional, Score Environmental Friendliness	(5) promotional, Score Running costs	(6) promotional, Score Running costs	(7) promotional, Score Running Costs	(8) promotional, Score Running Costs
RC salience	.13 (.07)*				.09 (.07)			
RC small		-.06 (.09)				-.18 (.09)**		
CO2text_IN			.15 (.06)**				.11 (.06)*	
RC_note				.18 (.10)*				-.06 (.10)
Process tracing	.05 (.07)	.05 (.07)	.05 (.07)	.05 (.07)	-.07 (.07)	-.07 (.07)	-.06 (.07)	-.07 (.07)
Gender	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X
Pseudo R2	.02	.02	.02	.02	.01	.01	.02	.01
Obs	1662	1662	1662	1662	1662	1662	1662	1662
Wald chi2	37.40***	34.85***	39.92***	37.17***	25.57***	28.43**	27.14**	24.90**

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Probit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

5.5.5 The analysis of the choice of promotional material format

In Table 64 we report the test of rankings that can be derived when respondents are asked to select the format of the promotional material they want to be shown. As can be seen, the emerging ranking is not statistically significant

Table 64 Test of Ranking of promotional material formats

	Without process tracing	With process tracing
Friedman	1.72	1.94
Kendall	0.00	0.00
p-value	0.63	0.58

5.5.6 The regression analysis of results with process tracing

The variables regressed are:

1. Total number of visualizations over blurred images;
2. A dummy for complete visualization of the label's (promotional material's) parts;
3. A dummy for visualization of at least one of the part of the label/promotional material.

For the first variable we report OLS with robust standard errors, for the second two we report both Logit and Probit regressions (we do not report OLS for lack of space but the results are fully in line). We add the usual controls for gender, age groups and country. Results are presented in Table 65-Table 68.

Table 65 OLS analysis of process tracing for labels

	(1) Number of visualizations	(2) At least one visualization (OLS)	(3) At least one visualization (Probit)	(4) At least one visualization (Logit)	(5) Complete Visualization (OLS)	(6) Complete Visualization (Probit)	(7) Complete Visualization (Logit)
RC_L1	.96 (.67)	-.01 (.02)	-.27 (.28)	-.56 (.65)	-.01 (.05)	-.04 (.15)	-.07 (.25)
RC_L3	1.24 (.71)*	-.00 (.02)	-.11 (.30)	-.23 (.73)	.06 (.05)	.18 (.15)	.31 (.26)
LSF	2.22 (.80)***	-.00 (.02)	-.09 (.30)	-.21 (72)	.11 (.05)**	.38 (.16)**	.65 (.29)**
LSF_loss	.78 (.71)	-.02 (.02)	-.32 (.27)	-.62 (.64)	.05 (.05)	.15 (.15)	.25 (.26)
fuel	2.01 (.79)**	-.01 (.02)	-.17 (.30)	-.38 (70)	.08 (.05)	.26 (.16)	.45 (.28)
Gender	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X
R2	.03	.01	.03	.03	.03	.02	.02
Obs	824	824	743	743	824	824	824
F-test	1.54*	1.74**			1.62**		
Wald chi2			15.27	15.70		26.29*	25.74*

Source: merge between On-line experiment database and Car database. In the first line we report the subsamples (subject who perform a specific task), the dependent variable and the technique of the regression. All the regressions are run with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 66 OLS for process tracing (visualizations) for promotional material (selected)

	(1) promotional, Visualizations	(2) promotional, Visualizations	(3) promotional, Visualizations	(4) promotional, Visualizations
RC salience	3.68 (.91)***			
RC small		-2.64 (1.24)**		
CO2text_IN			4.26 (.87)***	
RC_note				3.99 (1.04)***
Gender	X	X	X	X
Age	X	X	X	X
Country	X	X	X	X
R2	.07	.05	.10	.06
Obs	417	417	417	417
F test	2.82**	1.90**	3.94***	2.95***

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 67 Probit/Logit for process tracing (1 visualisation) for promotional material (selected)

	(1) promotional, At least one visualization	(2) promotional, At least one visualization	(3) promotional, At least one visualization	(4) promotional, At least one visualization	(5) promotional, At least one visualization	(6) promotional, At least one visualization	(7) promotional, At least one visualization	(8) promotional, At least one visualization
RC salience	.37 (.16)**				.66 (.28)**			
RC small		-.30 (.20)				-.52 (35)		
CO2text_IN			.41 (.14)***				.76 (.26)***	
RC_note				.34 (.22)				.61 (.37)
Gender	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X
Pseudo R2	.06	.05	.06	.05	.06	.05	.07	.05
Obs	417	417	417	417	417	417	417	417
Wald chi2	22.66**	21.51*	23.39**	19.98*	21.96*	20.91*	22.81**	19.36

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. The first four columns correspond to Probit regressions, the last four columns are logit; the regressions are run with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. OLS regressions are not reported for lack of space but are available from the authors upon request. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 68 Probit/Logit for process tracing (complete visualisation) for promotional material (selected)

	(1) promotional, Complete Visualization	(2) promotional, Complete Visualization	(3) promotional, Complete Visualization	(4) promotional, Complete Visualization	(5) promotional, Complete Visualization	(7) promotional, Complete Visualization	(8) promotional, Complete Visualization
RC salience	.00 (.22)				.04 (.48)		
RC small		-.07 (.01)***					
CO2text_IN			.19 (.20)			.19 (.20)	
RC_note				-.62 (.27)**			-1.91 (52)**
Gender	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X
Pseudo R2	.06		.07	.08	.06	.07	.08
Obs	417	362	417	417	417	417	417
Wald chi2	22.85**		23.34**	28.26***	22.95**	23.34**	28.00***
R2		.04					
F test		2.21***					

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. Columns (1) and (3) correspond to Probit regressions, the last three columns are logit; the regressions are run with robust standard errors. In column (2) we report OLS because non linear estimator cannot be run because of prefect prediction. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

5.5.7 The regression analysis for highly educated

Since one of the results of the existing literature is that environmental preferences are particularly identified in highly educated, we run regressions on this subsample in order to see if the results are systematically different. All the results are robust across specifications.

Table 69 OLS analysis of the WTP for the highly educated

	(1) Standard Vehicles	(2) Hybrids	(3) Electric	(4) Promotional	(5) Promotional	(6) Promotional	(7) Promotional Selected Format	(7) Promotional Selected Format	(7) Promotional Selected Format	(7) Promotional Selected Format
RC_L1	-.02 (.02)	-.05 (.03)	-.10 (.06)							
RC_L3	-.02 (.02)	-.04 (.03)	-.06 (.06)							
LSF	-.00 (.02)	-.02 (.03)	-.05 (.06)							
LSF_loss	-.04 (.02)*	.00 (.03)	-.04 (.07)							
Fuel	-.05 (.02)**	-.06 (.03)*								
Battery			.044 (.08)							
CO2class_IN				-.02 (.02)						
CO2text_IN				-.02 (.01)*					-.02(.01)*	
RC_note				.00 (.01)						.01(.02)
RC salience					.00 (.01)		-.02(.01)			
RC small					-.00 (.01)			.05 (.02)**		
weblink_IN						.00 (.01)				
Process tracing	-.03 (.01)***						-.00 (.01)	-.00 (.01)	-.00 (.01)	-.00 (.01)
Gender	X	X	X	X	X	X	X	X	X	X
Age Groups	X	X	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X	X	X
R2	.08	.16	.28	.09	.09	.09	.07	.07	.07	.06
Obs	708	360	376	1076	1076	1076	708	708	708	708
F-test	3.67***	3.53***	10.88***	6.20***	6.59***	6.93***	3.06***	3.22***	3.12***	2.78***

Source: merge between On-line experiment database and Car database. In the first line we report the subsamples (subject who perform a specific task). All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request

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Table 70 Analysis of the ranking subtask for the highly educated

	(1)	(2)	(3)
German	-.69*** (.18)	-1.12 (.31)***	-.25 (.06)***
Full	.07 (.16)	.11 (.26)	.02 (.06)
Gender	X	X	X
Age	X	X	X
Country	X	X	X
R2 (Pseudo R2)	.07	.07	.09
Obs.	369	369	369
Wald chi2	36.33***	34.03***	
F-test			3.39***

Source: merge between On-line experiment database and Car database. In the first line we report the subsamples (subject who perform a specific task). Column (1) is probit, Column (2) is logit, Column (3) is OLS, all the three with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 71 OLS analysis of noticeability for labels for the highly educated

	(1) Standard Fuel cons	(2) Standard Fuel efficiency	(3) Standard Running Costs	(4) Hybrid Fuel consumption	(5) Hybrid Fuel efficiency	(6) Hybrid Running Costs	(7) Electric Electricity consumption	(8) Electric Fuel efficiency	(9) Electric Fuel cons versus standard	(10) Electric Running Costs
RC_L1	.85 (.25)***	.61 (.24)**	.61 (.24)**	.13 (.44)	-.12 (.42)	.11 (.42)	.52 (.39)	.12 (.37)	-.29 (.40)	.49 (.39)
RC_L3	.12 (.26)	-.04 (.25)	-.26 (.25)	-.66 (.43)	-.61 (.43)	-.96 (.36)***	.09 (.36)	.02 (.33)	-.42 (.35)	-.19 (.37)
LSF	.21 (.26)	.04 (.27)	-.10 (.24)	-.23 (.42)	.21 (.39)	-.25 (.36)	.11 (.35)	-.29 (.36)	-.54 (.35)	-.24 (.37)
LSF_loss	.35 (.26)	.09 (.26)	-.03 (.25)	-.00 (.40)	-.33 (.41)	-.19 (.35)	.36 (.38)	-.13 (.37)	-.49 (.41)	-.33 (.37)
fuel	.65 (.26)**	.51 (.26)*	.38 (.24)	.18 (.42)	.53 (.39)	.16 (.38)				
battery							.12 (.36)	.17 (.36)	-.14 (.36)	-.09 (.37)
Process tracing	.05 (.15)	.13 (.14)	-.04 (.14)							
Gender	X	X	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X	X	X
R2	.07	.06	.06	.07	.09	.12	.11	.07	.04	.07
Obs	713	713	713	360	360	360	376	376	376	376
F-test	3.39***	3.06***	2.76***	2.03***	2.56***	3.23***	2.34***	1.72**	1.15	1.57

Source: merge between On-line experiment database and Car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 72 OLS of noticeability for the highly educated

	(1) Promotional Environmental friendliness	(2) Promotional Environmental friendliness	(3) Promotional Environmental friendliness	(4) Promotional Fuel Efficiency	(5) Promotional Fuel Efficiency	(6) Promotional Fuel Efficiency	(7) Promotional Running Costs	(8) Promotional Running Costs	(9) Promotional Running Costs
CO2class_IN	-.56 (.28)*			-.28 (.30)			-.16 (.28)		
CO2text_IN	.14 (.15)			.04 (.14)			.12 (.13)		
RC_note	-.22 (.16)			-.30 (.15)*			-.15 (.14)		
RC salience		-.34 (.17)**			-.36 (.16)**			-.20 (.15)	
RC small		-.35 (.17)**			-.37 (.17)**			-.19 (.15)	
weblink_IN			-.19 (.14)			.04 (.13)			-.03 (.12)
Gender	X	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X	X
R2	.08	.08	.07	.07	.07	.06	.05	.05	.05
Obs	1076	1076	1076	1076	1076	1076	1076	1076	1076
F-test	7.34***	7.31***	7.66***	6.09***	6.35***	6.33***	4.73***	4.95***	5.09***

Source: On-line experiment database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 73 OLS noticeability promotional material (selected) for the highly educated

	(1) Promotional, Selected Environmental friendliness	(2) Promotional, Selected Environmental friendliness	(3) Promotional, Selected Environmental friendliness	(4) Promotional, Selected Environmental friendliness	(5) Promotional, Selected Running Costs	(6) Promotional, Selected Running Costs	(7) Promotional, Selected Running Costs	(8) Promotional, Selected Running Costs	(9) Promotional, Selected Fuel Efficiency	(10) Promotional, Selected Fuel Efficiency	(11) Promotional, Selected Fuel Efficiency	(12) Promotional, Selected Fuel Efficiency
RC_note	-.44 (.22)*				-.38 (.19)*				-.45 (.21)**			
RC salience		.46 (.28)				.31 (.25)				.56 (.26)**		
RC small			-.31 (.32)				-.36 (.26)				-.21 (.31)	
CO2text_IN				-.50 (.18)***				-.30 (.15)*				-.47 (.18)***
Process tracing	.22 (.20)	.23 (.20)	.21 (.20)	.21 (.20)	.04 (.17)	.04 (.18)	.03 (.17)	.04 (.17)	.33 (.19)*	.34 (.19)*	.32 (.19)*	.32 (.19)*
Gender	X	X	X	X	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X	X	X	X	X
R2	.07	.07	.07	.07	.05	.05	.05	.05	.07	.07	.07	.08
Obs	708	708	708	708	708	708	708	708	708	708	708	708
F-test	3.98***	3.89***	3.81***	4.48***	2.29***	2.86***	2.78***	2.92***	4.45***	4.50***	4.15***	4.98***

Source: On-line experiment database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 74 OLS of cognitive variables for labels for the highly educated

	(1) Standard, Score Fuel consumption	(2) Standard, Score Running costs	(3) Hybrid, Score Fuel consumption	(4) Hybrid, Score Running costs	(5) Electric, Score Electricity Consumption	(6) Electric, Score Running Costs
RC_L1	-.22 (.06)***	-.02 (.05)	.07 (.08)	-.13 (.09)	.10 (.08)	.12 (.09)
RC_L3	-.03 (06)	.05 (.05)	.21 (.08)**	.15 (.08)*	-.00 (.07)	-.03 (.09)
LSF	.01 (06)	.10 (.05)*	.12 (.08)	-.04 (.08)	.12 (.07)	.04 (.09)
LSF_loss	-.06 (06)	.05 (.05)	.10 (.07)	-.01 (.08)	-.04 (.07)	-.02 (.09)
fuel	-.10 (06)*	-.01 (.05)	.00 (.07)	-.01 (.09)		
battery					.14 (.08)*	.09 (.09)
Process tracing	.00 (.03)	-.00 (.03)				
Gender	X	X	X	X	X	X
Age	X	X	X	X	X	X
Country	X	X	X	X	X	X
R2	.07	.03	.07	.06	.07	.07
Obs	713	713	360	360	376	376
F-test	3.50***	1.35	2.06***	1.67**	1.97**	1.87**

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 75 Probit of cognitive variables for labels for the highly educated

	(1) Standard, Score Fuel consumption	(2) Standard, Score Running costs	(3) Hybrid, Score Fuel consumption	(4) Hybrid, Score Fuel consumption	(5) Electric, Score Electricity Consumption	(6) Electric, Score Running Costs
RC_L1	-.62 (.17)***	-.06 (.17)	.24 (.26)	-.36 (.25)	.36 (.27)	.35 (.25)
RC_L3	-.10 (.16)	.16 (.17)	.63 (.24)**	.45 (.25)*	-.03 (.26)	-.08 (.24)
LSF	.03 (.17)	.33 (.19)*	.37 (.23)	-.12 (.23)	.40 (.25)	.12 (.24)
LSF_loss	-.17 (.16)	.18 (.17)	.31 (.24)	-.05 (.23)	-.13 (.27)	-.05 (.24)
fuel	-.29 (.17)*	-.04 (.17)	.03 (.24)	-.06 (.23)		
battery					.49 (.25)*	.25 (.24)
Process tracing	.01 (.09)	-.00 (.10)				
Gender	X	X	X	X	X	X
Age	X	X	X	X	X	X
Country	X	X	X	X	X	X
Pseudo R2	0.06	0.03	0.07	0.05	0.07	0.06
Obs	713	713	360	360	376	376
Wald chi2	51.45***	22.70	29.50**	23.76	29.79**	27.20*

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Probit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 76 Logit of cognitive variables for labels for the highly educated

	(1) Standard, Score Fuel consumption	(2) Standard, Score Running costs	(3) Hybrid, Score Fuel consumption	(4) Hybrid, Score Fuel consumption	(5) Electric, Score Electricity Consumption	(6) Electric, Score Running Costs
RC_L1	-1.03 (.29)	-.12 (.29)	.38 (.44)	-.59 (.40)	.59 (.46)	.56 (.42)
RC_L3	-.16 (.26)	.30 (.30)	1.02 (.41)**	.75 (.42)*	-.06 (.45)	-.15 (.39)
LSF	.06 (.28)	.59 (.33)*	.59 (.39)	-.20 (.37)	.67 (.42)	.20 (.40)
LSF_loss	-.27 (.26)	.33 (.30)	.50 (.40)	-.08 (.38)	-.28 (.48)	-.09 (.39)
fuel	-.47 (.28)	-.07 (.30)	.04 (.41)	-.07 (.39)		
battery					.80 (.42)*	
Process tracing	.01 (.16)	.01 (.10)*				
Gender	X	X	X	X	X	X
Age	X	X	X	X	X	X
Country	X	X	X	X	X	X
Pseudo R2	0.06	0.03	0.06	0.05	0.07	0.06
Obs	713	713	360	360	376	376
Wald chi2	48.96***	22.26	27.43*	22.34	28.22**	25.74*

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Logit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 77 OLS of cognitive variables for promotional material for the highly educated

	(1) promotional, Score Environmental Friendliness	(2) promotional, Score Environmental Friendliness	(3) promotional, Score Environmental Friendliness	(4) promotional, Score Running costs	(5) promotional, Score Running Costs	(6) promotional, Score Running Costs
CO2class_IN	.18 (.06)**			.16 (.06)**		
CO2text_IN	.01 (.02)			.03 (.03)		
RC_note	.01 (.03)			.02 (.03)		
RC salience		.07 (.03)**			.08 (.03)**	
RC small		.02 (.03)			.02 (.03)	
weblink_IN			.03 (.02)			.00 (.03)
Gender	X	X	X	X	X	X
Age	X	X	X	X	X	X
Country	X	X	X	X	X	X
R2	.02	.01	.01	.02	.02	.01
Obs	1076	1076	1076	1076	1076	1076
F-test	1.51*	1.15	.99	2.14***	2.04**	1.71**

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 78 Probit of cognitive variables for promotional material for the highly educated

	(1) promotional, Score Environmental Friendliness	(2) promotional, Score Environmental Friendliness	(3) promotional, Score Environmental Friendliness	(4) promotional, Score Running costs	(5) promotional, Score Running Costs	(6) promotional, Score Running Costs
CO2class_IN	.50 (.16)**			.41 (.16)**		
CO2text_IN	.04 (.08)			.08 (.08)		
RC_note	.03 (.09)			.07 (0.9)		
RC salience		.21 (.10)			.24 (.10)**	
RC small		.06 (.09)**			.06 (.10)	
weblink_IN			.10 (.08)			.01 (.08)
Gender	X	X	X	X	X	X
Age	X	X	X	X	X	X
Country	X	X	X	X	X	X
Pseudo R2	.02	.01	.01	.02	.02	.01
Obs	1076	1076	1076	1076	1076	1076
Wald chi2	22.36*	15.33	12.42	30.19**	26.55**	20.97*

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Probit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 79 Logit of cognitive variables for promotional material for the highly educated

	(1) promotional, Score Environmental Friendliness	(2) promotional, Score Environmental Friendliness	(3) promotional, Score Environmental Friendliness	(4) promotional, Score Running costs	(5) promotional, Score Running Costs	(6) promotional, Score Running Costs
CO2class_IN	.81 (.26)**			.67 (.26)**		
CO2text_IN	.07 (.14)			.13 (.13)		
RC_note	.06 (.14)			.12 (.15)		
RC salience		.36 (.16)**			.39 (.16)**	
RC small		.10 (.16)**			.10 (.16)	
weblink_IN			.17 (.13)			.02 (.13)
Gender	X	X	X	X	X	X
Age	X	X	X	X	X	X
Country	X	X	X	X	X	X
Pseudo R2		.01	.00	.02	.02	.01
Obs	1076	1076	1076	1076	1076	1076
Wald chi2	22.25	15.08	12.27	29.53**	25.97**	20.59*

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Logit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 80 OLS cognitive var., promotional material (selected) for the highly educated

	(1) promotional, Score Environmental Friendliness	(2) promotional, Score Environmental Friendliness	(3) promotional, Score Environmental Friendliness	(4) promotional, Score Environmental Friendliness	(5) promotional, Score Running costs	(6) promotional, Score Running costs	(7) promotional, Score Running Costs	(8) promotional, Score Running Costs
RC salience	.06 (.04)				.09 (.04)**			
RC small		-.08 (.06)				-11 (.06)**		
CO2text_IN			.09 (.04)**				.09 (.04)**	
RC_note				.02 (.06)				.03 (.06)
Process tracing	-.03 (.04)	-.04 (.04)	-.03 (.04	-.04 (.04)	-.05 (.04)	-.05 (.04)	-0.5 (.04)	-.05 (.04)
Gender	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X
R2	.02	.02	.03	.02	.03	.03	.03	.02
Obs	708	708	708	708	708	708	708	708
F-test	1.41	1.44	1.79**	1.27	1.55*	1.61*	1.69**	1.26

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are OLS with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 81 Logit of cognitive var. promotional material (selected) for the highly educated

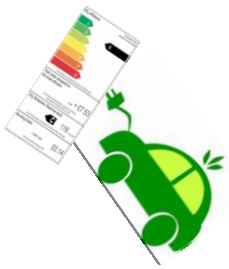
	(1) promotional, Score Environmental Friendliness	(2) promotional, Score Environmental Friendliness	(3) promotional, Score Environmental Friendliness	(4) promotional, Score Environmental Friendliness	(5) promotional, Score Running costs	(6) promotional, Score Running costs	(7) promotional, Score Running Costs	(8) promotional, Score Running Costs
RC salience	.27 (.20)				.40 (.19)**			
RC small		-.36 (.26)				-.52 (24)**		
CO2text_IN			.42 (.17)**				.41 (.16)**	
RC_note				.10 (.28)				.16 (.27)
Process tracing	-.17 (19)	-.18 (.19)	-.17 (.19)	-.18 (.19)	-.23 (18)	-.24 (.18)	-.23 (.18)	-.23 (.18)
Gender	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X
Pseudo R2	.21	.02	.03	.02	.02	.02	.02	.02
Obs	708	708	708	708	708	708	708	708
Wald chi2	17.85	18.31	22.68*	15.99	19.87	20.62	21.44*	16.22

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Logit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.

Table 82 Probit of cognitive var. promotional material (selected) for the highly educated

	(1) promotional, Score Environmental Friendliness	(2) promotional, Score Environmental Friendliness	(3) promotional, Score Environmental Friendliness	(4) promotional, Score Environmental Friendliness	(5) promotional, Score Running costs	(6) promotional, Score Running costs	(7) promotional, Score Running Costs	(8) promotional, Score Running Costs
RC salience	.17 (.12)				.24 (.11)**			
RC small		-.22 (.16)				-.32 (.15)**		
CO2text_IN			.26 (.10)**				.25 (.10)**	
RC_note				.06 (.17)				.09 (.16)
Process tracing		-.11 (.11)	-.11 (.11)	-.11 (.11)	-.14 (.11)	-.15 (.11)	-.14 (.11)	-.14 (.11)
Gender	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X
Country	X	X	X	X	X	X	X	X
Pseudo R2	.02	.02	.02	.02	.02	.02	.02	.02
Obs	708	708	708	708	708	708	708	708
Wald chi2	18.32	18.79	23.30*	16.37	20.20	20.90	21.87*	16.5

Source: merge between On-line experiment and car database. In the first line we report the subsamples (subject who perform a specific task) and the dependent variable. All the regressions are Probit with robust standard errors. * refers to statistical significance at 10%, ** at 5%, and *** at 1%. Robust standard errors are reported in parenthesis below the coefficients. All the regressions include controls for gender (1 dummy), age groups (2 dummies) and country (9 dummies). Coefficients of the control variables are not reported for the sake of clarity of the Table but are available from the authors upon request.



6 Car database

6.1 Introduction

As should be clear by now from the description of the protocols of the two experiments, we have adopted a very sophisticated design with multiple randomisations of subjects, treatments, visual stimuli, and cars. Just to briefly recall, not only subjects were randomly allocated to treatment and control conditions and performed tasks in randomised order, but also the cars presented to the respondents for the experimental tasks (simulated purchase in the laboratory experiment, while for MPL the car shown was only one) together with the labels were randomly allocated.

In the lab, the respondents declared the class of vehicle (i.e. superminis, large family car, SUV, etc.) they intend to buy in the pre-treatment questionnaire. Conditional on this declared preference, when they started the experimental task they were randomly presented with the image of 3 cars (also containing main technical parameters of the cars) belonging to their class of preference. Next to the cars they are also shown the labels containing the elements corresponding to the experimental conditions to which they have been randomly allocated. In the online, the principle was the same but there was only one car shown, with the grid of prices.

The source for the random selection of the three cars is the database containing 470 models of cars covering all the main size classes and engine types and all the parameters needed to produce the correct visual stimuli (labels) such as CO2 emissions, running costs, class in the different classification systems (absolute, relative, combine, German), etc. In addition this database is matched by a parallel database of neutral images for each of the 470 cars.

Given the above description, it should be clear that if we were to produce all the possible labels ex ante, which means before knowing which cars would be randomly selected, this would have amounted only for the laboratory experiment to 470*13 (12 treatments plus control group) that is equal to 6110 labels. Add then that in the online experiment, visual stimuli should be adapted to different countries conditions (different currencies, languages, etc.). This would have resulted in a huge work of graphic production,

unmanageable for any software during the randomization procedure in the questionnaire.

In order to cope with this challenge our programmers developed a sophisticated algorithm that at the same time produced the randomisation of subjects, treatments, and selection of cars and the production of the visual stimuli. Basically the program provided instruction to the software to automatically compose the labels combining three sources:

1. The car database of objective information (described in next two paragraphs);
2. The database of car images;
3. A series of pre-produced template elements:
    a. The graphic vertical or horizontal layout for the classification systems;
    b. Short sentences for lost saving on fuel (translated in 9 languages for the online experiment);
    c. Short sentence for savings on fuels (for electric vehicles only, translated in 9 languages for the online experiment).

In practice let us illustrate how the process worked using a stylised and hypothetical example. Assume respondent A expressed the preference for the vehicle class X and that randomisation assigned her to test a label with horizontal relative classification of CO2 emissions, running cost per 5 years, and CO2 taxation, for the three cars. The programming was such that as it randomised the selection of the cars and selected X_1, X_2, and X_3, it automatically took the images of the three cars (source 2), the horizontally graphic template (source 3) and it combined them with the information regarding their class according to the relative classification, the monetary value of running costs per five years, and the monetary value of CO2 taxation. All of these latter elements were taken from the car database (source 1).

The sheer amount of work and information for 470 cars in ten different countries that went into the construction of the car database make it worth devoting the next two paragraphs to describe it. Since the 10 databases are made available as Annex VIII this description and illustration will help any researcher that in the future may want to replicate our design and procedure.

6.2 Car Database general description

In general terms the database is structured as a matrix where the rows represent a specific car already available in the market and the columns describe a specific attribute of the car useful for production of the visual stimuli used in the experiments.

Since we knew from the very start that we would first run one experiment in the UK only and then in 10 countries (including the UK) we designed separate databases for each of the 10 countries. Naturally the structure (models of cars and attributes) remain mostly the same across the countries, but the value in the cells concerning the attributes changed (price changes, currencies, taxation, usage of Km or miles, etc.)

Therefore, as an additional output of our work this set of 10 databases is available for consultation.

A full description of the elements contained in the database is provided in the following paragraphs and constitutes sort of a *legenda* of the structure of the 10 car databases.

The various car models include are organised according to two criteria:

- The **Size of the passenger car** that has been divided into **10 classes, adjusted from the "Euro NCAP Classification System"**: **Micro cars** (2 seat only, like Smart); **Superminis** (it includes city cars); **Small family cars** (also for stand-alone saloon superminis, like the Dacia Logan); **Large family cars** (includes compact executive cars); **Executive cars** (for expansive cars over 4.80m long); **Roadsters** (like Audi R8 or Mercedes-Benz SLK)**; Economic Sport Utility Vehicles (like FIAT sedici or DACIA Duster); Expensive Sport Utility Vehicles** (like VW Tuareg; BMW X6; Audi Q8); **Small Multy Purposes Vehicles** (like Renault Kangoo or Toyota Verso-S), **Large Multi Purposes Vehicles** (Like Peugeot 50008 or Ford S-Max);

- The **Engine type/powered fuel of passenger car** that is divided in **5 classes**: **Diesel powered engine** (all classes of the "size" criterion); **Gasoline powered engine** (all classes of the "size" criterion); **Alternative fuels powered engine (e.g. Bi-fuel, BioFuel, Natural gas native or derived cars powered engine** (all classes of the "size" criterion); **Hybrid** (only for the following classes of the "size" criterion: Small family Classes; Large Family Classes; Executive cars; Small of roaders; Large of roaders; small and large MPV); **Electric powered engine** (only for the following classes of the "size" criterion: Micro car, Supermini and Small family Car).

This segmentation in our opinion has several advantages:

- It has been **based on some of the most diffused EU27 classification systems** for passenger cars;

- It is **based upon products already in the market** with which the persons that will be interviewed are already familiar;

- It **allows maintaining a significance of the sample distribution** across the classes;

The selected classification system allowed us to define a set of 470 different passengers car models, distributed per size and engine type as described in the following table

Table 83 Number of models per class and engine type

	Petrol	Diesel	Alternative fuels	Hybrid	Electric	TOTAL
Micro Cars	1	1			4	**6**
Supermini	32	16	19	2	10	**79**
Small family car	23	23	14	6	8	**74**
Large family car	25	25	12	9	12	**83**
Executive car	15	16	4	9		**44**
Roadster/Sports	11	3		1	1	**16**
Economic SUV	17	23	3			**43**
Expensive SUV	**14**	**19**	**2**	**5**		**40**
Small MPV	18	15	14	1		**48**
Large MPV	13	17	7			**37**
TOTAL	**169**	**158**	**75**	**33**	**35**	**470**

Each of the 10 car databases presents the same number of models (if available in the car market of any given country). In order to make them comparable, we have adopted the following rules:

- Each car model is positioned in the same row for all 10 car databases;
- Each car model is described by using the name available in the car magazines (paper based or online) of the country to which the car database refers;
- In case the car model is not available in a specify country the row in the car database will be maintained to preserve the same database structure but the value in correspondence to the first column of the database (column A labelled with “ID”) is switched to “000”.

While 470 cars are of course a large number, they still represent a small proportion of all the possible car models that are available in the ten classes. We, thus, illustrate below the rationale used for the selection.

We aimed to ensure a random selection of cars from the total ‘universe’ while at the same time a high degree of comparability of the selected car variants across the chosen countries. In this regard we have decided to follow the procedure described below:

1. Select one of the 10 countries involved in the online experiment as “pivotal country”;

2. Use a passengers cars magazine of this country as data sources for the car variants selection process;
3. Per each combination of brand-car model-type of engine available in the car magazine, make a random selection of the variant to be included in the car database of the "pivotal country". The random selection of the number corresponding to a certain variants available on the car magazine is based on an existing algorithm of integer number randomization that receives as input the number of variants available in the car magazine for a given combination of brand-car model-type of engine, and provide as output an integers lower or equal to the given number. The output number is used to count from the beginning of the list of available variants and to select the correspondent variant from the list;[25]
4. Insert the selected variant in the car database of the "pivotal country", together with the values of the performance parameters available in the car magazine in correspondence to the selected variant;
5. Complete the database of the "pivotal country" following the steps 2, 3 and 4.

All the other car databases have been developed starting from the list of variants and performance parameters contained in the database of the "pivotal country", following this procedure:

1. Check if the variant presents in the car database of the pivotal country is also considered in a passenger car magazine (paper based or online) of the country for which the database is going to be developed;
2. If the variant exists, copy all the performance parameters already collected for the "pivotal country" database for that variant in the new database for the country under observation;
3. If the variant doesn't exist, select the combination of brand-model-engine with the closest performances to the variant under of the "pivotal country" database under observation and update the measure of performance parameters in the new database of the country under observation;
4. Follow point 1, 2 and 3 until the list of variants in the database of the "pivotal country" is completed;
5. Follow point 1, 2, 3 and 4 until the list of selected countries is completed.

The random approach described above has been used for all the variants having petrol, diesel and low environmental impact engines (e.g. Natural gas, Bio-fuel and Bi-fuel engines). On the contrary hybrids and electric cars have been selected with respect to their availability in the car-marketplace. In particular we have selected all the available combination of brand-model for both hybrid and electric cars that the car manufacturers

[25] By randomizing also the selection of variant of the model, we guarantee that the measurement error in the choice of the variant is not correlated with any omitted variable.

have already included in their pricing list since last year. The decision to abandon the randomized selection procedure for such vehicles is due to the scarce availability of brands-models with alternative engines.

To have a wide set of combination of brand-model-engines we have selected Italy as "pivotal country" and as car magazine we have chosen "*Quattroruote*".[26] With its more 36 million of car passengers, Italy is the second largest country after Germany in terms of numbers of circulating cars. It also presents the largest variety of brand-model-engine combinations in the passengers' car park and moreover it has a very qualified production of car magazines and official web sites dedicated to passengers car market.

[26] We have used as reference document to build up the car database of Italy (the "pivotal country") the August 2012 publication of "Quattroruote".

Table 84 Distribution of car variants per segments and brands (all types of engine).

Brands	Micro car	Supermini	SM family car	L. famil. car	Executive	Roadster	Ec. SUV	Exp. SUV	Small MPV	Large MPV	TOTAL
VW Group		11	8	16	9	5	2	10	6	7	**74**
Ford Group		5	3	4			1		6	6	**25**
Renault Group	1	6	4	7	1		4		13	3	**39**
Fiat Group		14	10	6	4	1	4	3	7	5	**54**
PSA Group		7	10	8	2		4		4	5	**40**
Toyota Group		4	5	7	6		4	3	2	2	**33**
BMW Group		3	2	3	6	4	4	7			**29**
DAIMLER Group	3		2	6	7	3	2	4			**27**
Nissan		3		1		1	3	2	2	1	**13**
Kia		3	4		1		3				**11**
Hyunday		2	2	2			1				**7**
Volvo		2	4	5	3			4			**18**
GM Group		5	9	10		1	4	1	7	5	**42**
Honda		3	5	4			2				**14**
Suzuki		4	2						1	2	**9**
Mazda		2		2			2				**6**
Mitzubishi		1	4	1				1			**7**
Tata		4									**4**
Mia	1										**1**
Reva	1										**1**
Infinity				1							**1**
Jaguar/L. Rover					4			2		1	**7**
Tesla						1					**1**
Subaru							3	3			**6**
Nevs (Saab)					1						**1**
TOTAL	**6**	**79**	**74**	**83**	**44**	**16**	**43**	**40**	**48**	**37**	**470**

6.3 Database parameters

In this paragraph we describe the parameters of the 470 passengers car variants for which information have been gathered and/or generated for each of the 10 car databases. To preserve the same structure in each of the car databases, the majority of the parameters have been placed in the same reference column as can be seen in the following table of correspondence broken down between this and the following pages. However for certain parameters that are country dependent (e.g. the car price) there are different columns of reference in each country database. With the help of different colours we will signal differences across country databases.

Table 85 Table of columns correspondence across countries

COLUMS IN CAR DATASETS FILES (NB. The rows are always the same)										
	D	F	I	SP	NL	B	SWE	POL	ROM	UK
Reference File	German.xls	France.xls	Italy.xls	Spain.xls	The Netherlands.xls	Belgium.xls	Sweden.xls	Poland.xls	Romania.xls	UK.xls
Control ID	A	A	A	A	A	A	A	A	A	A
Brand	E	E	E	E	E	E	E	E	E	E
Model	F	F	F	F	F	F	F	F	F	F
Variant	I	I	I	I	I	I	I	I	I	H
Fuel type	C	C	C	C	C	C	C	C	C	C
Price	M	O	S	U	W	AA	Y	AC	AE	P
NCAP	BI	BI	BI	BI	BI	BI	BI	BI	BI	BH
Engine cc	BE	BE	BE	BE	BE	BE	BE	BE	BE	BD
Acceleration	BC	BC	BC	BC	BC	BC	BC	BC	BC	BC
Max Speed	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA
Seats	BJ	BJ	BJ	BJ	BJ	BJ	BJ	BJ	BJ	BI

Range	AI	AI	AI	AI	AI	AI	AI	AI	AI	AI
	D	F	I	SP	NL	B	SWE	POL	ROM	UK
Reference File	German.xls	France.xls	Italy.xls	Spain.xls	The Netherlands.xls	Belgium.xls	Sweden.xls	Poland.xls	Romania.xls	UK.xls
Fuel Economy	AG	AG	AG	AG	AG	AG	AG	AG	AG	AG
Weight	BH	BH	BH	BH	BH	BH	BH	BH	BH	BG
Trunk capacity	BF-BG	BF-BG	BF-BG	BF-BG	BF-BG	BF-BG	BF-BG	BF-BG	BF-BG	BE-BF
Lost Savings	CB	CB	CB	CB	CB	CB	CC	CC	CC	CB
Savings on fuel spending	CF	CF	CF	CF	CF	CF	CF	CF	CF	CE
Circulation tax	CH	CH	CH	CH	CH	CH	CH	CH	CH	CG
Upstream emission (FEV and HY)	CK	CK	CK	CK	CK	CK	CK	CK	CK	CJ
Tailpipe emission	BL	BL	BL	BL	BL	BL	BL	BL	BL	BK
Running Cost	DB-DC-DD	DB-DC-DD	DB-DC-DD	DB-DC-DD	DB-DC-DD	DB-DC-DD	DB-DC-DD	DB-DC-DD	DB-DC-DD	DA-DB-DC
German Classification (option of relative)	DE	DE	DE	DE	DE	DE	DE	DE	DE	DD
	D	F	I	SP	NL	B	SWE	POL	ROM	UK

Reference File	German.xls	France.xls	Italy.xls	Spain.xls	The Netherlands.xls	Belgium.xls	Sweden.xls	Poland.xls	Romania.xls	UK.xls
Label info (Abs – Rel)	DF-DG-DH-DI	DF-DG-DH-DI	DF-DG-DH-DI	DF-DG-DH-DI	DF-DG-DH-DI	DF-DG-DH-DI	DF-DG-DH-DI	DF-DG-DH-DI	DF-DG-DH-DI	DE-DF-DG-DH
HY Vehicle consumption (combined)	DL	DL	DL	DL	DL	DL	DL	DL	DL	DK
HY Vehicle consumption (splitted)	DJ-DK	DJ-DK	DJ-DK	DJ-DK	DJ-DK	DJ-DK	DJ-DK	DJ-DK	DJ-DK	DI-DJ
German Label (control group additional info)	DN-DO-DP	DN-DO-DP	DN-DO-DP	DN-DO-DP	DN-DO-DP	DN-DO-DP	DN-DO-DP	DN-DO-DP	DN-DO-DP	
MPG										BM

In the following sub-sections we describe all the variables contained in the 10 databases. In order to avoid misinterpretations the reference columns described are those of the database for cars sold in Belgium. In case the reader need to consult one of the other nine, please make references to the above conversion table.

6.3.1 Control ID

Placed in column “A”, it is the code that identifies a specific car variant. It is an integer with three digits (from 001 to 470). When the code is switched to 000 it means that for that specific country database the correspondent variant is not available in the market.

6.3.2 Class size

Placed in column "B" it represents the specific segment to which the car variant belongs. As described above the possible segments are 10: **Micro cars**; **Superminis**; **Small family cars**; **Large family cars Executive cars; Roadsters; Economic Sport Utility Vehicles; Expensive Sport Utility Vehicles**; **Small Multi-Purposes Vehicles**; **Large Multi-Purposes Vehicles**.

6.3.3 Class Engine/fuel

Placed in column "C", it represents the second segmentation criterion that we have selected. It is constituted by **5 classes**: **Diesel powered engine** (all classes of the "size" criterion); **Gasoline powered engine** (all classes of the "size" criterion); **Alternative fuels powered engine (e.g. Bi-fuel, BioFuel, Natural gas native or derived cars powered engine** (all classes of the "size" criterion); **Hybrid** (only for the following classes of the "size" criterion: Small family Classes; Large Family Classes; Executive cars; Small of roaders; Large of roaders; small and large MPV); **Electric powered engine** (only for the following classes of the "size" criterion: Micro car, Supermini and Small family Car).

6.3.4 Brand cluster

Placed in column "D", it allows identifying the brand of a car manufacturers group. It is based on the current situation of the passengers car production an it considers the following Groups: **VW Group**: VW; Skoda; Seat; Audi; **Renault Group**: Renault; Dacia; **PSA Group**: Peugeot; Citroen; **Fiat Group**: Lancia/Chrisler; Fiat; Lancia; Maserati; Jeep; **BMW Group**: Mini; BMW; **Toyota**; **GM Group**: Opel/Vauxall; Chevrolet; **Daimler**: Mercedes-Benz; Smart; **Nissan**; **Kia**; **Hyunday**; **Suzuki**; **Volvo car corporation**; **Ford**; **Honda**; **Mazda**; **Mia**; **Reva**; **Tata**; **Mitzubishi**; **Tesla**; **Jaguar-Land Rover**; **Infinity**; **Subaru.**

6.3.5 Brand

Placed in column "E", it allows identifying the specific brand of the variant in correspondence of the Brand cluster.

6.3.6 Model

Placed in column "F", it allows identifying the commercial name of the selected car variant.

6.3.7 Variant

Placed in column "I", it contains the specific car variant commercial identification code as it is presented in the advertising material of the car manufacturer. Often the variant is the

same even if the country of sales is different. Sometimes the manufacturer change some part of the identification code to be more visible in a specific car market. In this regards in columns "G" and "H" of each database we have placed the commercial identification code of the same car variant for other two EU Countries selected for the study.

6.3.8 Web link

Placed in column "J", it contains the web link to cars in the online magazine that has been used to extract information related to the variant under examination.

6.3.9 Price

Placed from column "K" to column "AF", it contains the price on the road of each selected car variant expressed in national currency. Per each EC Country selected for the study we provide two columns: the first one shows the full prices on the road of the car variants, the other one shows the same prices without taxation.

The first two columns related to the price ("K" and "L") contains the average price of each car variant – with and without taxes – calculated on the bases of the car variants prices in the 10 EU Countries selected for the study.

Prices of the car variants are based on official car magazines published in 2012 for D; F; UK; I; SP and based upon EC Report: "*Car price within European Union*", published by DG Competition in January 2011, for SWE; BE; POL; ROM; NED. The price of the car variants of these latter EC countries that were not present in the report of DG Competition has been extrapolated from the "Pivotal Country" car variant price through conversion rates based on the car variants prices provided by DG Competition in its report (see the following table).

Table 86 Conversion rates for prices estimation

CLASS/COUNTRY	IT	FR	DE	ES	UK	BE	NL	PL	RO	SE
Micro cars/Supermini	1,00	1,05	1,07	1,04	0,76	1,05	0,99	3,99	4,19	9,41
Small family cars/Small MPV	1,00	1,07	1,07	1,02	0,79	1,05	1,01	3,80	4,08	8,61
Large family car/Large MPV	1,00	1,01	1,05	0,98	0,52	1,01	0,96	3,57	4,21	8,38
Economic SUV	1,00	1,04	1,06	1,00	0,65	1,03	0,99	3,69	4,14	8,49
Executive cars/Expensive SUV	1,00	0,96	0,99	0,97	0,57	0,96	0,95	4,08	4,49	7,64
Roadster	1,00	0,98	1,00	0,99	0,63	1,00	1,02	4,27	4,54	8,51

Source: Our elaboration on data from DG Competition Report

6.3.10 Fuel economy

Placed from column "AG" to column "AH", it contains the consumption per 100 km (first column) and per 100 miles (second column) of each car variant. For the petrol, diesel and

alternative fuel car variants the consumption is calculated in “litres” per 100 km or per 100 miles. For hybrid car variants are reported only the consumption, in “litres” every 100 km or 100 miles, of the traditional powered engine. A full hybrid consumption calculation that also includes the consumption of electric powered engine is described later (§ 6.3.33). For electric passengers car variants the consumption is expressed in “kwh” every 100 km or 100 miles.

6.3.11 Battery Range (electric)

Placed from column “AI” to column “AJ” is calculated from the data related to “fuel economy” (see previous sub-paragraph) and it is expressed in km (first column) and miles (second column).

6.3.12 Refuelling time (electric)

Placed in column “AK” it contains the numbers of hours that the electric car variants require for a full recharging of their battery. Where information is available, we report in brackets also the share of battery that can be recharged in one hour.

6.3.13 Battery life cycle (electric)

Placed in column “AL” it shows the number of times that a battery pack of an electric car variant can be fully recharged before its substitution. If available, it is based on the manufacturer declaration reported in the advertising material of each electric car variant.

6.3.14 Yearly running costs

Placed from column “AM” to column “AX” it reports – where available – the running costs of each car variant equipped with petrol engine (first 6 columns) and diesel engine (second 6 columns). The running costs have been expressed both in “km” and in “miles” and calculated in three different annual ranges for each of the two motorizations: 10.000 km/yr; 14.000 km/yr; 18.000 km/yr for petrol engine powered car variants; 12.000 km/yr; 16.000 km/yr; 20.000 km/yr for diesel engine powered car variants. A conversion rate from “km” to “miles” has been applied to also obtain same data in this measure unit.

6.3.15 Maintenance costs

Placed from column “AY” to column “AZ” it contains, where it was possible, the “break even distance” expressed in “km” (first column) and “miles” (second column). The “break even distance” expresses the number of km (or miles) that a Hybrid or Electric car variant has to run every year to get the balance of the operating costs plus the yearly car depreciation one with those of an equivalent car variant petrol engine powered.

6.3.16 Car performances

Placed from column "BA" to column "BM" it contains the basic information related to performances of each car variant that a consumer could easily retrieve from the advertising material provided on paper magazines and on line by the car manufactures. They are:

- Max speed in "km/h" – column "BA";
- Max speed in "miles/h" – column "BB";
- Acceleration from 0 to 100 km/h (in seconds) – column "BC"
- Acceleration from 0 to 100 miles/h (in seconds) – column "BD"
- Cubic centimetre in "cc" – column "BE"
- Minimum Trunk capacity in "dm^3"– column "BF"
- Maximum Trunk capacity in "dm^3"– column "BG"
- Car weight in "kg" – column "BH"
- Degree of security based upon the Euro NCAP test when available – column "BI"
- Number of seats – column "BJ"
- Number of doors – column "BK"
- Tail pipe CO2 emissions in "g/km" – column "BL"
- Tail pipe CO2 emissions in "g/mile" – column "BM"

6.3.17 MPG

Placed in column "BN", it provides a conversion from "fuel economy" (column "AG") expressed in "litres/100km" in numbers of equivalent miles per gallon of fuel (MPG).

6.3.18 Environmental compatibility (UK only)

Placed in column "BO", it provides – if available – the degree of environmental compatibility of the car variant based upon a "green performance measurement scale" associated to vehicles sold in UK.

6.3.19 Reference costs

Placed from column "BP" to column "BY", it expresses the refuelling cost for running 100 km (or 100 miles). It is calculated per each car variants starting from its "fuel economy" value (in km – column "AG" and in miles – column "AH"), and by using the fuel price of the EC Country for which the car database has been developed. Source of data for the fuel price cost are:

- For petrol: http://www.energy.eu/
- For diesel: http://www.energy.eu/
- for natural gas: http://www.energy.eu/
- for LGP: http://www.energy.eu/

6.3.20 Reference costs best in class

Placed from column "BZ" to column "CA", it provides an extraction of the best car variants of a specific class for what concern the "reference costs" defined in previous paragraph. The "best in class" calculation is produced as follows:

- Per each segment as defined in "class size" column (paragraph 6.3.2), it is calculated the "best in class" in €/km (first column) and in national currency/km or miles (second column) considering all together the car variants of the segment under examination equipped with petrol, diesel or alternative fuels;
- The "best in class" of the hybrid car variants is calculated considering all together the hybrid car variants independently from the car segment to which they belong;
- The "best in class" of the electric car variants is calculated considering all together the electric car variants independently from the car segment to which they belong.

6.3.21 Lost savings on fuel spending

Placed from column "CB" to column "CE" it represents the additional costs that the owner of a given car variant have to pay with respect to the owner of a "best in class" car variant. It is expressed in:

- €/100 km – column "CB"
- national currency/100 km – column "CC"
- % of additional costs – column "CD" and column "CE"

6.3.22 Savings on fuel spending

Placed in column "CF" it represents the amount of savings on fuel spending of an electric vehicle compared with the fuel spending of the "best in class" of conventional vehicles of the same category. According to the cost of the fuel and the electricity cost, this number in some occasion can have negative value (e.g. for some car variants in the database for cars sold in Germany). In that case the electric vehicle fuel spending is higher than the one of the "best in class" conventional vehicles.

6.3.23 Incentives

Placed in column "CF" it provides, in national currency, the foreseen price reduction for each car variants, on the basis of the national incentive scheme for each of the EU Countries considered in the study.

6.3.24 Taxation

Placed from column "CG" to column "CH" it provides, in national currency, the value of the circulation tax for the first year of matriculation of the car variant (column "CG") – in case it is different from the other year; the yearly value of the circulation tax for the subsequent years (column "CH"). Both of them are calculated on the bases of the national tax system for each of the EU Countries considered in the study.

6.3.25 German car tax band

Placed in column "CI", it associates to each car variant the correspondent tax band applied in Germany that is based on the level of emission of the car variant (column "BL") and thresholds defined by the law.

6.3.26 Savings for alternative fuels

Placed in column "CJ", it presents the incentive scheme for alternative fuel car variants. As the other incentives and taxation elements, it is based upon national rules of each Member State considered for the study.

6.3.27 Upstream emissions

Placed from column "CK" and column "CL", it represent for the electric cars and hybrid (that in our study are based on "plug-in" technology and therefore that can use the electric network to recharge their battery pack) variants considered in the database the gram of CO2 equivalent (gCO2eq) emitted from the whole electric network considering not just the kWh accounted by the recharging facility to recharge a battery pack of each car variant, but also the kWh dispersed by the distribution electric network distribution system. In other world it represents the "gCO2eq" emitted by the electric production system to provide the needed quantity of kWh to recharge a battery pack of the car variant. It is expressed in gCO2eq/km (column "CK") and gCO2eq/miles (column "CL"). Conversion rate used are: 182,8 gCO2eq/MJ and 1MJ=0,278 kwh.

6.3.28 Running costs

Placed from column "CM" to column "DO", it represents the costs in national currency of the consumption costs of each car variant in the database. It is based on the "fuel

economy" performances of the car variant described in sub-paragraph 6.3.10. The use of a definition of running costs based on fuel economy only has been a decision by DG CLIMA that we have implemented. In particular we considered:

- Petrol engine equipped car variants running an average of 14.000 km/year, where:
  - Column "CM" contains running costs expressed in €/km (national currency/km for SWE; SOM; POL; DK and £/miles for UK)
  - Column "CN" contains running costs expressed in €/month (national currency/month for SWE; SOM; POL; DK; UK)
  - Column "CO" contains running costs expressed in €/5yrs (national currency/5yrs for SWE; SOM; POL; DK ; UK)
- Diesel engine equipped car variants running an average of 16.000 km/year, where:
  - Column "CP" contains running costs expressed in €/km (national currency/km for SWE; SOM; POL; DK and £/miles for UK)
  - Column "CQ" contains running costs expressed in €/month (national currency/month for SWE; SOM; POL; DK; UK)
  - Column "CR" contains running costs expressed in €/5yrs (national currency/5yrs for SWE; SOM; POL; DK ; UK)
- Alternative fuel engine equipped car variants running an average of 16.000 km/year, where:
  - Column "CS" contains running costs expressed in €/km (national currency/km for SWE; SOM; POL; DK and £/miles for UK)
  - Column "CT" contains running costs expressed in €/month (national currency/month for SWE; SOM; POL; DK; UK)
  - Column "CU" contains running costs expressed in €/5yrs (national currency/5yrs for SWE; SOM; POL; DK ; UK)
- Hybrid car variants running an average of 16.000 km/year, where:
  - Column "CV" contains running costs expressed in €/km (national currency/km for SWE; SOM; POL; DK and £/miles for UK)
  - Column "CW" contains running costs expressed in €/month (national currency/month for SWE; SOM; POL; DK; UK)
  - Column "CX" contains running costs expressed in €/5yrs (national currency/5yrs for SWE; SOM; POL; DK ; UK)
- Electric car variants running an average of 8.000 km/year, where:
  - Column "CY" contains running costs expressed in €/km (national currency/km for SWE; SOM; POL; DK and £/miles for UK)

- Column "CZ" contains running costs expressed in €/month (national currency/month for SWE; SOM; POL; DK; UK)
- Column "DA" contains running costs expressed in €/5yrs (national currency/5yrs for SWE; SOM; POL; DK ; UK)

- Synthesis of the results of the running cost calculation is provided in:
  - Column "DB", that contains running costs expressed in €/km (national currency/km for SWE; SOM; POL; DK and £/miles for UK), per each car variant
  - Column "DC", that contains running costs expressed in €/month (national currency/month for SWE; SOM; POL; DK; UK), per each car variant
  - Column "DD", that contains running costs expressed in €/5yrs (national currency/5yrs for SWE; SOM; POL; DK ; UK), per each car variant

6.3.29 German relative classification

Placed in column "DE", it associates a letter to each car variant and it is based on the level of emission of the car variant (column "BL") and thresholds defined by the German law. German scheme is a sub-variant of relative classification with a different approach towards segmentation of vehicles than described in 6.3.33.

The classification schema of CO2 emissions for passenger cars in Germany is based upon the following table:

CO2 emission class	**Reference band (CO2diff)**
A+	>= -37%
A	>=-36,99%; <= -28%
B	>=-27,99%; <= -19%
C	>=-18,99%; <= -10%
D	>=-9,99%; <= -1%
E	>=-0,99%; <= +8%
F	>=+8,1%; <= +17%
G	>=+17,01%

The reference band represents how many distance in terms of CO2 emission the passenger car under examination has in respect to the CO2 emission of a reference car of the same weight. This distance is expressed in percentage:

CO2diff (%) = ((CO2 pass.car – CO2 ref. car)/CO2 ref.car) x 100

Where:

CO2diff (%): reference band

CO2 pass.car: CO2 emission in g/km of the passenger car under examination

CO2 ref.car: CO2 emission in g/km of a reference car of the same weight of the passenger car under examination. It is calculated as: **36,59079 + 0,08987 x M;** where M is expressed in kg and it is the weigh of the passenger car under examination.

The more negative is the **CO2 diff**, more efficient, in terms of CO2 emissions, is the passenger car under examination. On the contrary, more positive is the **CO2 diff**, less efficient is the assessed passenger car.

6.3.30 Absolute classification

Placed in column "DF", it associates a letter to each car variant and it is based on the level of emission of the car variant (column "BL") and thresholds defined by the UK law. It is used in the survey as element of reference to check how environmental friendly is each car variant in the database. Below we report UK table for CO2 emission classification for passenger cars in use at the time of completing this annex (June 2013)

CO2 emission class	CO2 emission band (g/km)
A	<= 100
B	>= 101; <= 110
C	>= 111; <= 120
D	>= 121; <= 130
E	>= 131; <= 140
F	>= 141; <= 150
G (*)	>= 151; <= 165
H	>= 166; <= 175
I	>= 176; <= 185
J	>= 186; <= 200
K	>= 201; <= 225
L	>= 226; <= 255
M	> 255

(*) For the purposes of our study in the databases of passenger cars the UK CO2 emission classification has been considered from A to G class. Therefore all the CO2 emission classes above G have been grouped in this latter class.

6.3.31 Best emissions in class

Placed in column "DG", it provides an extraction of the best car variants of a specific segment for what concerns the "tail pipe emission" defined in previous paragraph 6.3.16. The "best in class" calculation follows the below criteria:

- Per each segment as defined in "class size" column (paragraph 1.4.2), it is calculated the "best in class" in g/km considering all together the car variants of the segment under examination equipped with petrol, diesel or alternative fuels;
- The "best in class" of the hybrid car variants is calculated considering all together the hybrid car variants independently from the car segment to which they belong;
- The "best in class" of the electric car variants is calculated considering all together the electric car variants independently from the car segment to which they belong.

6.3.32 Worst emissions in class

Placed in column "DH", it provides an extraction of the worst car variants of a specific segment for what concerns the "tail pipe emission" defined in previous paragraph 1.4.16. The "best in class" calculation follows the below criteria:

- Per each segment as defined in "class size" column (paragraph 1.4.2), it is calculated the "best in class" in g/km considering all together the car variants of the segment under examination equipped with petrol, diesel or alternative fuels;
- The "best in class" of the hybrid car variants is calculated considering all together the hybrid car variants independently from the car segment to which they belong;
- The "best in class" of the electric car variants is calculated considering all together the electric car variants independently from the car segment to which they belong.

6.3.33 Relative classification

Placed in column "DI", it represents the ranking of each car variant within its class, in terms of "tail pipe emission" defined in previous paragraph 6.3.16. The scale adopted to define the above distance is described as follows:

Criteria	Classes
If car variant "tailpipe emission" is less than or equal to the "best in class"	A
If car variant "tailpipe emission" is less that "best in calls " + 1/7 of the difference between "worst in class" and "best in class"	B
If car variant "tailpipe emission" is less that "best in calls " + 2/7 of the difference between "worst in class" and "best in class"	C
If car variant "tailpipe emission" is less that "best in calls " + 3/7 of the difference between "worst in class" and "best in class"	D
If car variant "tailpipe emission" is less that "best in calls " + 4/7 of the	E

difference between “worst in class” and “best in class”	
If car variant “tailpipe emission” is less that “best in calls “ + 5/7 of the difference between “worst in class” and “best in class”	F
If car variant “tailpipe emission” is more that “best in calls “ + 5/7 of the difference between “worst in class” and “best in class”	G

6.3.34 Hybrid Consumption

Placed from column “DJ” to column “DM” it allows calculating the consumption in KWheq/100km of the hybrid car variants in the database. It is obtained as described below:

- Column “DJ” provides the km/l consumed by each hybrid car variant when conventional engine is only used. This data is obtained from advertising material of the car manufacturer;
- Column “DK” provides the km/l eq (electric) consumed by each hybrid car variant when only alternative engine is used. This data is get from advertising material of the car manufacturer;
- Column “DL” provides the km/l eq (electric + fuel) consumed by each car variant, obtained as sum of the data in the previous bullet points;
- Column “DM” provides the kwh eq (electric + fuel) consumed every 100 km by each car variant as transformation of the data in the previous column.

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