Transparency of carbon-neutral labels: evidence from a choice experiment*

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February 17, 2026

*I thank Stefano Carattini, Ivana Logar, Sabrina Eisenbarth, and Fabian Dvorak for valuable advice and comments on earlier versions of this paper. I thank participants at the 30th Annual Conference of the European Association of Environmental and Resource Economists in Bergen, Norway; the Swiss Society of Economics and Statistics Annual Congress 2025 at ETH Zürich; the Brown Bag Seminar Series at the University of St. Gallen; the Choice Experiment Clinics at the IVM Institute, VU Amsterdam; the Ninth Workshop on Experimental Economics for the Environment at Ruhr University Bochum; the Eawag Symposium 2024; the First ETH Domain Conference on Social Sciences on Environment, Technology and Sustainability; and the Eawag Environmental Social Sciences Colloquium for helpful comments and suggestions. I acknowledge financial support from Eawag: Swiss Federal Institute of Aquatic Science and Technology. I declare no conflict of interest. The choice experiment was preregistered in the AEA RCT Registry under identifier AEARCTR-0012520. The corresponding pre-analysis plan is available on OSF under ID 573kw.

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Abstract

This paper examines whether transparency affects consumers' willingness to pay for carbon-neutral labels. Companies increasingly label products as carbon neutral, yet these labels do not disclose the shares of CO_2 offsetting and CO_2 reduction underlying the claim. Using a discrete choice experiment with 1,339 UK tea consumers, I compare willingness to pay for standard versus transparent carbon-neutral labels that disclose these shares. The control group saw a standard label, while treatment groups saw transparent labels indicating different offset–reduction compositions. I find no evidence that consumers are willing to pay for transparency or that they prefer CO_2 reductions over offsets. Furthermore, organic and ethical trade labels crowd out the value of the carbon-neutral claim but do not change the null effect of transparency. These findings suggest that demand-side market forces alone may be insufficient to ensure quality differentiation in carbon-neutral labeling and may strengthen the case for regulation.

Keywords carbon-neutral labeling; competing sustainability labels; discrete choice experiment; greenwashing; information asymmetry; transparency

JEL codes C25, C83, C90, D12, Q51, Q58

1 Introduction

As the effects of climate change become more severe, many companies, responding to investor and board pressure, have committed to carbon neutrality (Kim and Lyon, 2011; Rogelj et al., 2021). Nearly two-thirds (63%) of the Forbes Global 2000 companies have announced carbon-neutral or net-zero targets (Net Zero Tracker, 2025). While companies more commonly label their products as carbon neutral, these labels lack transparency regarding how carbon neutrality is achieved. This paper asks whether consumers value transparency in carbon-neutral labels that disclose the shares of CO_2 offsetting and CO_2 reduction and whether, conditional on disclosure, they prefer CO_2 reductions over offsets. It finds no evidence of either effect.

Carbon-neutral labels denote CO_2 offsets, direct CO_2 reductions, or a combination thereof. However, these activities are not equivalent, and how neutrality is achieved matters. Carbon neutrality requires measuring greenhouse-gas (GHG) emissions in carbon-dioxide equivalents (CO_2e) and then reducing emissions internally (e.g., through energy-efficiency improvements) and/or offsetting remaining emissions. CO_2 offsetting involves financing external projects, such as reforestation, to compensate for residual emissions. These offsets are traded on voluntary carbon markets, with transaction values totaling USD 723 million in 2023 (Forest Trends' Ecosystem Marketplace, 2024).

Established frameworks and principles for climate change mitigation prioritize direct CO_2 reductions and treat offsets as a last resort (IPCC, 2022; Axelsson et al., 2024). In practice, offsetting can provide a comparatively low-cost pathway for firms to claim carbon neutrality, as voluntary carbon credit prices show extraordinary dispersion, with credits trading between a few cents and USD 100 per ton of CO_2 (Berg et al., 2025). However, voluntary offset credits may not deliver real, additional abate-

ment (Calel et al., 2025), and one ton of offset is worth only a fraction of a ton of permanent CO_2 reduction (Groom and Venmans, 2023).

Concerns about CO_2 offsets arise from both practical and ethical considerations. On the practical side, the credibility of offset projects has long been questioned (Bumpus and Liverman, 2008; Hooper et al., 2008), particularly regarding whether they deliver emission reductions that would not have occurred otherwise, a problem known as additionality (Hyams and Fawcett, 2013; Schneider and Kollmuss, 2015). These credibility gaps are compounded by the risk of double counting, where the same reduction is claimed by multiple parties (Schneider et al., 2015; Calel et al., 2025; Trencher et al., 2024), and by leakage, whereby emissions avoided in one location simply resurface elsewhere (Murray et al., 2004). Beyond these practical shortcomings, offsets also raise ethical questions: they may induce moral licensing, where the act of purchasing offsets reduces the perceived obligation to cut emissions directly (Dorner, 2019), especially when credits are available at very low prices and more broadly, they entail the commodification of nature (Aldred, 2012).

Transparency of carbon-neutral labels is becoming increasingly important for policymakers. The European Parliament proposed limits on unverified generic claims such as "climate neutral" (European Parliament, 2023); German courts require firms to clarify the meaning of "climate neutral" in advertising (The Wall Street Journal, 2024); and lawsuits have challenged airline neutrality claims (The Guardian, 2023). In response, some certifiers have withdrawn carbon-neutral labels (Carbon Trust, 2023; ClimatePartner, 2023). Despite these developments, most carbon-neutral certifiers still do not disclose the offset–reduction shares on the label.[1] Therefore, the empirical questions arise: *Do consumers value transparency on carbon-neutral labels? Do*

[1] An exception is Swiss International Air Lines, which offers offsetting or a combination of offsetting and reductions after flight purchases (Swiss International Air Lines, 2024).

they prefer CO_2 reductions over offsets? In practice, however, products often carry multiple sustainability claims; therefore, I also examine *how the coexistence of other labels (organic and ethical trade) changes the marginal willingness to pay (MWTP) for the carbon-neutral claim and for transparency.*

I use a pre-registered[2] discrete choice experiment (DCE) to estimate how label transparency affects MWTP for carbon-neutral labels. I randomize the information on the share of offsetting and reduction in a between-subjects design to avoid direct comparisons that could mechanically increase the salience of transparency. A stated-preference design is well-suited because carbon-neutral labels in product markets do not indicate the offset–reduction composition on the label.

The survey was conducted online with 1,339 tea consumers in the UK and comprised one control group and two treatment arms that varied the transparency of carbon-neutral labels. Participants in the control group viewed a standard carbon-neutral label without information on the composition of mitigation efforts. In contrast, participants in both treatment arms viewed a transparent label that explicitly disclosed the shares of CO_2 offsetting and CO_2 reduction underlying the carbon-neutral claim. Treatment 1 specified 95% offsetting and 5% reduction, while Treatment 2 specified equal shares (50% offsetting and 50% reduction). To ensure informed evaluation, all participants received a short, neutral description of the CO_2 offsetting and CO_2 reduction activities entailed by the carbon-neutral label; however, the precise shares of each mitigation strategy were disclosed only in the treatment arms.[3]

In addition to the carbon-neutral label, all choice tasks included two other sustainability labels—organic and ethical trade—to examine coexistence effects, that is,

[2]Registration details are available in the AEA RCT Registry (AEARCTR-0012520), and the pre-analysis plan is available on OSF (573kw).

[3]While the experiment provides participants with information on CO_2 offsetting and reduction, the descriptions are neutral and non-evaluative. Thus, the design is primarily intended to reveal consumers' preferences rather than to form new ones.

how the presence of competing sustainability claims affects the valuation of carbon-neutral labels and their transparency. These labels were displayed identically across all experimental groups and were not subject to the transparency manipulation.

Consumer demand for carbon-neutral labels may reflect psychological motives such as guilt about environmental harm (Kotchen, 2009) and the warm glow from environmentally friendly choices (Andreoni, 1990; Kahneman and Knetsch, 1992). At the same time, media skepticism and concerns about corporate greenwashing may undermine trust in labels that rely on CO_2 offsets. The existing evidence on willingness to pay is therefore mixed: while many studies find a positive premium for carbon-neutral labels (Gassler et al., 2015; Vecchio and Annunziata, 2015; Drichoutis et al., 2016; Birkenberg et al., 2021; Bek, 2022), other work finds no such effect (e.g., the hedonic analysis in Carattini et al., 2025).

Transparency may shift demand in either direction. By disclosing the shares of CO_2 offsetting versus CO_2 reduction, it can increase trust by clarifying what the claim entails and by reducing information asymmetries (Darby and Karni, 1973). However, transparency may also reduce demand when the offsetting share is high relative to reductions, given practical and ethical concerns about offsets (Carattini and Tavoni, 2016). Moreover, in markets without standardized labels, additional detail can increase confusion and may even facilitate adverse selection (Akerlof, 1970; Brécard, 2017). The net effect therefore depends on whether consumers distinguish offsets from reductions and how they process additional information. Although the study does not elicit prior beliefs or normative views about typical shares to avoid priming, it provides reduced-form evidence on how disclosure affects MWTP for carbon-neutral labels.

I find that UK consumers are willing to pay a premium for carbon-neutral labels on tea products, with an estimated MWTP of £0.55 in the control group. However,

there is no evidence that transparency affects this premium. If anything, it slightly reduces MWTP: by £0.03 [£-0.22, £0.28] when the label discloses a high share of CO_2 offsetting (95%), and by £0.23 [£0.00, £0.46] when it shows equal shares of offsetting and reduction. These effects correspond to reductions of about 5.8% and 41.7% of the baseline MWTP, respectively. Moreover, there is no evidence that consumers prefer CO_2 reductions over offsets: moving from a 5% to a 50% reduction share lowers MWTP by about £0.20 [£-0.06, £0.45], roughly 38% relative to the low-reduction group.

I also explore a range of potential pre-registered mechanisms–psychological and contextual factors such as confusion, trust, concern, climate worry, guilt, social approval, and beliefs about the polluter-pays principle–together with resource constraints. I find no evidence that these mechanisms account for the differences in MWTP across experimental groups; if anything, the null treatment effects appear robust when controlling for and interacting with these channels.

These results also hold for conditional MWTP for carbon-neutral label when other sustainability claims are present. The findings show that organic and ethical-trade labels compete with the carbon-neutral claim and substantially reduce–and, when combined, can even reverse–the premium for carbon neutrality. However, neither the transparency treatment nor the shift from a 5% to a 50% reduction share has a statistically significant effect, regardless of whether other sustainability labels are present concurrently with the carbon-neutral label.

These findings provide three policy-relevant insights. First, the demand-side market forces cannot sort out the quality of carbon-neutral claims by rewarding transparent labels more than non-transparent ones: consumers do not reward transparency per se, and the estimated transparency effects are small, negative, and statistically insignificant.

Second, a policy intervention that ensures transparency regarding the composition of carbon-neutral labels does not lead consumers to demand a shift away from offset-dominant claims. The findings show that consumers value labels dominated by offsets at least as highly as those with an equal-share disclosure.

Third, the presence of organic and ethical-trade labels substantially reduces–and, when combined, can even reverse–the WTP premium for the carbon-neutral claim. While the effects of transparency and a higher reduction share remain statistically insignificant, other sustainability claims can erode the marginal value of carbon-neutral certifications. Because several mechanisms could drive this crowd-out (e.g., salience competition or substitution toward other valued sustainability attributes), these findings motivate the exploration of alternative label architecture policies (e.g., standardized placement and prominence) to preserve the visibility of carbon-neutral claims.

Regulating labels remains important[4], and is consistent with the intentions of policymakers. Taken together, the results indicate that, given current information and beliefs, consumers neither generate stronger demand for CO_2 reductions than for CO_2 offsets nor show a higher WTP for transparency itself. The mismatch between expert assessments and consumer valuations provides a rationale for additional regulation to enhance the composition and credibility of carbon-neutral claims.

This study contributes to several lines of the existing literature. First, it adds to the literature focusing on consumers' valuation of climate labels (Drichoutis et al., 2016; Akaichi et al., 2017; Feucht and Zander, 2018; Grebitus et al., 2013; Onozaka and McFadden, 2011; Bek, 2022). While many stated preference studies and a few revealed preference studies have examined consumers' MWTP for climate labels, to

[4]Information asymmetry can distort market mechanisms, leading to adverse selection and the selection of lower-quality goods (Akerlof, 1970). A body of theoretical literature suggests that, under certain assumptions and in the presence of information asymmetry, competition can favour labels with lower environmental quality (Brécard, 2014; Heyes and Martin, 2017; Brécard, 2017; Heyes and Martin, 2018; Poret, 2019).

my knowledge, none of them has focused on the effect of transparency in carbon-neutral labels. This paper fills that gap by studying how making the share of CO_2 offsetting explicit affects consumers' valuation of the carbon-neutral labels.

Second, this paper contributes to the extensive literature on the economics of CO_2 offsetting (Blasch and Farsi, 2014; Ziegler et al., 2012; Brouwer et al., 2008; MacKerron et al., 2009; Carattini and Tavoni, 2016; Chen et al., 2018), which examines how consumers value CO_2 offsets. I contribute by focusing on the offsetting share indicated on carbon-neutral labels relative to direct CO_2 reductions. Two recent studies have examined how German consumers value CO_2 offsets relative to direct CO_2 reductions (Bek, 2022; Roemer et al., 2023). Bek (2022) uses a hypothetical DCE on coffee and find that consumers are willing to pay 66% more for lifecycle CO_2 reductions than for offsets, whereas Roemer et al. (2023) use an incentivized DCE on shipping mode choice and report roughly equal valuations for internal reductions and offsets. However, both studies rely on within-subjects designs, where participants are shown multiple label types, either as attribute levels or as distinct attributes, making it difficult to disentangle absolute preferences from contrast or salience effects. In this study, I instead adopt a between-subjects design, randomly assigning each participant to only one of three label conditions. This approach minimizes contrast and experimenter demand effects and allows me to identify the effect of transparency on MWTP for carbon-neutral labels.

Third, the study contributes to the empirical literature on the competition or complementarity between climate labels and other sustainability labels (Onozaka and McFadden, 2011; Akaichi et al., 2020). Onozaka and McFadden (2011) find that negative perceptions of carbon footprint or imported products can be mitigated when paired with organic or fair trade labels, while Akaichi et al. (2020) show that Spanish consumers perceive health and sustainability labels as complements, whereas UK

consumers show weaker complementarity and even substitutability. By contrast, my findings point to competition across sustainability claims: organic and ethical-trade labels crowd out the marginal value of the carbon-neutral claim.

The remainder of the paper is outlined as follows: Section 2 details the methodology, including the survey and DCE design (2.1), data (2.2), and the empirical approach (2.3). Section 3 presents the results, which discusses the effect of transparency on MWTP for carbon neutral labels (3.1), robustness tests (3.2), the underlying mechanisms of consumers' MWTP (3.3), and competing labels (3.4). Section 4 concludes.

2 Methodology

2.1 Survey and choice experiment design

This section provides an overview of the survey and experimental design. It begins by introducing the tea product that is the focus of the survey and outlining the sample characteristics. Next, it presents the experimental design. It then describes the DCE, including the attributes and levels, as well as the choice tasks presented to participants. Finally, it summarizes the additional survey questions that followed the DCE.

Participants are randomly assigned to one of three experimental groups. All groups receive identical survey content and DCE designs. The only difference is in the type of carbon-neutral label that participants in each group see, as shown in Table 1. The control group is shown a standard carbon-neutral label, stating "CO_2 neutral" only. The information on the shares of CO_2 offsetting and CO_2 reduction are not revealed to the participants [5]. The two treatment groups are shown a "transparent" carbon-neutral label with additional text indicating the shares of CO_2 offsetting and CO_2 reduction that make the life cycle of the tea product carbon neutral. In treatment group 1, the carbon-neutral label indicates a 95% offset and a 5% reduction, while in treatment group 2, the carbon-neutral label indicates a 50% offset and a 50% reduction.

The between-subjects design reduces concerns about demand and comparison effects that can arise when the same participant is exposed to multiple experimental

[5]Participants in the control group are provided the following information: "The product's greenhouse gas emissions, measured in carbon equivalents has been offset (compensated) by investing in activities outside of the company, such as tree planting projects, or reduced within the company in the last five years, such as through investments in cleaner production processes; or both offset and reduced."

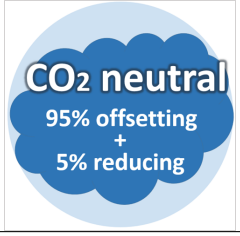
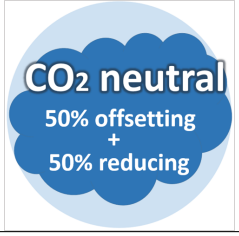
	Control	Treatment 1	Treatment 2
Label explanation	Yes	Yes	Yes
Carbon-neutral label			
CO_2 offset share	No information	95%	50%
CO_2 reduction share	No information	5%	50%
No. of participants	448	447	444

Table 1: Experimental design

conditions (Charness et al., 2012).The 95/5 and 50/50 compositions were chosen to span two policy-relevant disclosure scenarios, one offset-heavy and one more balanced. This aligns with evidence that many corporate carbon-neutral strategies rely heavily on offsetting, and with guidance that treats offsets as a last resort after direct reductions (NewClimate Institute and Carbon Market Watch, 2022; Axelsson et al., 2024).

This study focuses on tea consumers in the UK for several reasons. Firstly, it is common for tea products in the UK to have sustainability labels, including carbon-neutral labels, making tea a relevant product to study transparency in carbon-neutral labeling. Second, food systems significantly contribute to climate change, accounting for a third of global anthropogenic CO_2 emissions (Crippa et al., 2021). Although a box of tea itself may not be considered CO_2-intensive, its frequent consumption can still result in high emissions over time. Third, the UK ranks as the country with the third-highest per capita tea consumption globally (Statista, 2023).

In the survey, which is provided in Appendix E, respondents are asked to consider

80 teabags or 200 grams of tea in their preferred form. The pre-registered online survey[6] is pretested on 157 respondents, and the main survey included 1,339 tea drinkers in the UK[7].

At the beginning of the survey, screening questions are asked about age, tea consumption and tea purchasing habits. Participants under the age of 18, or those who never consume or purchase tea, are screened out.

Attributes	**Attribute levels**
Carbon-neutral label	Carbon-neutral label, no label
Organic label	Organic label, no label
Ethical trade label	Ethical trade label, no label
Price	£0.90, £1.90, £2.90, £3.90, £4.90, £5.90, £6.90

Table 2: Choice attributes and levels

The DCE focuses on a tea box with the following attributes: carbon-neutral label, organic label, ethical trade label, and price. Table 2 shows the attributes and attribute levels included in the DCE: three sustainability labels with two possible levels each, the presence or absence of the label, and the price that can take seven levels, ranging from £0.90 to £6.90 with £1 increments. The price levels in this survey were determined based on the average tea price in the UK, which is £2.46 for 250 grams of tea (Office for National Statistics, 2024c), as well as an online search for 100 tea products conducted on Sainsbury's, Tesco, Morrisons, Ocado, and Amazon UK during 2023.

There are two choice attributes: organic and ethical trade labels, in addition to the carbon-neutral label. These are included because organic and fair trade labels

[6]This choice experiment was preregistered in the AEA RCT Registry (AEARCTR-0012520), and the associated pre-analysis plan is available on OSF (573kw).

[7]Any deviations from the pre-registration, as well as exploratory and confirmatory hypotheses, are listed in the Appendix D.

are among the most common sustainability labels on tea products in the UK (based on an online search for 100 tea products in UK online grocery stores during 2023). Therefore, it makes the choice experiment more realistic and captures the trade-offs individuals would face in real decision-making situations. Organic and ethical trade labels do not vary across sub-samples, unlike carbon-neutral labels.[8] Participants are informed about the nature of these labels, including the carbon-neutral label, before the choice tasks. All five labels, three versions of carbon-neutral label, as well as organic, and ethical trade labels, are developed by the author and are hypothetical. Respondents were also informed about the hypothetical nature of the choice scenarios.

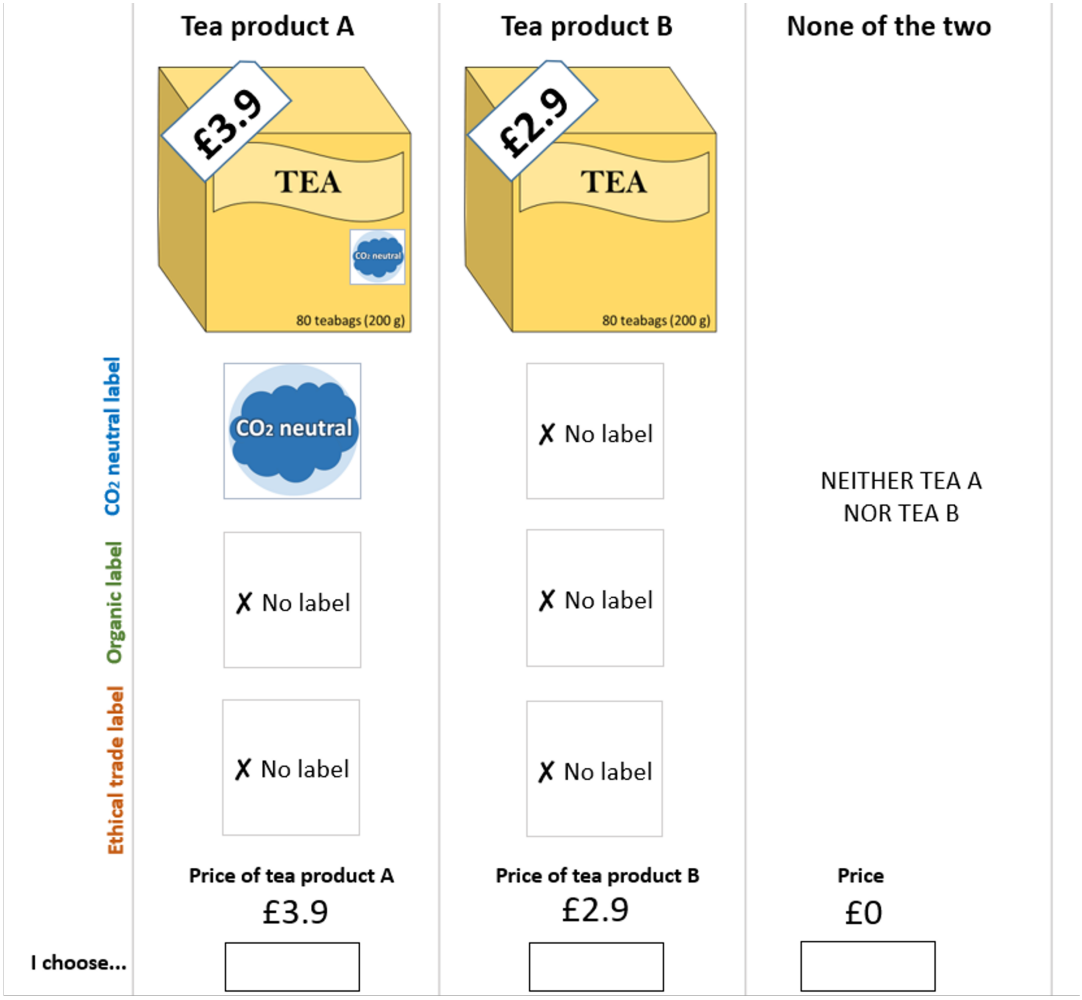
The type of tea blend (e.g., black, green, herbal) is not specified as a separate choice attribute because there is a strong preference for black tea in the UK. That is, 74% of people in the UK consume black tea, although they also drink other varieties such as green tea and herbal infusions at the same time (Tea and Infusions Association, 2022). Similarly, the packaging form (loose leaf or teabags) is not included as a separate attribute because 97.5% of tea sold in the UK is in teabag form (Tea and Herbal Association, 2024).

DCEs and contingent valuation methods (CVMs) are often criticized for being prone to hypothetical bias since participants are not required to make actual payments for their choices. To address this issue, the literature has employed various techniques such as cheap talk (Cummings and Taylor, 1999), honesty priming (Howard et al., 2017), and oath scripts (de Magistris and Pascucci, 2014). In this study, I implement cheap talk, oath scripts, and a budget reminder to mitigate the limitations of stated preference methods. In the cheap talk script, I informed the respondents that survey participants are likely to overstate their WTP in hypothetical surveys and asked them

[8]The participants are informed that the organic label indicates products with only organic ingredients and no synthetic pesticides, while the ethical trade label ensures responsible labor practices and guarantees higher prices for exporters based on internationally recognized standards.

to consider how they would feel about spending their money in a real situation. In the oath script, I asked participants to promise to provide honest responses by checking the box. In the budget reminder, I remind respondents that any amount they choose to spend on tea would reduce the money available for other purchases.

Ngene software is used to generate the D-efficient DCE design, which consists of 16 different choice tasks divided into 2 blocks containing 8 choice tasks each. These blocks are two different versions of the questionnaire: each respondent is randomly assigned to one block and therefore answers only 8 choice tasks, which reduces respondent fatigue while using all 16 tasks in the estimation. Figure 1 shows one of the choice cards shown to the control group. There are two tea products, and "none of the two" choice options. Restrictions are included to make choice cards more realistic. Alternatives with more labels had to be priced higher than alternatives with fewer labels. In addition to that, for the design of the main survey, additional restrictions are added for the lowest price level (£0.9) and the highest price level (£6.9) tea alternatives. If the price is 0.9 pounds, it should not have any labels; similarly, if it is £6.9, it must have all labels. The estimated parameters from the pre-test were used to create the final DCE design. Please refer to Table A.9 in Appendix A.2 for the respective DCE design used for the main survey.



Each participant was shown one of eight different cards. This example shows one of the cards presented to participants in the control group, block 2.

Figure 1: Example choice card presented to participants in the control group

The DCE is followed by questions that assess participants' choice certainty and identify protest responses. It further includes attribute non-attendance (ANA) and open-ended CVM questions. Additionally, the survey explores participants' attitudes toward climate change and sustainability labels using Likert-scale statements, such as trust in carbon-neutral labels, confusion about carbon-neutral labels, concerns about CO_2 offsetting, climate worry, warm glow (positive emotions from climate-friendly purchases), guilt (negative feelings when not making climate-friendly choices), social approval (perceived acceptance by others), the polluter pays principle (the opinion that producers should pay for climate mitigation), time restrictions (limited time for climate-friendly choices), and financial constraints (budget limitations preventing climate-friendly purchases)[9]. Then, participants are shown all three versions of carbon-neutral labels and asked which label they trust the most and find the most confusing. Finally, it collects information on participants' tea consumption habits and sociodemographic characteristics.

2.2 Data

The survey data were collected online in September 2024 in collaboration with a professional survey company (Bilendi). 54,219 respondents were initially invited to the survey. Of these, 2,366 started the survey, 580 were eliminated due to quota restrictions, and 225 were screened out or dropped out. Individuals who indicated that they never purchase or never drink tea, constituting 16% of the total sample,

[9]In the survey instrument, the statements capturing respondents' concerns about CO_2 offsetting are designed based on the ethical and practical considerations discussed in (Carattini and Blasch, 2024). The protest-response screeners and the statement assessing beliefs about the polluter-pays principle are based on Brouwer (2011). Finally, the items measuring social approval and guilt are adapted from the questionnaire used by Theotokis and Manganari (2015) and Gruchmann et al. (2025).

were disqualified from continuing the survey[10].

A total of 1,339 individuals successfully completed the main survey[11]. After excluding protest responses (1% of the full sample), the analyzed sample consists of 1,321 individuals. Protest responses were identified as cases where respondents consistently chose the status quo option (no tea purchase), with reasons including opposition to one or more labels, insufficient information about the products, or disagreement with the question itself.

The sample represents the UK population aged 18 and over, with some variations with respect to general population statistics due to the focus on adult tea consumers older than 18 years in this study. The median age of the sample is 46 years, whereas the national median age for adults is approximately 41 years (Office for National Statistics, 2022). Gender distribution is very close to the national profile, with 50% female participants in the sample compared to 51% in the population (Gov.uk, 2021b). 50% of the sample holds a post-secondary certificate (NQF Level 4) level or above, very close to the national figure of 49% in the population (Gov.uk, 2021a). Additionally, the median household income of the sample[12] is £35,000, which is close to the national median of approximately £34,500 (Office for National Statistics, 2024a). Finally, the sample's employment rate of 65% is slightly below the national average of 75% (Office for National Statistics, 2024b). A summary of all socioeconomic characteristics of tea consumers/drinkers is provided in Table A.1. Table A.8 in Appendix A.1 reports covariate balance. Standardized mean differences are generally small, with most covariates showing values below 0.2 in absolute terms. The only

[10]Please refer to Table A.2 in Appendix A.1 for the comparison between tea drinkers/purchasers and non-tea drinkers/purchasers in terms of the three covariates (age, gender, and education) used as quota criteria to recruit a representative sample of the UK population before the screening questions.

[11]For the pre-test, 157 participants were recruited. The pre-test data is not included in the main survey data.

[12]Income was estimated by assigning the midpoint of each reported income bracket, with the lowest and highest categories approximated using a Pareto distribution.

deviation is the attention-check question on the definition of CO_2 offsetting, where standardized mean differences are around 0.3. This is expected, as transparent labels explicitly reference offsetting and reduction shares, likely increasing attention to the definition (Section 3.3 examines whether this affects the results).

Among tea consumers, approximately 78% drink tea daily, and 78% purchase tea at least once a month or more frequently. Detailed information on tea consumption and purchasing habits is provided in Table A.3 in Appendix A.1. Over 73% of respondents reported consuming black tea, while the remainder consume green tea, herbal tea, or other blends.

2.3 Empirical approach

To estimate consumers' MWTP for the carbon-neutral label, I leverage a mixed logit (MXL) model estimated directly in WTP space.[13] A summary of deviations from the pre-analysis plan, along with the exploratory and confirmatory hypotheses, is provided in Appendix D.

The foundation of my approach is based on the Random Utility Model (RUM) (Lancaster, 1966; McFadden, 1973), where individuals choose the alternative that maximizes their expected utility. Each choice situation n consists of a deterministic component (sustainability labels and tea price) and a random component capturing unobserved factors. In a standard "preference space" specification, the utility U_{inj} that individual i derives from alternative j in choice situation n is defined as:

$$U_{inj} = \alpha_i p_{inj} + \boldsymbol{\beta}_i^\top \mathbf{X}_{inj} + s_{in} + \varepsilon_{inj}, \tag{1}$$

[13] Although the preregistration specified a preference-space specification, the main analysis relies on an MXL model estimated in WTP space because of methodological advantages of WTP-space models, including the direct estimation of MWTP and greater interpretability. All preference-space model results are reported in the robustness checks.

where p_{inj} denotes price, and $\mathbf{X}_{inj}$ is a vector of non-price attributes (carbon-neutral, organic, and ethical trade labels). The parameters α_i and $\boldsymbol{\beta}_i$ represent the individual-specific marginal utility of price and non-price attributes, respectively, while s_{in} captures the status quo (no purchase) alternative. The error term ε_{inj} is assumed to be i.i.d. Type I extreme value.

In this framework, the MWTP for an attribute is derived by calculating the ratio of the attribute coefficient to the price coefficient ($-\boldsymbol{\beta}_i/\alpha_i$). However, when both coefficients are random, this ratio can yield a heavy-tailed distribution with undefined moments, leading to unstable estimates (Hensher et al., 2005b; Daly et al., 2012). To resolve this, I follow Train and Weeks (2005) and estimate the model directly in WTP space. This involves reparameterizing the utility function so that the coefficients represent monetary values directly:

$$U_{inj} = -\alpha_i\big(p_{inj} - \mathbf{w}_i^\top \mathbf{X}_{inj}\big) + s_{in} + \varepsilon_{inj}. \tag{2}$$

In this specification, $\mathbf{w}_i$ is the vector of random coefficients interpreted directly as the MWTP for the attribute levels. The price coefficient α_i becomes a scaling parameter representing the variance of unobserved utility, which I assume to be log-normally distributed to ensure it is strictly positive. The MWTP parameters $\mathbf{w}_i$ and the status quo parameter s_{in} are assumed to be normally distributed.

I use the MXL model to estimate the choice parameters, allowing coefficients to vary randomly across respondents to capture more realistic substitution patterns among alternatives and better reflect the distribution of MWTP. I use MXL model approach instead of the standard multinomial logit (MNL) model, with fixed coefficients because of two reasons: (i) MXL model accounts for unobserved preference heterogeneity across individuals and (ii) relaxes the independence of irrelevant alter-

natives (IIA) assumption, which implies that the relative odds of choosing between any two alternatives are unaffected by the presence or characteristics of other options.

I estimate the model using Simulated Maximum Likelihood. To approximate the high-dimensional integrals in the log-likelihood function, I use 1,000 Halton draws, which provide greater precision than pseudo-random draws (Train, 2009). Following Mariel et al. (2021), I initialize the standard deviations of the random parameters at 0.5 to facilitate convergence, while mean starting values are taken from an initial MNL estimation.

To compare MWTP estimates across experimental groups, I use 10,000 draws from the Krinsky–Robb parametric bootstrap procedure (Krinsky and Robb, 1986) and apply the combinatorial test proposed by Poe et al. (2005) to the resulting MWTP distributions. Although the Poe test is most relevant for MWTP estimates derived from preference-space models, where the ratio of two random coefficients can result in an analytically undefined distribution, I apply it to all specifications, including WTP-space estimations, to ensure full comparability between the main analysis (WTP space) and the robustness checks (which also include preference space estimations[14]). I then compute pairwise MWTP differences to estimate the effect of transparency on WTP for carbon-neutral labels, constructing 95% confidence intervals via a normal approximation that combines the robust standard errors from the independently estimated subgroup models.

To address the issue of multiple hypothesis testing–standard in experimental economics (List et al., 2019)–I adjust p-values using the Holm-Bonferroni procedure. This correction is applied to the means of the random parameters (carbon-neutral,

[14]For the preference-space estimation with all parameters specified as random, MWTP is computed as the draw-by-draw ratio of the attribute and price coefficients. The resulting distributions are winsorized at the 1st and 99th percentiles to limit the influence of extreme values arising from the heavy-tailed ratio of two random coefficients.

organic, ethical trade labels) and pairwise comparisons across experimental groups.

To understand why transparency may or may not increase MWTP, or consumers may prefer CO_2 reductions over offset, I examine several pre-registered mechanisms suggested by the literature on pro-environmental behavior. Specifically, I interact the MWTP parameter for the carbon-neutral label with the variables[15] listed in Table A.7 in Appendix A.1[16]. These variables capture mechanisms such as label trust and confusion, climate-related worry, guilt, perceived social approval, beliefs about who should bear the cost of mitigation, and constraints related to time and financial resources. I then compare the resulting coefficients across experimental groups using Wald tests. Because the 7-point Likert scale variables are mean-centered, their coefficients represent the change in MWTP associated with a one-unit increase; for dummy variables, they indicate a discrete shift compared to the reference group.

Because products frequently carry multiple sustainability claims, the marginal value of a carbon-neutral label is likely determined not only by absolute preferences for carbon-neutral claims but also by trade-offs and salience in a broader labeling environment. To explore potential crowd-out or complementarity between sustainability labels, I therefore include interaction terms between the MWTP parameter for the carbon-neutral label and the organic and ethical-trade labels. This specification enables estimation of the MWTP for the carbon-neutral label when no other label is present, when either organic or ethical-trade is present, and when both labels appear simultaneously, and it allows testing whether these differ across experimental groups

[15]Since the warm glow variable is highly correlated with the guilt and social approval variables, it is excluded from the main estimation and included in a separate robustness test that omits the other two variables.

[16]Pre-registered binary indicators identifying participants who are confused only by transparent labels but not by standard labels, and those who trust only transparent but not standard labels, based on survey questions 18 and 19 in Section E of the Appendix. The preregistered psychological and contextual variables–confusion, trust, concern, climate worry, guilt, social approval, and beliefs about the polluter-pays principle–along with resource constraints (financial and time), are measured using the statements in the first ten rows of Table A.6 in the Appendix.

in these different situations.

3 Results

3.1 Transparency and willingness to pay

In this section, I begin by presenting MWTP estimates for the carbon-neutral label across the three experimental groups: a control group which saw a standard (non-transparent) label; Treatment 1, which saw a transparent label with 95% offsetting and 5% reduction; and Treatment 2, which saw a transparent label with a 50%–50% split. I then show two key results: (i) transparency regarding the shares of CO_2 offsetting and reduction does not increase consumers' MWTP; and (ii) consumers do not show a preference for CO_2 reductions over CO_2 offsets.

I first present the MWTP estimates for the carbon-neutral label across the three experimental groups. Table 3 reports the results from a MXL model estimated in WTP space. In this specification, the estimated coefficients for the attributes, including the carbon-neutral labels, are expressed directly in monetary terms, while the corresponding standard deviations capture unobserved taste heterogeneity across respondents. The coefficients for the carbon-neutral label are positive and statistically significant at the 1% level in all three groups, indicating that respondents are willing to pay a premium for carbon neutrality. The implied MWTP is £0.55 in the control group, £0.52 in Treatment 1, and £0.32 in Treatment 2. Relative to the average product price used in the experiment (£3.90), these values correspond to 14%, 13%, and 8% of the average price, respectively.

Building on the baseline MWTP estimates, I first examine whether transparency affects consumers' MWTP, corresponding to the first main research question. Poe

tests with Holm–Bonferroni correction reported in Table 4 show no statistically significant differences between the control group and either Treatment 1 or Treatment 2.[17] Relative to the control group, MWTP is lower by £0.03 [£-0.22, £0.28] in Treatment 1 and by £0.23 [£0.00, £0.46] in Treatment 2. These correspond to reductions of about 5.8% and 41.7% of the control-group MWTP, respectively, but neither is statistically significant. Overall, there is no evidence that transparency increases MWTP for carbon-neutral labels; if anything, it slightly reduces it. [18]

The results indicate that consumers do not value CO_2 reductions more than CO_2 offsets. If reductions were preferred, MWTP should be higher in Treatment 2 than in Treatment 1. The results indicate the opposite: MWTP in Treatment 2 is about £0.20 [£-0.06, £0.45] lower than in Treatment 1, which corresponds to a reduction of about 38% of MWTP. This difference is not statistically significant after correcting for multiple comparisons (Holm–Bonferroni). Overall, an equal share of reduction and offsetting does not lead to a higher MWTP premium; if anything, it leads to valuations similar to or lower than those for the label with a higher share of offsetting, indicating no preference for carbon reductions over offsets, and vice versa.

[17] Similarly, Holm–Bonferroni-adjusted Wald tests comparing experimental groups yield Wald statistics of 0.25 ($p = 0.801$), 1.95 ($p = 0.154$), and 1.53 ($p = 0.251$) for Control vs. Treatment 1, Control vs. Treatment 2, and Treatment 1 vs. Treatment 2, respectively, indicating no statistically significant differences across groups.

[18] Appendix F reports minimum detectable effects for the pairwise group comparisons. The estimated differences are below or close to these benchmarks, indicating that large, economically meaningful differences across groups are not supported by the data.

	Full sample	Control	Treatment 1	Treatment 2
Means of parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.47***	0.55***	0.52***	0.32***
	(0.11)	(0.08)	(0.10)	(0.09)
$\text{MWTP}_{\text{Organic}}$	1.10***	1.04***	1.15***	1.13***
	(0.07)	(0.09)	(0.11)	(0.10)
$\text{MWTP}_{\text{Ethical trade}}$	1.17***	1.15***	1.14***	1.23***
	(0.07)	(0.11)	(0.12)	(0.11)
μ_{Price}	-0.17***	-0.11	-0.18***	-0.21***
	(0.04)	(0.07)	(0.06)	(0.07)
$\mu_{\text{Status quo}}$	-4.26***	-4.73***	-3.97***	-4.28***
	(0.19)	(0.33)	(0.27)	(0.29)
Standard deviations of random parameters				
$\sigma_{\text{Carbon neutral}}$	1.24***	1.31***	1.36***	1.25***
	(0.46)	(0.12)	(0.24)	(0.12)
σ_{Organic}	1.64***	1.41***	1.57***	1.69***
	(0.10)	(0.14)	(0.14)	(0.10)
$\sigma_{\text{Ethical trade}}$	1.48***	1.40***	1.43***	1.47***
	(0.12)	(0.19)	(0.15)	(0.15)
σ_{Price}	0.77***	0.78***	0.74***	0.82***
	(0.07)	(0.07)	(0.09)	(0.07)
$\sigma_{\text{Status quo}}$	2.27***	2.49***	2.12***	2.22***
	(0.13)	(0.24)	(0.18)	(0.19)
Log Likelihood	-8540.44	-2808.57	-2898.27	-2822.83
AIC	17100.88	5637.13	5816.54	5665.67
BIC	17173.54	5698.88	5878.24	5727.21
Pseudo-R^2	0.26	0.28	0.25	0.26
Number of observations	10568	3552	3536	3480
Number of participants	1321	444	442	435

This table reports results from a mixed logit model estimated in WTP space. Robust standard errors are shown in parentheses. Statistical significance is assessed using Holm–Bonferroni-adjusted p-values, applied within each experimental group to the set of four tests (the MWTP coefficients and the status quo parameter): *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table 3: Mixed logit model estimates in WTP space with all parameters specified as random

	 Control	 Treatment 1	 Treatment 2
MWTP$_{\text{Carbon neutral}}$	0.55*** (0.08)	0.52*** (0.10)	0.32*** (0.09)
Holm-Bonferroni adjusted Poe test			
Control vs Treatment 1	0.40 (p = 0.803)		
Control vs Treatment 2	0.03 (p = 0.163)		
Treatment 1 vs Treatment 2		0.07 (p = 0.261)	
Unadjusted Poe test			
Control vs Treatment 1	0.40 (p = 0.803)		
Control vs Treatment 2	0.03* (p = 0.054)		
Treatment 1 vs Treatment 2		0.07 (p = 0.131)	

MWTP estimates are reported with robust standard errors in parentheses. Significance levels: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$. Poe test statistics, together with the corresponding Holm-Bonferroni-adjusted p-values for the three pairwise comparisons across experimental groups, are reported at the top of the table, while unadjusted p-values are reported below.

Table 4: Poe test results comparing MWTP estimates for the carbon-neutral label between experimental groups

3.2 Robustness tests

The robustness tests reported in Appendix B show that the conclusions about the insignificant differences between experimental groups do not change. Because the MWTP estimates could, in principle, change based on specific utility specifications, distributional assumptions, or sample restrictions, I conduct a comprehensive set of robustness checks to assess their stability, in line with best practice in the discrete choice literature (Hensher et al., 2005a; Train, 2009).

The first set of robustness tests varies (i) whether models are estimated in preference space or WTP space and (ii) whether coefficients are treated as fixed or random. In the preference-space models, Table A.11 presents an MNL specification without random parameters, while Tables A.12 and A.13 report MXL specifications with non-monetary attributes and all parameters treated as random. In the WTP-space models,[19] Tables A.16 and A.17 report an MNL specification and an MXL specification with non-monetary attributes treated as random, respectively.

The second set of robustness tests with WTP-space models varies the simulation precision and model specification. Table A.18 doubles the number of Halton draws to 2,000; Table A.19 introduces alternative-specific error components; and Table A.20 allows for correlations among the error terms of non-monetary attributes.

The third set of robustness checks involves relaxing or tightening sample restrictions. Tables A.21, A.22, and A.23 estimate the WTP-space models by (i) including protest responses, (ii) excluding survey speeders, and (iii) excluding participants who failed attention or manipulation checks, respectively.

The corresponding Poe test results for the robustness checks, reported for preference-space estimates in Tables A.14 and for WTP-space estimates in Ta-

[19] Sensitivity checks with cost parameter starting values of 0.1 or 1 yield identical results (Table 3) and are not reported separately.

bles A.24, A.25, and A.26, show no significant differences in MWTP between groups. Across all these robustness checks, there are only two marginal exceptions: the specification with twice as many Halton draws (Table A.18) and the model that includes protest responses (Table A.21), both of which indicate marginal 10% significance for Treatment 2 versus the control group, with the corresponding Poe test results reported in Tables A.24 and A.26, respectively.

A complementary check using an open-ended CVM approach also does not change the main conclusion of no statistically significant differences in MWTP across treatments. The CVM estimates in Table A.27, based on 10,000 bootstrapped samples, yield higher WTP in Treatment 2 than in the control group and Treatment 1, in contrast to the DCE results. However, none of these differences are statistically significant after applying the Holm adjustment, again indicating no statistically robust differences in MWTP across treatments.

Finally, Appendix A.3 examines in more detail whether the effects of transparency vary by socioeconomic characteristics (income, education, age, gender, employment). In summary, none of the pairwise comparisons of interaction coefficients are statistically significant after Holm adjustment. Overall, transparency effects appear broadly similar across socioeconomic groups.

3.3 Mechanisms

In this section, I examine mechanisms that may underlie the null findings, in particular the statistically insignificant effect of transparency on MWTP for carbon-neutral labels and the absence of a preference for CO_2 reductions over offsets.

I focus on three sets of channels. First, I evaluate preregistered *psychological and contextual factors*–confusion, trust, concern, climate worry, guilt, social approval,

and beliefs about the polluter-pays principle–together with *resource constraints* (financial and time), based on statements listed in the first ten rows of Table A.6 in the Appendix. In addition, I consider preregistered binary variables that identify a subgroup of participants who are confused only by transparent labels but not by standard labels, and who trust only transparent but not standard labels, based on survey questions 18 and 19 in Section E of the Appendix. Second, I explore the role of correct *understanding* of the term "offsetting." Third, I consider *additional factors*, such as participants' familiarity with carbon-neutral labels, the perceived consequentiality of the survey (i.e., whether participants think that the survey results affect labeling or pricing policies), and attribute non-attendance for the carbon-neutral label (participants ignoring the carbon-neutral label while making choices).[20]

Table 5 reports trust and confusion patterns based on a follow-up question shown after the choice experiment, where participants were presented with all three labels. The transparent 50/50 label is reported as the most trusted (39.29%), whereas the 95% offset/5% reduction label is reported as the most confusing (34.07%). Despite these descriptive differences, I find no evidence that trust, confusion, other psychological and contextual factors, or resource constraints are associated with differences in MWTP across experimental groups. Table 6 estimates associations between MWTP and the listed preregistered factors.[21] Several variables are associated with MWTP in individual groups—trust in transparent labels, concern about offsets, social approval, and financial constraints—but none of these associations differ significantly across ex-

[20]Further factors tested include beliefs about the effectiveness of offsetting; views on putting a price on nature; moral licensing; perceptions of greenwashing; survey time, which might capture attention to the survey; a manipulation check; additional attention checks; membership in an environmental organization; and response certainty (how certain respondents are about their choices).

[21]Seven-point Likert covariates are mean-centred and treated as continuous; a one-unit change corresponds to a change in MWTP (GBP). Binary indicators for respondents who are only (i) confused by or (ii) trusting of transparent labels (but not standard labels) reflect average MWTP differences relative to the remainder of the sample.

perimental groups after Holm adjustment. That is, these factors are linked to MWTP levels but do not explain why transparency fails to increase them. These results are robust to alternative specifications shown in Tables A.28—A.33 in Appendix B.[22]

Second, the descriptive statistics in Table A.4 show limited understanding of the meaning of "CO_2 offsetting" among nearly half of participants. However, the interaction between MWTP for the carbon-neutral label and correct understanding of offsetting does not differ across experimental groups, as reported in Table A.29.[23] This suggests that correct understanding of the term "offsetting" does not translate into a higher WTP for transparency, noting that only neutral definitions were provided and potential criticisms of offsetting were not communicated.

Third, I examine an additional set of factors which may be associated with differences in MWTP between experimental groups. Familiarity with carbon-neutral labels, measured by whether respondents have purchased carbon-neutral labeled products while grocery shopping, is consistently associated with higher MWTP across all groups. Table A.30 indicates an average increase of about £1.54 associated with familiarity in the full sample. However, Holm-adjusted Wald tests do not reject equality of this association across experimental groups. Wald tests comparing experimental groups for the remaining coefficients, including perceived survey consequentiality and attribute non-attendance for the carbon-neutral label, indicate that the differences are small and not statistically significant.

[22]Without Holm–Bonferroni correction, several pairwise comparisons reach marginal or conventional significance—for example, the association between social approval and MWTP differs between the control group and Treatment 2 ($p = 0.038$), and concern about offsets differs between Treatment 1 and the control group ($p = 0.079$). However, none of these survive correction for multiple testing. Table A.28 reports the coefficients and respective discussion is available in Appendix B).

[23]Both unadjusted and Holm-adjusted Wald tests indicate no statistically significant differences for the interaction coefficient ($\text{MWTP}_{\text{Carbon neutral}} \times$ Understanding offsetting) across groups: unadjusted p-values are 0.877 (Control vs. Treatment 1; test statistic = 0.15), 0.449 (Control vs. Treatment 2; test statistic = -0.76), and 0.382 (Treatment 1 vs. Treatment 2; test statistic = -0.87), and the corresponding Holm-adjusted p-values are all 1.000.

		Full sample		Control		Treatment 1		Treatment 2	
		N	Share	N	Share	N	Share	N	Share
Trust for label 1		309	23.39%	109	24.55%	90	20.36%	110	25.29%
Trust for label 2		330	24.98%	114	25.68%	124	28.05%	92	21.15%
Trust for label 3		519	39.29%	179	40.32%	164	37.10%	176	40.46%
Trust (none)		264	19.98%	80	18.02%	97	21.95%	87	20.00%
Confusion about label 1		341	25.81%	111	25.00%	130	29.41%	100	22.99%
Confusion about label 2		450	34.07%	162	36.49%	124	28.05%	164	37.70%
Confusion about label 3		336	25.44%	106	23.87%	116	26.24%	114	26.21%
Confusion (none)		393	29.75%	131	29.50%	144	32.58%	118	27.13%

This table is based on participants' responses to the question about which label they trust most and which they find most confusing among the three label options (Label 1, Label 2, Label 3) and the 'none' option. This question was asked after the choice experiment. Multiple selections were allowed. Label 1 represents the standard carbon-neutral label. Label 2 is the transparent carbon-neutral label with 95% CO_2 offsetting and 5% CO_2 reduction. Label 3 is the transparent carbon-neutral label with an equal split between CO_2 reduction and CO_2 offsetting (50%-50%).

Table 5: Trust in and confusion about standard and transparent carbon-neutral labels

	Full sample	**Control**	**Treatment 1**	**Treatment 2**
$\text{MWTP}_{\text{Carbon neutral}}$	-0.26	-0.43	-0.25	-0.19
	(0.16)	(0.29)	(0.26)	(0.29)
Main interactions				
$\text{MWTP}_{\text{Carbon neutral}}$ × Only confused with transparent labels	0.03	0.21	0.24	-0.32
	(0.15)	(0.20)	(0.19)	(0.24)
$\text{MWTP}_{\text{Carbon neutral}}$ × Only trust transparent labels	0.65***	0.80***	0.39	0.72**
	(0.14)	(0.23)	(0.20)	(0.23)
$\text{MWTP}_{\text{Carbon neutral}}$ × Concern level	0.18***	0.08	0.30***	0.15
	(0.05)	(0.10)	(0.08)	(0.18)
$\text{MWTP}_{\text{Carbon neutral}}$ × Trust level	0.09	0.16	0.12	-0.05
	(0.05)	(0.08)	(0.07)	(0.09)
$\text{MWTP}_{\text{Carbon neutral}}$ × Confusion level	-0.03	0.01	-0.00	-0.16
	(0.06)	(0.06)	(0.06)	(0.08)
$\text{MWTP}_{\text{Carbon neutral}}$ × Climate worry	0.06	0.01	-0.05	0.25
	(0.05)	(0.10)	(0.08)	(0.22)
$\text{MWTP}_{\text{Carbon neutral}}$ × Guilt	0.12	0.15	0.11	0.13
	(0.05)	(0.07)	(0.08)	(0.13)
$\text{MWTP}_{\text{Carbon neutral}}$ × Social approval	0.18***	0.29	0.21	0.00
	(0.05)	(0.11)	(0.09)	(0.09)
$\text{MWTP}_{\text{Carbon neutral}}$ × Polluter pays	-0.02	-0.01	-0.12	0.03
	(0.04)	(0.09)	(0.06)	(0.09)
$\text{MWTP}_{\text{Carbon neutral}}$ × Financial constraints	-0.18***	-0.16	-0.15	-0.22
	(0.04)	(0.11)	(0.07)	(0.09)
$\text{MWTP}_{\text{Carbon neutral}}$ × Time restrictions	-0.02	-0.08	-0.03	0.06
	(0.04)	(0.07)	(0.06)	(0.06)
Socioeconomic interactions	Yes	Yes	Yes	Yes
Sustainability label attributes, price, status quo	Yes	Yes	Yes	Yes
Standard deviations of random parameters	Yes	Yes	Yes	Yes
Log Likelihood	-8371.60	-2746.65	-2835.84	-2756.99
AIC	16797.20	5547.30	5725.68	5567.97
BIC	16993.37	5714.04	5892.29	5734.15
Pseudo R^2	0.28	0.30	0.27	0.28
Number of observations	10568	3552	3536	3480
Number of participants	1321	444	442	435

This table presents the choice model output from the mixed logit model estimated in WTP space, including interaction variables. Robust standard errors are reported in parentheses. All parameters, except for the interaction terms, are randomized. Significance levels: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$. Significance stars in the main table are based on Holm-Bonferroni-adjusted p-values for the coefficients in the Holm set (excluding the price parameter and the standard deviations). Pre-registered binary indicators identifying participants who are confused only by transparent labels but not by standard labels, and those who trust only transparent but not standard labels, are based on survey questions 18 and 19 in Section E of the Appendix. The preregistered psychological and contextual variables–confusion, trust, concern, climate worry, guilt, social approval, and beliefs about the polluter-pays principle–along with resource constraints (financial and time), are measured using the statements in the first ten rows of Table A.6 in the Appendix.

Table 6: Mixed logit model in WTP space with interaction variables

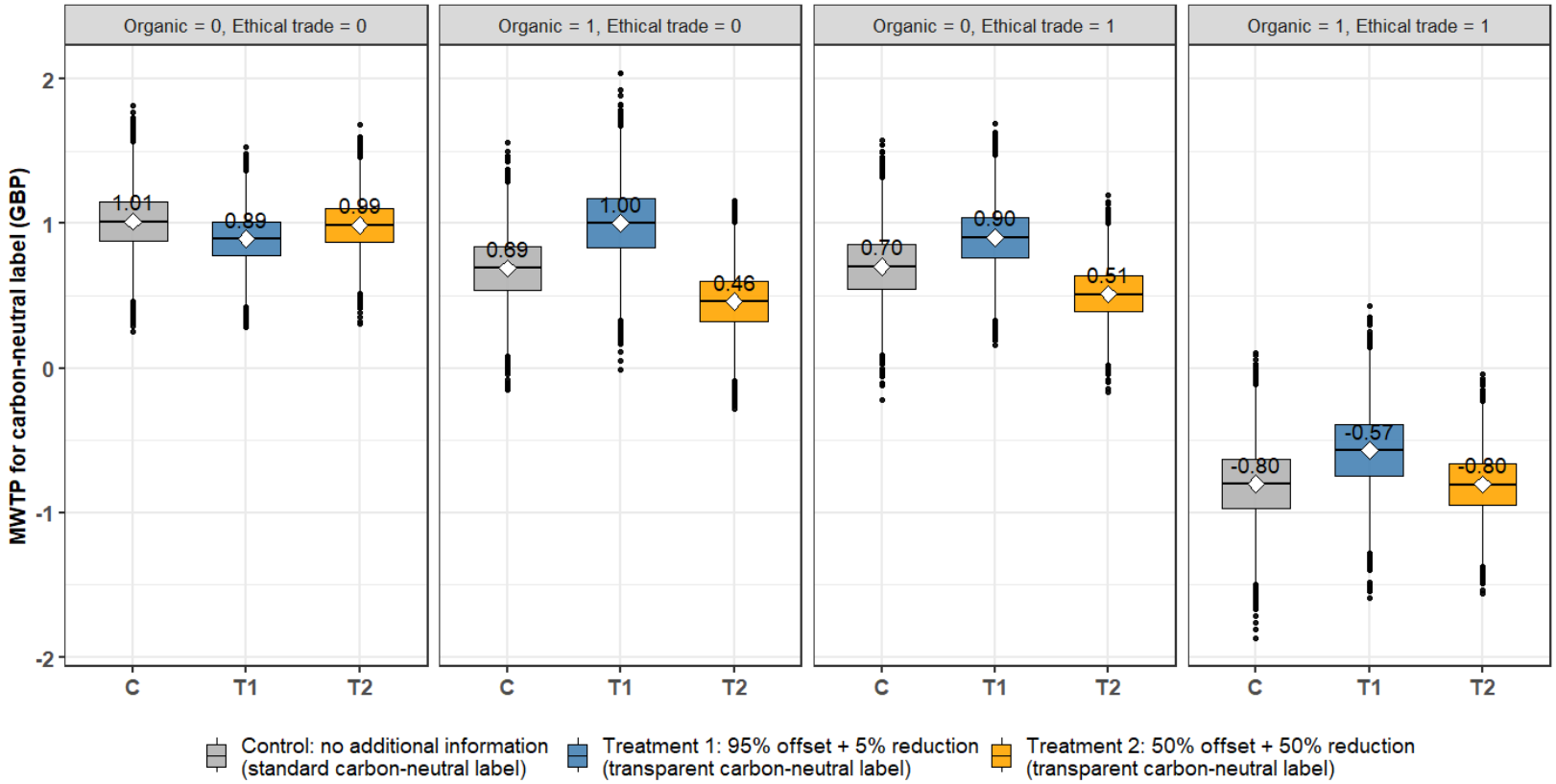
Overall, the evidence suggests that the null treatment effects are not associated with psychological and contextual factors, resource constraints, limited understanding of offsetting, or prior familiarity with carbon-neutral labels. If a confound such as confusion or limited understanding were driving these results, one would expect the corresponding interaction to differ across groups, which is not the case. Future research could explore alternative explanations, such as order effects in the presentation of offsetting and reduction on the labels or biases related to large numerical shares of offsetting versus reduction.

3.4 Competing labels

This section analyzes consumers' MWTP for two further sustainability labels on tea, organic and ethical trade, and examines how their presence changes the MWTP for transparent and standard (intransparent) versions of the carbon-neutral label.

First, I present the estimated MWTPs for each sustainability label across scenarios and show how these labels compete with each other (rather than complement each other). Second, I assess whether MWTP for the carbon-neutral label differs across experimental groups to test whether the presence of competing labels does not change the main conclusions (the null effects of transparency and of a higher CO_2 reduction share).

Table 3 reports an average MWTP of £0.47 for the carbon-neutral label, £1.10 for the organic label, and £1.17 for the ethical-trade label. Relative to the average product price of £3.90 in the choice experiment, these values correspond to approximately 12%, 28%, and 30% of the product price. Similar values are obtained in all robustness checks, including the preference-space results summarised in Table A.15 and the additional WTP-space estimates in Tables A.16-A.23.



This figure shows the MWTP estimates derived from a mixed logit model with both two-way and three-way interaction terms for sustainability labels, and correlated error terms. It displays the WTP estimates for the carbon-neutral label depending on whether the other labels are present (coded as 1) or not present (coded as 0). The corresponding choice model output is provided in Table A.36 in Appendix C.

Figure 2: MWTP for the carbon-neutral label in the presence or absence of other sustainability labels

To understand whether other sustainability claims complement or compete with the carbon-neutral claim, two-way and three-way interaction terms between the sustainability labels, as well as correlated error terms, are introduced into the MXL model. Figure 2 plots the estimated MWTP for the carbon-neutral label under four scenarios. When no other labels are present, the MWTP for the carbon-neutral label equals £1.01 in the control group, £0.89 in treatment 1, and £0.99 in treatment 2. Adding only the organic label lowers the corresponding MWTP estimates to £0.69, £1.00, and £0.46. When only the ethical trade label is present, the MWTP estimates fall to £0.70, £0.90, and £0.51. Finally, when all labels are displayed simultaneously, the WTP for the carbon-neutral claim turns negative, reaching -£0.80 in the control group, -£0.57 in treatment 1, and -£0.80 in treatment 2, and is statistically significant.

The negative interaction coefficients in Table A.36 confirm competition among the labels for the control group and treatment group 1: the three-way interaction equals –£1.18 in the control group, –£1.58 in treatment 1, and is statistically significant, and –£0.78 in treatment 2 but is statistically insignificant. While the interaction effects are smaller for the label implying a higher offsetting share, the results indicate that the two competing labels substantially erode the WTP premium otherwise paid for carbon neutrality.

Finally, I demonstrate that the presence of competing labels changes the main conclusions (i.e., the null effects of transparency and a higher CO_2 reduction share). Holm-adjusted Poe tests (Table A.38) show that, despite competition among labels, the differences between the experimental groups remain statistically insignificant. This result is robust when only two two-way interactions between the carbon-neutral label with organic and ethical-trade labels are included, and no correlations between error terms are introduced. See Table A.35 for the MXL model and Table A.37 for the Poe test results.

To sum up, although consumers value each sustainability certification, the organic and ethical-trade labels reduce, and when combined, even reverse, the additional amount they are willing to pay for a carbon-neutral label. However, in either case, there is no evidence that transparency or a higher CO_2 reduction share affects consumers' MWTP for the carbon-neutral label.

4 Conclusion

The motivation of this paper is based on the growing criticism of CO_2 offsets and increasing regulatory scrutiny of environmental claims. While carbon-neutral labels are becoming more common, many lack information on how carbon neutrality is achieved. Given that CO_2 offsets and reductions may differ substantially in their environmental effectiveness, transparency may play a key role in shaping consumers' WTP.

I find that consumers value carbon-neutral labels in general, but they do not value transparency per se, nor do they value a higher reduction share once transparency is provided. Transparent versions are valued no more than the standard label, and an equal offset-reduction split is not valued more than a label with a larger share of offsets.

I further show that organic and ethical-trade claims compete with the carbon-neutral claim and substantially erode, and when combined can even reverse, its marginal value. However, the labels' coexistence does not change the core results: neither transparency nor a higher share of CO_2 reduction leads to a statistically significant increase in MWTP.

The policy implications are as follows. First, if policymakers expect markets to sort out the quality of carbon-neutral claims because consumers reward transparency,

the evidence does not support this expectation: transparency alone is not valued. Second, if the goal is to shift demand from offsets toward reductions, simply requiring disclosure of offset and reduction shares is unlikely to achieve it. Transparency mandates are nonetheless consistent with anti-greenwashing objectives, but they may need to be complemented by communication that clearly distinguishes offsets from reductions in terms of their effectiveness in mitigating climate change, or by stricter regulation of labeling standards. Furthermore, because multiple labels can crowd out the value of carbon-neutral claims, policy could also regulate label architecture.

Three avenues for future work emerge. First, rather than testing disclosure per se, experiments could randomize clarity interventions (brief explanations and simple visuals) to assess whether improved comprehension and an emphasis on the distinction between offsets and reductions change valuations of reduction- versus offset-based neutrality. Second, experiments could vary the order in which reductions and offsets are presented and the size of the reported reduction share to test for ordering and large-number effects. Third, research could study label architecture in realistic shopping environments, examining how order, salience, and the joint display of multiple sustainability claims shape attention, crowd-out, and the marginal value of carbon-neutral claims.

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Appendix

A Survey Data

A.1 Descriptive Statistics

This section presents the descriptive statistics of the main survey data. Table A.1 includes the age, gender, education, employment, and income of the participants, while Table A.2 shows the socio-demographic comparison between tea drinkers/purchasers and never tea drinkers/purchasers. Table A.3 presents participants' tea consumption habits, including their frequency of tea drinking, purchasing habits, and preferences for tea blends. Table A.4 shows the survey clarity, attention checks, and completion time, while Table A.5 presents the levels of certainty, attendance, consequentiality, and protest responses of participants. Table A.6 presents the level of agreement with various statements using a Likert scale. Table A.7 lists the variables interacted with the carbon-neutral label attribute and their definitions. Finally, Table A.8 shows covariate balance.

Overall, the descriptive tables document three main facts. First, the three treatment groups are very similar in terms of age, gender, education, employment, and income, even when using detailed category breakdowns, with differences across groups typically within a few percentage points, which supports the credibility of the randomized design. Second, the sample largely consists of regular tea consumers for whom the choice scenario is realistic: about 78% report drinking tea daily and roughly 88% at least once a week, and most purchase tea at least monthly. Third, survey-quality indicators are reassuring: 99% of respondents report clear instructions, only about 7% report confusion with the survey, more than half perceive the choices as consequential,

and protest responses remain below 2% of the sample, while attribute non-attendance and misperceptions about offsetting versus reduction are non-negligible but similar across experimental groups.

	Full sample		Control		Treatment 1		Treatment 2	
	N	Share	N	Share	N	Share	N	Share
Sample size	1321		444		442		435	
Age								
18 - 34 years	410	31.04%	135	30.41%	134	30.32%	141	32.41%
35 - 54 years	469	35.50%	157	35.36%	158	35.75%	154	35.40%
55+ years	442	33.46%	152	34.23%	150	33.94%	140	32.18%
Gender								
Male	645	48.83%	227	51.13%	206	46.61%	212	48.74%
Female	666	50.42%	214	48.20%	231	52.26%	221	50.80%
Non-binary	9	0.68%	3	0.68%	5	1.13%	1	0.23%
I prefer not to say	1	0.08%	-	-	-	-	1	0.23%
Education								
Primary school	3	0.23%	2	0.45%	1	0.23%	-	-
Secondary school: High school or equivalent	359	27.18%	130	29.28%	124	28.05%	105	24.14%
Post-secondary vocational training (up to 1 year)	55	4.16%	16	3.60%	27	6.11%	12	2.76%
Post-secondary vocational training (2 and more years)	153	11.58%	44	9.91%	55	12.44%	54	12.41%
Post-secondary academic below-degree level qualification (up to 1 year)	80	6.06%	31	6.98%	23	5.20%	26	5.98%
Post-secondary academic below-degree level qualification (2 and more years)	171	12.94%	49	11.04%	50	11.31%	72	16.55%
Bachelors or equivalent first degree qualification (e.g., BA, BSc, BEng)	311	23.54%	111	25.00%	95	21.49%	105	24.14%
Masters or equivalent higher degree level qualification (e.g., MA, MSc, MBA)	140	10.60%	49	11.04%	47	10.63%	44	10.11%
PhD or equivalent doctoral level qualification (e.g., PhD)	39	2.95%	8	1.80%	19	4.30%	12	2.76%
None of above	10	0.76%	4	0.90%	1	0.23%	5	1.15%

This figure displays the number of participants (N) and their share.

Table A.1: Summary statistics of sociodemographics

	Full sample		Control		Treatment 1		Treatment 2	
	N	Share	N	Share	N	Share	N	Share
Sample size	1321		444		442		435	
Employment								
Full or part time employment	760	57.53%	248	55.86%	257	58.14%	255	58.62%
Self-employed	95	7.19%	32	7.21%	29	6.56%	34	7.82%
Unemployed	82	6.21%	24	5.41%	28	6.33%	30	6.90%
Retired	263	19.91%	90	20.27%	87	19.68%	86	19.77%
Looking after family or home	77	5.83%	30	6.76%	26	5.88%	21	4.83%
Full-time student	32	2.42%	14	3.15%	11	2.49%	7	1.61%
None of above	12	0.91%	6	1.35%	4	0.90%	2	0.46%
Annual household income after taxes								
Under £10,000	75	5.68%	23	5.18%	22	4.98%	30	6.90%
£10,000 - £19,999	177	13.40%	50	11.26%	62	14.03%	65	14.94%
£20,000 - £29,999	250	18.93%	85	19.14%	88	19.91%	77	17.70%
£30,000 - £39,999	174	13.17%	71	15.99%	48	10.86%	55	12.64%
£40,000 - £49,999	136	10.30%	43	9.68%	53	11.99%	40	9.20%
£50,000 - £59,999	103	7.80%	32	7.21%	34	7.69%	37	8.51%
£60,000 - £69,999	68	5.15%	24	5.41%	16	3.62%	28	6.44%
£70,000 - £79,999	49	3.71%	15	3.38%	18	4.07%	16	3.68%
£80,000 - £89,999	43	3.26%	10	2.25%	21	4.75%	12	2.76%
£90,000 - £99,999	31	2.35%	12	2.70%	9	2.04%	10	2.30%
£100,000 - £129,999	70	5.30%	22	4.95%	27	6.11%	21	4.83%
£130,000 or more	49	3.71%	16	3.60%	15	3.39%	18	4.14%
No answer	96	7.27%	41	9.23%	29	6.56%	26	5.98%
Environmental organization membership								
Member	149	11.28%	46	10.36%	55	12.44%	48	11.03%

This figure displays the number of participants (N) and their share.

Table A.1: Summary statistics of sociodemographics

	Non-tea consumers (N = 222)	**Tea consumers** (N = 1,339)	**SMD**
Descriptive statistics			
Age	Mean: 50.54 (SD: 16.78)	Mean: 47.54 (SD: 16.52)	0.180
Male, n (%)	111 (50.0%)	653 (48.8%)	0.025
Higher than post-secondary education (up to 1 year), n (%)	52 (23.4%)	491 (36.7%)	-0.292

This table displays descriptive statistics and standardized mean differences (SMDs) between tea consumers and non-tea consumers across age, gender, and education characteristics. Note that the tea consumer sample includes protest responses.

Table A.2: Comparison of tea consumers and non-tea consumers

	Full sample		Control		Treatment 1		Treatment 2	
	N	Mean	N	Mean	N	Mean	N	Mean
Sample size	1321		444		442		435	
Tea drinking frequency								
Daily	1027	77.74%	338	76.13%	343	77.60%	346	79.54%
Once a week	138	10.45%	52	11.71%	50	11.31%	36	8.28%
Once every two weeks	60	4.54%	18	4.05%	21	4.75%	21	4.83%
Once a month	35	2.65%	10	2.25%	10	2.26%	15	3.45%
Several times a year	61	4.62%	26	5.86%	18	4.07%	17	3.91%
Tea purchase frequency								
Once a week	252	19.08%	94	21.17%	83	18.78%	75	17.24%
Once every two weeks	271	20.51%	80	18.02%	98	22.17%	93	21.38%
Once a month	505	38.23%	173	38.96%	160	36.20%	172	39.54%
Several times a year	253	19.15%	83	18.69%	85	19.23%	85	19.54%
Once a year	40	3.03%	14	3.15%	16	3.62%	10	2.30%
Preferred tea blend								
Black tea	955	72.29%	317	71.40%	324	73.30%	314	72.18%
Green tea	212	16.05%	75	16.89%	62	14.03%	75	17.24%
Herbal tea	105	7.95%	36	8.11%	39	8.82%	30	6.90%
Other	49	3.71%	16	3.60%	17	3.85%	16	3.68%
Regular grocery shopping								
Carbon-neutral label	168	12.72%	54	12.16%	61	13.80%	53	12.18%
Organic label	321	24.30%	109	24.55%	111	25.11%	101	23.22%
Fair trade label	485	36.71%	169	38.06%	161	36.43%	155	35.63%
No sustainability label	249	18.85%	80	18.02%	81	18.33%	88	20.23%
Other label	26	1.97%	15	3.38%	4	0.90%	7	1.61%
No knowledge about label	391	29.60%	127	28.60%	131	29.64%	133	30.57%

This figure displays the number of participants (N), along with either their share for binary variables or their mean for continuous variables.

Table A.3: Summary statistics: tea consumption

	Full		Control		Treatment 1		Treatment 2	
	N	Mean	N	Mean	N	Mean	N	Mean
Sample size	1321		444		442		435	
Survey completion time								
Choice experiment time (min.)	1321	3.09	444	4.69	442	1.86	435	2.70
Full survey time (min.)	1321	14.61	444	16.14	442	11.41	435	16.31
Device								
Smartphone	741	56.09%	239	53.83%	260	58.82%	242	55.63%
Tablet	42	3.18%	12	2.70%	13	2.94%	17	3.91%
Desktop	538	40.73%	193	43.47%	169	38.24%	176	40.46%
Attention and manipulation								
The number of labels								
One label	65	4.92%	28	6.31%	20	4.52%	17	3.91%
Two labels	334	25.28%	103	23.20%	119	26.92%	112	25.75%
Three labels (correct resp.)	821	62.15%	281	63.29%	266	60.18%	274	62.99%
Not remember.	101	7.65%	32	7.21%	37	8.37%	32	7.36%
Percentage info. on label								
Yes (correct for treat. groups)	564	42.69%	94	21.17%	242	54.75%	228	52.41%
No (correct for control group)	273	20.67%	164	36.94%	51	11.54%	58	13.33%
I do not remember.	484	36.64%	186	41.89%	149	33.71%	149	34.25%
Definition of CO_2 offsetting								
Correct resp.	650	49.21%	223	50.23%	225	50.90%	202	46.44%
False resp. (CO_2 reduction def.)	475	35.96%	156	35.14%	149	33.71%	170	39.08%
Not remember.	196	14.84%	65	14.64%	68	15.38%	63	14.48%
Survey clarity								
Clear instructions								
No.	9	0.68%	-	-	5	1.13%	4	0.92%
Yes.	1312	99.32%	444	100.00%	437	98.87%	431	99.08%
Confusion with survey								
No.	1232	93.26%	422	95.05%	415	93.89%	395	90.80%
Yes.	89	6.74%	22	4.95%	27	6.11%	40	9.20%

This figure displays the number of participants (N), along with either their share of the total sample for binary variables or the mean for continuous variables.

Table A.4: Summary statistics: survey clarity, and attention

	Full sample		Control		Treatment 1		Treatment 2	
	N	Share	N	Share	N	Share	N	Share (%)
Certainty level (0-10)								
0-2 (very uncertain)	10	0.76%	3	0.68%	5	1.13%	2	0.46%
3-5	119	9.01%	39	8.78%	42	9.50%	38	8.74%
6-8	627	47.46%	214	48.20%	198	44.80%	215	49.43%
9-10 (very certain)	565	42.77%	188	42.34%	197	44.57%	180	41.38%
Attribute-non-attendance								
Not considered: CN label	440	33.31%	134	30.18%	154	34.84%	152	34.94%
Not considered: Organic label	450	34.07%	128	28.83%	154	34.84%	168	38.62%
Not considered: Ethical trade l.	315	23.85%	97	21.85%	108	24.43%	110	25.29%
Not considered: Price	266	20.14%	103	23.20%	73	16.52%	90	20.69%
Considered all attributes	400	30.28%	144	32.43%	138	31.22%	118	27.13%
Consequentiality								
Yes (policy and price impact).	706	53.44%	229	51.58%	253	57.24%	224	51.49%
No (no impact).	615	46.56%	215	48.42%	189	42.76%	211	48.51%
Consistent status-quo response								
Total protest responses	18	1.34%	4	0.89%	5	1.12%	9	2.03%
The products were too expensive.	10	0.75%	4	0.89%	3	0.67%	3	0.68%
I oppose one or more of the labels. [P]	3	0.22%	1	0.22%	-	-	2	0.45%
Insufficient information was provided about the labels or the products. [P]	7	0.52%	2	0.45%	2	0.45%	3	0.68%
I prefer to spend money on other social and environmental responsibility projects.	3	0.22%	1	0.22%	2	0.45%	-	-
I disagree with the way the choice question was asked. [P]	2	0.15%	-	-	-	-	2	0.45%
Other reason* [P]	6	0.45%	1	0.22%	3	0.67%	2	0.45%

This table displays the number of participants (N) and their share. Protest responses indicated by [P]. *This category includes protest responses based on various open-ended reasons. In addition to pre-specified categories, other responses were classified as protests if participants indicated that they consume only one brand, do not drink tea, or never purchase loose-leaf tea (possibly due to misinterpreting the question). One respondent mentioned that the options were expensive; however, since a pre-specified category already covered this reason, the response was coded accordingly and not classified as a protest.

Table A.5: Summary statistics: certainty, attribute-non-attendance, consequentiality, and protest responses

Statement	SD	MD	SltD	N	SltA	MA	SA
I worry about climate change.	5.98	5.45	7.57	13.02	28.08	22.79	17.11
Limited financial resources prevent me from buying climate-friendly products.	5.83	4.69	8.55	16.73	23.54	21.88	18.77
Lack of time prevents me from buying climate-friendly products.	16.35	13.02	19.53	24.30	12.94	8.71	5.15
My positive emotions increase when I choose climate-friendly products.	8.02	6.43	9.31	31.87	22.71	13.40	8.25
I feel guilty when I buy conventional products.	14.84	11.36	18.85	21.88	16.96	8.71	7.42
Most people approve of my choice of climate-friendly products.	5.53	3.71	8.10	47.16	15.97	12.34	7.19
Producers are responsible for climate change mitigation costs.	2.35	3.63	8.48	23.54	23.92	21.88	16.20
I trust carbon-neutral labels.	5.90	6.06	12.64	31.26	25.44	13.55	5.15
I am confused about carbon-neutral labels.	5.00	8.25	14.84	26.87	29.37	10.14	5.53
I am concerned about carbon offsets.	5.07	4.69	13.63	30.81	25.28	11.73	8.78
Carbon offsetting reduces carbon emissions.	5.60	4.92	12.49	31.11	27.93	12.41	5.53
Carbon offsetting allows producers to continue polluting.	1.89	2.95	8.02	30.20	30.96	15.37	10.60
Carbon offsetting is a misleading sense of relief.	2.57	1.67	6.28	27.18	32.10	19.15	11.05
Carbon offsetting is a form of greenwashing.	1.74	1.97	6.43	33.61	28.16	15.82	12.26

Values indicate the percentage of respondents who selected each agreement level. SD = Strongly Disagree, MD = Mostly Disagree, SltD = Slightly Disagree, N = Neutral, SltA = Slightly Agree, MA = Mostly Agree, SA = Strongly Agree.

Table A.6: Agreement to the list of statements - full sample

Variable	Description	Measurement
Only confused with transparent labels	Participants who are only confused with transparent labels but not with the standard labels	Binary variable (1 = yes, 0 = no)
Only trust transparent labels	Participants who only trust transparent labels but not the standard labels	Binary variable (1 = yes, 0 = no)
Concern level	Concern level about CO_2 offsetting	7-point Likert scale (mean-centered)
Confusion level	Confusion about carbon neutral labels	7-point Likert scale (mean-centered)
Trust level	Trust in carbon-neutral labels	7-point Likert scale (mean-centered)
Climate worry	Worry level about climate change	7-point Likert scale (mean-centered)
Warm glow	Positive emotions from climate-friendly purchases	7-point Likert scale (mean-centered)
Guilt	Negative emotions when not making climate-friendly choices	7-point Likert scale (mean-centered)
Social approval	Perceived acceptance by others for climate-friendly choices	7-point Likert scale (mean-centered)
Polluter pays	Belief that producers should pay for climate mitigation	7-point Likert scale (mean-centered)
Financial constraints	Limited financial resources for climate-friendly purchases	7-point Likert scale (mean-centered)
Time restrictions	Limited time for climate-friendly choices	7-point Likert scale (mean-centered)
Gender	Male respondents	Binary variable (1 = male, 0 = female, non-binary, or not disclosed)
Age	Age of the respondent	Continuous variable (mean-centered)
High education	Highest educational qualification: Bachelor's degree or higher	Binary variable (1 = bachelor's degree or higher, 0 = lower than bachelor's degree)
Employed	Employment status	Binary variable (1 = employed, 0 = unemployed, retired, full-time student, looking after family or home, other)
High income	Yearly household income equal to or greater than £50,000 after taxes	Binary variable (1 = high income, 0 = low income or not disclosed)
Not disclosed income	Participants' income information disclosure in the survey	Binary variable (1 = not disclosed, 0 = disclosed)

This table lists the covariates interacted with the carbon-neutral label to examine the factors associated with consumers' choices. Variables measured on 7-point Likert scales were converted to continuous, mean-centered variables, with higher values indicating stronger agreement and lower values indicating stronger disagreement.

Table A.7: Description of main interacted covariates

Covariate	Control (Mean)	Treatment 1 (Mean)	Treatment 2 (Mean)	C - T1 (SMD)	C - T2 (SMD)	T1 - T2 (SMD)
Only confused with transparent labels	0.45	0.38	0.50	0.15	-0.09	-0.24
Only trust transparent labels	0.57	0.58	0.55	-0.01	0.05	0.06
Confusion level	4.25	4.16	4.18	0.06	0.05	-0.01
Trust level	4.28	4.21	4.28	0.05	0.00	-0.05
Concern level (for CO_2 offsets)	4.45	4.32	4.34	0.09	0.07	-0.01
Climate worry	4.96	4.79	4.91	0.10	0.03	-0.08
Warm glow	4.43	4.20	4.21	0.15	0.14	-0.00
Guilt	3.80	3.67	3.64	0.08	0.09	0.02
Social approval	4.44	4.29	4.17	0.11	0.20	0.09
Polluter pays	4.97	4.86	4.97	0.08	0.00	-0.07
Financial constraints	4.97	4.74	4.94	0.14	0.02	-0.12
Time restrictions	3.62	3.36	3.55	0.16	0.04	-0.11
Gender (male)	0.51	0.47	0.49	0.09	0.05	-0.04
Age	47.72	47.88	46.73	-0.01	0.06	0.07
High education	0.38	0.36	0.37	0.03	0.02	-0.01
Employed	0.63	0.65	0.66	-0.03	-0.07	-0.04
High income	0.30	0.32	0.33	-0.05	-0.07	-0.02
Not disclosed income	0.09	0.07	0.06	0.10	0.12	0.02

This table continues on the next page, where table notes are provided.

Table A.8: Covariate balance

Covariate	Control (Mean)	Treatment 1 (Mean)	Treatment 2 (Mean)	C - T1 (SMD)	C - T2 (SMD)	T1 - T2 (SMD)
Effectiveness of offsetting	4.37	4.18	4.35	0.14	0.01	-0.12
Putting a price on nature	4.79	4.73	4.70	0.05	0.07	0.02
Moral licensing	4.91	4.87	4.81	0.03	0.07	0.04
Offsetting as greenwashing	4.88	4.71	4.84	0.13	0.03	-0.10
Survey time	16.14	11.41	16.31	0.11	-0.00	-0.10
Familiarity with the label	0.12	0.14	0.12	-0.05	-0.00	0.05
Manipulation checker (percentage info.)	0.50	0.51	0.46	-0.01	0.08	0.09
Attention checker (number of labels)	0.63	0.60	0.63	0.06	0.01	-0.06
Attention checker (definition of CO_2 offsetting)	0.37	0.55	0.52	-0.36	-0.32	0.05
Not consider carbon neutral label (ANA)	0.30	0.35	0.35	-0.10	-0.10	-0.00
Consequentiality	0.52	0.57	0.51	-0.11	0.00	0.12
Member of environmental organization	0.10	0.12	0.11	-0.07	-0.02	0.04
Response certainty	8.03	8.00	8.05	0.02	-0.01	-0.03

SMD refers to the standardized mean difference between experimental groups. c refers to the control group; t1 refers to treatment 1; t2 refers to treatment 2. The first part of the table includes key variables used to test mechanisms, including: only confused with transparent labels (participants confused by at least one transparent label but not the standard label), only trust transparent labels (participants who trust at least one transparent label but not the standard label), confusion level (degree of confusion about carbon-neutral labels), trust level (trust in carbon-neutral labels), concern level (for CO_2 offsets), climate worry (concern about climate change), warm glow (positive emotions from climate-friendly purchases), guilt (negative feelings when making non-climate-friendly choices), social approval (perceived social acceptance for climate-friendly behavior), polluter pays (belief that producers should bear climate mitigation costs), financial constraints (perceived financial constraints to climate-friendly purchases), and time restrictions (perceived lack of time to make climate-friendly choices). Among these, all except the two binary variables (only confused and only trust transparent labels) are measured using 7-point Likert scales. Demographic covariates include gender, age, high education (post-secondary or higher), employment status, high income (annual household income above £50,000), and undisclosed income. The part of the table reports additional covariates included as robustness checks. Among them, the following are measured using 7-point Likert scales: perceived effectiveness of offsetting (belief that offsetting reduces emissions), putting a price on nature (perception that offsetting is about putting monetary value to nature), moral licensing (belief that offsetting allows companies to pollute without real effort to reduce), and offsetting as greenwashing (belief that offsetting is a form of greenwashing). Other robustness covariates include: survey duration, familiarity with carbon-neutral labels, manipulation checker (percentage information), attention checkers (number of labels, definition of offsetting) and, attribute-non-attendance (ignoring the carbon-neutral label), consequentiality perception (whether participants believe their responses affect tea prices or label policies), environmental organization membership, and response certainty.

Table A.8: Covariate balance

A.2 Choice data

This section presents the choice experiment data. Table A.9 summarizes the overall choice design, including the different blocks, choice scenarios (cards), and respective attribute levels. Table A.10 details the specific choices available to participants within each block, presenting the number of alternatives (Alt A, Alt B, Alt SQ) and their respective distribution percentages for each choice card.

Block	Choice card	Price AltA	Price AltB	CN AltA	CN AltB	Organic AltA	Organic AltB	ET AltA	ET AltB
1	1	3.9	4.9	No	Yes	Yes	No	No	Yes
1	2	2.9	6.9	No	Yes	No	Yes	No	Yes
1	3	2.9	3.9	No	No	Yes	No	No	Yes
1	4	4.9	4.9	No	No	No	Yes	Yes	No
1	5	0.9	4.9	No	Yes	No	Yes	No	Yes
1	6	6.9	0.9	Yes	No	Yes	No	Yes	No
1	7	2.9	0.9	Yes	No	Yes	No	No	No
1	8	4.9	2.9	Yes	Yes	Yes	No	No	Yes
2	1	1.9	5.9	Yes	No	No	Yes	No	Yes
2	2	1.9	4.9	No	Yes	Yes	No	Yes	Yes
2	3	0.9	1.9	No	Yes	No	Yes	No	Yes
2	4	1.9	1.9	No	No	Yes	No	No	Yes
2	5	6.9	3.9	Yes	No	Yes	No	Yes	Yes
2	6	5.9	1.9	Yes	No	Yes	Yes	No	Yes
2	7	3.9	2.9	Yes	No	No	No	No	No
2	8	5.9	5.9	No	Yes	Yes	No	No	No

CN = Carbon-neutral label; ET = Ethical Trade label. Values in the table represent attribute levels shown on each choice card for Alternatives A and B. For the status quo option, all attribute levels take a value of 0 (i.e., the no-purchase option). Price values are in GBP. There were two blocks, shown in the first column.

Table A.9: Choice design

Block	Choice card	N Alt A	N Alt B	N Alt SQ	Total	AltA	AltB	AltSQ
1	1	319	189	168	676	47.19%	27.96%	24.85%
1	2	363	166	147	676	53.70%	24.56%	21.75%
1	3	403	172	101	676	59.62%	25.44%	14.94%
1	4	228	203	245	676	33.73%	30.03%	36.24%
1	5	309	252	115	676	45.71%	37.28%	17.01%
1	6	174	333	169	676	25.74%	49.26%	25.00%
1	7	337	284	55	676	49.85%	42.01%	8.14%
1	8	110	449	117	676	16.27%	66.42%	17.31%
2	1	433	155	75	663	65.31%	23.38%	11.31%
2	2	506	103	54	663	76.32%	15.54%	8.14%
2	3	204	420	39	663	30.77%	63.35%	5.88%
2	4	258	342	63	663	38.91%	51.58%	9.50%
2	5	123	313	227	663	18.55%	47.21%	34.24%
2	6	77	537	49	663	11.61%	81.00%	7.39%
2	7	149	296	218	663	22.47%	44.65%	32.88%
2	8	186	147	330	663	28.05%	22.17%	49.77%

This table reports the number of times each alternative was chosen in each choice card, as well as the share of respondents who selected each option. N Alt A, N Alt B, and N Alt SQ represent the number of times Alternatives A, B, and the status quo were chosen, respectively. Alt A, Alt B, and Alt SQ indicate their corresponding shares. Total refers to the total number of respondents per choice card. These results are based on the sample prior to the exclusion of protest responses.

Table A.10: Choices: detailed information

B Robustness, mechanisms and heterogeneity

A.1 Robustness tests

This section presents the estimations for robustness checks using both preference-space and WTP-space specifications and shows estimations exploring the underlying mechanisms of main findings.

Preference-space estimations are reported in Section A.1.1, and begins with the MNL model estimates in Table A.11. Next, a MXL model where label attributes treated as random (Table A.12) and then with all coefficients, including price and the status-quo, treated as random (Table A.13).

Holm-adjusted Poe statistics for WTP estimates are collected in Table A.14, and WTP point estimates derived from these preference-space models are collected in Table A.15.

Section A.1.2 repeats the same estimations directly in WTP space. It starts with a MNL model (Table A.16), proceeds to MXL (Table A.17), doubles the simulation precision with 2,000 Halton draws (Table A.18), adds alternative-specific error components (Table A.19), and introduces correlations for the error terms of non-monetary attributes (Table A.20).

Sensitivity analyses that change the starting value of the cost parameter to 0.1 or 1 (instead of 0.5) do not lead to any change in the main estimation output (Table 3 in Section 3); therefore, they are not reported separately.

Robustness to alternative samples is examined by estimating (i) the raw data of 1,339 responses without excluding protest responses (Table A.21), (ii) a dataset that excludes survey speeders (Table A.22), and (iii) a strictly-screened sample that also removes every participant who failed any manipulation or attention check (Table

A.23).

The results of the open-ended contingent-valuation question with 10,000 bootstrapped WTP samples and Holm-corrected Poe tests are summarized in Table A.27.

A.1.1 Preference space estimations

	Full sample	**Control**	**Treatment 1**	**Treatment 2**
Means of parameters				
Variable	Full Sample	Control	Treatment 1	Treatment 2
$\mu_{\text{Carbon neutral}}$	0.27***	0.31***	0.31***	0.20***
	(0.03)	(0.05)	(0.05)	(0.05)
μ_{Organic}	0.63***	0.61***	0.65***	0.63***
	(0.03)	(0.06)	(0.06)	(0.06)
$\mu_{\text{Ethical trade}}$	0.63***	0.64***	0.62***	0.62***
	(0.03)	(0.06)	(0.06)	(0.06)
μ_{Price}	-0.48***	-0.50***	-0.48***	-0.47***
	(0.02)	(0.03)	(0.03)	(0.03)
$\mu_{\text{Status quo}}$	-1.84***	-1.95***	-1.77***	-1.81***
	(0.06)	(0.11)	(0.10)	(0.10)
Log Likelihood	-9986.11	-3312.74	-3367.50	-3302.05
AIC	19982.23	6635.47	6745.01	6614.09
BIC	20018.56	6666.35	6775.86	6644.87
Pseudo R^2	0.14	0.15	0.13	0.14
Number of observations	10568	3552	3536	3480
Number of participants	1321	444	442	435

This table reports the results from a multinomial logit model estimated in preference space. Robust standard errors are shown in parentheses. P-values (Holm adjusted for 5 comparisons of the mean parameters) are used to determine statistical significance: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.11: Multinomial logit model in preference space

	Full sample	Control	Treatment 1	Treatment 2
Means of parameters				
$\mu_{\text{Carbon neutral}}$	0.30***	0.37***	0.37***	0.18***
	(0.04)	(0.07)	(0.08)	(0.07)
μ_{Organic}	0.76***	0.74***	0.80***	0.74***
	(0.05)	(0.08)	(0.08)	(0.08)
$\mu_{\text{Ethical trade}}$	0.81***	0.84***	0.80***	0.79***
	(0.05)	(0.08)	(0.08)	(0.08)
μ_{Price}	-0.67***	-0.69***	-0.67***	-0.65***
	(0.02)	(0.04)	(0.04)	(0.04)
$\mu_{\text{Status quo}}$	-2.42***	-2.54***	-2.35***	-2.38***
	(0.08)	(0.14)	(0.13)	(0.14)
Standard deviations of random parameters				
$\sigma_{\text{Carbon neutral}}$	1.18***	1.18***	1.27***	1.05***
	(0.06)	(0.10)	(0.11)	(0.11)
σ_{Organic}	1.22***	1.18***	1.24***	1.25***
	(0.06)	(0.10)	(0.09)	(0.10)
$\sigma_{\text{Ethical tade}}$	1.13***	1.18***	1.11***	1.13***
	(0.06)	(0.11)	(0.10)	(0.10)
Log Likelihood	-9218.19	-3063.44	-3098.03	-3051.75
AIC	18452.38	6142.88	6212.06	6119.50
BIC	18510.50	6192.28	6261.42	6168.74
Pseudo R^2	0.21	0.21	0.20	0.20
Number of observations	10568	3552	3536	3480
Number of participants	1321	444	442	435

This table reports results from a mixed logit model estimated in preference space. Robust standard errors are shown in parentheses. Statistical significance is assessed using Holm-adjusted p-values, applied to the set of five comparisons for the mean parameters: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.12: Mixed logit model in preference space, non-monetary parameters randomized

	Full sample	Control	Treatment 1	Treatment 2
Means of parameters				
$\mu_{\text{Carbon neutral}}$	0.46***	0.59***	0.50***	0.34***
	(0.05)	(0.08)	(0.08)	(0.08)
μ_{Organic}	0.97***	0.99***	0.97***	0.96***
	(0.05)	(0.09)	(0.09)	(0.09)
$\mu_{\text{Ethical trade}}$	1.01***	1.10***	0.97***	1.01***
	(0.05)	(0.10)	(0.09)	(0.09)
μ_{Price}	-0.23***	-0.13*	-0.25***	-0.30***
	(0.05)	(0.08)	(0.08)	(0.09)
$\mu_{\text{Status quo}}$	-5.19***	-5.93***	-4.66***	-5.41***
	(0.25)	(0.56)	(0.37)	(0.49)
Standard deviations of random parameters				
$\sigma_{\text{Carbon neutral}}$	0.83***	0.88***	0.88***	0.68***
	(0.08)	(0.14)	(0.12)	(0.14)
σ_{Organic}	1.00***	1.00***	0.99***	1.04***
	(0.07)	(0.11)	(0.11)	(0.12)
$\sigma_{\text{Ethical trade}}$	0.84***	0.93***	0.89***	0.78***
	(0.08)	(0.14)	(0.14)	(0.13)
σ_{Price}	0.92***	0.93***	0.86***	0.98***
	(0.04)	(0.08)	(0.06)	(0.07)
$\sigma_{\text{Status quo}}$	3.24***	3.78***	2.92***	3.37***
	(0.21)	(0.41)	(0.28)	(0.40)
Log Likelihood	-8248.47	-2697.14	-2811.60	-2726.17
AIC	16516.94	5414.28	5643.19	5472.34
BIC	16589.60	5476.03	5704.90	5533.89
Pseudo R^2	0.29	0.31	0.28	0.29
Number of observations	10568	3552	3536	3480
Number of participants	1321	444	442	435

Table A.13: Mixed logit model in preference space estimates, all parameters randomized

This table reports results from a mixed logit model estimated in preference space. Robust standard errors are shown in parentheses. Statistical significance is assessed using Holm-adjusted p-values, applied to the set of five comparisons for the mean parameters: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

WTP estimates derived from MNL model in preference space (Table A.11)				
	Full sample	Control	Treatment 1	Treatment 2
$\text{MWTP}_{\text{Carbon neutral}}$	0.56*** (0.06)	0.61*** (0.10)	0.65*** (0.11)	0.42*** (0.10)
Poe test: Control vs Treatment 1		0.61 (p = 0.79)		
Poe test: Control vs Treatment 2		0.09 (p = 0.37)		
Poe test: Treatment 1 vs Treatment 2			0.06 (p = 0.36)	
WTP estimates derived from MXL model in preference space, non-monetary attributes as random (Table A.12)				
	Full sample	Control	Treatment 1	Treatment 2
$\text{MWTP}_{\text{Carbon neutral}}$	0.45*** (0.06)	0.54*** (0.10)	0.56*** (0.11)	0.27*** (0.10)
Poe test: Control vs Treatment 1		0.53 (p = 0.93)		
Poe test: Control vs Treatment 2		0.03 (p = 0.16)		
Poe test: Treatment 1 vs Treatment 2			0.03 (p = 0.16)	
WTP estimates derived from MXL model in preference space, all parameters random (Table A.13)				
	Full sample	Control	Treatment 1	Treatment 2
$\text{MWTP}_{\text{Carbon neutral}}$	0.87*** (0.89)	1.04*** (1.12)	0.93*** (0.91)	0.73*** (0.85)
Poe test: Control vs Treatment 1		0.48 (p = 1.00)		
Poe test: Control vs Treatment 2		0.38 (p = 1.00)		
Poe test: Treatment 1 vs Treatment 2			0.39 (p = 1.00)	

item WTP estimates are reported with standard errors in parentheses. Significance levels: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$. Poe test statistics are provided with p-values in parentheses, which are Holm-Bonferroni adjusted for three bilateral comparisons across experimental groups.

Table A.14: Poe test results comparing MWTP estimates from preference-space models

WTP estimates derived from MNL model in preference space (Table A.11)				
	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{Carbon\ neutral}$	0.56*** (0.06)	0.61*** (0.10)	0.65*** (0.11)	0.42*** (0.10)
$MWTP_{Organic}$	1.31*** (0.06)	1.22*** (0.11)	1.37*** (0.11)	1.33*** (0.12)
$MWTP_{Ethical\ trade}$	1.29*** (0.07)	1.28*** (0.11)	1.29*** (0.12)	1.31*** (0.12)
WTP estimates derived from MXL in preference space, non-monetary parameters treated as random (Table A.12)				
	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{Carbon\ neutral}$	0.45*** (0.06)	0.54*** (0.10)	0.56*** (0.11)	0.27*** (0.10)
$MWTP_{Organic}$	1.13*** (0.06)	1.08*** (0.11)	1.19*** (0.11)	1.14*** (0.11)
$MWTP_{Ethical\ trade}$	1.20*** (0.06)	1.22*** (0.11)	1.19*** (0.11)	1.21*** (0.11)
WTP estimates derived from MXL model in preference space, all attributes and status quo as random p. (Table A.13)				
	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{Carbon\ neutral}$	0.87*** (0.89)	1.04*** (1.12)	0.93*** (0.91)	0.73*** (0.85)
$MWTP_{Organic}$	1.82*** (1.84)	1.74*** (1.84)	1.79*** (1.70)	2.06*** (2.30)
$MWTP_{Ethical\ trade}$	1.91*** (1.93)	1.93*** (2.03)	1.79*** (1.68)	2.17*** (2.42)
Number of participants	1321	444	442	435

This table shows the WTP estimates based on the choice model outputs shown in Tables A.11, A.12, and A.13. Standard errors are reported in parentheses. For the models shown in Tables A.11 and A.12, the delta method is used to derive the standard errors, whereas for the model shown in Table A.13, the Krinsky-Robb simulation with 10,000 draws is used. Holm-adjusted p-values (for three comparisons) are used to determine statistical significance: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.15: MWTP estimates for carbon-neutral, organic, and ethical trade labels

A.1.2 WTP space estimations

	Full sample	**Control**	**Treatment 1**	**Treatment 2**
Means of parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.56***	0.61***	0.65***	0.42***
	(0.06)	(0.10)	(0.11)	(0.10)
$\text{MWTP}_{\text{Organic}}$	1.31***	1.22***	1.37***	1.33***
	(0.06)	(0.11)	(0.11)	(0.12)
$\text{MWTP}_{\text{Ethical trade}}$	1.29***	1.28***	1.29***	1.31***
	(0.07)	(0.11)	(0.12)	(0.12)
μ_{Price}	-0.48***	-0.50***	-0.48***	-0.47***
	(0.02)	(0.03)	(0.03)	(0.03)
$\mu_{\text{Status quo}}$	-1.84***	-1.95***	-1.77***	-1.81***
	(0.06)	(0.11)	(0.10)	(0.10)
Log Likelihood	-9986.11	-3312.74	-3367.50	-3302.05
AIC	19982.23	6635.47	6745.01	6614.09
BIC	20018.56	6666.35	6775.86	6644.87
Pseudo R^2	0.14	0.15	0.13	0.14
Adj. R^2	0.14	0.15	0.13	0.13
Number of observations	10568	3552	3536	3480
Number of participants	1321	444	442	435

This table reports results from a multinomial logit model estimated in WTP space. Robust standard errors are shown in parentheses. Statistical significance is assessed using Holm-adjusted p-values, applied to the set of four comparisons for the WTP parameters, and the status quo: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.16: Multinomial logit model in WTP space

	Full sample	Control	Treatment 1	Treatment 2
Means of parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.45***	0.54***	0.56***	0.27***
	(0.06)	(0.10)	(0.11)	(0.10)
$\text{MWTP}_{\text{Organic}}$	1.13***	1.08***	1.19***	1.14***
	(0.06)	(0.11)	(0.11)	(0.11)
$\text{MWTP}_{\text{Ethical trade}}$	1.20***	1.22***	1.19***	1.21***
	(0.06)	(0.11)	(0.11)	(0.11)
μ_{Price}	-0.67***	-0.69***	-0.67***	-0.65***
	(0.02)	(0.04)	(0.04)	(0.04)
$\mu_{\text{Status quo}}$	-2.42***	-2.54***	-2.35***	-2.38***
	(0.08)	(0.14)	(0.13)	(0.14)
Standard deviations of random parameters				
$\sigma_{\text{Carbon neutral}}$	1.75***	1.72***	1.89***	1.61***
	(0.10)	(0.17)	(0.18)	(0.19)
σ_{Organic}	1.81***	1.70***	1.84***	1.92***
	(0.09)	(0.16)	(0.16)	(0.17)
$\sigma_{\text{Ethical trade}}$	1.69***	1.71***	1.65***	1.73***
	(0.09)	(0.16)	(0.16)	(0.16)
Log Likelihood	-9218.19	-3063.44	-3098.03	-3051.75
AIC	18452.38	6142.88	6212.06	6119.50
BIC	18510.50	6192.28	6261.42	6168.74
Pseudo R^2	0.21	0.21	0.20	0.20
Number of observations	10568	3552	3536	3480
Number of participants	1321	444	442	435

This table reports results from a mixed logit model estimated in WTP space. Robust standard errors are shown in parentheses. Statistical significance is assessed using Holm-adjusted p-values, applied to the set of four comparisons for the WTP parameters, and the status quo: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.17: Mixed logit model in WTP space, non-monetary parameters treated as random

	Full sample	Control	Treatment 1	Treatment 2
Means of the parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.45***	0.53***	0.54***	0.25***
	(0.06)	(0.09)	(0.10)	(0.08)
$\text{MWTP}_{\text{Organic}}$	1.09***	1.03***	1.16***	1.11***
	(0.05)	(0.09)	(0.10)	(0.14)
$\text{MWTP}_{\text{Ethical trade}}$	1.16***	1.15***	1.17***	1.17***
	(0.06)	(0.09)	(0.12)	(0.13)
μ_{Price}	-0.17***	-0.11	-0.20***	-0.21***
	(0.04)	(0.07)	(0.07)	(0.08)
$\mu_{\text{Status quo}}$	-4.36***	-4.82***	-3.96***	-4.36***
	(0.18)	(0.36)	(0.26)	(0.33)
Standard deviations of random parameters				
$\sigma_{\text{Carbon neutral}}$	1.17***	1.13***	1.44***	0.98***
	(0.22)	(0.26)	(0.22)	(0.09)
σ_{Organic}	1.58***	1.47***	1.58***	1.67***
	(0.08)	(0.14)	(0.13)	(0.27)
$\sigma_{\text{Ethical trade}}$	1.47***	1.44***	1.45***	1.49***
	(0.09)	(0.13)	(0.15)	(0.21)
σ_{Price}	0.82***	0.81***	0.72***	0.85***
	(0.06)	(0.08)	(0.07)	(0.07)
$\sigma_{\text{Status quo}}$	2.30***	2.61***	2.08***	2.32***
	(0.13)	(0.25)	(0.20)	(0.24)
Log Likelihood	-8536.84	-2808.48	-2898.52	-2823.37
AIC	17093.68	5636.96	5817.04	5666.73
BIC	17166.34	5698.71	5878.75	5728.28
Pseudo R^2	0.26	0.28	0.25	0.26
Number of Observations	10568	3552	3536	3480
Number of Participants	1321	444	442	435

This table reports results from a mixed logit model estimated in WTP space. Robust standard errors are shown in parentheses. Statistical significance is assessed using Holm-adjusted p-values, applied to the set of four comparisons for the WTP parameters, and the status quo: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.18: Mixed logit model in WTP space with 2000 Halton draws

	Full sample	Control	Treatment 1	Treatment 2
Means of the parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.47***	0.55***	0.52***	0.32***
	(0.11)	(0.08)	(0.10)	(0.08)
$\text{MWTP}_{\text{Organic}}$	1.10***	1.04***	1.15***	1.14***
	(0.08)	(0.09)	(0.11)	(0.10)
$\text{MWTP}_{\text{Ethical trade}}$	1.17***	1.16***	1.14***	1.23***
	(0.07)	(0.11)	(0.12)	(0.11)
μ_{Price}	-0.17***	-0.11	-0.18***	-0.21***
	(0.04)	(0.07)	(0.07)	(0.07)
$\mu_{\text{Status quo}}$	-4.26***	-4.73***	-3.97***	-4.29***
	(0.19)	(0.33)	(0.27)	(0.29)
Standard deviations of random parameters				
$\sigma_{\text{Carbon neutral}}$	1.24***	1.31***	1.37***	1.25***
	(0.47)	(0.12)	(0.25)	(0.12)
σ_{Organic}	1.64***	1.41***	1.57***	1.68***
	(0.10)	(0.14)	(0.14)	(0.11)
$\sigma_{\text{Ethical trade}}$	1.48***	1.40***	1.43***	1.47***
	(0.12)	(0.19)	(0.15)	(0.15)
σ_{Price}	0.77***	0.78***	0.74***	0.82***
	(0.07)	(0.07)	(0.09)	(0.08)
$\sigma_{\text{Status quo}}$	2.27***	2.49***	2.13***	2.22***
	(0.13)	(0.24)	(0.19)	(0.19)
Alternative specific error components				
$\sigma_{\text{Alternative 1}}$	0.02	-0.03	-0.12	0.13
	(0.05)	(0.05)	(0.15)	(0.14)
$\sigma_{\text{Alternative 2}}$	-0.00	-0.05	-0.11	0.06
	(0.10)	(0.06)	(0.18)	(0.18)
Log Likelihood	-8540.42	-2808.50	-2898.05	-2822.61
AIC	17104.84	5641.01	5820.10	5669.21
BIC	17192.03	5715.11	5894.15	5743.07
Pseudo R^2	0.26	0.28	0.25	0.26
Number of observations	10568	3552	3536	3480
Number of participants	1321	444	442	435

This table reports results from a mixed logit model estimated in WTP space. Robust standard errors are shown in parentheses. Statistical significance is assessed using Holm-adjusted p-values, applied to the set of four comparisons for the WTP parameters, and the status quo: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.19: Mixed logit model in WTP space with alternative specific error components

	Full sample	Control	Treatment 1	Treatment 2
Means of the parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.44***	0.47***	0.48***	0.41***
	(0.07)	(0.08)	(0.10)	(0.10)
$\text{MWTP}_{\text{Organic}}$	1.11***	1.00***	1.17***	1.16***
	(0.07)	(0.08)	(0.13)	(0.10)
$\text{MWTP}_{\text{Ethical trade}}$	1.17***	1.10***	1.19***	1.20***
	(0.07)	(0.09)	(0.12)	(0.10)
μ_{Price}	-0.20***	-0.12*	-0.23***	-0.23***
	(0.04)	(0.07)	(0.07)	(0.08)
$\mu_{\text{Status quo}}$	-4.32***	-4.88***	-4.00***	-4.40***
	(0.18)	(0.36)	(0.27)	(0.32)
Standard deviations of random parameters				
$\sigma_{\text{Carbon neutral}}$	0.62***	0.53***	0.59***	0.66***
	(0.13)	(0.14)	(0.18)	(0.14)
σ_{Organic}	1.50***	1.35***	1.55***	1.54***
	(0.09)	(0.11)	(0.15)	(0.15)
$\sigma_{\text{Ethical trade}}$	1.16***	1.18***	1.27***	1.17***
	(0.10)	(0.12)	(0.16)	(0.19)
σ_{Price}	0.75***	0.81***	0.71***	0.80***
	(0.04)	(0.07)	(0.08)	(0.06)
$\sigma_{\text{Status quo}}$	2.38***	2.72***	2.24***	2.42***
	(0.13)	(0.29)	(0.19)	(0.23)
Covariances				
Cov (Carbon neutral, Organic)	0.57***	0.40***	0.74***	0.59***
	(0.09)	(0.10)	(0.16)	(0.12)
Cov (Carbon neutral, Ethical trade)	0.78***	0.77***	0.71***	0.75***
	(0.07)	(0.08)	(0.12)	(0.10)
Cov (Organic, Ethical trade)	0.28***	0.51***	0.27***	0.20**
	(0.07)	(0.09)	(0.09)	(0.09)
Log Likelihood	-8378.83	-2748.89	-2843.16	-2771.04
AIC	16783.65	5523.78	5712.31	5568.07
BIC	16878.11	5604.05	5792.53	5648.09
Pseudo R^2	0.28	0.30	0.27	0.28
Number of Observations	10568	3552	3536	3480
Number of Participants	1321	444	442	435

This table reports results from a mixed logit model estimated in WTP space. Robust standard errors are shown in parentheses. Statistical significance is assessed using Holm-adjusted p-values, applied to the set of four comparisons for the WTP parameters, and the status quo: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.20: Mixed logit model in WTP space with correlated error terms

	Full sample	Control	Treatment 1	Treatment 2
Means of the parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.44***	0.53***	0.48***	0.24***
	(0.06)	(0.09)	(0.09)	(0.08)
$\text{MWTP}_{\text{Organic}}$	1.07***	1.06***	1.04***	1.13***
	(0.06)	(0.10)	(0.09)	(0.10)
$\text{MWTP}_{\text{Ethical trade}}$	1.13***	1.16***	1.09***	1.15***
	(0.06)	(0.11)	(0.10)	(0.09)
μ_{Price}	-0.15***	-0.11	-0.18**	-0.17**
	(0.04)	(0.07)	(0.07)	(0.08)
$\mu_{\text{Status quo}}$	-4.42***	-4.78***	-4.03***	-4.56***
	(0.19)	(0.33)	(0.26)	(0.38)
Standard deviations of random parameters				
$\sigma_{\text{Carbon neutral}}$	1.21***	1.25***	1.50***	-0.74***
	(0.16)	(0.19)	(0.25)	(0.21)
σ_{Organic}	1.57***	1.50***	1.54***	1.71***
	(0.09)	(0.16)	(0.08)	(0.09)
$\sigma_{\text{Ethical trade}}$	1.36***	1.41***	1.38***	1.55***
	(0.09)	(0.16)	(0.17)	(0.09)
σ_{Price}	0.85***	0.80***	0.81***	0.97***
	(0.05)	(0.08)	(0.08)	(0.11)
$\sigma_{\text{Status quo}}$	2.49***	2.64***	2.22***	2.74***
	(0.14)	(0.24)	(0.22)	(0.26)
Log Likelihood	-8609.12	-2827.09	-2918.09	-2855.94
AIC	17238.24	5674.18	5856.17	5731.87
BIC	17311.03	5736.02	5917.99	5793.62
Pseudo R^2	0.27	0.28	0.26	0.27
Number of observations	10712	3584	3576	3552
Number of participants	1339	448	447	444

This table reports results from a mixed logit model estimated in WTP space. Robust standard errors are shown in parentheses. Statistical significance is assessed using Holm-adjusted p-values, applied to the set of four comparisons for the WTP parameters, and the status quo: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.21: Mixed logit model in WTP space, with the sample including protest responses

	Full sample	Control	Treatment 1	Treatment 2
Means of the parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.47***	0.56***	0.51***	0.31***
	(0.05)	(0.09)	(0.13)	(0.11)
$\text{MWTP}_{\text{Organic}}$	1.10***	1.10***	1.12***	1.12***
	(0.07)	(0.11)	(0.11)	(0.12)
$\text{MWTP}_{\text{Ethical trade}}$	1.14***	1.15***	1.09***	1.15***
	(0.07)	(0.11)	(0.11)	(0.11)
μ_{Price}	-0.11***	-0.04	-0.15**	-0.14*
	(0.04)	(0.07)	(0.07)	(0.08)
$\mu_{\text{Status quo}}$	-4.30***	-4.73***	-3.96***	-4.30***
	(0.17)	(0.37)	(0.29)	(0.33)
Standard deviations of random parameters				
$\sigma_{\text{Carbon neutral}}$	1.24***	1.18***	1.42***	1.17**
	(0.12)	(0.22)	(0.48)	(0.47)
σ_{Organic}	1.57***	1.40***	1.59***	1.64***
	(0.09)	(0.14)	(0.18)	(0.18)
$\sigma_{\text{Ethical trade}}$	1.44***	1.39***	1.31***	1.33***
	(0.12)	(0.16)	(0.23)	(0.18)
σ_{Price}	0.76***	0.72***	0.70***	0.80***
	(0.05)	(0.10)	(0.10)	(0.08)
$\sigma_{\text{Status quo}}$	2.28***	2.62***	2.05***	2.30***
	(0.13)	(0.25)	(0.23)	(0.24)
Log Likelihood	-8070.32	-2637.56	-2721.75	-2704.60
AIC	16160.65	5295.12	5463.50	5429.21
BIC	16232.79	5356.31	5524.63	5490.36
Pseudo-R^2	0.27	0.29	0.26	0.26
Number of observations	10040	3360	3336	3344
Number of participants	1255	420	417	418

This table reports results from a mixed logit model estimated in WTP space. Robust standard errors are shown in parentheses. Statistical significance is assessed using Holm-adjusted p-values, applied to the set of four comparisons for the WTP parameters, and the status quo: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.22: Mixed logit model in WTP space, all parameters randomized, without survey speeders

	Full sample	Control	Treatment 1	Treatment 2
Means of the parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.89***	0.97***	1.05***	0.69***
	(0.13)	(0.27)	(0.24)	(0.21)
$\text{MWTP}_{\text{Organic}}$	1.17***	1.39***	0.92***	1.21***
	(0.15)	(0.28)	(0.22)	(0.26)
$\text{MWTP}_{\text{Ethical trade}}$	1.19***	1.68***	0.75***	1.24***
	(0.13)	(0.34)	(0.23)	(0.21)
μ_{Price}	0.04	0.22	-0.02	-0.03
	(0.08)	(0.13)	(0.11)	(0.15)
$\mu_{\text{Status quo}}$	-4.20***	-4.65***	-3.80***	-4.50***
	(0.40)	(0.91)	(0.56)	(0.78)
Standard deviations of random parameters				
$\sigma_{\text{Carbon neutral}}$	1.65***	1.46***	1.56***	1.80***
	(0.21)	(0.38)	(0.31)	(0.20)
σ_{Organic}	1.66***	1.76***	1.26***	1.75***
	(0.19)	(0.31)	(0.33)	(0.19)
$\sigma_{\text{Ethical trade}}$	1.27***	1.74***	1.16***	0.96***
	(0.15)	(0.46)	(0.35)	(0.30)
σ_{Price}	0.53***	0.31	0.38**	0.81***
	(0.11)	(0.20)	(0.18)	(0.20)
$\sigma_{\text{Status quo}}$	2.13***	2.57***	1.79***	2.44***
	(0.29)	(0.59)	(0.45)	(0.52)
Log Likelihood	-1434.68	-365.32	-524.64	-531.90
AIC	2889.35	750.64	1069.27	1083.81
BIC	2944.44	792.70	1114.01	1129.03
Pseudo-R^2	0.28	0.33	0.26	0.29
Number of observations	1824	496	648	680
Number of participants	228	62	81	85

This table reports results from a mixed logit model estimated in WTP space. Robust standard errors are shown in parentheses. Statistical significance is assessed using Holm-adjusted p-values, applied to the set of four comparisons for the WTP parameters, and the status quo: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.23: Mixed logit model in WTP space, excluding protest responses, survey speeders, and attention/manipulation test failers

WTP estimates: MNL model, WTP space (Table A.16)				
	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{Carbon\ neutral}$	0.56*** (0.06)	0.61*** (0.10)	0.65*** (0.11)	0.42*** (0.10)
Poe test: Control vs Treatment 1		0.61 (p = 0.78)		
Poe test: Control vs Treatment 2		0.09 (p = 0.37)		
Poe test: Treatment 1 vs Treatment 2			0.06 (p = 0.36)	
WTP estimates: MXL model, WTP space, label attributes as random parameters (Table A.17)				
	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{Carbon\ neutral}$	0.45*** (0.06)	0.54*** (0.10)	0.56*** (0.11)	0.27*** (0.10)
Poe test: Control vs Treatment 1		0.54 (p = 0.919)		
Poe test: Control vs Treatment 2		0.03 (p = 0.172)		
Poe test: Treatment 1 vs Treatment 2			0.03 (p = 0.172)	
WTP estimates: MXL model, WTP space, all parameters as random, using twice as many Halton draws (Table A.18)				
	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{Carbon\ neutral}$	0.45*** (0.06)	0.53*** (0.09)	0.54*** (0.10)	0.25*** (0.08)
Poe test: Control vs Treatment 1		0.54 (p = 0.918)		
Poe test: Control vs Treatment 2		0.01* (p = 0.069)		
Poe test: Treatment 1 vs Treatment 2			0.01* (p = 0.069)	

WTP estimates are reported with standard errors in parentheses. Significance levels: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$. Poe test statistics are provided with p-values in parentheses, which are Holm-Bonferroni adjusted for three bilateral comparisons across experimental groups.

Table A.24: Poe test results, estimations with various model specifications estimated in WTP space

WTP estimates: MXL model, WTP space, all parameters as random, error components for alternatives (Table A.19)				
	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{Carbon\ neutral}$	0.47*** (0.11)	0.55*** (0.08)	0.52*** (0.10)	0.32*** (0.08)
Poe test: Control vs Treatment 1		0.40 (p = 0.81)		
Poe test: Control vs Treatment 2		0.03 (p = 0.16)		
Poe test: Treatment 1 vs Treatment 2			0.06 (p = 0.26)	
WTP estimates: MXL model, WTP space, all parameters as random, correlated error terms (Table A.20)				
	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{carbon\ neutral}$	0.44*** (0.07)	0.47*** (0.08)	0.48*** (0.10)	0.41*** (0.10)
Poe test: Control vs Treatment 1		0.54 (p = 1.000)		
Poe test: Control vs Treatment 2		0.30 (p = 1.000)		
Poe test: Treatment 1 vs Treatment 2			0.29 (p = 1.000)	

WTP estimates are reported with standard errors in parentheses. Significance levels: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$. Poe test statistics are provided with p-values in parentheses, which are Holm-Bonferroni adjusted for three bilateral comparisons across experimental groups.

Table A.25: Poe test results, estimations with various model specifications estimated in WTP space

WTP estimates: MXL model, WTP space, including protest responses (Table A.21)				
	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{Carbon\ neutral}$	0.44*** (0.06)	0.53*** (0.09)	0.48*** (0.09)	0.24*** (0.08)
Poe test: Control vs Treatment 1		0.35 (p = 0.705)		
Poe test: Control vs Treatment 2		0.01* (p = 0.054)		
Poe test: Treatment 1 vs Treatment 2			0.03 (p = 0.105)	
WTP estimates: MXL model, WTP space, excluding protest responses and survey speeders (Table A.22)				
	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{Carbon\ neutral}$	0.47*** (0.05)	0.56*** (0.09)	0.51*** (0.13)	0.32*** (0.11)
Poe test: Control vs Treatment 1		0.38 (p = 0.756)		
Poe test: Control vs Treatment 2		0.04 (p = 0.262)		
Poe test: Treatment 1 vs Treatment 2			0.13 (p = 0.526)	
WTP estimates: MXL model, WTP space, excluding protest responses, attention/manipulation checker failers (Table A.23)				
	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{Carbon\ neutral}$	0.89***	0.97***	1.05***	0.69***
Poe test: Control vs Treatment 1		0.59 (p = 0.851)		
Poe test: Control vs Treatment 2		0.21 (p = 0.851)		
Poe test: Treatment 1 vs Treatment 2			0.13 (p = 0.806)	

WTP estimates are reported with standard errors in parentheses. Significance levels: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$. Poe test statistics are provided with p-values in parentheses, which are Holm-Bonferroni adjusted for three bilateral comparisons across experimental groups.

Table A.26: Poe test results, estimations with different sample restrictions

A.1.3 Open-ended contingent valuation method MWTP estimates

	 Control	 Treatment 1	 Treatment 2
$\mathbf{MWTP}_{\textbf{Carbon neutral}}$	4.30*** (0.16)	4.41*** (0.17)	4.75*** (0.16)
Holm-Bonferroni adjusted Poe test			
Control vs Treatment 1	0.69 (p = 0.617)		
Control vs Treatment 2	0.98 (p = 0.144)		
Treatment 1 vs Treatment 2		0.92 (p = 0.313)	
Unadjusted Poe test			
Control vs Treatment 1	0.69 (p = 0.617)		
Control vs Treatment 2	0.98 (p = 0.048)		
Treatment 1 vs Treatment 2		0.92 (p = 0.157)	

WTP estimates are based on 10,000 bootstraped samples. Significance levels: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$. Poe test statistics are reported with Holm-Bonferroni adjusted p-values (for three pairwise comparisons).

Table A.27: WTP estimates and Poe tests from the open-ended contingent valuation method

A.2 Mechanisms

This section reports the full estimation output for the robustness checks of the mechanism analysis discussed in Section 3.3. Table 6 in the main text presents the baseline interaction model estimated in WTP space with Holm–Bonferroni adjustment. The Holm correction is applied jointly to all main choice parameters (MWTP, status quo, and in preference-space specifications, the price coefficient) and all interaction terms, including both the mechanism and socioeconomic interactions.[24].

Table A.28 replicates the main interaction model without adjusting p-values for multiple hypothesis testing. Without correction, several unadjusted bilateral Wald tests are marginally significant ($p < 0.10$) across pairwise group comparisons.[25] However, none of these differences survives Holm–Bonferroni adjustment, and none reaches $p < 0.01$ even without correction.

The remaining tables examine the sensitivity of the mechanism results to alternative specifications: Table A.29 interacts MWTP with correct understanding of offsetting; Table A.30 extends the model with additional covariates; Table A.31 reports the preference-space counterpart of the model in the main text; Table A.32 reduces the interaction set to three key variables; and Table A.33 replaces guilt and social approval with warm glow (which was not included in the main model due to high correlation). Across all specifications, Holm-adjusted Wald tests do not reject equality of any interaction coefficient across experimental groups.

[24]Socioeconomic interactions are separately examined in Section A.3

[25]Specifically, $p < 0.10$ for social approval (Control vs. Treatment 2, $p = 0.038$); concern about offsets (Treatment 1 vs. Control, $p = 0.079$); trust level (Control vs. Treatment 2, $p = 0.077$); confusion level (Control vs. Treatment 2, $p = 0.094$); the binary confusion indicator for transparent labels (Control vs. Treatment 2, $p = 0.089$; Treatment 1 vs. Treatment 2, $p = 0.065$); age (Control vs. Treatment 1, $p = 0.046$); male (Treatment 1 vs. Treatment 2, $p = 0.092$); high income (Treatment 1 vs. Treatment 2, $p = 0.089$); and the status quo parameter (Control vs. Treatment 1, $p = 0.090$).

	Full sample	**Control**	**Treatment 1**	**Treatment 2**
$MWTP_{\text{Carbon neutral}}$	-0.26	-0.43	-0.25	-0.19
	(0.16)	(0.29)	(0.26)	(0.29)
Main interactions				
$MWTP_{\text{Carbon neutral}}$ × Only confused with transparent labels	0.03	0.21	0.24	-0.32
	(0.15)	(0.20)	(0.19)	(0.24)
$MWTP_{\text{Carbon neutral}}$ × Only trust transparent labels	0.65***	0.80***	0.39*	0.72***
	(0.14)	(0.23)	(0.20)	(0.23)
$MWTP_{\text{Carbon neutral}}$ × Concern level	0.18***	0.08	0.30***	0.15
	(0.05)	(0.10)	(0.08)	(0.18)
$MWTP_{\text{Carbon neutral}}$ × Trust level	0.09**	0.16**	0.12	-0.05
	(0.05)	(0.08)	(0.07)	(0.09)
$MWTP_{\text{Carbon neutral}}$ × Confusion level	-0.03	0.01	-0.00	-0.16**
	(0.06)	(0.06)	(0.06)	(0.08)
$MWTP_{\text{Carbon neutral}}$ × Climate worry	0.06	0.01	-0.05	0.25
	(0.05)	(0.10)	(0.08)	(0.22)
$MWTP_{\text{Carbon neutral}}$ × Guilt	0.12**	0.15**	0.11	0.13
	(0.05)	(0.07)	(0.08)	(0.13)
$MWTP_{\text{Carbon neutral}}$ × Social approval	0.18***	0.29***	0.21**	0.00
	(0.05)	(0.11)	(0.09)	(0.09)
$MWTP_{\text{Carbon neutral}}$ × Polluter pays	-0.02	-0.01	-0.12*	0.03
	(0.04)	(0.09)	(0.06)	(0.09)
$MWTP_{\text{Carbon neutral}}$ × Financial constraints	-0.18***	-0.16	-0.15**	-0.22**
	(0.04)	(0.11)	(0.07)	(0.09)
$MWTP_{\text{Carbon neutral}}$ × Time restrictions	-0.02	-0.08	-0.03	0.06
	(0.04)	(0.07)	(0.06)	(0.06)
Socioeconomic interactions	Yes	Yes	Yes	Yes
WTP for other sustainability label attributes, price, status quo	Yes	Yes	Yes	Yes
Standard deviations of random parameters	Yes	Yes	Yes	Yes
Log Likelihood	-8371.60	-2746.65	-2835.84	-2756.99
AIC	16797.20	5547.30	5725.68	5567.97
BIC	16993.37	5714.04	5892.29	5734.15
Pseudo R^2	0.28	0.30	0.27	0.28
Number of Observations	1056	3552	3536	3480
Number of Participants	1321	444	442	435

This table reports the choice model output from the mixed logit model estimated in WTP space. Robust standard errors are reported in parentheses. P-values and significance levels: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.28: Mixed logit model in WTP space with interactions (unadjusted for multiple hypothesis testing)

	Full sample	**Control**	**Treatment 1**	**Treatment 2**
$\text{MWTP}_{\text{Carbon neutral}}$ × Understanding the term "offsetting"	0.46***	0.37*	0.33	0.61**
	(0.13)	(0.20)	(0.21)	(0.25)
Means of parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.23***	0.36**	0.35**	0.03
	(0.07)	(0.14)	(0.13)	(0.16)
$\text{MWTP}_{\text{Organic}}$	1.08***	1.04***	1.16***	1.12***
	(0.06)	(0.09)	(0.11)	(0.11)
$\text{MWTP}_{\text{Ethical trade}}$	1.17***	1.14***	1.15***	1.18***
	(0.06)	(0.11)	(0.12)	(0.11)
$\mu_{\text{Status quo}}$	-4.29***	-4.73***	-3.97***	-4.30***
	(0.17)	(0.33)	(0.26)	(0.30)
μ_{Price}	-0.17***	-0.11	-0.18***	-0.21***
	(0.04)	(0.07)	(0.06)	(0.07)
Standard deviations of random parameters				
$\sigma_{\text{Carbon neutral}}$	1.22***	1.27***	1.37***	1.17***
	(0.13)	(0.13)	(0.22)	(0.16)
σ_{Organic}	1.59***	1.41***	1.58***	1.67***
	(0.10)	(0.15)	(0.15)	(0.13)
$\sigma_{\text{Ethical trade}}$	1.47***	1.39***	1.43***	1.42***
	(0.06)	(0.18)	(0.14)	(0.14)
σ_{Price}	0.79***	0.78***	0.73***	0.84***
	(0.04)	(0.07)	(0.09)	(0.07)
$\sigma_{\text{Status quo}}$	2.28***	2.50***	2.13***	2.25***
	(0.13)	(0.24)	(0.18)	(0.21)
Log Likelihood	-8532.81	-2806.72	-2897.00	-2818.81
AIC	17087.63	5635.45	5815.99	5659.62
BIC	17167.55	5703.37	5883.87	5727.32
Pseudo R^2	0.27	0.28	0.25	0.26
Number of observations	10568	3552	3536	3480
Number of participants	1321	444	442	435

This table reports the choice model output from the mixed logit model estimated in WTP space. Robust standard errors are reported in parentheses. Holm-adjusted p-values account for 5 comparisons (WTP parameters, the status quo, and interaction term): *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.29: Mixed logit model in WTP space, with interaction variable for participants who misunderstand the meaning of offsetting

	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{Carbon\ neutral}$	-0.48	-0.72	-0.10	-0.51
	(0.27)	(0.44)	(0.50)	(0.60)
Additional interactions				
$MWTP_{Carbon\ neutral}$ x Effectiveness of offsetting	0.04	-0.02	0.16	0.00
	(0.04)	(0.07)	(0.07)	(0.08)
$MWTP_{Carbon\ neutral}$ x Putting a price on nature	-0.01	-0.00	0.06	-0.01
	(0.05)	(0.09)	(0.09)	(0.08)
$MWTP_{Carbon\ neutral}$ x Moral licensing	0.02	0.04	-0.05	-0.02
	(0.06)	(0.10)	(0.10)	(0.11)
$MWTP_{Carbon\ neutral}$ x Offsetting as greenwashing	-0.07	-0.04	-0.17	0.04
	(0.05)	(0.09)	(0.09)	(0.10)
$MWTP_{Carbon\ neutral}$ x Survey time	-0.00	-0.00	0.00	-0.00
	(0.00)	(0.00)	(0.01)	(0.00)
$MWTP_{Carbon\ neutral}$ x Familiarity with carbon neutral label	1.54***	1.11	1.30**	2.66***
	(0.27)	(0.42)	(0.38)	(0.52)
$MWTP_{Carbon\ neutral}$ x Manipulation checker	0.12	0.14	0.12	0.07
	(0.10)	(0.19)	(0.18)	(0.18)
$MWTP_{Carbon\ neutral}$ x Attention checker (number of labels)	0.15	0.12	0.09	0.18
	(0.08)	(0.12)	(0.16)	(0.17)
$MWTP_{Carbon\ neutral}$ x Understanding the term "offsetting"	0.18	-0.07	0.18	0.37
	(0.10)	(0.16)	(0.18)	(0.18)
$MWTP_{Carbon\ neutral}$ x Not consider carbon neutral label (ANA)	-0.53***	-0.22	-0.64**	-0.63**
	(0.11)	(0.18)	(0.20)	(0.18)
$MWTP_{Carbon\ neutral}$ x Perceived consequentiality	-0.26	-0.07	-0.44	-0.18
	(0.10)	(0.16)	(0.19)	(0.18)
$MWTP_{Carbon\ neutral}$ x Environmental organization membership	0.78***	0.90	0.98	0.29
	(0.20)	(0.34)	(0.45)	(0.33)
$MWTP_{Carbon\ neutral}$ x Response certainty	-0.03	-0.00	0.02	-0.15
	(0.03)	(0.05)	(0.06)	(0.06)
Main interactions	Yes	Yes	Yes	Yes
Socioeconomic interactions	Yes	Yes	Yes	Yes
WTP for other sustainability labels, price, status quo	Yes	Yes	Yes	Yes
Standard deviations of random parameters	Yes	Yes	Yes	Yes
Log Likelihood	-8299.05	-2734.62	-2803.43	-2714.25
AIC	16678.10	5549.23	5686.85	5508.49
BIC	16968.72	5796.24	5933.69	5754.68
Pseudo-$R\hat{2}$	0.29	0.30	0.28	0.29
Number of Observations	10568	3552	3536	3480
Number of Participants	1321	444	442	435

This table reports the choice model output from the mixed logit model estimated in WTP space. Robust standard errors are reported in parentheses. Holm-adjusted p-values account for 34 comparisons (WTP parameters, the status quo, and interaction terms): *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.30: Mixed logit model in WTP space with additional interactions

	Full sample	Control	Treatment 1	Treatment 2
$\mu_{\text{Carbon neutral}}$	0.00	-0.04	0.01	-0.01
	(0.12)	(0.21)	(0.21)	(0.23)
Main interactions				
$\mu_{\text{Carbon neutral}}$ × Only confused with transparent labels	-0.19	-0.12	-0.08	-0.31
	(0.09)	(0.17)	(0.17)	(0.15)
$\mu_{\text{Carbon neutral}}$ × Only trust transparent labels	0.40***	0.50**	0.19	0.60***
	(0.10)	(0.17)	(0.18)	(0.17)
$\mu_{\text{Carbon neutral}}$ × Concern level	0.07	-0.06	0.18*	0.09
	(0.04)	(0.07)	(0.06)	(0.07)
$\mu_{\text{Carbon neutral}}$ × Trust level	0.04	0.10	0.07	-0.08
	(0.04)	(0.06)	(0.06)	(0.07)
$\mu_{\text{Carbon neutral}}$ × Confusion level	-0.05	0.00	-0.05	-0.16*
	(0.03)	(0.06)	(0.06)	(0.06)
$\mu_{\text{Carbon neutral}}$ × Climate worry	0.12**	0.13	0.02	0.25***
	(0.03)	(0.06)	(0.06)	(0.06)
$\mu_{\text{Carbon neutral}}$ × Guilt	0.07	0.11	0.04	0.07
	(0.04)	(0.06)	(0.07)	(0.06)
$\mu_{\text{Carbon neutral}}$ × Social approval	0.13**	0.17	0.16	0.01
	(0.04)	(0.07)	(0.07)	(0.07)
$\mu_{\text{Carbon neutral}}$ × Polluter pays	-0.04	-0.02	-0.09	0.03
	(0.03)	(0.06)	(0.05)	(0.06)
$\mu_{\text{Carbon neutral}}$ × Financial constraints	-0.08*	-0.10	-0.07	-0.13
	(0.03)	(0.05)	(0.05)	(0.05)
$\mu_{\text{Carbon neutral}}$ × Time restrictions	-0.08	-0.10	-0.09	-0.05
	(0.03)	(0.06)	(0.06)	(0.05)
Socioeconomic interactions	Yes	Yes	Yes	Yes
Sustainability label attributes, price, status quo	Yes	Yes	Yes	Yes
Standard deviations of random parameters	Yes	Yes	Yes	Yes
Log Likelihood	-8031.02	-2615.01	-2739.11	-2640.57
AIC	16116.05	5284.02	5532.23	5335.15
BIC	16312.22	5450.75	5698.84	5501.33
Pseudo R^2	0.31	0.33	0.29	0.31
Number of observations	10568	3552	3536	3480
Number of participants	1321	444	442	435

This table reports the choice model output from the mixed logit model estimated in preference space. Robust standard errors are reported in parentheses. Holm-adjusted p-values account for 21 comparisons (WTP parameters, the status quo, and interaction terms): *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.31: Mixed logit model in preference space estimates with interaction variables

	Full sample	**Control**	**Treatment 1**	**Treatment 2**
Interactions				
$MWTP_{Carbon\ neutral}$ x Only confused with transparent labels	-0.01	0.24	0.21	-0.35
	(0.11)	(0.20)	(0.21)	(0.17)
$MWTP_{Carbon\ neutral}$ x Only trust transparent labels	0.77***	1.04***	0.57*	0.77***
	(0.12)	(0.21)	(0.21)	(0.19)
$MWTP_{Carbon\ neutral}$ x Concern level	0.31***	0.25***	0.35***	0.30***
	(0.04)	(0.07)	(0.07)	(0.07)
Means of the parameters				
$MWTP_{Carbon\ neutral}$	-0.37*	-0.55	-0.45	-0.25
	(0.14)	(0.29)	(0.26)	(0.25)
$MWTP_{Organic}$	1.09***	1.03***	1.17***	1.10***
	(0.06)	(0.10)	(0.11)	(0.12)
$MWTP_{Ethical\ trade}$	1.17***	1.17***	1.19***	1.16***
	(0.06)	(0.13)	(0.11)	(0.10)
μ_{Price}	-0.18***	-0.12*	-0.18***	-0.21***
	(0.04)	(0.07)	(0.06)	(0.08)
$\mu_{Status\ quo}$	-4.20***	-4.63***	-3.90***	-4.22***
	(0.16)	(0.32)	(0.26)	(0.29)
Socioeconomic interactions	Yes	Yes	Yes	Yes
Standard deviations of random parameters	Yes	Yes	Yes	Yes
Log Likelihood	-8413.84	-2768.77	-2848.03	-2777.06
AIC	16865.68	5575.54	5734.06	5592.12
BIC	17003.73	5692.87	5851.30	5709.06
Pseudo R^2	0.28	0.29	0.27	0.27
Number of Observations	10568	3552	3536	3480
Number of Participants	1321	444	442	435

This table reports the choice model output from the mixed logit model estimated in WTP space. Robust standard errors are reported in parentheses. Holm-adjusted p-values account for 13 comparisons (WTP parameters, the status quo, and interaction terms): *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.32: Mixed logit model in WTP space with a smaller set of interactions

	Full sample	Control	Treatment 1	Treatment 2
$MWTP_{Carbon\ neutral}$	-0.27	-0.47	-0.17	-0.14
	(0.15)	(0.25)	(0.26)	(0.25)
Main interactions				
$MWTP_{Carbon\ neutral}$ x Only confused with transparent labels	0.02	0.21	0.15	-0.29
	(0.11)	(0.18)	(0.19)	(0.20)
$MWTP_{Carbon\ neutral}$ x Only trust transparent labels	0.66***	0.76***	0.33	0.70**
	(0.12)	(0.19)	(0.20)	(0.22)
$MWTP_{Carbon\ neutral}$ x Trust level	0.08	0.14	0.07	-0.03
	(0.05)	(0.07)	(0.07)	(0.09)
$MWTP_{Carbon\ neutral}$ x Confusion level	-0.05	0.00	0.02	-0.16
	(0.04)	(0.07)	(0.06)	(0.08)
$MWTP_{Carbon\ neutral}$ x Concern level	0.21***	0.09	0.28***	0.16
	(0.05)	(0.08)	(0.08)	(0.08)
$MWTP_{Carbon\ neutral}$ x Climate worry	0.05	0.05	-0.07	0.25**
	(0.04)	(0.07)	(0.08)	(0.08)
$MWTP_{Carbon\ neutral}$ x Warm glow	0.25***	0.31***	0.34***	0.14
	(0.06)	(0.08)	(0.10)	(0.09)
$MWTP_{Carbon\ neutral}$ x Polluter pays	-0.02	0.00	-0.11	0.02
	(0.04)	(0.07)	(0.06)	(0.07)
$MWTP_{Carbon\ neutral}$ x Financial constraints	-0.18***	-0.12	-0.16	-0.24***
	(0.04)	(0.08)	(0.07)	(0.06)
$MWTP_{Carbon\ neutral}$ x Time restrictions	-0.00	-0.05	-0.04	0.06
	(0.04)	(0.06)	(0.06)	(0.06)
Socioeconomic interactions	Yes	Yes	Yes	Yes
WTP for other sustainability labels, price, status quo	Yes	Yes	Yes	Yes
Standard deviations of random parameters	Yes	Yes	Yes	Yes
Log Likelihood	-8372.29	-2750.23	-2834.09	-2757.73
AIC	16796.58	5552.46	5720.18	5567.45
BIC	16985.49	5713.01	5880.62	5727.48
Pseudo R^2	0.28	0.30	0.27	0.28
Number of Observations	10568.00	3552.00	3536.00	3480.00
Number of Participants	1321	444	442	435

This table reports the choice model output from the mixed logit model estimated in WTP space. Robust standard errors are reported in parentheses. Holm-adjusted p-values account for 20 comparisons (WTP parameters, the status quo, and interaction terms): *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.33: Mixed logit model in WTP space with interactions (warm glow variable added)

A.3 Heterogeneity

This section examines whether the effects of transparency vary by socioeconomic characteristics (income, education, age, gender, and employment). Table A.34 reports results from an MXL specification that interacts MWTP for the carbon-neutral label with these characteristics. The interaction coefficients represent the difference in MWTP between the indicated subgroup and the reference category (e.g., high-income vs. low-income participants).

Some associations between socioeconomic variables and MWTP vary across groups in magnitude and significance. High-income participants are willing to pay £0.72 more than low-income participants for the carbon-neutral label in the control group, £0.50 more in Treatment 1, and £1.24 more in Treatment 2. Participants with a Bachelor's degree or higher are willing to pay £0.63 more in the control group and £0.76 more in Treatment 1, but the association is not significant in Treatment 2. The age interaction is negative and significant only in Treatment 1, where each additional year is associated with a £0.02 lower MWTP, suggesting that older individuals may be more skeptical of offset-heavy labels. No consistent patterns emerge for gender or employment.

However, none of these differences across experimental groups are statistically significant after Holm–Bonferroni adjustment. Without the correction, the high-income interaction differs between Treatment 1 and Treatment 2 ($p = 0.030$), but this does not survive adjustment for multiple testing ($p = 0.302$). Overall, transparency effects appear similar across socioeconomic groups.

	Full sample	**Control**	**Treatment 1**	**Treatment 2**
Socioeconomic interactions				
$\text{MWTP}_{\text{Carbon neutral}}$ x Male	0.01	-0.09	0.41	-0.15
	(0.12)	(0.23)	(0.21)	(0.23)
$\text{MWTP}_{\text{Carbon neutral}}$ x Age	-0.01	-0.00	-0.02**	-0.01
	(0.00)	(0.01)	(0.01)	(0.01)
$\text{MWTP}_{\text{Carbon neutral}}$ x High education	0.55***	0.63*	0.76**	0.40
	(0.13)	(0.25)	(0.28)	(0.27)
$\text{MWTP}_{\text{Carbon neutral}}$ x Employed	-0.09	-0.06	0.01	-0.08
	(0.13)	(0.27)	(0.25)	(0.26)
$\text{MWTP}_{\text{Carbon neutral}}$ x High income	0.75***	0.72**	0.50	1.24***
	(0.13)	(0.25)	(0.24)	(0.25)
$\text{MWTP}_{\text{Carbon neutral}}$ x Not disclosed income	-0.29	-0.68*	0.16	-0.47
	(0.16)	(0.27)	(0.40)	(0.79)
Means of parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.13	0.29	-0.09	-0.03
	(0.12)	(0.20)	(0.22)	(0.24)
$\text{MWTP}_{\text{Organic}}$	1.07***	1.05***	1.16***	1.10***
	(0.06)	(0.09)	(0.10)	(0.12)
$\text{MWTP}_{\text{Ethical trade}}$	1.16***	1.19***	1.16***	1.12***
	(0.06)	(0.10)	(0.12)	(0.11)
$\mu_{\text{Status quo}}$	-4.23***	-4.63***	-3.93***	-4.22***
	(0.17)	(0.31)	(0.26)	(0.29)
μ_{Price}	-0.17***	-0.11*	-0.18***	-0.21***
	(0.04)	(0.07)	(0.06)	(0.07)
Standard deviations of random parameters	Yes	Yes	Yes	Yes
Log Likelihood	-8480.40	-2790.12	-2869.27	-2800.80
AIC	16992.80	5612.25	5770.55	5633.59
BIC	17109.05	5711.05	5869.28	5732.07
Pseudo R^2	0.27	0.28	0.26	0.27
Number of observations	10568	3552	3536	3480
Number of participants	1321	444	442	435

This table reports the choice model output from the mixed logit model estimated in WTP space. Robust standard errors are reported in parentheses. Holm-adjusted p-values account for 10 comparisons (WTP parameters, the status quo, and interaction terms): *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.34: Mixed logit model in WTP space with socio-economic interactions

C Competing labels

This section explores how the presence or absence of organic and ethical-trade labels is associated with the valuation of the carbon-neutral label. Two-way and three-way interaction estimates, along with correlated error terms, are presented in Table A.36. A more basic model, including only two of the two-way interactions and excluding correlated errors, is presented in Table A.35. The implied scenario-specific WTPs and their Poe comparisons are reported in Table A.38 for the full interaction model and in Table A.37 for the basic model.

	Full sample	**Control**	**Treatment 1**	**Treatment 2**
Means of the parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.91***	1.01***	0.86***	0.84***
	(0.10)	(0.20)	(0.17)	(0.17)
$\text{MWTP}_{\text{Organic}}$	1.38***	1.35***	1.36***	1.45***
	(0.08)	(0.15)	(0.15)	(0.19)
$\text{MWTP}_{\text{Ethical trade}}$	1.43***	1.45***	1.38***	1.51***
	(0.09)	(0.18)	(0.21)	(0.20)
μ_{Price}	-0.18***	-0.12	-0.19***	-0.22***
	(0.04)	(0.07)	(0.07)	(0.08)
$\mu_{\text{Status quo}}$	-4.12***	-4.51***	-3.82***	-4.13***
	(0.17)	(0.33)	(0.28)	(0.31)
Interactions				
$\text{MWTP}_{\text{Carbon neutral}}$ x $\text{MWTP}_{\text{Organic}}$	-0.65***	-0.73**	-0.46	-0.73***
	(0.13)	(0.29)	(0.25)	(0.25)
$\text{MWTP}_{\text{Carbon neutral}}$ x $\text{MWTP}_{\text{Ethical trade}}$	-0.52***	-0.47**	-0.42	-0.54***
	(0.12)	(0.21)	(0.23)	(0.18)
Standard deviations of random parameters	Yes	Yes	Yes	Yes
Log Likelihood	-8517.55	-2800.77	-2893.98	-2813.97
AIC	17059.10	5625.53	5811.97	5651.95
BIC	17146.29	5699.64	5886.01	5725.80
Pseudo R^2	0.27	0.28	0.26	0.26
Number of observations	10568.00	3552.00	3536.00	3480.00
Number of participants	1321	444	442	435

This table reports the choice model output from the MXL model estimated in WTP space. Robust standard errors are reported in parentheses. Holm-adjusted p-values account for 6 comparisons (WTP parameters, the status quo, and interaction terms): *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.35: Mixed logit model in WTP space, with sustainability label interactions, no correlated errors

	Full sample	**Control**	**Treatment 1**	**Treatment 2**
Means of the parameters				
$\text{MWTP}_{\text{Carbon neutral}}$	0.95***	1.01***	0.89***	0.99***
	(0.15)	(0.20)	(0.17)	(0.18)
$\text{MWTP}_{\text{Organic}}$	1.70***	1.60***	1.80***	1.70***
	(0.20)	(0.36)	(0.18)	(0.17)
$\text{MWTP}_{\text{Ethical trade}}$	1.75***	1.70***	1.80***	1.73***
	(0.21)	(0.33)	(0.20)	(0.16)
β_{Price}	-0.17***	-0.10	-0.19***	-0.20***
	(0.05)	(0.07)	(0.06)	(0.08)
$\beta_{\text{Status quo}}$	-4.02***	-4.56***	-3.77***	-4.23***
	(0.23)	(0.38)	(0.28)	(0.34)
Interactions				
$\text{MWTP}_{\text{Carbon neutral}}$ x $\text{MWTP}_{\text{Organic}}$	-0.21	-0.32	0.11	-0.53
	(0.19)	(0.32)	(0.30)	(0.30)
$\text{MWTP}_{\text{Carbon neutral}}$ x $\text{MWTP}_{\text{Ethical trade}}$	-0.22	-0.31	0.01	-0.48
	(0.17)	(0.26)	(0.28)	(0.24)
$\text{MWTP}_{\text{Organic}}$ x $\text{MWTP}_{\text{Ethical trade}}$	-0.34	-0.29	-0.54	-0.26
	(0.18)	(0.39)	(0.29)	(0.25)
$\text{MWTP}_{\text{Carbon neutral}}$ x $\text{MWTP}_{\text{Organic}}$ x $\text{MWTP}_{\text{Ethical trade}}$	-1.29***	-1.18***	-1.58***	-0.78
	(0.29)	(0.38)	(0.45)	(0.37)
Covariances				
Cov (Carbon neutral, Organic)	0.69***	0.52***	0.81***	0.67***
	(0.14)	(0.12)	(0.14)	(0.09)
Cov (Carbon neutral, Ethical trade)	0.91***	0.95***	0.88***	0.76***
	(0.21)	(0.20)	(0.13)	(0.08)
Cov (Organic, Ethical trade)	0.41***	0.63***	0.42***	0.34***
	(0.10)	(0.12)	(0.11)	(0.08)
Standard deviations of random parameters	Yes	Yes	Yes	Yes
Log Likelihood	-8302.66	-2721.48	-2813.28	-2746.64
AIC	16639.32	5476.96	5660.55	5527.28
BIC	16762.83	5581.94	5765.46	5631.92
Pseudo R^2	0.28	0.30	0.28	0.28
Number of observations	10568	3552	3536	3480
Number of participants	1321	444	442	435

This table reports the choice model output from the MXL model estimated in WTP space. Robust standard errors are reported in parentheses. Holm-adjusted p-values account for 8 comparisons (WTP parameters, the status quo, and interaction terms): *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$.

Table A.36: Mixed logit model in WTP space, with sustainability label interactions, correlated errors

WTP estimates: MXL model, WTP space, Org=0, ET=0 (Table A.35)				
	Full sample	Control	Treatment 1	Treatment 2
WTP_{CN}(Org=0,ET=0)	0.91*** (0.10)	1.01*** (0.21)	0.86*** (0.18)	0.83*** (0.17)
Poe test: Control vs Treatment 1		0.29 (p = 1.000)		
Poe test: Control vs Treatment 2		0.25 (p = 1.000)		
Poe test: Treatment 1 vs Treatment 2			0.46 (p = 1.000)	
WTP estimates: MXL model, WTP space, Org=0, ET=1 (Table A.35)				
	Full sample	Control	Treatment 1	Treatment 2
WTP_{CN}(Org=0,ET=1)	0.40*** (0.08)	0.55*** (0.12)	0.44*** (0.14)	0.30** (0.15)
Poe test: Control vs Treatment 1		0.29 (p = 0.952)		
Poe test: Control vs Treatment 2		0.09 (p = 0.567)		
Poe test: Treatment 1 vs Treatment 2			0.24 (p = 0.952)	
WTP estimates: MXL model, WTP space, Org=1, ET=0 (Table A.35)				
	Full sample	Control	Treatment 1	Treatment 2
WTP_{CN}(Org=1,ET=0)	0.26*** (0.09)	0.28 (0.19)	0.40** (0.19)	0.11 (0.18)
Poe test: Control vs Treatment 1		0.67 (p = 1.000)		
Poe test: Control vs Treatment 2		0.26 (p = 1.000)		
Poe test: Treatment 1 vs Treatment 2			0.14 (p = 0.822)	
WTP estimates: MXL model, WTP space, Org=1, ET=1 (Table A.35)				
	Full sample	Control	Treatment 1	Treatment 2
WTP_{CN}(Org=1,ET=1)	-0.25* (0.15)	-0.18 (0.26)	-0.02 (0.28)	-0.43 (0.26)
Poe test: Control vs Treatment 1		0.67 (p = 1.000)		
Poe test: Control vs Treatment 2		0.25 (p = 1.000)		
Poe test: Treatment 1 vs Treatment 2			0.14 (p = 0.851)	

WTP estimates are reported with standard errors in parentheses. Significance levels: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$. Poe test statistics are provided with p-values in parentheses, which are Holm-Bonferroni adjusted for three bilateral comparisons across experimental groups. CN stands for carbon-neutral, Org for Organic, and ET for Ethical Trade. A value of 0 indicates that the label is present on the choice card, while 1 indicates that it is absent.

Table A.37: Poe test results for competing label scenarios in a model with two-way interactions

WTP estimates: MXL model, WTP space, Org=0, ET=0 (Table A.36)				
	Full sample	Control	Treatment 1	Treatment 2
WTP_{CN}(Org=0,ET=0)	0.95*** (0.15)	1.01*** (0.20)	0.89*** (0.17)	0.99*** (0.18)
Poe test: Control vs Treatment 1		0.32 (p = 1.000)		
Poe test: Control vs Treatment 2		0.47 (p = 1.000)		
Poe test: Treatment 1 vs Treatment 2			0.66 (p = 1.000)	
WTP estimates: MXL model, WTP space, Org=0, ET=1 (Table A.36)				
	Full sample	Control	Treatment 1	Treatment 2
WTP_{CN}(Org=0,ET=1)	0.73*** (0.19)	0.70*** (0.23)	0.90*** (0.21)	0.51*** (0.18)
Poe test: Control vs Treatment 1		0.74 (p = 1.000)		
Poe test: Control vs Treatment 2		0.25 (p = 1.000)		
Poe test: Treatment 1 vs Treatment 2			0.08 (p = 0.476)	
WTP estimates: MXL model, WTP space, Org=1, ET=0 (Table A.36)				
	Full sample	Control	Treatment 1	Treatment 2
WTP_{CN}(Org=1,ET=0)	0.74*** (0.20)	0.69*** (0.22)	1.00*** (0.25)	0.46** (0.20)
Poe test: Control vs Treatment 1		0.82 (p = 0.709)		
Poe test: Control vs Treatment 2		0.22 (p = 0.709)		
Poe test: Treatment 1 vs Treatment 2			0.05 (p = 0.271)	
WTP estimates: MXL model, WTP space, Org=1, ET=1 (Table A.36)				
	Full sample	Control	Treatment 1	Treatment 2
WTP_{CN}(Org=1,ET=1)	-0.77*** (0.16)	-0.80*** (0.26)	-0.56** (0.27)	-0.80*** (0.21)
Poe test: Control vs Treatment 1		0.74 (p = 1.000)		
Poe test: Control vs Treatment 2		0.49 (p = 1.000)		
Poe test: Treatment 1 vs Treatment 2			0.24 (p = 1.000)	

WTP estimates are reported with standard errors in parentheses. Significance levels: *** $p \leq 0.01$, ** $0.01 < p \leq 0.05$, * $0.05 < p \leq 0.1$. Poe test statistics are provided with p-values in parentheses, which are Holm-Bonferroni adjusted for three bilateral comparisons across experimental groups. CN stands for carbon-neutral, Org for Organic, and ET for Ethical Trade. A value of 0 indicates that the label is present on the choice card, while 1 indicates that it is absent.

Table A.38: Poe test results for competing label scenarios in a model with two- and three-way interactions and correlated errors

D Confirmatory and exploratory analyses

This section outlines the deviations from the pre-analysis plan and clarifies the distinction between confirmatory and exploratory analyses.

The study is pre-registered on the AEA RCT Registry (ID: 12520-2.0), with the main objective of estimating the effect of transparency regarding CO_2 offsetting and reduction on consumers' WTP for a carbon-neutral label. The following deviations from the pre-registration occurred:

First, although the pre-registration stated that 1,200 participants would be recruited and payment was made for 1,200 responses, the survey company provided data for a total of 1,339 participants.

Second, while the original plan indicated the use of a preference-space model, the final main analysis uses an MXL model estimated in WTP space. This deviation was motivated by the methodological advantages of WTP-space models, such as direct estimation of MWTP values and better interpretability. All preference-space model results are reported in the robustness checks.

Third, although the variable 'warm glow' variable was originally planned to be included in the estimation exploring underlying mechanisms, it was excluded due to its high correlation with guilt and social approval variables. Its role is examined separately in the robustness checks.

Fourth, to detect differences among experimental groups, both the Poe et al. (2005) and Swait and Louviere (1993) tests were pre-registered. However, only the Poe test was used in the analysis, as the main model was estimated using an MXL specification that accounts for individual heterogeneity. The Swait and Louviere (1993) test, by contrast, requires an MNL model.

Fifth, since the primary goal of the paper is not to estimate WTP for a carbon-

neutral label per se, but rather to assess the effect of transparency, the translation of WTP into CO_2 reduction or offset equivalents, and its comparison with the social cost of carbon, is not discussed. This decision responds to criticisms that the study focuses on a single product, which may not be representative of all products and services, and relies on a stated preference method that may be subject to hypothetical bias.

Fourth, although the pre-registration did not mention multiple hypothesis correction, all p-values for WTP estimates and hypothesis tests are corrected using the Holm-Bonferroni procedure. This correction has become a standard practice in experimental economics, and strengthens the reliability of analyses. Results without Holm-Bonferroni correction are reported in the robustness checks.

Fifth, I explore a set of additional factors that underlie my findings, such as familiarity with carbon-neutral labels and survey consequentiality, as robustness tests. I distinguish the pre-registered set from the additional ones explicitly in the main body.

Finally, while the exploration of the role of different sustainability labels was pre-registered, the interaction effects between sustainability labels are considered exploratory analyses.

All deviations and additional analyses are transparently reported, and robustness tests confirm that the main findings remain consistent across alternative specifications and samples.

E Survey instrument

This survey is part of a research project conducted by Eawag, the Swiss Federal Institute of Aquatic Science and Technology, and the University of St. Gallen in Switzerland. The project studies the role of sustainability labels on people's preferences for tea products. By participating in this survey, you are contributing to improving our understanding of this topic. Your participation is voluntary, your responses are anonymous and will be kept confidential. You can opt out anytime without providing a reason, in which case your responses will not be stored. You will receive a payment from the survey company after submitting a completed survey. The survey is expected to take 10 minutes.

While you can return to previous pages in the survey, you will not be able to change your answers. We would like to ask you to read each question carefully. Please refrain from seeking information online or from any other source while answering the survey. There is no right or wrong answer, we are simply interested in knowing your opinion.

Please indicate your consent to participate in this study by selecting the appropriate option.

☐ I consent to participate in this study.

☐ I do not consent to participate in this study.

1 What is your year of birth?

[4 digit number]

2 What is your gender?

- Male.
- Female.
- Non-binary.
- I prefer not to say.

3. What is the highest level of education you have completed?

- Primary school
- Secondary school: High school or equivalent
- Post-secondary vocational training (2 and more years)
- Post-secondary vocational training (up to 1 year)
- Post-secondary academic below-degree level qualification (2 and more years)
- Post-secondary academic below-degree level qualification (up to 1 year)
- Bachelors or equivalent first degree qualification (e.g., BA, BSc, BEng)
- Masters or equivalent higher degree level qualification (e.g., MA, MSc, MBA)
- PhD or equivalent doctoral level qualification (e.g., PhD)
- None of above

4 How frequently do you purchase tea?

- Once a week
- Once every two weeks
- Once a month
- Several times a year
- Once a year
- Never

5 How frequently do you drink tea?

- Daily
- Once a week
- Once every two weeks
- Once a month
- Several times a year
- Never

If you are participating in the survey on a smartphone, please turn it to a **horizontal** orientation for the best display of the upcoming survey section.

Imagine that a box of tea containing **80 teabags** (roughly 200 grams) as shown in this figure is your preferred tea type-be it black, green, or herbal tea-and in your favored packaging type, either teabags or loose leaf. In the following questions, you will be asked to choose between various versions of this tea, differentiated by the presence or absence of carbon-neutral, organic, and ethical trade labels, and price. Note that the tea product and the labels are hypothetical and designed for the purpose of this survey.

This specific **carbon-neutral (CO_2 neutral) label** indicates that the product's greenhouse gas emissions, measured in carbon equivalents, have been:

- **offset** (compensated) by investing in activities **outside of the company** such as tree planting projects; **or**
- **reduced within the company** in the last five years, such as through investments in cleaner production processes; **or**
- both **offset** and **reduced**.

This specific **organic label** indicates that the product contains **only organic ingredients** and no synthetic pesticides.

This specific **ethical trade label** indicates that the product is produced following **responsible labor practices**, which guarantee higher prices for exporters based on internationally recognized standards.

If you are participating in the survey on a smartphone, please turn it to a **vertical orientation** for the best display of the remainder part of survey.

In the next questions, you will be asked to choose between two tea products with certain labels and a given price and 'none of the two' option. Note that the questions are hypothetical, i.e. you are not required to pay for your choices at any point in the survey. All you have to do is to indicate your most preferred option as if you were choosing between such products in a supermarket.

We would like to inform you that people are likely to overstate their willingness to pay for a product in a survey and would not pay the stated amount in real life. Please consider how you would feel spending your money on such products in a real-life situation, and answer accordingly.

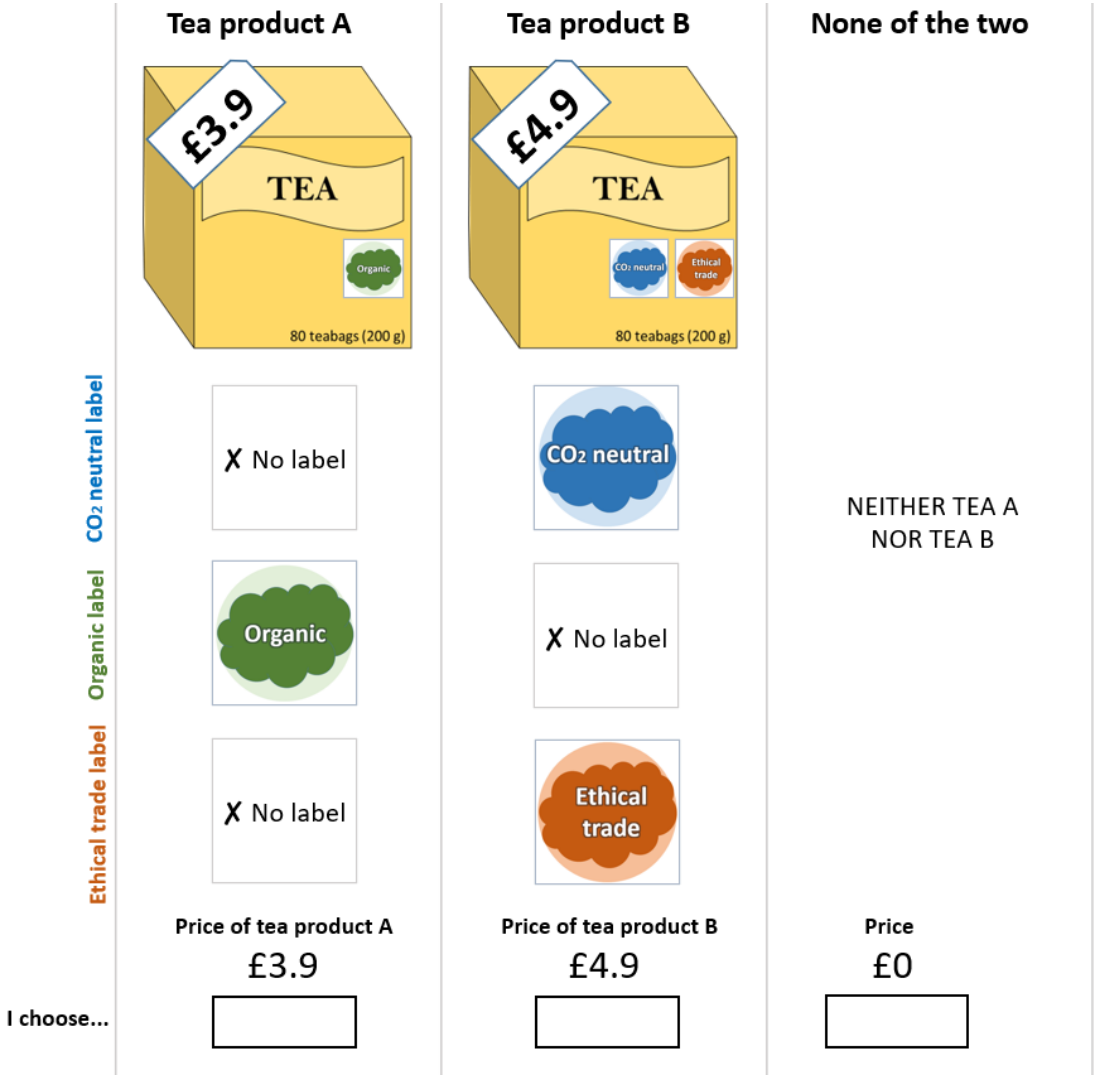
Please also consider your budget limitations. Depending on the amount you choose to spend on tea, you will have less money available for other products.
Please check the box if you agree with the statement below.

I **understand** the importance of providing truthful answers as if I was making a decision in a real-life setting and promise to provide honest and accurate responses to the questions that follow.

☐

6 Imagine a box containing 80 teabags or 200 grams of loose tea. In the following questions, please indicate which option you prefer the most.
If you are participating in the survey on a smartphone, please keep it in a vertical orientation for the best display.

CHOICE CARD 1/8



CHOICE CARD 2/8

	Tea product A	Tea product B	None of the two
			
CO₂ neutral label	✗ No label	CO₂ neutral	NEITHER TEA A NOR TEA B
Organic label	✗ No label	Organic	
Ethical trade label	✗ No label	Ethical trade	
	Price of tea product A £2.9	Price of tea product B £6.9	Price £0
I choose...	☐	☐	☐

CHOICE CARD 3/8

	Tea product A	Tea product B	None of the two
			
CO_2 neutral label	✗ No label	✗ No label	NEITHER TEA A NOR TEA B
Organic label	Organic	✗ No label	
Ethical trade label	✗ No label	Ethical trade	
	Price of tea product A £2.9	Price of tea product B £3.9	Price £0
I choose...	☐	☐	☐

CHOICE CARD 4/8

	Tea product A	Tea product B	None of the two
			
CO_2 neutral label	✗ No label	✗ No label	NEITHER TEA A NOR TEA B
Organic label	✗ No label	Organic	
Ethical trade label	Ethical trade	✗ No label	
	Price of tea product A £4.9	Price of tea product B £4.9	Price £0
I choose...	☐	☐	☐

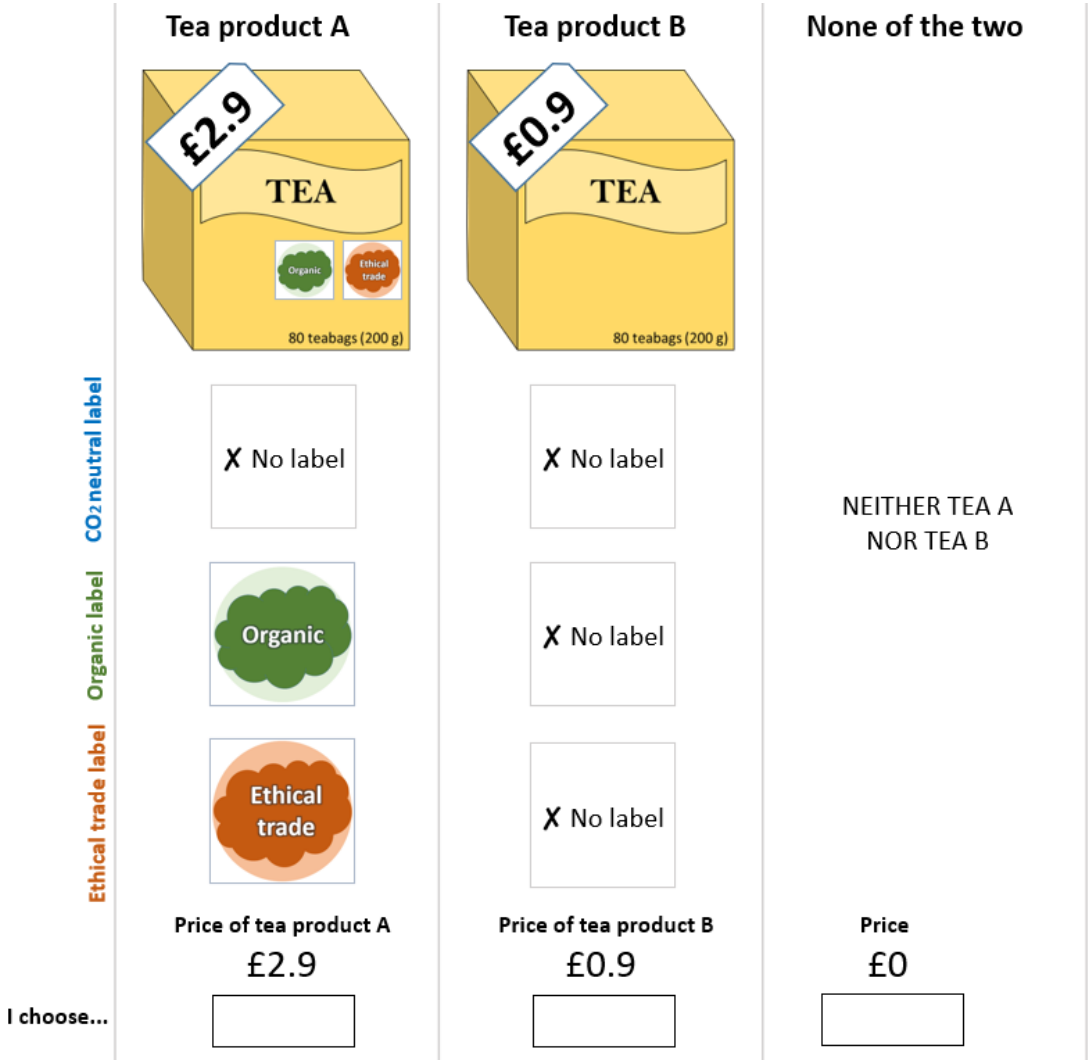
CHOICE CARD 5/8

	Tea product A	Tea product B	None of the two
			
CO_2 neutral label	✗ No label	CO_2 neutral	NEITHER TEA A NOR TEA B
Organic label	✗ No label	Organic	
Ethical trade label	✗ No label	Ethical trade	
	Price of tea product A	Price of tea product B	Price
	£0.9	£4.9	£0
I choose...			

CHOICE CARD 6/8

	Tea product A	Tea product B	None of the two
			
CO_2 neutral label	CO_2 neutral	✗ No label	NEITHER TEA A NOR TEA B
Organic label	Organic	✗ No label	
Ethical trade label	Ethical trade	✗ No label	
	Price of tea product A: £6.9	Price of tea product B: £0.9	Price: £0
I choose...	☐	☐	☐

CHOICE CARD 7/8



CHOICE CARD 8/8

	Tea product A	Tea product B	None of the two
			
CO₂ neutral label	CO₂ neutral	CO₂ neutral	NEITHER TEA A NOR TEA B
Organic label	Organic	✗ No label	
Ethical trade label	✗ No label	Ethical trade	
	Price of tea product A £4.9	Price of tea product B £2.9	Price £0
I choose...	☐	☐	☐

7 How certain are you about your choices? Please use the slider below to indicate your level of certainty.

Very uncertain (0) ——slider——(10) Very certain

8. Could you please indicate the main reason why you always chose the "neither tea A nor tea B" option? (This question will only be shown to the participants who always chose the "none of the two" option.)

- The products were too expensive.
- I oppose one or more of the labels.
- Insufficient information was provided about the labels or the products.
- I prefer to spend money on other social and environmental responsibility projects.
- I disagree with the way the choice question was asked.
- Other reason, please specify: ...

9. Can you shortly describe how you made your choices?

... (Open-ended)

10. Which tea characteristics did you **not consider** when making your choices? You can choose one, more than one, or none of the characteristics.

- Carbon neutral label
- Organic label
- Ethical trade label
- Price

- None of above (I considered all tea characteristics).

11. What was your main reason for not considering this tea characteristic/these tea characteristics? (This question will only be shown to those who have not chosen the "None of above" option in the previous question .)

...

12. What is the maximum amount you would be willing to pay for **the carbon-neutral label** (shown on the previous choice cards) **in addition to the cost of the tea product?**

£...

13. Which of the following can be considered **carbon offsetting**?

- **Compensating emissions** by investing in activities outside of the company, such as tree planting projects.
- **Reducing emissions** within the company, such as through investments in cleaner production processes.
- I do not remember.

14. How many different **tea product labels** appear on the choice cards?

- 1 label
- 2 label
- 3 labels
- I do not remember.

15. In this survey, did carbon-neutral label include any percentages (%) of carbon offsetting and carbon reduction?

- Yes.
- No.
- I do not remember.

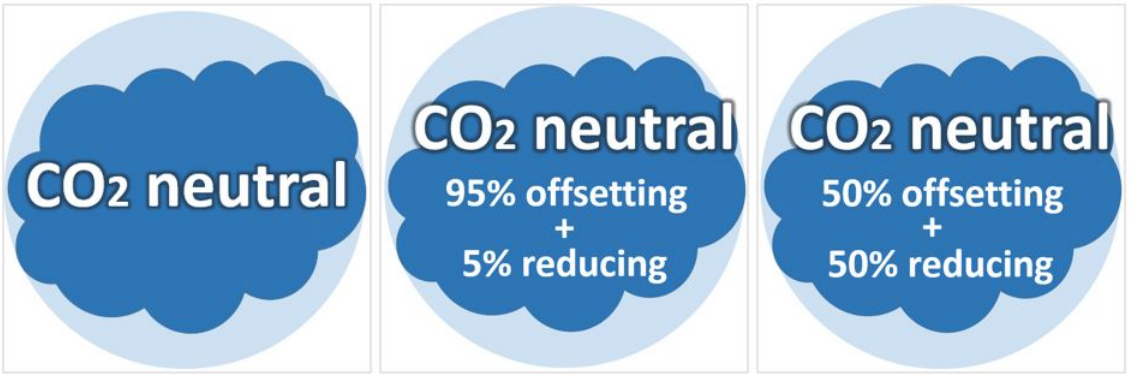
16. Please indicate to which degree you agree or disagree with the following statements.

Statement	Strongly Disagree	Mostly Disagree	Slightly Disagree	Neutral	Slightly Agree	Mostly Agree	Strongly Agree
I worry about climate change.							
Limited financial resources prevent me from buying climate-friendly products instead of the conventional ones.							
Lack of time prevents me from buying climate-friendly products instead of conventional ones.							
My positive emotions increase when I choose climate-friendly products over conventional ones.							
I feel guilty when I buy conventional products instead of climate-friendly ones.							
Most people who are important to me approve of my choice of climate-friendly products over the conventional ones.							
Producers, not consumers, are responsible for covering climate change mitigation costs.							

17. Remember that carbon offsetting involves compensating emissions by investing in projects outside of the company, such as tree planting projects, while carbon reductions occur within the company, such as investments in cleaner production processes. Emission offsetting, reduction, or a combination of both ensures that the entire life-cycle of a product is carbon-neutral.

Please indicate to which degree you agree or disagree with the following statements.

Statement	Strongly Disagree	Mostly Disagree	Slightly Disagree	Neutral	Slightly Agree	Mostly Agree	Strongly Agree
I trust carbon neutral labels.							
I am confused about carbon-neutral labels.							
I am concerned about carbon offsetting.							



Label 1 Label 2 Label 3

Please look at the different types of hypothetical labels shown above carefully, and answer the questions below. You may choose one or more label options, or none.

18. Which label(s) do you trust the most?

- Label 1
- Label 2
- Label 3
- None

19. Which label(s) do you find the most confusing?

- Label 1
- Label 2
- Label 3
- None

20. Please indicate to which degree you agree or disagree with the following statements.

Statement	Strongly Disagree	Mostly Disagree	Slightly Disagree	Neutral	Slightly Agree	Mostly Agree	Strongly Agree
Carbon offsetting effectively reduces carbon emissions.							
Carbon offsetting puts a price tag on emissions, thereby allowing producers to continue polluting.							
Carbon offsetting generates a misleading sense of relief, without encouraging further efforts to reduce emissions.							
Carbon offsetting is a form of greenwashing.							

Please now consider your usual **real-life** grocery shopping.

21. Which type of tea do you consume the most? Please select only one.

- Black tea (e.g., English Breakfast, Early Grey tea)
- Green tea
- Herbal tea
- Other, please specify: ...

22. How much do you typically pay for tea?

- £...
- I do not know.

23. Which tea quantity do you usually buy?

- I usually buy ... **grams** of tea.
- I usually buy ... **teabags**.
- I do not know.

24. Please indicate which sustainability labels the grocery products you buy have.

- Carbon neutral label
- Organic label
- Fair trade label
- No sustainability label
- I do not know
- Other, please specify: ...

Finally, a few questions about yourself.

25. What is your approximate annual household income after taxes?

- Under £10,000
- £10,000 - £19,999
- £20,000 - £29,999
- £30,000 - £39,999
- £40,000 - £49,999
- £50,000 - £59,999

- £60,000 - £69,999
- £70,000 - £79,999
- £80,000 - £89,999
- £90,000 - £99,999
- £100,000 - £129,999
- £130,000 or more

26. What is your current employment status?

- Full or part time employment
- Self-employed
- Unemployed
- Retired
- Looking after family or home
- Full-time student
- None of above

27. Are you a member of any environmental organization?

- Yes
- No

Now, we want to learn about your opinions and experience with this survey.

28. Do you think that your responses in this survey will influence tea product labeling or pricing policies?

- Yes
- No

29. Is there anything about the tea choices that you find confusing or unclear?

- Yes. Please specify what was confusing or unclear: ...
- No.

30.Were the instructions clear to you?

- Yes
- No. Please specify what was unclear: ...

31. Do you have any further comments or feedback about the survey?

... [open-ended]

Thank you for your participation in this survey. Your responses are very valuable to us and contribute to the research project by Eawag, the Swiss Federal Institute of Aquatic Science and Technology, and the University of St.Gallen, Switzerland.

If you have any questions or concerns about the survey please contact Begüm Özdemir Oluk (begum.ozdemiroluk@eawag.ch).

Please click "continue" to submit the survey and receive your payment.

F Power Analysis

In this section, I discuss the ex-ante power calculations for my main analysis to understand the consumers' WTP differences between experimental groups. This analysis involves three bilateral comparisons, each with subsamples of 400 participants. The objective of the power calculation is to determine the minimum detectable effect size (MDEs) for WTP differences between subsamples, using the formula from Djimeu and Houndolo (2016) and the power calculation sheet from International Initiative for Impact Evaluation (3ie) (2016):

$$\text{MDEs} = \frac{(t_1 + t_2) \times \text{sd}(y)}{\sqrt{p \times (1-p) \times n}}$$

where sd(y) is the pooled total standard deviation of the estimated effect on the outcome variable, p is the proportion of the study that is randomly assigned to the treatment group, n is the sample size, t1 is the t-value corresponding to the significance level (0.05) of the test, t2 is the t-value corresponding to the power of the design (0.80), and MDEs is the minimum detectable effect size. I assume sd(y) follows a truncated normal distribution, and the mean and standard deviation of the distribution are based on both the literature (Bek, 2022; Carattini et al., 2025) and the my expectations regarding the differences between the subsamples.

I find that the MDEs is 0.18 pounds for the difference between treatment group 2 and control group and treatment group 1, which corresponds to 18% of the standard deviation. Furthermore, the MDEs for the difference between control and treatment group 1 is 0.36 pounds, which also corresponds to 18% of the standard deviation.