Department for Transport

THE BEHAVIOURAL INSIGHTS TEAM

TRL

Exploring the effect of carbon labels on consumer flight choices

Behavioural insights from a quantitative survey, a choice experiment and qualitative interviews

Department for Transport
Great Minster House
33 Horseferry Road
London
SW1P 4DR

This publication is also available on our website at
www.gov.uk/government/organisations/department-for-transport

Any enquiries regarding this publication should be sent to us at
www.gov.uk/government/organisations/department-for-transport

Contents

Contents

Executive summary 6

Overview 6

Methodology 6

Key findings 7

Recommendations 10

1. Introduction 11

1.1. Research methodology 12

1.1.1 Literature review approach 12

1.1.2 Qualitative research approach 12

1.1.3 Quantitative research approach 13

1.1.4 Limitations of the methodology and approach: 18

1.2. What makes an effective eco-label? A rapid summary of the literature 19

1.3. Our carbon label designs for testing 21

2. Findings 24

2.1. All flight carbon information (numeric and visual) increased consumer uptake lower-carbon flights 24

2.1.1 The impact of flight carbon information provision on flight choices 24

2.1.2. The impact of flight carbon information on choices across flight types (short-, long-, multistage) 26

2.2. Flight choices were predominantly shaped by prices and logistics (e.g. flight timing, duration), but carbon labels and flight carbon emissions also influenced choices 28

2.2.1. The interplay between flight price and flight carbon-emissions during choices 28

2.2.2. Consumer priorities during flight decision-making 30

2.2.3. Behavioural barriers to engaging with flight carbon emissions during flight choices 33

2.3. Participants understand that flights emit CO_2, but key knowledge gaps remain around what scale of impact an individual passenger has. Carbon labels did not improve understanding. 35

2.3.1. Consumer understanding of flight carbon emissions principles 35

2.3.2. The impact of carbon label design on understanding of flight carbon emissions 36

2.4. Flight carbon information increased willingness to switch airlines or pay more for a lower carbon flight ticket 40

2.4.1. Willingness to engage with different pro-environmental travel behaviours 40

2.5. Participants thought the carbon labels were easy to understand, simple (i.e. not complex or overwhelming), useful, and trustworthy 42
2.5.1. Participant perceptions of the visual carbon label options 42
2.5.2. Participants trust of carbon labels and messengers 43
2.5.4. Participant demand for different environmental information for flights 44
2.6. Unintended consequences of the carbon labels include participant guilt and a 'licence' to take more flights 45
2.6.1. The impact of flight carbon labels on feelings of positivity and guilt 45
2.6.2. The impact of carbon labels on the 'licence' to take more flights 46
2.7. Consumers want to see flight carbon information before or during flight comparison and booking 47
2.7.1. The flight consumer online consumer journey 48
2.8 Most participants support the implementation of flight carbon carbon labels, despite the added complexity 50
2.8.1 Support for flight carbon carbon labelling policies 50
2.8.2 Support for wider policies to achieve Net Zero aviation in the UK 50
3. Conclusion & Recommendations 51
Conclusion 51
Recommendations 52
4. Appendices 55
Appendix 1. Framework for designing effective eco-labels 55
Appendix 2. Sample for the qualitative research 58
Appendix 3. Flight habits 60
Appendix 4. Survey questions 61
Appendix 5. Subgroup analysis based on participant flight frequency 69
Appendix 6. Control group low-carbon flight choices by flight type 70
Appendix 7. Barriers to engaging with flight carbon emissions 71
Appendix 8. Impact of carbon information on emissions recall 72
Appendix 9. Recall of labels 73
Appendix 10. Sentiments and perceived usefulness of labels 74
Appendix 11. What carbon information do people want to see when booking flights? 76
Appendix 12. Screener questions for qualitative research recruitment 77
Appendix 13. Topic guide for qualitative research focus groups 81
Appendix 14. Topic guide for qualitative research interviews 86

Executive summary

Overview

This research contributes to the Department for Transport's (DfT) Jet Zero Strategy, which sets out the UK Government's approach to achieving Net Zero aviation by 2050. One of the core policy measures set out in this strategy is 'Influencing consumers': preserving the ability for people to fly whilst supporting consumers to make sustainable aviation travel choices and access standardised environmental information at the time of looking for and booking a flight online.

This strategy recognises that access to clear and consistent carbon (CO_2) information relating to flights has been highlighted as a key barrier for consumers in making sustainable flight choices.[1] Consumers who book flights online are currently provided with limited, or no information about the carbon emissions of flights, with only a small number of exceptions in the form of large online booking websites.

DfT commissioned the Behavioural Insights Team (BIT) and Transport Research Laboratory (TRL) to explore different ways of presenting carbon information and assess the impacts on sustainable consumer flight choices, consumer understanding, and wider consumer attitudes.

Methodology

The project involved three sequential research streams; a rapid literature review, qualitative research with consumers and an online experiment.

The **rapid literature review** sought to explore existing evidence on the effective design of eco-labels to inform consumer choices. Insights from the review were used to inform the design of the carbon labels tested in subsequent research activities.

The **qualitative research** consisted of three focus groups with consumers who flew for business and for leisure (N=24), as well as four one-to-one interviews conducted with individuals with reading disabilities and visual impairments (N=4). The purpose of the qualitative research was to explore consumer perspectives around flight booking, flight sustainability and carbon labelling. The focus groups and interviews were also used to gather perspectives on the early-stage carbon label designs before they were finalised for testing.

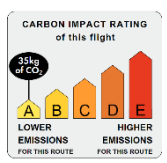
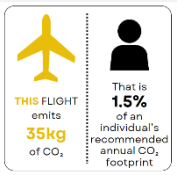
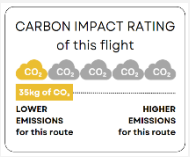
The **online experiment** included a representative sample of 6,176 participants from the UK general population. The experiment aimed to assess the impact of the designed carbon labels on flight booking choices in a simulated online flight booking website. The experiment involved a randomised controlled trial (RCT) design, where participants were randomised into one of five groups; a **control** group who saw no carbon information, a **numeric** group who saw carbon presented numerically (as kilograms of carbon), and three groups who each saw one of three label designs: an **A-E scale**, a **comparison label** and a **5-point rating scale** (these groups, along with the labels are illustrated in the table below). The participants were then shown a series of flight choices which varied based on their carbon emissions, their price, their distance (short haul and long haul) as well as whether the flight was direct or multistage. Participants were asked to select the option they would like to

[1] European Union Aviation Safety Agency, *The case for an environmental label in aviation* (EASA Eco, 2021).

book as if they were making a real choice. This enabled us to assess the impact of the carbon information on sustainable flight choice across these varying conditions.

The experiment also included a survey component which sought to explore the following; *(i)* Recall of choices from the previous section, *(ii)* Understanding of carbon emissions, *(iii)* Factors influencing travel choices, *(iv)* Sentiment towards label designs, *(v)* Views towards the provision of environmental information and environmental information policies, and *(vi)* Demographic information.

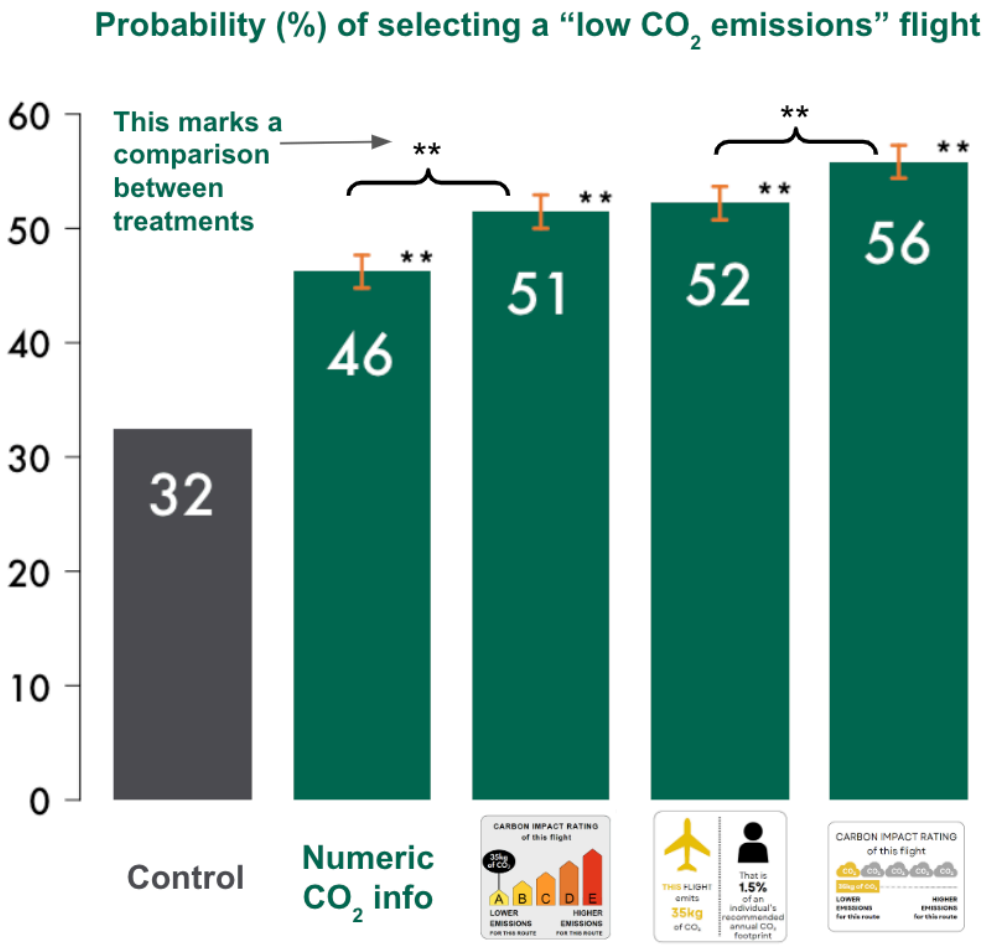
Description of the five treatment groups.

Condition	Control *(n = 1,215)*	Numeric CO_2 info (Kgs of carbon) *(n=1,287)*	 *(n=1,210)*	 *(n=1,216)*	 *(n=1,248)*
Description	No carbon information or label (control group).	Only numeric carbon information with no label.	'A-E Scale Rating' label	Comparison (recommended annual emissions) label	5-Point Rating Scale

Key findings

1. All of the carbon labels increased intent to select sustainable flight choices to a statistically significant degree versus both the control and simple numeric carbon information. The best performing label was the 5-point rating scale, which resulted in a 75% increase in participants selecting the least emitting flight versus the control. Additionally, exposure to numeric flight carbon information also significantly increased sustainable flight choice (by 44% compared to control), demonstrating that even the simplest timely information provision that prompts pro-environmental reflections could have a meaningful impact on consumer choices.

Carbon information impact on low carbon emission flight choices



2. All carbon information labels (numeric and visual carbon labels) remained effective across different price levels, although effects decreased as the price premium for the lower-carbon flights increased (see figure below). This suggests that consumers may have a finite 'willingness to pay' for lowering their carbon footprint.

This was corroborated through survey responses and the qualitative research which found that consumer **flight choices were predominantly shaped by flight prices and logistics (e.g. flight timing, duration).** Interestingly however, participants who saw the carbon information in the experiment were more likely to report carbon emissions as being an important factor in their flight choice. This suggests carbon information may *engender* preferences for lower carbon flights, rather than merely *reveal* latent preferences.

Carbon information impact on low carbon emission flight choices across price differences

3. Consumer understanding around flight carbon emissions was mixed. Participants across the experiment and the qualitative research generally understood that flights generally emit more CO_2 compared to other forms of transport, however most acknowledged that they did not fully understand what the impact was, what the specific emissions equated to, or what their individual contribution to climate change was, from selecting flying as their mode of travel.

Moreover, the experiment revealed that **exposure to carbon information did not meaningfully improve consumer understanding around the carbon impacts of flying.** This is likely due to the fact that label designs focused on helping consumers compare flight options rather than providing a detailed explanation of the environmental impact of flying.

4. The experiment revealed **the majority of participants rated carbon labels as easy to understand (90-91%), not overly complex (80-82%), useful for making their flight decision (76 -78%), and trustworthy (85-86%)**.

However, the experiment also revealed some drawbacks of the carbon labels that are worth considering. **Some participants felt that carbon labels made them feel overwhelmed by information (16-17%)**. Moreover, **some participants said that the flights' carbon emissions were lower than expected (11-15%) and that the carbon labels made them feel that they can take more flights per year (13-15%),** demonstrating that the labels may also carry a licensing effect that may carry unintended consequences.

Recommendations

Together, these findings lead to the following recommendations pertaining to the future design and implementation of carbon labels.

1. **Carbon labels should be implemented as a means of supporting consumers to make more sustainable flight choices** given the findings from our experiment show they can effectively support consumers in making more sustainable flight choices, and are viewed positively by consumers.
2. **Replicate findings with a real-world field trial.** Given the caveats of all online and hypothetical research, the magnitude of impact of the labels should be validated through an RCT measuring actual consumer flight choices, rather than just stated intent.
3. **Undertake further research into possible backfire / licensing effects.** Further research should seek to explore any possible backfiring effects from the labels, including social licensing effects.
4. **Future carbon label designs should consider clarity, simplicity, salience, and credibility.** As future label designs are user-tested and iterated, the elements of the labels should continue to adhere to the evidence-based principles of effective eco-label design.
5. **Carbon labels should be standardised and regulated by a central body such as the Civil Aviation Authority or from the UK Government to ensure consumer trust**, given that their effectiveness is reliant on them being perceived as legitimate and trustworthy by consumers.
6. **Position carbon labels next to price or time of flight and / or number of layovers** in order to increase their salience and the probability that consumers notice them and factor them into their flight choice.

1. Introduction

The Behavioural Insights Team (BIT) and Transport Research Laboratory (TRL) were commissioned by the Department for Transport (DfT) in September 2023 to assess the potential impact of different carbon label designs on consumer flight choices. The overarching aim of this project was to understand how to best present flight carbon emissions information to enable consumers to make more informed choices, including understanding how to choose more sustainable flight options when booking online. In addition to observing consumers' flight choices within a simulated flight booking website, this project also explored consumer beliefs and attitudes towards flight carbon labels, and the acceptability of presenting flight environmental impact information when booking flights (see Box 1 for a summary of the main research objectives).

Currently, when customers book flights online (e.g. through flight comparison tools or directly via airline webpages) they are provided with limited (or no) information about the carbon emissions of their flights. Some exceptions exist, with a few flight comparison and booking websites (including Google and SkyScanner) displaying basic numeric labels showing CO_2 emissions per passenger per flight (with lower emission flights occasionally highlighted). However this is not common practice across the industry, nor is it standardised across sites. Moreover, a lack of clear and consistent flight carbon information has been highlighted as a key barrier for the public in making sustainable flight choices.[2] In this project, we aim to explore different ways of presenting CO_2 emissions information to best support consumer flight choice.

This research contributes to DfT's Jet Zero Strategy, which sets out the UK Government's approach to achieving Net Zero aviation by 2050. One of the core policy measures set out in this strategy is 'Influencing consumers': preserving the ability for people to fly whilst supporting consumers to make sustainable aviation travel choices and access standardised environmental information at the time of looking for and booking a flight.

This report has been prepared by the Behavioural Insights Team and Transport Research Laboratory on behalf of DfT. It forms part of the evidence base that will facilitate the ongoing development of policy concerning the Jet Zero Strategy. The report findings and conclusions are those of the authors and do not represent the views of DfT.

Box 1. Research aims and objectives

The main research objectives of the project were:
Objective 1: To identify the relative impact of different information design options in relation to CO_2 on consumer understanding of the environmental impacts of, and their preferences towards, different flight options. Under this objective, we explored the following research questions:
a. How does the provision of environmental information impact consumer preferences and flight choices?
b. How does the provision of environmental information impact consumer understanding of the environmental impact of air travel?
c. How does the specific design of carbon labelling impact on a. and b.?

Objective 2: Understanding how consumers book flights, how they perceive the environmental impacts of flying, and their views of different design options for the

[2] European Union Aviation Safety Agency, *The case for an environmental label in aviation* (EASA Eco, 2021).

provision of environmental information – in respect of both CO_2 and non-CO_2 emissions. Under this objective, we explored the following research questions:

a. How do consumers book flights in the UK?
b. What specific environmental information, if any, do consumers want to be provided with when searching for and booking a flight?
c. What point in the search and booking journey would consumers prefer to have access to environmental information about their flight options?
d. What, if anything, would instil trust in the environmental information presented?
e. Do consumers think environmental information will impact their air travel choices?
f. Should the non-CO_2 environmental impacts of a flight be included in the overall environmental impact of the flight or should they be presented alongside the CO_2 emissions data?

1.1. Research methodology

Multiple research streams enabled BIT and TRL to explore the impact of carbon information on consumer flight choices and attitudes. Across each research stream, BIT and TRL conducted research adhering with the Government Social Research guidance on ethical assurance for social and behavioural research, and principles of GDPR.[3] Below, we explain our approach for the rapid literature review, the qualitative research, the carbon label development and the quantitative research.

1.1.1 Literature review approach

BIT conducted a rapid review of the existing evidence on the effectiveness of eco-labels in informing consumer choices.[4] This process followed principles of a targeted narrative review that synthesised findings from 20+ academic and grey literature papers, previous work undertaken by BIT, and existing materials shared by DfT. This rapid evidence review took place in September 2023. The scope of the review was to identify studies that assessed the impact of features of different eco-labels; where possible, we focussed on studies about labels in flight booking scenarios. Insights were synthesised into key take-aways to inform the label design process. The dimensions that were identified during this review process are summarised in Appendix 1.

1.1.2 Qualitative research approach

TRL conducted qualitative research using focus groups (N = 24, with each session consisting of between 6 to 9 participants) and one-to-one interviews (N = 4) to explore perceptions of flight booking, flight sustainability, and flight carbon labelling. Interviews were undertaken between October - November 2023. During the qualitative focus groups and interviews, participants commented on early-draft label designs to help inform development and explore our research questions. These early designs are shown in Appendix 16. Taking a mixed-method approach including both qualitative and quantitative primary research streams enabled us to cross-validate and triangulate key insights about flight booking choices, as well as allowing us to gather user feedback on the flight carbon labels that were later tested in the online experiment.

[3] Ethical Principles of Social and Behavioural Research, Retrieved from https://www.gov.uk/government/publications/ethical-assurance-guidance-for-social-research-in-government

[4] Note. The term ‘eco-label’ is used to refer to all types of labels used to indicate sustainability. These include carbon labels as well as other types of labels such as certifications.

Recruitment: The qualitative research took a purposive sampling approach that sought a sample of the UK general population, encompassing a range of age groups, gender, household income and geographical locations. Additional purposive sampling was used to recruit participants with visual impairments and reading disabilities to ensure representation of people who may have important have perspectives about the accessibility and usability of the flight labels. Participants with visual impairments were represented by a person with colour blindness and a person with monocular vision and reading disabilities were represented by two people with dyslexia. It is worth noting that this sample does not give generalisable insights about the accessibility of wider disability groups, given the small size of the sample and this sample only representing a small proportion of visual and learning conditions that exist. Further research could be undertaken to ensure representation from wider disability groups (e.g. vision impaired condition certified in the UK; participants who use screen readers; wider reading disabilities).[5]

All participants were recruited through a recruitment agency using the screener questions provided in Appendix 15. Participants were paid £65 for a 90-minute focus group or £50 for an hour interview in line with Government social research guidelines. [6] [7]

Sample: Across the focus groups, there were a total of 24 participants with each session consisting of between 6 to 9 participants. We recruited participants who flew for leisure (two focus groups; N = 8 and 10 respectively), those who flew for business (one focus group; N=6), and participants with dyslexia (N=2) and visual impairments (N=2) were interviewed one-to-one. Table 10 (Appendix 3) shows the distribution of the sample.

Topic guide: Participants were first asked about (i) their process for booking flights and important factors they consider during the process, (ii) their perceptions of environmental information provision during flight purchase, and (iii) were shown 4 types of labels indicating the carbon emissions of a flight. These labels were early wireframe drafts and perspectives were used to develop the carbon labels evaluated in the experiment and survey. Full topic guides and early-draft test labels are available in Appendix 16- 18.

Qualitative Analysis: A thematic analysis approach was used to analyse the qualitative data, allowing for different insight themes to be drawn out.

1.1.3 Quantitative research approach

BIT recruited 6,176 participants from the UK general population for an online experiment, between 14th - 29th November 2023.

Recruitment was conducted to achieve a nationally representative sample– our sample comprised individuals of different ages, genders, education levels, incomes, locations, ethnicities as well as typical purpose of travel (business vs. leisure), and those for whom English was a second language (see Table 1 below for details of the demographic characteristics of the sample). Those who had not travelled by air in the past five years, and

[5] In line with Government Social Research guidance on inclusive social and behavioural research. Retrieved from https://www.gov.uk/government/publications/a-guide-to-inclusive-social-research-practices/a-guide-to-inclusive-social-research-practices

[6] In line with Government Social Research guidance on ethical assurance for social and behavioural research. Retrieved from https://www.gov.uk/government/publications/ethical-assurance-guidance-for-social-research-in-government

[7] In line with Government Social Research guidance on use of incentives. Government Social Research (2023) GSR Professional Guidance, Ethical Assurance for Social and Behavioural Research in Government.

had no current intent to do so were excluded from the study. Recruitment was conducted on the Predictiv platform.[8] See Table 1 for a summary of the sample demographics.

Table 1. Demographic characteristics of the sample

Demographics	Range or Context	Percentage of Sample
Gender: Female		50%
Education: Has a degree		38%
Annual income: Less than £40K		53%
Ethnicity: White		85%
English is my first language		91%
Very or moderately concerned about climate change / global warming		80%
Age	18 to 30	22%
	31 to 49	37%
	50 to 64	24%
	65 and over	17%
Living area	Urban	30%
	Suburban	49%
	Rural	22%
Region	London	13%
	Midland	17%
	North	24%
	South and East	31%
	Wales, Scotland and Northern Ireland	14%

Those with no flying history or intentions to fly were excluded, as the CO_2 labels tested in this study primarily target potential flight purchasers. Regarding air travel, 84% of respondents had flown on an aeroplane in the past 5 years, reflecting general trends across the UK

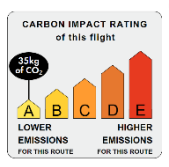
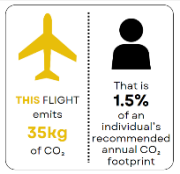
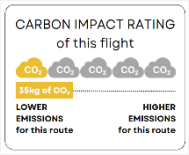
[8] https://www.bi.team/bi-ventures/predictiv/

population.[9] The remaining 16% intended to fly in the future. Thirtysix percent of respondents reported taking 'a few flights per year', while 44% flew once a year or less. Leisure travel dominated as the purpose of flight for 92% of respondents, with 15% flying for business. See Appendix 4 and Appendix 6 for further information about flight habits.

We found 80% of all respondents reported feeling moderately or strongly concerned about climate change/global warming. This aligns with findings from an Ipsos survey in 2023 that indicated similar levels of concern among the UK population. [10]

Behavioural Experiment: The quantitative research aimed to determine if carbon labelling impacted flight booking choices in a simulated online flight booking website. The behavioural experiment consisted of an online randomised controlled trial (RCT), where participants were randomised into five groups (see Table 2).

Table 2. Description of the five treatment groups.

Condition	Control *(n = 1,215)*	Numeric CO_2 info (Kgs of carbon) *(n=1,287)*	 *(n=1,210)*	 *(n=1,216)*	 *(n=1,248)*
Description	No carbon information or label (control group).	Only numeric carbon information with no label.	'A-E Scale Rating' label	Comparison (recommended annual emissions) label	5-Point Rating Scale

Note: *In the 'Condition' row, the five treatment groups are displayed. In the 'Description' row, the components of each treatment group are summarised.*

Participants used a simulated booking website to select flights they would likely purchase in a given context. Before making their flight choices, participants were provided with instructions asking them to imagine they had decided to travel to a particular flight destination for a holiday and that they were looking to book a flight on an online booking platform (e.g. Expedia, Skyscanner, Google Flights etc.). Participants were asked to select the option they would like to book as if they were making a real choice.[11] Within the instructions, we acknowledged that the flight choices from the scenarios may have varied from participants' actual travel plans and asked participants to engage with the scenarios as if they did apply. For example, we specifically asked them to imagine that London Heathrow was their usual departure airport to avoid factors such as how to travel to the airport which may have influenced the participants' choices.

---

[9] Civil Aviation Authority. (2023). CAA Aviation Consumer Survey - 11th Wave Report. Retrieved from https://publicapps.caa.co.uk/docs/33/Civil%20Aviation%20Authority%20-%20Aviation%20Consumer%20Survey%20-%20Wave%2012.pdf

[10] The July 2023 Ipsos Political Monitor reveals that 77% of Britons are concerned about climate change

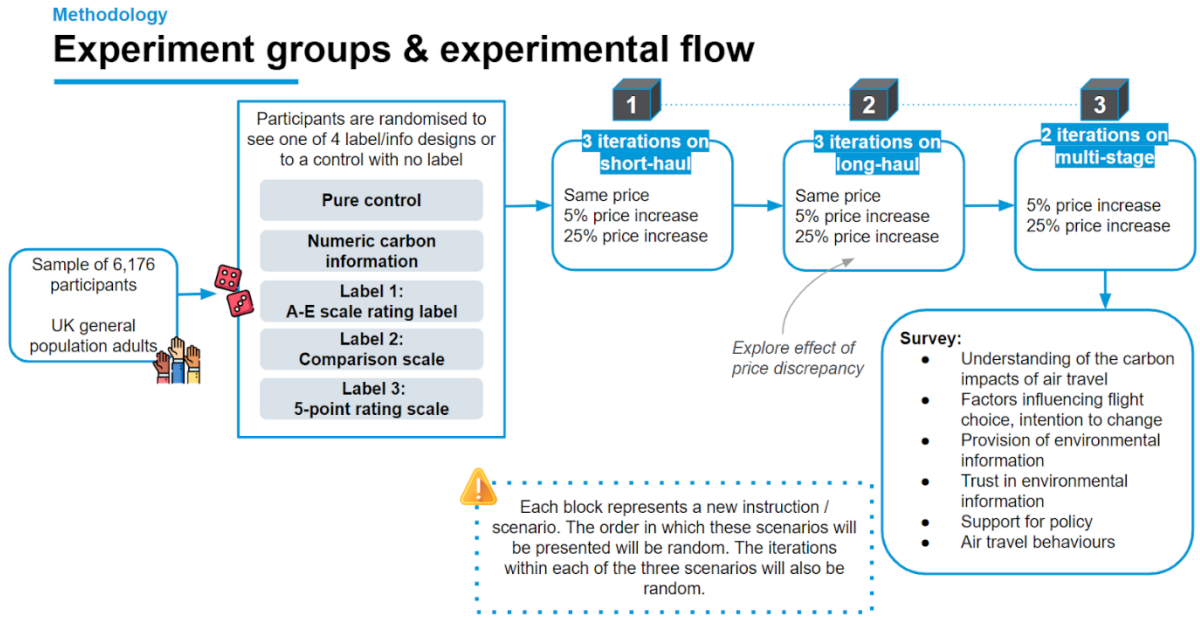
[11] We also noted to participants that they would only see flight options for the outbound flight and not the return. This reflected the design of the experiment whereby we chose to only show the outbound flight to avoid repetition and to simplify the scenario.

The scenarios that participants saw varied based on two key factors. The first factor was **flight type** where we displayed flights across:

- A short haul flight route (London to Paris),
- A long haul flight route (London to San Francisco),
- A direct vs. multi-stage flight route (London - Bangkok) where the direct flight was lower-emitting and more expensive, and the multi-stage flight was higher-emitting and cheaper.

The second factor was the **price difference between the lower and higher CO_2 emitting flights** (same price between low and high CO_2, 5% price premium for the lower CO_2 flight, and a 25% price premium for the lower CO_2 flight). This meant that the low CO_2 emitting flight was always equivalent in price or more expensive. In total, participants therefore made 8 flight choices across 8 different scenarios (see Figure 1 for a schematic of the participant journey).[12] This experiment design allowed us to measure the impact of carbon labels under two additional dimensions variables: i) a higher vs. lower price price difference between the high and low carbon flight, and ii) scenarios for short haul; long haul; and multi-leg flights.

Figure 1. Schematic of the participant journey through the online experiment and survey



Note: *Participants initially underwent a series of screening questions and attention checks, to ensure the collection of high-quality data. Participants from each treatment group were then shown* ***a series of 'choice A (high carbon/low price) or B (low carbon/high price)' flight options across three iterated scenarios (each corresponding to one route)****:*

1. *Short-haul flights showing three scenarios (same price between choices, a 5%, and 25% price difference between the high and low carbon choices);*
2. *Long-haul flights showing three scenarios (same price between choices, a 5%, and 25% price difference between the high and low carbon choices), and;*
3. *Multi-leg flights showing two scenarios (a 5% and 25% price difference between the high and low carbon choices).*

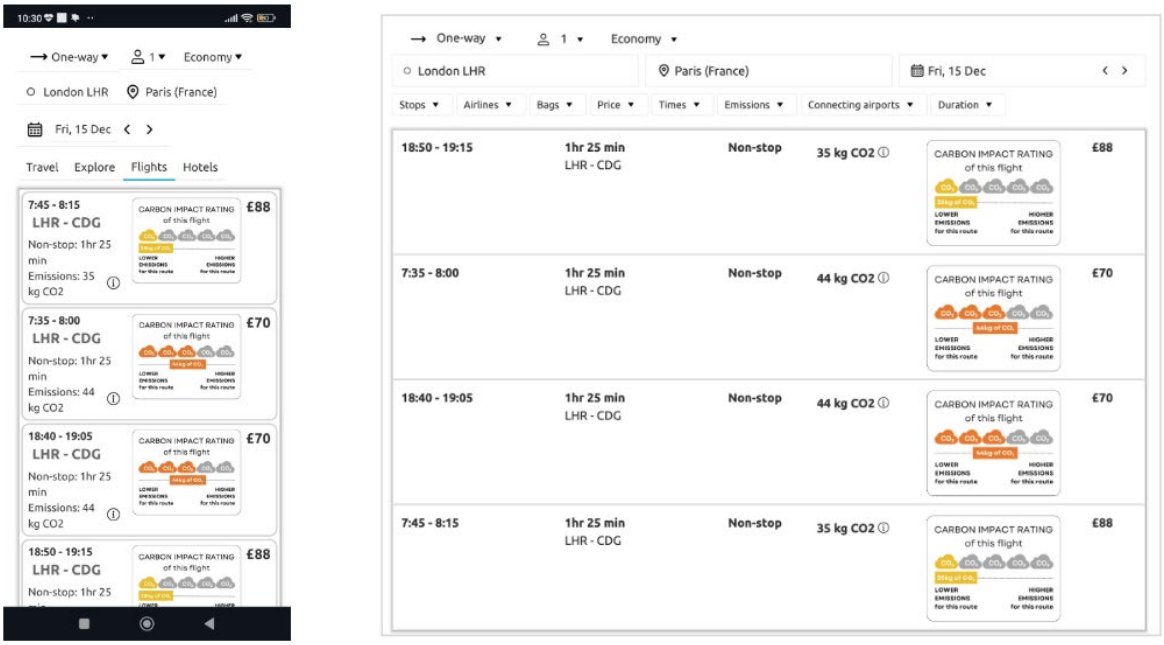
[12] We note that we opted to exclude a scenario where direct vs. multi-stage flights were the same price from our experiment. This was because i) direct flights are typically more expensive than multistage flights across the same route in real-world contexts, and ii) at the same price point, direct flights would be too much of an 'obvious' choice for participants given they would be both more convenient, and have a lower carbon impact.

*Each participant was asked to make up to **8 'flight A or B?' choices in succession**. The order of these scenarios was randomised.*

Within each scenario, participants saw 4 different flight options along the same route. Across the 4 flight options, 2 options represented lower CO_2 flights and 2 options represented higher CO_2 flights. The two option pairs varied only based on the departure times (e.g. morning and evening), while the price and CO_2 amounts across these corresponding option pairs were always the same. In other words, within each choice-set there were always 2 flight options which constituted the 'lower CO_2 choice' (see Figure 2 below). It is also worth noting that the carbon labels designed and tested through the experiment only had two variations across the choice sets (i.e. the carbon labels indicated flights as being either low or medium carbon impact within each of their relative scales (there were no high-emitting carbon labels/flights)). This was done to maintain the simplicity of the experiment and to facilitate the comparability of different carbon labels.[13]

We chose to incorporate four different flight choices within our experiment design (e.g. instead of presenting just 2 choices) for two key reasons; i) we wanted to recreate a real-world flight booking scenario in which consumers would typically select an option among a myriad of choices rather than just a simple A vs. B choice, and ii) recognising that flight time would be a factor that would influence flight choice, we wanted to present participants with differing flight time options to avoid the flight time influencing participant flight choices.

Figure 2. Platform visual that participants saw while undertaking the experiment (example from the short-haul flight choice scenario for participants who saw the 5-point scale)



(A) Smartphone visual **(B) Web page visual**

***Description of graph [for accessibility]:** The figure presents two user interfaces for booking flights: (A) is a mobile app design showing a search for flights from London to Paris with options for one-way travel, number of passengers, and class, alongside a list of flights detailing times, carbon emissions, and prices; (B) is a webpage design with additional filters for stops, airlines, and other features, displaying flights in a grid format with similar detailed*

[13] This represents a diversion from what would be expected in a real-world flight choice scenario where flights would vary significantly in their carbon impacts.

information. Both designs highlight environmental impact with carbon rating badges, catering to user preferences for sustainability.

Survey: Following the choice-based questions, participants were asked a series of survey questions to gain further insights about participants' awareness and sentiments towards travel choices and carbon labels/information. The survey was run on BIT's online platform, Predictiv, and took participants 10-12 minutes to complete. Specifically, the survey questions were divided into the following six categories: *(i)* Recall of choices from the previous section, *(ii)* Understanding of carbon emissions, *(iii)* Factors influencing travel choices, *(iv)* Sentiment towards label designs, *(v)* Views towards the provision of environmental information and environmental information policies, and *(vi)* Demographic information.The survey questions can be found in full in Appendix 5.

1.1.4 Limitations of the methodology and approach:

It is worth highlighting the main limitations of the quantitative and qualitative research approaches used. These are summarised below:

1. **Sampling**:

- **Experiment and survey**: While the sample of participants for the experiment and survey were representative of the UK national population in terms of age, sex, income, and location, it is worth noting that our sample did not include digitally excluded or people otherwise not inclined to complete online surveys.[14] Therefore, further verification of findings may be appropriate if implementing the labelling system in other contexts, such as high-street or business travel agents where the flyer is less exposed to the booking system.

- **Qualitative interviews:** Moreover, our qualitative interviews drew on a small sample (n=28). A purposive sampling approach was undertaken in efforts to ensure a wide representation of views, rather than aiming to include a sample that is proportionately representative of the UK population. Namely, the sample included participants with visual impairments and learning conditions to give us some understanding of any accessibility challenges relating to the labels for these groups. It is noteworthy that the perspectives of those participants with visual impairments and learning conditions cannot be generalised and are not representative of the perspectives of people with other disabilities.

2. **External validity**: In this study, experiment and survey outcomes were based on hypothetical choices that may be subject to social desirability bias and other sources of imprecision and bias such as ordering effects (the survey came after the experiment), and we generally interpret stated intent as an upper bound of real behaviour. The online choice environment presented for the experiment aimed to emulate the real-world decision context, however, since the choices were hypothetical, drawbacks in external validity remain, given that for example, respondents did not have real-world trade-offs to make around price and convenience. Moreover, it should be noted that in our experiment the least-emitting flight option was always compared with the middling emissions option (not the highest-emitting option). In a real world scenario, where there is likely to be greater differences in emissions between flight choices (at least in some cases), it is possible the effects of the labels may be greater.

[14] Being "digitally excluded" refers to the lack of access or ability to use information and communication technologies (ICT), such as computers, smartphones, and the internet.

1.2. What makes an effective eco-label? A rapid summary of the literature

To inform the carbon label designs we tested during this experiment, BIT ran a rapid evidence review to explore the characteristics that make eco-labels effective at enabling pro-environmental choices.[15] The impact of eco-labels has been tested across numerous consumption contexts, and they have been shown to be promising at enabling sustainable travel across flight decisions,[16] car purchases,[17] and other transport choices.[18] [19] Insights throughout the literature indicate that the effectiveness of an eco-label depends on a series of key principles that are outlined below.

Clarity: Eco-labels that are clear are more impactful at enabling green choices. The clarity of an eco-label depends on:

- **Simplicity and ease of understanding**: An eco-label must be easy to understand and interpret. This can require using simple and intuitive colour schemes that have been checked for colour blindness issues,[20] avoiding complex visuals and avoiding the provision of too much information on a label.[21] Any written language should be jargon-free and any metrics used should be as familiar as possible.[22]
- **Comparability across different levels of environmental impact**: Clear eco-labels make it easy to compare between different levels of impact. For example, labels containing A-G ratings, gold-bronze scales, and 1-5 star scores are often rated by consumers as easily comparable.[23] Practitioners must make a trade-off: labels must be sensitive enough to capture meaningful differences between choices, while not providing so many different categories that consumers feel overwhelmed.[24] There is also a challenge of calibration: for example, providing enough gradation that two short-haul flights can be differentiated in their carbon impact, while still having a label scale that works for the greenest short-haul *and* the most polluting long-haul flights.

Salience: Eco-labels that are more visible and salient are more impactful at enabling green choices. The salience of an eco-label depends on:

---

[15] Department for Environment, Food and Rural Affairs and Kantar Public, *The role of ecolabelling in the path to net zero: Evidence review and Theory of Change*, July 2023.
[16] Baumeister, S., Zeng, C., & Hoffendahl, A. (2022). The effect of an eco-label on the booking decisions of air passengers. *Transport Policy*, *124*, 175-182.
[17] Folkvord, F., Veltri, G. A., Lupiáñez-Villanueva, F., Tornese, P., Codagnone, C., & Gaskell, G. (2020). The effects of ecolabels on environmentally-and health-friendly cars: an online survey and two experimental studies. *The International Journal of Life Cycle Assessment*, *25*, 883-899.
[18] Brazil, W., & Caulfield, B. (2017). Current Status and Potential Role of Eco-labels in Informing Environmentally Friendly Purchases and Behaviours. *Environmental Protection Agency, Johnstown Castle, Ireland*.
[19] Marek, E. M. (2018). Social learning under the labeling effect: Exploring travellers' behavior in social dilemmas. *Transportation research part F: traffic psychology and behaviour*, *58*, 511-527.
[20] Baumeister, S., Zeng, C., & Hoffendahl, A. (2022). The effect of an eco-label on the booking decisions of air passengers. *Transport Policy*, *124*, 175-182.
[21] Taufique, K. M. R., Siwar, C., Talib, B., Sarah, F. H., & Chamhuri, N. (2014). Synthesis of constructs for modeling consumers' understanding and perception of eco-labels. *Sustainability*, *6*(4), 2176-2200.
[22] John Carroll et al., "Imperfect emissions information during flight choices and the role of CO2 labelling," *Renewable and Sustainable Energy Reviews* 165 (2022): 112508.
[23] Taufique, K. M. R., Siwar, C., Talib, B., Sarah, F. H., & Chamhuri, N. (2014). Synthesis of constructs for modeling consumers' understanding and perception of eco-labels. *Sustainability*, *6*(4), 2176-2200.
[24] Sigit, D. V., Fauziah, R., & Heryanti, E. (2017). The impact of ecolabel knowledge to purchase decisions of green production biology students. In AIP Conference Proceedings (Vol. 1868, No. 1, p. 100009).

- **Visual salience**: The use of bright colours and clear, large text can increase the visual salience of a label and increase the likelihood that people will attend to it.[25]
- **Relevance to the consumer**: Highlighting consumer-relevant benefits can increase the impact of an eco-label. For example, emphasising lifetime running cost savings on energy efficient appliance eco-labels increases consumer engagement.[26]
- **Effective messengers:** Moreover, official endorsement from regulators boosts credibility and salience.[27]
- **Timely presentation**: Displaying eco-labels at the point of purchase optimises their salience because it provides consumers with information which they can immediately act on. [28]

Other key considerations: Several other important factors are worth considering when optimising the effectiveness of an eco-label. This includes considering:

- **Trust and credibility:** Ensuring that consumers trust that a label comes from a credible source that is underpinned by reliable data. This can be achieved by providing viewers with supplementary information on separate web-pages.
- **Supplementary information provision:** Providing consumers with additional information can aid comprehension, but only necessary information should be provided to avoid confusing or overwhelming consumers.[29]
- **Consistent and standardised design:** Standardised labels ease the fluency of consumer comprehension of eco-labels and allow them to compare more easily across products. The A-G eco-label for various goods is standardised across the EU and UK.[30] See here.
- **Risk of backfire effects or licensing behaviours:** For example, in an attempt to differentiate the higher emission flights with the lower emission alternatives, there is a risk of presenting those flights as objectively sustainable (rather than merely relatively so), and thus encouraging greater use of flights vs. more sustainable modes or journeys not referenced in the label.

We used these principles to develop a series of eco-label designs to test in this project. In Appendix 1, we also present a framework that was developed to support practitioners to develop effective eco-labels.

[25] Simon Baumeister, Chen Zeng, and Anke Hoffendahl, "The effect of an eco-label on the booking decisions of air passengers," *Transport Policy* 124 (2022): 175-182.
[26] UK Government. (2023). Exploring the effect of energy labels on consumer shopping decisions. Retrieved from https://assets.publishing.service.gov.uk/media/648b1522103ca6000c039f71/effect-of-energy-labels-on-consumer-shopping-decisions.pdf
[27] John Carroll et al., "Imperfect emissions information during flight choices and the role of CO2 labelling," *Renewable and Sustainable Energy Reviews* 165 (2022): 112508.
[28] Simon Baumeister, Chen Zeng, and Anke Hoffendahl, "The effect of an eco-label on the booking decisions of air passengers," *Transport Policy* 124 (2022): 175-18; Mia Guath, Bart Stikvoort, and Patrik Juslin, "Nudging for eco-friendly online shopping–Attraction effect curbs price sensitivity," *Journal of Environmental Psychology* 81 (2022): 101821.
[29] Simon Baumeister, Chen Zeng, and Anke Hoffendahl, "The effect of an eco-label on the booking decisions of air passengers," *Transport Policy* 124 (2022): 175-182.
[30] Simon Baumeister, Chen Zeng, and Anke Hoffendahl, "The effect of an eco-label on the booking decisions of air passengers," *Transport Policy* 124 (2022): 175-182.

1.3. Our carbon label designs for testing

As described above, we designed the draft carbon labels for this project on the basis of insights taken from the existing literature and responses to the Civil Aviation Authority's 2023 call for evidence on consumer environmental information,[31] aiming to use the principles of effective design to create original labels (albeit with many features familiar to existing labels in a variety of sectors). These were then refined through co-design workshops, input from DfT and Civil Aviation Authority (CAA) colleagues, and input from participants in the qualitative research stream. A shortlist of 3 final label designs were prioritised for the experiment, detailed below.

Label 1: A-E scale rating label: This label (Figures 3.1 and 3.2) was designed in the style of the UK Energy Performance Certificates and product Energy Efficiency labels, which run along an A-G scale.[32] The A-E rating was chosen because it facilitates comparisons between different magnitudes of carbon emissions, and is based on existing label designs, potentially making the label more familiar to consumers, and easier to understand. The colour green was not used to protect any impact of greenwashing and colour association (i.e. consumers believing that their flights had a positive environmental impact), however recognising that zero emissions flights may be available in the future.[33]

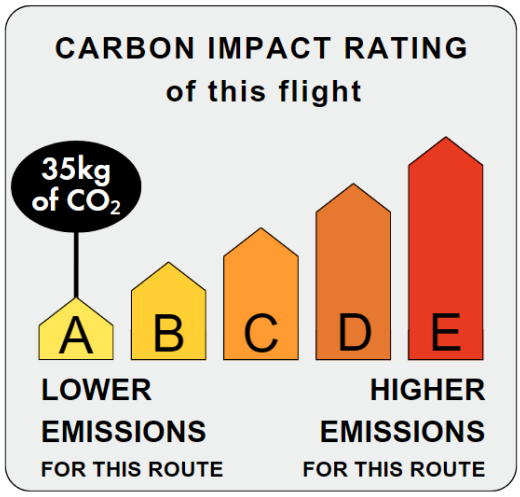


Figure 3.1

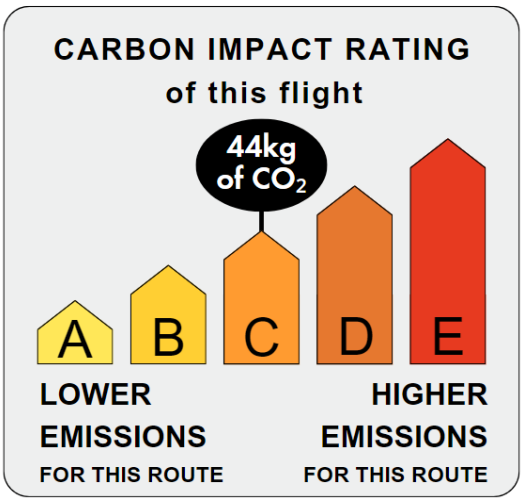


Figure 3.2

Note: [i] *These labels are illustrative examples of labels shown for lower and medium emitting flights along a given short-haul route.* ***[ii] Label 1 description [for accessibility]:*** *Figures 3.1 & 3.2 show a horizontal A-E scale, with 'A' shaded in pale yellow and 'E' in red. Each letter in between increases in darkness. 'A' is labelled 'lower emissions for this route' and E is labelled 'higher emissions for this route'. Emissions in Kg are given above the letter rating in a black text box with white text. The label is titled 'carbon impact rating of this flight'.*

Label 2: Comparison (recommended annual emissions) scale: In these labels (Figures 4.1 and 4.2) , a passenger's flight emissions were given as a percentage of a UK citizen's recommended annual CO_2 emissions (aligned with the Paris Agreement). This label aimed to

[31] https://consultations.caa.co.uk/policy-development/environmental-information-call-for-evidence/
[32] https://www.gov.uk/guidance/the-energy-labelling-of-products
[33] Behavioural Insights Team. (2023). Two interventions for mitigating the harms of greenwashing on consumer perceptions. Retrieved from https://www.bi.team/wp-content/uploads/2023/03/WPS-Greenwashing.pdf

contextualise the impact of the passenger's flights within annual emissions recommended, to make the carbon emissions information personally relevant.

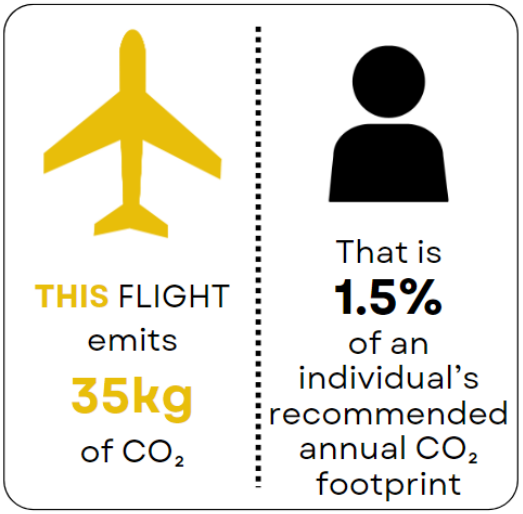


Figure 4.1

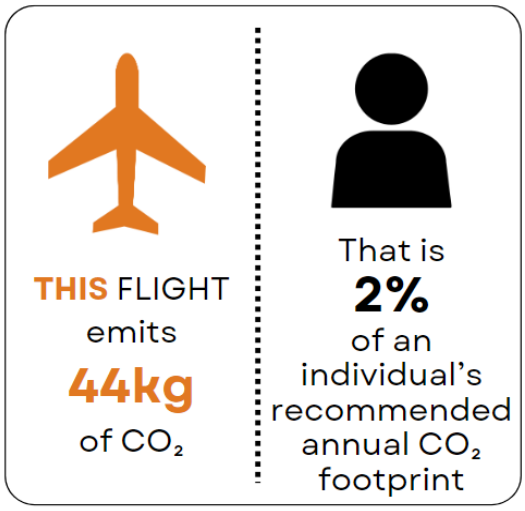


Figure 4.2

Note: [i] *These labels are illustrative examples of labels shown for lower and medium emitting flights along a given short-haul route.* ***[ii] Label 2 description [for accessibility]:*** *Figures 4.1 & 4.2 show a comparison between a flight choice (in Kg) with that figure as a percentage of an individual's recommended annual CO_2 emissions. The CO_2 figure is displayed underneath an aeroplane icon, both of which are shaded in a colour depending on the CO_2 figure: In figure 4.1, the 35kg figure and aeroplane are shaded in yellow; in figure 4.2, the 44kg figure and aeroplane are shaded in orange.*

Label 3: 5-point rating scale. This label (Figures 5.1 and 5.2) was designed to mimic '5-star' rating labels. Carbon emissions clouds were used to replace the stars to align more with the context of flight emissions. More coloured 'CO_2 clouds' indicated flights with greater carbon emissions, and 'Amber-Orange- Red' colour gradients indicated increasing environmental impact, avoiding the use of green to minimise potential perceptions of greenwashing.

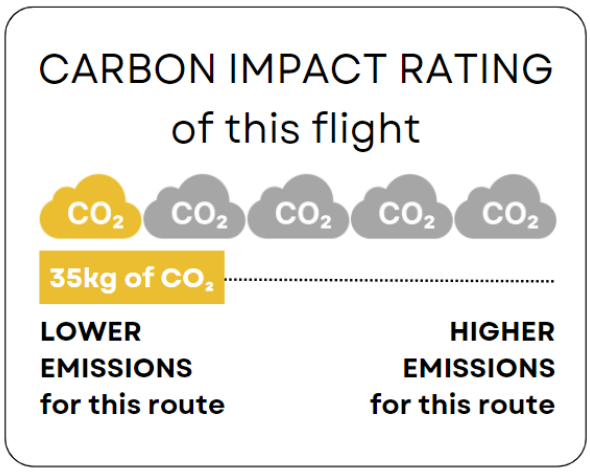


Figure 5.1

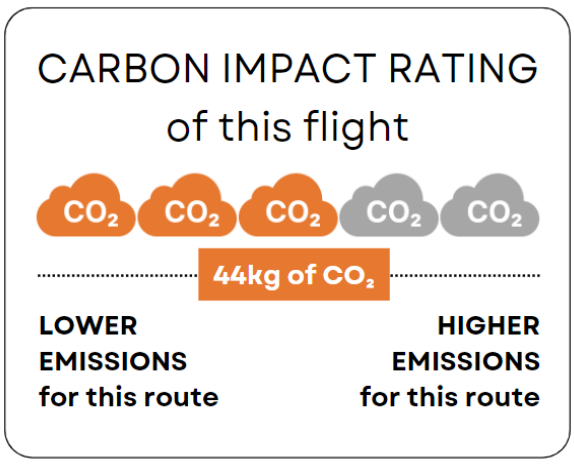


Figure 5.2

Note: [i] *These labels are illustrative examples of labels shown for lower and medium emitting flights along a given short-haul route.* ***[ii] Label 3 description [for accessibility]:*** *Figures 5.1 & 5.2 show a horizontal scale with five CO_2 clouds instead of letters or numbers. Figure 5.1 has one cloud shaded in yellow; figure 5.2 has three clouds shaded in orange. The CO_2 figure is also shaded in the same colour as the cloud, and sits underneath the last shaded cloud. The beginning of the scale is labelled 'lower emissions for this route'; the end of the scale is labelled 'higher emissions for this route'. The label is titled 'carbon impact rating of this flight'.*

2. Findings

Throughout this section, we outline the findings from our experiment, survey and qualitative research. We present these findings as they relate to each of the key research objectives.

2.1. All flight carbon information (numeric and visual) increased consumer uptake lower-carbon flights

The extent to which the provision of environmental information impacted on consumer choice and preference was one of the primary research questions we sought to address through this research.

We were interested in both i) the impact of presenting carbon labelling vs. no carbon labelling on flight choices, and ii) the relative impacts of different carbon label designs. In particular, we were interested in (and put more credence in) the latter, recognising the likelihood of over-reporting in a hypothetical online experiment (i.e. social desirability bias is likely to be quite strong when participants are presented with carbon information about flights they are not actually paying for, or taking). Nonetheless, both findings are reported.

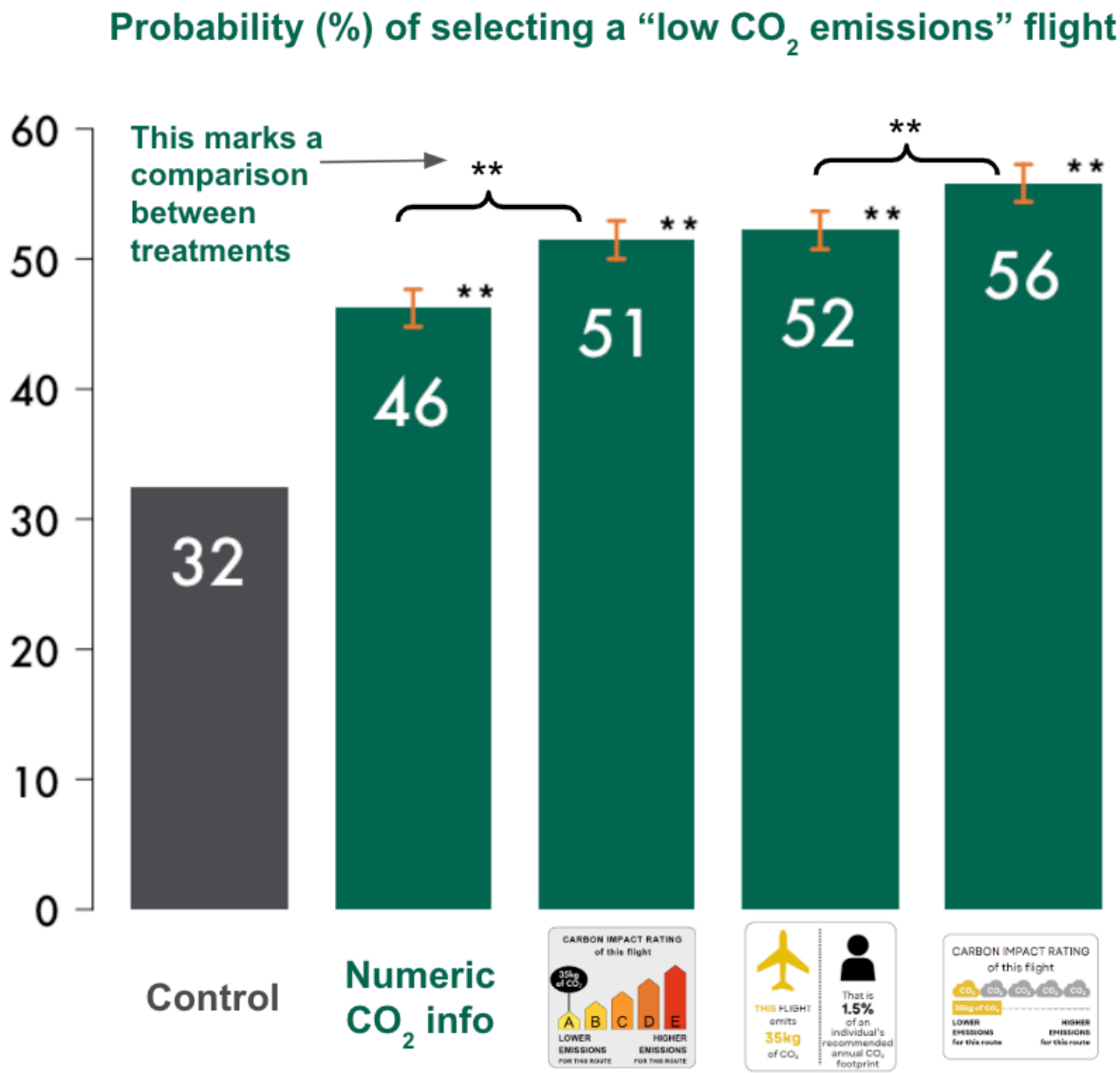
2.1.1 The impact of flight carbon information provision on flight choices

We found that presenting **carbon information (including carbon labels and simple numeric carbon information) appeared to have a positive impact in terms of participants being more likely to choose lower carbon flights**: Participants were more likely to choose sustainable flight options when provided with ***any*** carbon information (numeric carbon information and each of the eco labels) compared to control: carbon information increased sustainable flight choices by at least 44% (or 14 percentage-points) for the numeric label and at most 75% (or 24 percentage-points) for the 5-point rating label. See Figure 6 below. The findings affirm the potential effectiveness of carbon information in encouraging consumers to make more sustainable flight choices.

All of the **visual carbon labels had a greater impact on the selection of low carbon flights than the numeric carbon label group**. Lower carbon flight choices increased by at least 11% (or 5 percentage-points) and at most 22% (or 10 percentage-points).[34] The 5-point rating label had a significantly higher impact on sustainable flight selection (56%) than the A-E scale label and Comparison label. Together, these results demonstrate the value of going beyond presenting carbon information numerically, and presenting carbon information visually and enabling consumers to more easily compare carbon impact across flight choices.

[34] Subgroup analyses revealed some differences in low-carbon flight selection based on respondent characteristics. Specifically, environmentally conscious individuals chose low-emission options more frequently than those who are not environmentally conscious (50% vs 38% on average). Respondents earning over £40k annually also showed a higher rate of low-carbon picks compared to those below that threshold (49% vs 46%, on average). However, flying frequency did not correlate with selection patterns - regular and infrequent flyers performed similarly. See Appendix 6 for detailed results.

Figure 6. Carbon information impact on low CO_2 emission flight choices



Note: *Primary analysis. N = 49,264. ** p < 0.01, * p < 0.05, + p < 0.1. Data collected by the BIT from 14 to 29 November 2023. N = total number of choices made (each participant made 8 choices). The results presented were obtained using multivariate logistic regression, where the outcome is a binary variable equal to 1 if a low emission flight was selected and 0 otherwise. Covariates : age, gender, income, region, ethnicity, education, employment status, urbanity. Standard errors clustered at the individual level. All comparisons are corrected for multiple comparisons using the Hochberg procedure (4 comparisons). The two comparisons between treatment arms were not pre-specified.*

Description of graph [for accessibility]: *The graph displays the probability (%) of selecting a "lower CO_2 emissions" flight under different conditions. The control group has a 32% probability, while the treatment groups with numeric CO_2 information show higher probabilities of 46%, 51%, 52%, and 56%, respectively. The increase between treatments is statistically significant, as denoted by asterisks above the comparison lines. Additional information about carbon impact rating labels is provided alongside the treatment bars.*

The "5-point rating" label was the most impactful carbon label, resulting in 56% of participants selecting the low carbon flights on average - a 22% (or 10 percentage-points) increase over numeric information, and a 75% (or 24 percentage-points) increase from the control. The "Comparison" and "A-E scale" formats achieved 52% and 51% respectively, also outperforming the numeric format.

However, presenting carbon information numerically can still positively affect consumer choice. In the control group (who did not see any CO_2 information), 32% on average chose low-carbon flights. Simply disclosing the CO_2 emissions numerically resulted in 46% selecting low-carbon flights, indicating that numeric information has a significant, positive influence on sustainable flight choice.

These findings suggest that providing any carbon information at a timely moment (when browsing flight choices online) has a positive impact on consumer choices. Crucially, the fact that the carbon labels significantly outperformed both the control and the numeric information suggests that visual labels are more salient and allow for an easier comparison of flight options, and therefore motivate more sustainable choices. Practitioners should therefore focus on developing visual carbon labels for maximum effect. The success of the "5-point rating" would appear to be down to three differences from the "A-E scale" label. First, emissions are represented in CO_2 clouds (a potentially intuitive or more salient representation). Second, it acts like a 1-5 star system rather than an A-E rating (i.e. lower vs. higher carbon flights have fewer vs more clouds shaded, rather than one letter identified). And third, only one colour (amber or yellow) would be present on any given instance of the label. This may allow for a quicker and easier comparison between flights, given one flight might have an amber label, and another flight a yellow label (as opposed to all flights having the same 5 shades of colour, requiring the user to look closer to identify which carbon 'level' is being indicated).

Box 2. Note on interpreting experiment and survey results

Some drawbacks of the experiment should be noted to fully contextualise the findings from the experiment and survey.

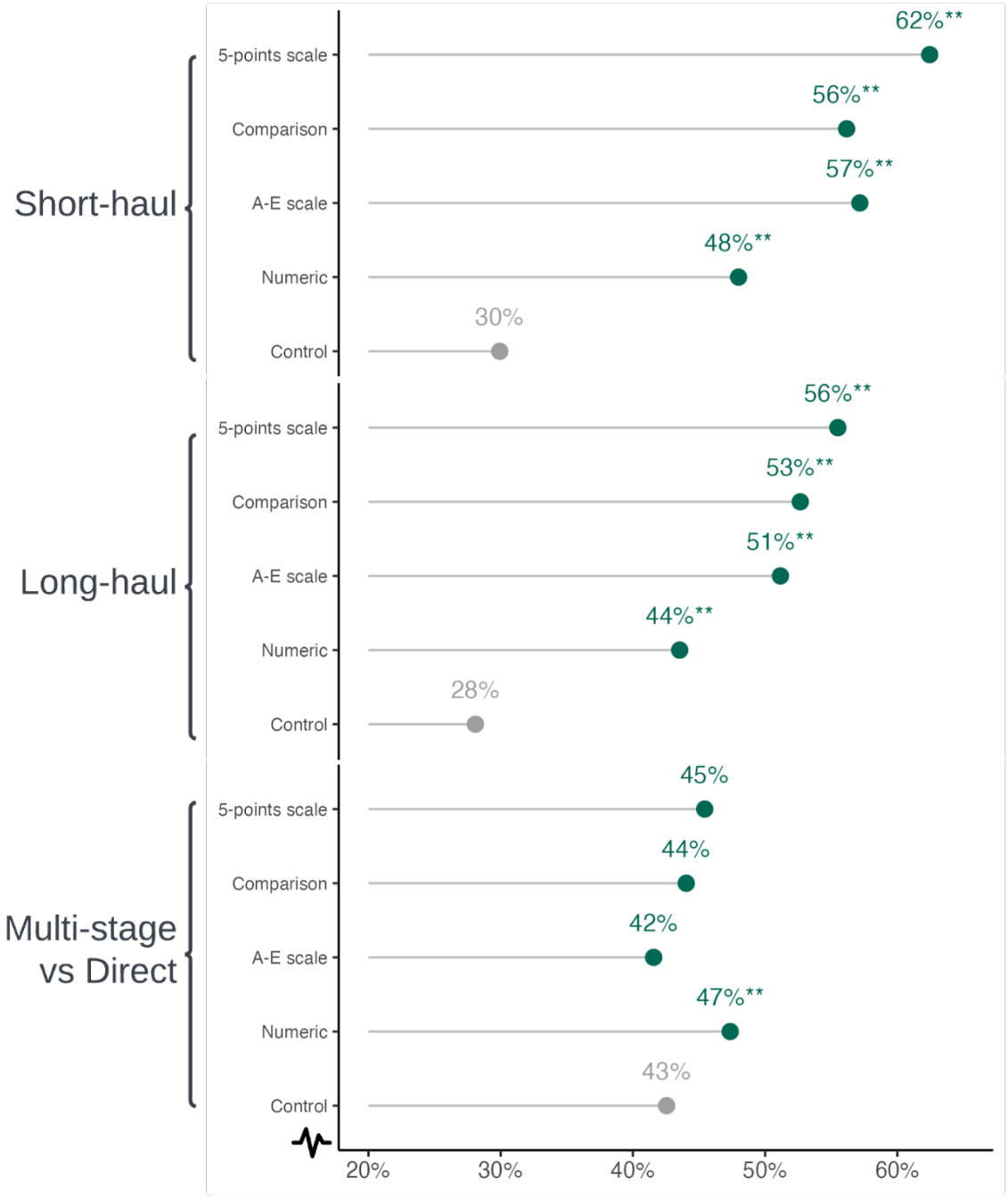
- First, participants were making hypothetical flight purchase decisions, so decisions did not have financial consequences for them, therefore participants may be likely to overclaim their likelihood to purchase more expensive flights just since they are lower carbon. Similarly, it is possible that factors relating to convenience such as flight time and duration may have been overlooked.
- Second, given we tested the impacts of carbon labels, it is possible that social desirability may have played a role in shaping participants' choices. I.e. it is possible that participants chose the more sustainable flight choices knowing that this was the more desirable choice.
- Third, though the experiment sought to replicate a real-world flight booking scenario, there were numerous elements that were simplified to maintain the feasibility of the research. For instance, participants were only ever presented with 4 flight choices that were all relatively homogeneous (i.e. the same same flight route, and same prices between certain choices). Further, participants were provided with less details relating to each flight choice than they typically would in a real-world context.
- Lastly, in our experiment, the least-emitting flight option was always compared with the middling emissions option (not the highest-emitting option). In a real world scenario, where there is likely to be greater differences in emissions between choices (at least in some cases), the effects of the labels may be even greater.

2.1.2. The impact of flight carbon information on choices across flight types (short-, long-, multistage)

We also sought to explore whether the effect of the labels varied across different types of flights; short-haul, long-haul, and direct vs. multistage flights. The results in Figure 7 show that **all carbon information treatments had a statistically significant positive effect on choosing lower-carbon options compared to the control group, for both short-haul**

and long-haul direct flights. The size of the effect was consistent between flight types, with the impact visual carbon labels remaining the same across short and long-haul flights.

Figure 7. Carbon information impact on low CO_2 emission flight choices across different types of flights.



Notes: *Exploratory outcome. Data collected by the BIT from 14 to 29 November 2023. N=18,474 for the short-haul and long-haul subgroups. N=12,316 for the multi-stage subgroup. N corresponds to the total number of choices made by subgroup (2 choices for the multi-stage, 3 choices for short-haul and long-haul). Reference group for comparisons : Control. ** p < 0.01, * p < 0.05. The results presented were obtained using multivariate logistic regressions on each subgroup separately, including the following covariates : age, gender, income, region, ethnicity, education, employment status, urbanity. Standard errors clustered at the individual level. Corrections for multiple comparisons using the Hochberg procedure (4 comparisons). The symbol on the left of the scale indicates it does not begin at 0%.*

Description of graph [for accessibility]: *This graph displays a comparative graph showing how different labelling strategies affect travellers' choices of low CO2 emission flights. It's divided into three sections: Short-haul, Long-haul, and Multi-stage vs Direct flights. Within each section, the 5-point scale label generally leads to the highest selection of low-emission flights, particularly in short-haul flights where it achieves a 62% selection rate. Comparison and A-E scale labels also show a notable influence across flight types, while the Numerical label is less effective. The Control group, without labels, consistently results in the lowest selection of low-emission flights, highlighting the effectiveness of labelling in influencing environmentally friendly travel choices.*

However, the effect of the carbon information disappeared for multistage flights. When participants made flight choices involving a less-expensive and higher CO_2 multistage vs. a less-expensive and lower CO_2 direct flight, the impact of carbon labels on sustainable consumption disappeared or significantly diminished. For instance, none of the visual carbon labels had any effect at all in multi-stage vs. direct scenarios. In the multistage flight decision context, more people chose the sustainable flight option, including in the control group. This could in part be because direct flights are always more sustainable compared to multistage flights, so in this context the sustainable flight option was also more convenient. Labels have small-to-no additional impact on flight choices in this context, potentially because the impact of increased flight convenience for direct flights (which produce fewer carbon emissions than multistage flights) was so large, the secondary co-benefit of flight sustainability was crowded out. See Appendix 7 for further insights about the relationship between flight type and flight price.

2.2. Flight choices were predominantly shaped by prices and logistics (e.g. flight timing, duration), but carbon labels and flight carbon emissions also influenced choices

Beyond exploring the impacts of the carbon information designs on consumer flight choices, our research also sought to unpack the reasons behind these choices. Price was one such factor we sought to explore in depth, and we hypothesised that the effects of the carbon information designs on consumer flight choice would be shaped by the cost of the flight.

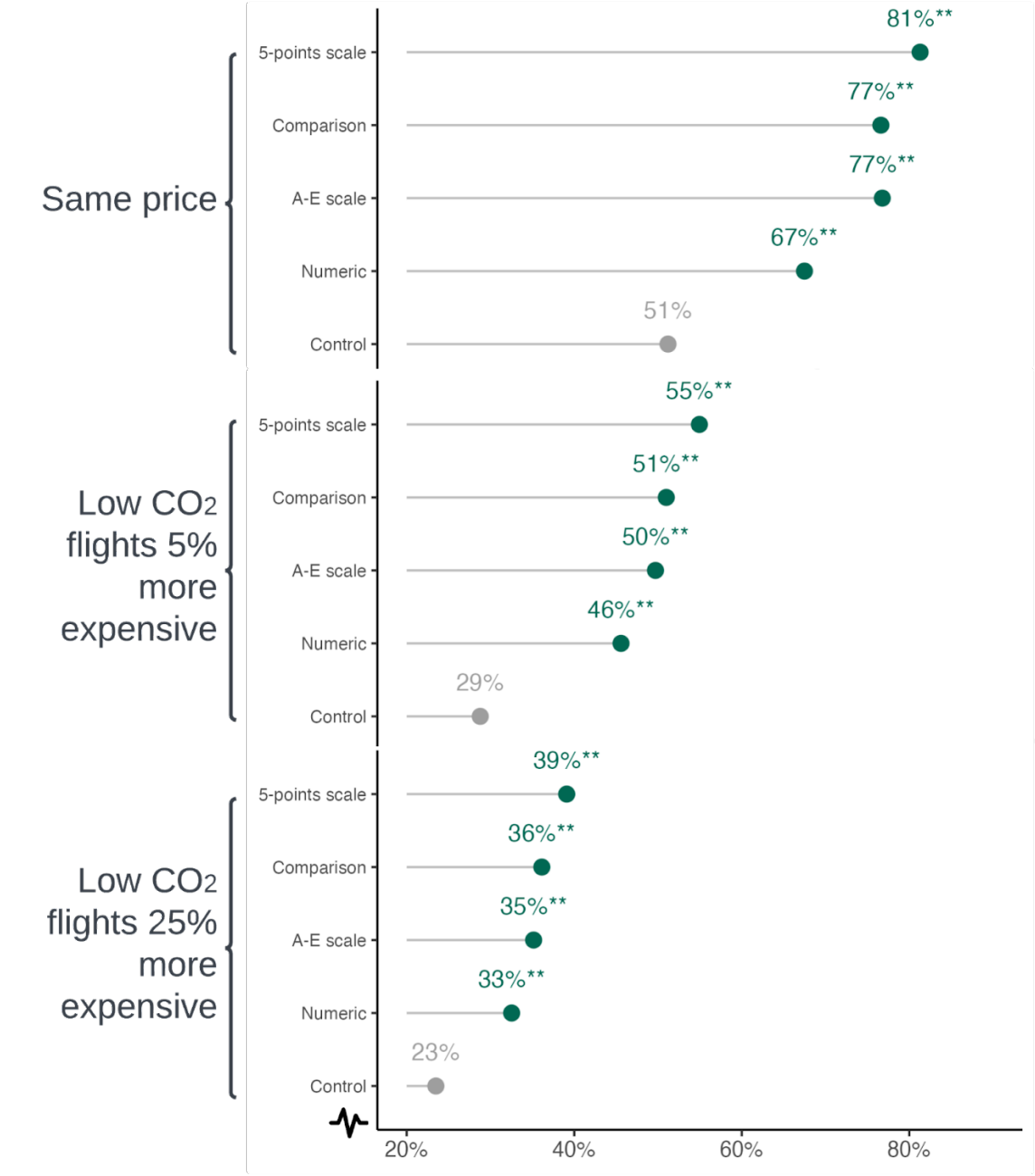
2.2.1. The interplay between flight price and flight carbon-emissions during choices

Our experiment found that **the effects of the carbon information in encouraging people to select lower carbon flights remained even when the more sustainable flights were more expensive.** All carbon information labels (numeric and visual carbon labels) remained effective across different price levels. This was true for when lower-carbon flights cost a similar amount, 5 percent more, and 25 percent more than higher-carbon flights (a typical real-world price range) (see Figure 8). This finding highlights the effectiveness of carbon impact information in positively influencing sustainable flight choices across a range of flight price discrepancies. This is encouraging given the extent to which flights vary in cost in real-world settings.

However, the effects of the carbon information decreased as the price premium for the lower-carbon flight increased. The effect sizes of the treatments consistently decreased as price differences between the low and high carbon flights increased. For example, when flights were all the same price the “5-point Rating scale” label increased the probability of selecting the low-CO_2 flight option by **30 percentage-points** compared to the control group. The impact of this label decreases to **26 percentage-points** when the low-emitting flight is 5% more expensive, and shrinks further to **16 percentage-points** when the price difference grows to 25%. A similar gradual decrease in effect size was observed

across all of the carbon information arms. Intuitively, this suggests that consumers have a finite 'willingness to pay' for lowering their carbon footprint (see Figure 8).

Figure 8. Carbon information impact on low CO_2 emission flight choices across price differences



Note : *Exploratory outcome. Data collected by the BIT from 14 to 29 November 2023. n=18,474 for the 5% and 25% subgroups, n=12,316 for the Same price subgroup. The number of observations (n) corresponds to the total number of choices made by subgroup (2 choices for Same price, 3 choices for 5% and 25%). Reference group for comparisons : Control. ** p < 0.01, * p < 0.05. The results presented were obtained using multivariate logistic regressions on each subgroup separately, including the following covariates : age, gender, income, region, ethnicity, education, employment status, urbanity. Standard errors clustered at the individual level. Corrections for multiple comparisons using the Hochberg procedure (4 comparisons). The symbol on the left of the scale indicates it does not begin at 0%.*

Description of graph [for accessibility]: *This graph shows the percentage of choices for low CO2 flights at different price levels. It displays four categories for each price level—Control, Numeric, A-E scale, and 5-points scale—with percentages indicating how often each option is chosen. At the same price, the choices for low CO2 flights range from 51% for the Control to 81% for the 5-points scale. When low CO2 flights are 5% more expensive, the choice percentage decreases, ranging from 29% (Control) to 55% (5-points scale). At 25% more expensive, the numbers further decrease, with Control at 23% and 5-points scale at 39%. Asterisks indicate statistical significance, with more asterisks denoting higher significance levels.*

The same prioritisation of cost was observed across other strands of our research. All qualitative participants who flew for leisure stated that cost was the most important factor. Other prominent factors mentioned were: time of the flight (departure and landing), duration of layover, location of departure airport and baggage allowance. Among business travellers and travellers flying with infants, time of the flight was reported as the most important factor, followed by price. When asked whether they would consider environmental information when booking flights, qualitative research participants said they would likely only consider this information if there were no or a very small difference in price, or if the more sustainable option were cheaper.

"[The labels] are not as relevant as the price. If lower emissions meant cheaper, then I would look at the [label]." (Quantitative research participant)

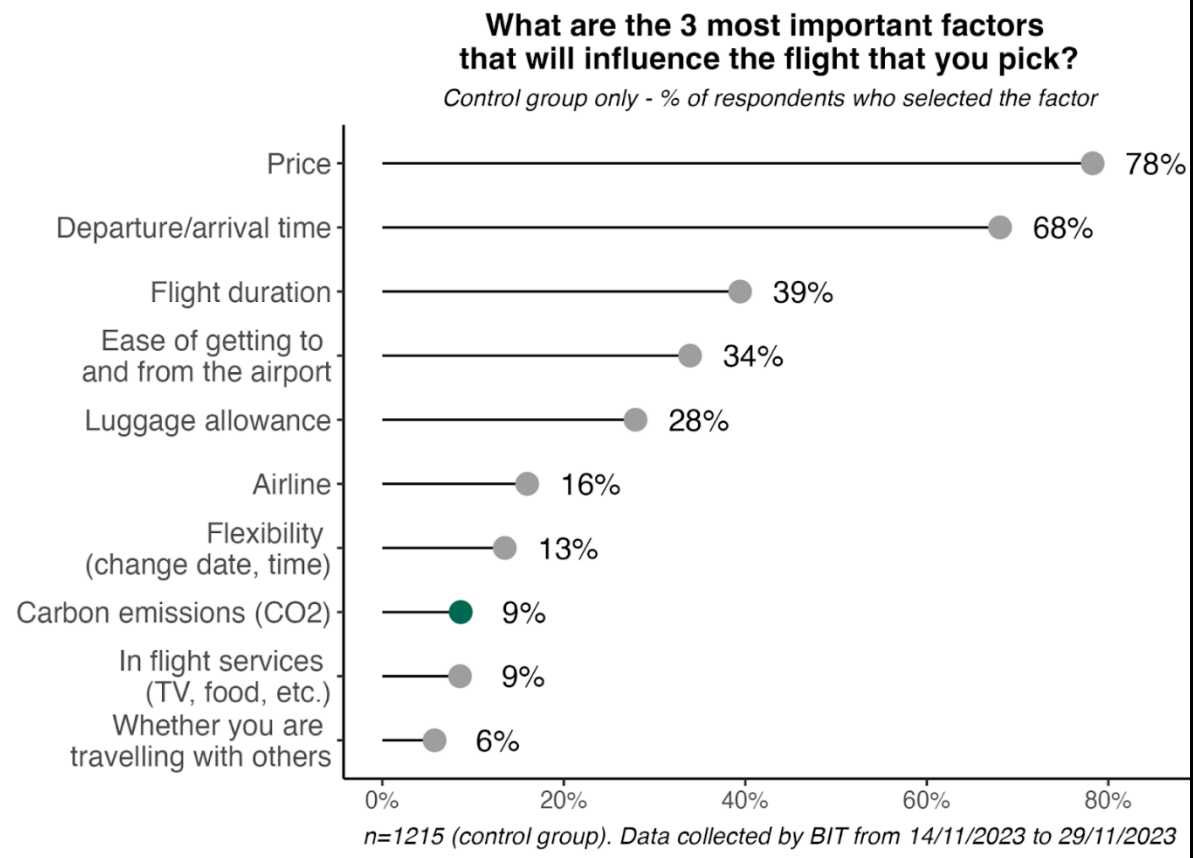
"[The label] might influence me if the prices are fairly similar." (Focus group participant)

These findings re-emphasise that consumers' flight choices are predominantly shaped by price and logistical factors.

2.2.2. Consumer priorities during flight decision-making

Moreover, these findings were broadly corroborated by the online experiment survey responses which revealed that **CO_2 emissions are not considered a priority for consumers when selecting flights**. For instance, participants that were assigned to our control group and therefore were not shown the carbon information designs, identified price (78%) and convenience/departure & arrival times (68%) as the two most prevalent factors underpinning their flight choices. Only 9% of participants in the control group prioritised CO_2 emissions as a top-3 factor. See Figure 9 below.

Figure 9. Factors influencing flights selection (control group)



Description of graph [for accessibility]: *The graph shows factors influencing flight choice in a control group. Price is the most influential at 78%, followed by departure/arrival time at 68%. Flight duration affects 39%, ease of getting to and from the airport 34%, and luggage allowance 28%. Airline preference is at 16%, flexibility at 13%, and carbon emissions (CO2) and in-flight services both at 9%. Only 6% consider travelling with others as a key factor. Data was collected by the Behavioural Insights Team from November 14 to 29, 2023, with a sample size of 1215 from the control group.*

This list of ranked priorities (Figure 9) emphasises the primacy of flight price and logistics elements above flight sustainability during consumer decision making.

Interestingly, however, our survey also revealed that **the provision of carbon-related information (e.g. numerically or in visual carbon labels can bring flight environmental impact to the forefront for some participants**. Specifically, we observed that participants who saw carbon information designs when picking flights (and were therefore primed to consider flight impacts on the environment during this later survey element of the study), were twice as likely to say that carbon emissions were in their top-3 considerations when booking flights (going from 9% of them saying so to 18%, see Figure 10).

This raises some questions: is the increase in sustainable choices a result of social desirability bias, with participants being primed to think they 'ought' to prioritise carbon emissions? Or is it legitimate, reflecting the fact that consumers do genuinely weight carbon impact as more important, because the information is made available to them in a salient form? Both explanations are plausible. Certainly, we would expect some social desirability bias / priming effect. However, the primary experimental findings (showing that carbon information did influence choice), and the fact that this effect increased with improved label design (despite social desirability bias likely to be fairly similar for all label designs), suggests there was at least some legitimate effect of the labels. In other words, there could be at least two distinct mechanisms explaining the impact of the labels - i) consumers have a latent

preference for low-carbon flights, but it is only the presence of the carbon information that allows them to act on this preference, and ii) the presence of carbon information *creates* a stronger preference for low-carbon flights, because it elevates its perceived importance, simply because it is made to be a more salient characteristic and one on which flights can be differentiated. This findings replicates previous research conducted with BritainThinks wherein participants agreed that the presence of environmental information enabled them to factor it into their multidimensional flight decision.[35]

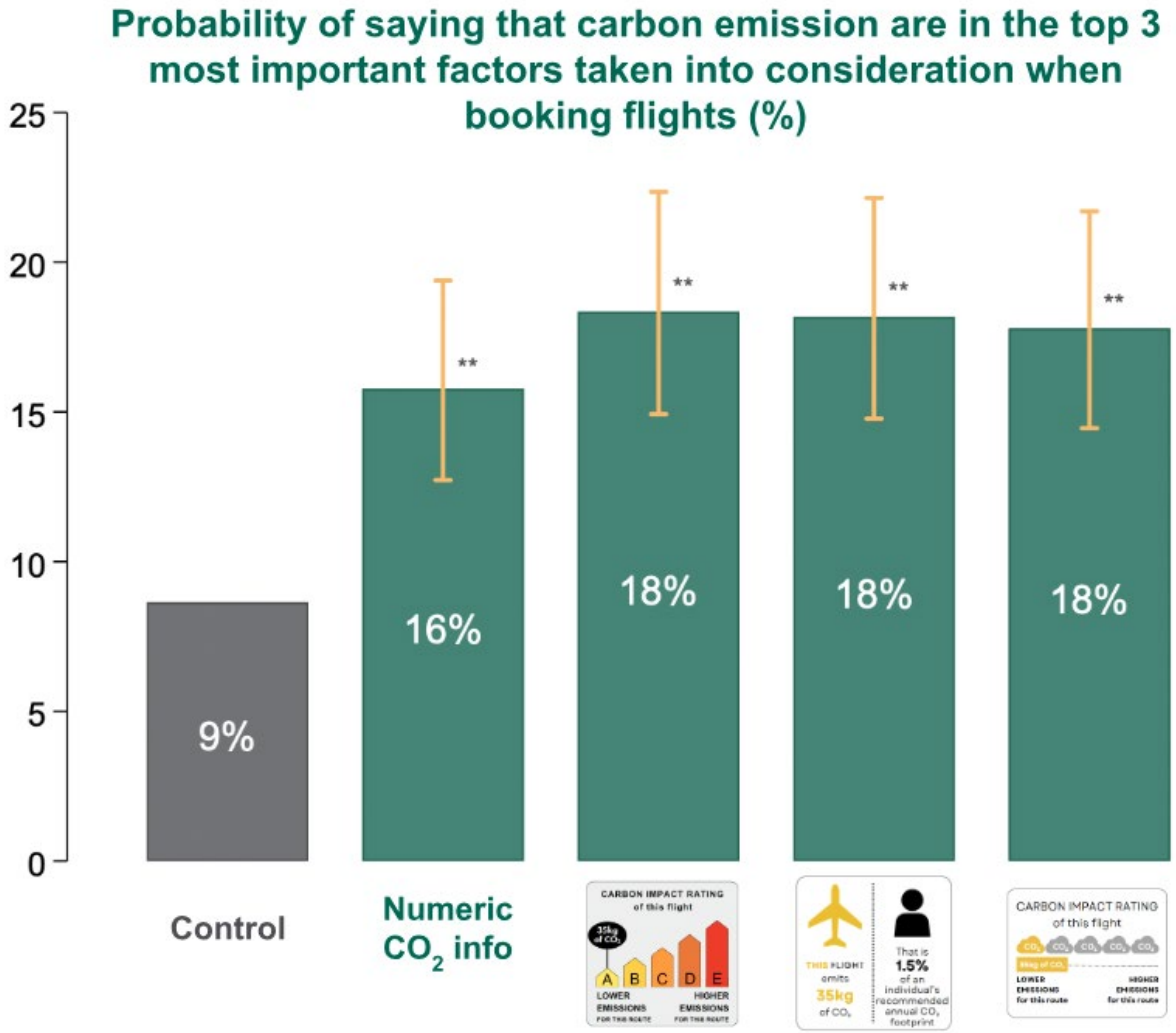
Respondents who selected carbon emissions as one of the top three factors in flight decisions also differed in their characteristics compared to those who did not. Specifically, those considering emissions tended to have lower incomes (48% earning under £40,000 and 42% earning over), be an average of two years younger, and reside in more urban areas (38% vs 28%). Additionally, they expressed greater concern about climate change (93% vs 78%).

Overall, this suggests that while carbon emissions and environmental impacts may not be a primary consideration for consumers when selecting flights (compared to price and other key variables), the presence of carbon information at the point of purchase may serve as a timely and effective nudge in prompting consumers to consider the environmental impacts of air travel.

[35] CAA Environmental Information Provision (2021) Retrieved from https://publicapps.caa.co.uk/docs/33/CAP2205%20-%20CAA_Environmental%20Information%20Provision_Final%20Report_070421.pdf

Figure 10. Impact of labels on the probability to report carbon emissions as a top-3 factor

Note : *Exploratory outcome. Data collected by the BIT from 14 to 29 November 2023. N=6,176. Reference group for comparisons : Control. ** p < 0.01, * p < 0.05. The results presented were obtained using multivariate logistic regressions with no covariates. No corrections for multiple comparisons.*



Description of graph [for accessibility]: *The graph illustrates the probability of respondents considering carbon emissions as one of the top three factors when booking flights. The control group is at 9%, while exposure to numeric CO_2 information increases the likelihood to 16%. The presence of different carbon impact rating systems (depicted by icons under each bar) correlates with an 18% probability across these treatments. The data suggests that providing carbon emission information influences consideration of environmental impact in flight selection decisions. All treatment groups show a statistically significant difference from the control, as indicated by the double asterisks.*

2.2.3. Behavioural barriers to engaging with flight carbon emissions during flight choices

The research also sought to investigate *why* consumers did not tend to consider environmental impacts of flying when making flight choices. **The most prevalent barriers to engaging with flight carbon information were *(i)* competing priorities** (e.g. flight price, flight time, and duration) (58%), ***(ii)*** **the complexity of flight booking makes it difficult to**

pay attention to flight carbon emissions (38%), and *(iii)* **a lack of knowledge about where to find flight carbon information while booking flights** (27%) [36] (See Appendix 8).

Beyond reaffirming the importance consumers place on factors such as price and flight times, these barriers also highlight the range of other criteria that consumers must consider when booking flights, suggesting that environmental information is unlikely to be considered due to information overload. This highlights the potential usefulness in presenting carbon information at the point of purchase in a clear and simple way, because this allows the flight carbon information to cut saliently through other criteria when consumers make flight choices.

A similar picture emerges from our qualitative research when participants were asked whether they would consider environmental information in their booking decisions. Participants largely agreed that price and other key considerations (outlined in section 2.2.1) would still be decisive. As one participant put it:

“To be honest, [environmental emissions] wouldn't make any difference to me at the end of the day" (Focus group)

Similarly, some participants alluded to the fact that flying is always an environmentally-damaging activity, and so it would not be worth taking emissions information into account versus other considerations:

"I'm aware of the carbon impact, but you can't really get around it if you have to catch your flight." (Focus group)

Similarly, another participant suggested that they would only take environmental information into account if the differences in emissions were considerable, even if the price and destination of the flight remained the same:

"Perhaps in the future. If it was 5% less CO2 for the same price and location – definitely. If it was 0.5% maybe not." (Interviewee)

In the context of this study, it is possible that the effectiveness of the labels was in part due to the simplicity of their design and their salience (e.g because of their use of colour or because participants were not used to seeing them in flight booking scenarios). These design elements may have enabled the labels to stand out compared to other flight criteria and be simple enough to integrate into the multidimensional decision that participants were making during the study.

This is supported by the proportion of participants who noticed the labels from the experiment scenarios. We found that **participants remembered seeing visual carbon labels (52-55%) more than numeric information (49%).** When asked unprompted to recall information presented on the website, the "5-points scale" label ranked highest at 55% recall, though differences versus other labels proved insignificant. This reaffirms that label salience (e.g., placing them near the price) remains important during real-world implementation, especially when labels are first being introduced.

Participants with visual impairments and learning conditions report facing the same barriers to the use of flight carbon emissions information as participants without. When prompted to

[36] Other barriers to engaging with the carbon information of flights included participants thinking that; their personal emissions did not impact the environment that much (14%), they did not trust the carbon information provided (10%) and that emissions were not an issue (7%).

specifically discuss whether their condition impacted their ability to use flight labels, **participants with visual or learning impairments in our sample noted that they largely do not have challenges when booking flights or using flight labels**. One participant said:

> "*I can't think of any challenges or any issues I've had with [the flight carbon labels].*"
> (Interviewee, visual impairment)

However, it is worth noting that this perspective came from a small sample of four participants, and further research is recommended to explore the accessibility of flight carbon emissions labels.

It is worth recognising, however, that the flight choice environment built as part of the experiment was a simplified version of a real-life scenario, meaning that there is a chance the labels may have stood out more given there were fewer competing criteria for participants to consider. For example, participants were only presented with four flight options at once, the departure and arrival airports were always fixed, and additional flight information which is commonly displayed on booking sites such as baggage allowance, was not included.

Overall, practitioners should recognise that, due to the array of different factors that shape consumer flight decision-making, the impact that carbon labels alone can have on lower carbon flight purchases is limited, and further solutions should also be explored to enable more sustainable flight consumption.

2.3. Participants understand that flights emit CO_2, but key knowledge gaps remain around what scale of impact an individual passenger has. Carbon labels did not improve understanding.

To evaluate the overall impact and effectiveness of carbon information designs, it is important to not only assess how they affect consumer flight choices, but also to consider how well the carbon information is understood by consumers. With this in mind, we sought to explore consumer understanding of the general impacts of flying on the environment, as well as how the carbon information designs themselves might have impacted consumer understanding.

2.3.1. Consumer understanding of flight carbon emissions principles

We found that **understanding of basic flight carbon emissions principles was high, but key gaps remained**. Those who did not see any carbon-related information in the experiment (i.e. the control group) had a good understanding of basic flight carbon emissions principles. For example, more than three quarters of participants understood emissions vary between aircraft types (78%) and that the same journey by train rather than by plane would have lower carbon emissions (79%). The impact of distance on emissions was also well understood, with 74% aware that longer flights emit more carbon. However, only 45% knew that connecting flights could exacerbate carbon emissions and 66% knew that newer planes typically pollute less (see Figure 11 below). Together, these findings capture a general lay understanding around flight carbon emissions, but demonstrate that some knowledge gaps exist that may be important to mitigate to enable sustainable flight choices.

Figure 11. Levels of understanding of flight carbon emissions among the Control group.

n=1,215 (Control group). Data collected by BIT from 14/11/2023 to 29/11/2023.

Description of graph [for accessibility]: *The graph displays the control group's beliefs about factors affecting aircraft carbon emissions. A majority, 74%, correctly believe flight distance affects emissions. 66% correctly say newer aircraft generally emit less than older ones. 45% mistakenly think layovers increase emissions. 22% incorrectly believe two different aircraft on the same route emit the same emissions. Finally, 21% incorrectly equate the emissions of a London to Paris flight with a train journey on the same route. The bottom two statements, marked as "Wrong answers," indicate common misconceptions about emissions. Data comes from 1215 respondents, collected by the Behavioural Insights Team from November 14 to 29, 2023.*

Moreover, our qualitative research also highlighted gaps in consumer understanding. **Participants tended to know that flights can lead to significant CO_2 emissions but did not know what impact this has on the environment or what individual passenger contributions meant.** Interview participants knew that flights generally emit more CO_2 compared to other forms of transport, but acknowledged that they did not fully understand what the impact was, what the specific emissions equated to, nor what their individual contribution to climate change was from selecting flying as their mode of travel. These gaps in understanding further substantiate the need for the provision of carbon information when booking flights.

"When I've seen it come up, the environmental information, it doesn't really mean anything to me. Like I don't really understand what it means" (Focus group)

"You sort of see kilogrammes or tonnes of carbon and you know to the average person it doesn't really mean anything." (Focus group)

For practitioners, these findings emphasise the importance of improving consumer understanding of flight impacts (e.g. through flight carbon labels) to inform sustainable flight decisions, highlighting the need for information about how impactful an individual's flight emissions are. (See Appendices 9 and 10 for further data about flight recall).

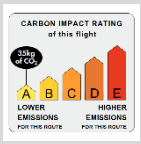
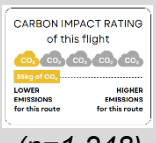
2.3.2. The impact of carbon label design on understanding of flight carbon emissions

Beyond looking at general understanding of the impacts of flying, we also sought to explore whether the carbon labels themselves affected consumers' understanding of the carbon emissions of flights. We found that **exposure to carbon labels did not meaningfully improve general understanding of flight carbon emissions (a score calculated based on the number of questions that were correctly answered about flight emissions)** (see Table 3 below). This is likely due to the fact that label designs focused on helping consumers compare flight options rather than giving them a detailed explanation of the environmental impact of flying. It is worth noting, however, that the carbon information designs (numeric and carbon labels) also included an 'info' icon, that if clicked, revealed a pop-up box with additional information on what CO_2 emissions are, how they contribute to climate change, as well as outlining some of the factors that lead flights to produce more emissions (e.g. flight class, the flight's distance, etc.) (see Box 3 below).

Despite this, **no participants** from the experiment clicked on the icon to see this information. It is possible that this was due to the displayed icon not being visible enough, or that participants did not expect interactive elements within the experiment (and so did not think to click it expecting more information). In any case, the finding suggests that providing additional information via a click-through mechanism may be an ineffective vehicle for providing additional carbon information.

It is noteworthy that focus group attendees did reflect that, over time, the presence of flight environmental labels may build comprehension and understanding.

Table 3. Effects of carbon information on understanding of flight carbon emissions

% of participants…	Control (n = 1,215)	Numeric CO_2 info (n=1,287)	 (n=1,210)	 (n=1,216)	 (n=1,248)
General Understanding of Flight Emissions score (= number of true answers / 5)	0.68	0.69	0.69	0.69	0.68

Note: *Secondary outcome. N=6,176. Data collected by the BIT from 14 to 29 November 2023. The results presented were obtained using a multivariate linear regression, including the following covariates : age, gender, income, region, ethnicity, education, employment status, urbanity. Corrections for multiple comparisons using the Hochberg procedure (4 comparisons). Statistical significance threshold 5%.*

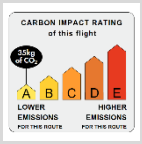
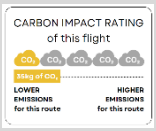
Box 3. Pop-up box with additional information

CO2 emissions refer to the amount of carbon dioxide this flight releases into the atmosphere. It is important to measure CO2 emissions because they contribute to climate change. Factors contributing to the CO2 emissions per passenger include your chosen class, the flight's flying distance, and aircraft efficiency (a newer aircraft can be more fuel-efficient).

Moreover, **carbon labels can confuse consumers if not designed carefully.** Interview and focus group participants expressed that certain elements of carbon labels could be difficult to understand.

Across all the label designs, **the numeric carbon metrics were considered confusing by many interview participants, because they did not know what the numbers of units meant in terms of actual environmental impact.** This highlights the need for flight carbon carbon labels to be personally relevant, since many carbon quantity metrics are meaningless to people. The comparison label aimed to contextualise flight carbon emissions by comparing them across an annual recommended amount. The heightened personal relevance of the comparison label could explain why participants reported preferring the comparison label 95% more than the 5-star rating label (39% and 20% preferred respectively). Further practitioners should consider how to frame carbon emissions metrics and statistics in a relatable and understandable way to improve carbon labels.

Table 4. Label preferences

% of participants…			
…who preferred this carbon label*	34%	39%	20%

Note: *N=6176. Data collected by BIT from 19/11/2023 to 29/11/2023.*
**7% of participants answered "None".* All participants were shown the 3 labels and asked to select their preferred version, independently of their assigned treatment group.

The A-E scale was considered the most familiar design by qualitative research participants:

"I guess it's more familiar... So, if you have a similar set up ready where you know A is the best and E is the worst then I guess it's easier to interpret" (Leisure flyer - focus group)

However some participants commented that **the A-E scale could be made more clear:** e.g. it was commented by several participants that a 1-5 rating would be more intuitive:

"I was just wondering - would it be easier, instead of A-E, just [having] 1-5?" (Leisure flyer - focus group)

"I agree with the numbers. I feel like the numbers would speak for themselves, just easier" (Leisure flyer - focus group)

Participants also commented that the absence of a green colour would detract from the effect of the label - though this was a deliberate design choice to avoid implying that any flights were truly a 'green' choice. For practitioners, this is a challenging trade-off to make, as noted by previous studies, the inclusion of the colour green may also undermine the credibility of the labels (as the colour green is associated with sustainability, and all flights currently do have an environmental impact) and create a licensing effect, whereby consumers believe they can fly more because they are selecting more sustainable flights.

"Green should be green completely. You wouldn't be flying at all if it was green" (Focus group)

"If it was green my eyes would be attracted to is straight away... if there wasn't a green, I feel like psychologically I'd be looking for a green one, even if there isn't any there" (Focus group)

A compromise may be to have clearer differences between the colours used, as this would make emissions differences more salient. This sentiment was emulated across participants with and without visual or learning impairments.

"I think if it was in this format [A-E scale], I would want more distinction between the colours" (Interviewee)

Across all the label designs, qualitative **participants preferred simpler designs, with some participants commenting that the "comparison" and "5 point rating" were too busy to be easily understood at a glance.**

"If I'm thinking of it in my ideal spot on the search window ... for me that's too much information to take in when making this decision, I'd want something a bit more instant and visual" (Interviewee)

This reflects findings from the academic literature about carbon label clarity, and emphasises that further carbon labels could be user tested for perceived simplicity. However, there is a trade-off to be made between providing clear information and sufficient information. Further research could investigate more simple carbon labels, e.g. traffic-light systems, or colour text with carbon emissions quantities.

Overall, these findings highlight the role that carbon labels play both to enable consumers to compare easily between different magnitudes of impact for a given flight, and to educate the consumer about the impact of their personal emissions within the wider context of climate change. Complex labels that contain too much information or unfamiliar metrics or colour schemes may limit the impact of a carbon label on consumer understanding of flight carbon emissions.

2.4. Flight carbon information increased willingness to switch airlines or pay more for a lower carbon flight ticket

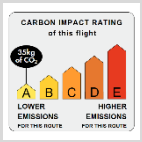
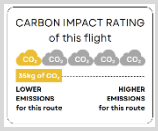
To evaluate the wider impact of carbon labels on consumer engagement with more sustainable flight behaviours, in our survey we explored participant willingness to compromise on airline, price, or transport mode in order to make the pro-environmental decision.

2.4.1. Willingness to engage with different pro-environmental travel behaviours

Among participants from the control group who did not see the carbon labels or the numeric carbon information, a baseline of 66% were willing to switch airlines if they produced fewer carbon emissions and 38% were willing to pay more for a lower carbon ticket (see Table 5). This reflects findings from our experiment where 46 - 55% of participants self-reported that they were willing to pay 5% more for a low-carbon flight, and 33 - 39% self-reported that they were willing to pay 25% more for lower-carbon flight. As a baseline, these are sizable proportions of the population, which implies a general support from the public for more sustainable flight options. It is worth noting however, that these figures should be interpreted as an upper-bound given the hypothetical nature of the experiment and people are not paying for flights in the experimental context.

Interestingly, **flight carbon labels modestly increased participants' openness to changing airlines (by 2-4 percentage-points) and paying a premium (by 5-8 percentage-points)**, which demonstrates the potential for flight carbon carbon labels to shape a variety of sustainable flight behaviours (e.g. airline selection, flight selection). **Again, this highlights that labels do not merely allow existing preferences to be realised by providing information, but also shape preferences** by making environmental performance more salient and more important to consumers. Moreover, given that carbon labels further foster people's willingness to switch airlines, **these findings imply that carbon labels could have systemic impacts on sustainable travel, and may represent a market mechanism that encourages airlines to compete on the sustainability of their flights.**

Table 5. Willingness to change by treatment group

% of participants…	Control (n = 1,215)	Numeric CO_2 info (n=1,287)	 (n=1,210)	 (n=1,216)	 (n=1,248)
I would be willing to change airlines if it produced less carbon emissions (CO_2)	66%	69%	68%	70%	69%
I would be willing to pay more for my ticket if it produced less carbon emissions (CO_2)	38%	43%	44%	44%	46%
Where possible, **I would be willing** to take the train or another mode of transportation if it produced less carbon emissions (CO_2)	63%	62%	63%	62%	62%

Note: *N=6,176. Data collected by BIT from 14/11/2023 to 29/11/2023.* ***Green shading*** *identifies the statistically highest (or joint highest) in row. Statistical significance threshold 5%.*

Baseline willingness to take a train to avoid producing carbon emission was 63%. Exposure to carbon labels during this experiment did not increase this sentiment, which could be because none of the labels made direct comparison with trains. Nonetheless, willingness remained above 62% in all conditions.
Some qualitative research participants also noted a willingness to consider alternative modes of transport to flying, and suggested that carbon labels might, over time, encourage them to do this:

"[Seeing mode comparison information] would stop and make me think." (Interviewee)

However, other participants noted the considerable barriers to switching transport mode, particularly price:

"Sadly, the cost of a flight is sometimes even less than half the cost of a train, if not a quarter sometimes." (Interviewee)

Overall, these findings demonstrate the potential for carbon labels to increase willingness to engage with a variety of sustainable travel behaviours, and show people's willingness to compromise in order to reduce the carbon emissions associated with their flights. However, it should be noted that, whilst participants report that they are willing to engage with these behaviours, other barriers (e.g. availability of options, price, convenience, etc.) restrict and prevent them from doing so; carbon labels alone are unlikely to translate that willingness into action.

2.5. Participants thought the carbon labels were easy to understand, simple (i.e. not complex or overwhelming), useful, and trustworthy

To evaluate the overall impact and effectiveness of a carbon label, is it important to not only assess how it affects consumer flight choices, but also to consider how it is perceived, how well it is understood, and how well it is trusted. We explored each of these aspects through our experiment and survey.

2.5.1. Participant perceptions of the visual carbon label options

When asked in the survey, participants rated the labels as **highly comprehensible**, with **90-91%** across groups rating them as **easy to understand**. A sizable **80-82%** also felt the labels were **not over-complex** and contained an appropriate amount of information. Moreover, the majority of participants (**76 -78%**) said that the visual carbon labels were **useful for making their flight decision**. There were no statistically significant differences between the visual carbon labels on these dimensions (see Appendix 11 for detailed results). These findings are encouraging, since these dimensions (comprehension, complexity) are evidenced in the literature as key for developing effective carbon labels.

A minority of participants felt **overwhelmed by information** on carbon labels **(16-17%)**, or **tired of environmental prompts** **(12-15%)** while making flight choices. This is because they perceived the labels to be too busy and not simple enough to use. It may be worth exploring, through further research, whether the labels could be simplified further, however there is also a risk that for other consumers, this would leave too little information (for example noting that simple numeric labels with no other context performed less well). It is also worth noting that this was the first time participants had seen these labels in a flight-booking context. In the real world, consumers would have repeated opportunities to learn and familiarise themselves with the labels over time.

Some qualitative research participants also found certain carbon label designs overwhelming, particularly an earlier version of the 'comparison' label which was not included in the online experiment.

"For me that's too much information to take in when making this decision, I'd want something a bit more instant and visual" (Interviewee)

This again emphasises the importance of making label designs as simple as possible, including only the most essential information. Overall, the encouraging reception of these labels suggests a promising foundation for any of these three carbon label concepts, or a combination of them, to be further tested.

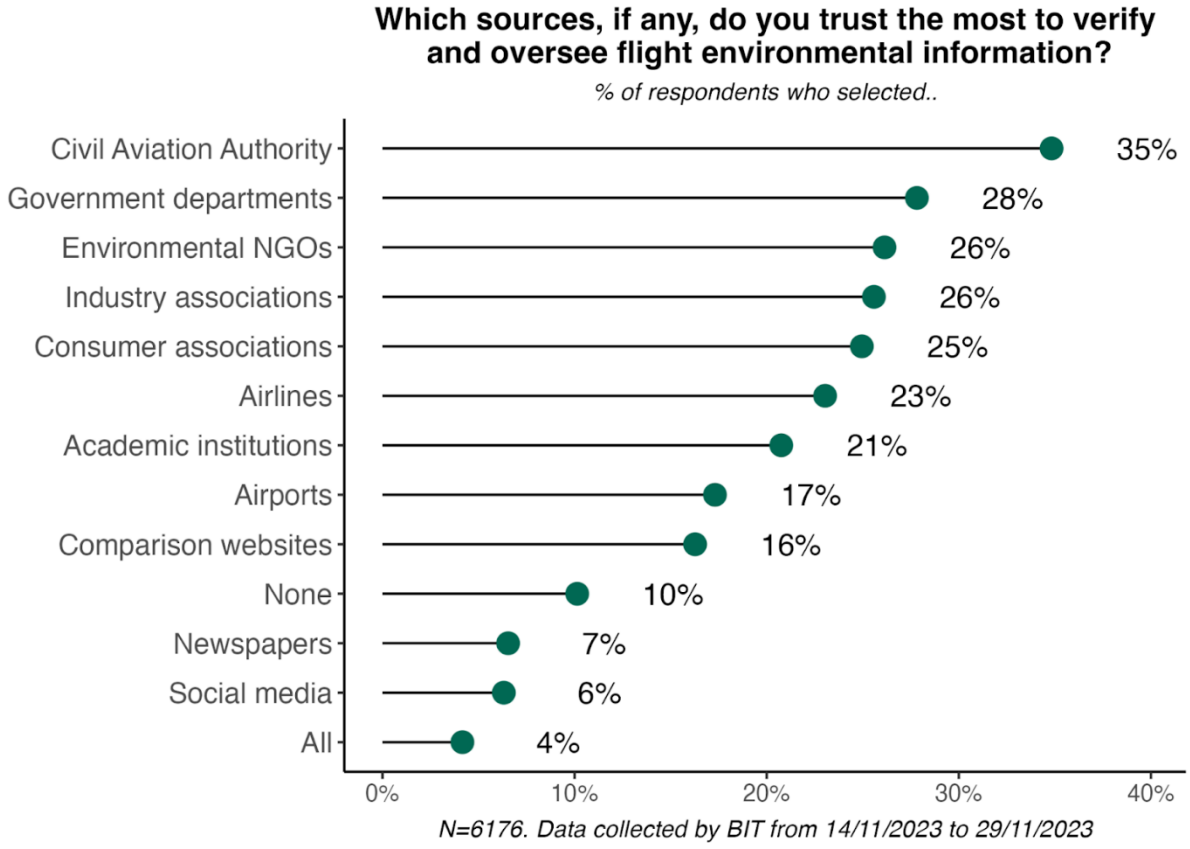
2.5.2. Participants trust of carbon labels and messengers

As part of the survey we also explored participant trust of the information on each of the visual carbon labels, as well as exploring which potential sources and messengers of carbon information are most trusted.

Overall, **85-86% of the participants found the carbon labels trustworthy** (see Appendix 11), which is an important dimension of a carbon label to enable impact (see Section 1.2). None of the design elements of the visual carbon labels were developed specifically to foster trust, so it is positive that such a large majority trusted these labels. This suggests that scepticism for these labels is generally low.

Nonetheless, quantitative research participants were probed which sources they would trust to verify and oversee flight environmental information, spanning from the Civil Aviation Authority, to airlines and social media. **Participants trusted official public bodies the most: CAA (35%) and Government departments (28%).** See Figure 12.

Figure 12. Percentage of participants who trust different organisations to oversee flight carbon labelling.



Description of graph [for accessibility]: *The graph shows the trust levels in different sources for verifying and overseeing flight environmental information. The Civil Aviation Authority is the most trusted at 35%. Government departments follow at 28%, then environmental NGOs and industry associations both at 26%. Consumer associations are trusted by 25% of respondents, airlines by 23%, academic institutions by 21%, airports by 17%, and comparison websites by 16%. Only 10% of respondents don't trust any source, while newspapers and social media are the least trusted at 7% and 6% respectively. 4% trust all sources. Data is from 6176 respondents, collected by the Behavioural Insights Team from November 14 to 29, 2023.*

Similarly, most focus group participants and interviewees supported a form of independently certified standard that could ensure consistency in the way airlines provide environmental

information and to help consumers compare the environmental impact of flights across various airlines and platforms.

"[The provision of environmental information should be] governed by a trusted body or like an independent body. Then you're more likely to trust it" (Focus group)

"[I'm] not sure what organisation that would be but if there is for example an ISO [International Organization on Standardization] standard on how you measure aeroplane emissions. All measurements should be compliant with the ISO." (Focus group)

Overall, these findings demonstrate that, whilst baseline trust for carbon labels is likely to be quite high, flight carbon labels would be trusted more if they are verified by the CAA or the UK Government in some format.

2.5.4. Participant demand for different environmental information for flights

There are a variety of different approaches that can be taken to communicate flight environmental impact to the public. For example, practitioners could provide consumers with carbon emissions at the level of the airline or at the level of the flight itself, or even communicate about non-CO_2 impacts of flights.

In the survey, participants supported seeing **carbon emissions information about both the specific flight and the airline that they are using.** Between a quarter and a third of participants would like to see **flight specific information**, including CO_2 emissions for the flight (35%), alternative lower-emission flight routes (30%), information about whether sustainable aviation fuel is used (30%), and option for offsetting (24%); and **airline specific information** including airline decarbonisation strategies (34%), and airline ratings and impact (28 - 29%). See Appendix 12.

There are mixed responses around including non-CO_2 impacts (e.g NO_2, or noise pollution) in carbon labels. Interview and focus group participants had no consensus about whether to include wider considerations of environmental impact on labels (or even as 'Additional Information'). Some participants noted that they wanted the ability to see all the environmental emissions together, while one participant noted that the emission information used should be based on the most harmful pollutant to the environment, as long as enough of that pollutant was released. Given that carbon label simplicity is fundamental to its success, any additional environmental impact information must not overcrowd or over-complicate a label.

"I think if you're gonna talk about emissions, talk about all of them." (Focus group)

"I would want it positioned based on its [the pollutants'] assessed damage to our environment... with the considerations on the amount [of the pollutant] that are put into the atmosphere " (Interviewee)

Overall, these findings emphasise that consumers would support more information about the environmental impact of both flights and airlines themselves, but that labels should remain balanced and not overcrowded or over-complex.

2.6. Unintended consequences of the carbon labels include participant guilt and a ‘licence’ to take more flights

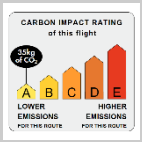
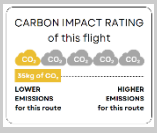
In order to get a complete picture of the impact of flight carbon carbon labels on customers, we explored some potential unintended consequences of exposure, including feelings of guilt or participants feeling ‘licenced’ to fly more often if the label suggests their flight was lower emissions. Note that these two outcomes somewhat conflict, so optimising both may be difficult (i.e. zero feelings of guilt may mean the labels too readily make flying appear more acceptable). When designing these labels, we sought to avoid overt associations of guilt, while also mitigating against potential licensing effects (e.g. avoiding the use of the colour green in the label designs).

2.6.1. The impact of flight carbon labels on feelings of positivity and guilt

To understand how different carbon carbon labels influenced emotional responses during flight selection, participants were surveyed about their feelings when selecting flights.

Around a third of participants **(29 - 34%)** **felt positively about carbon reductions** that they made, and between a quarter and a third **(25 - 31%)** **felt guilty about the impact of their flights**. Interestingly, the **"comparison" label group reported feeling significantly more guilty** and significantly less positive than in the "5-point rating" and "A-E scale" label groups. Results are shown in Table 6 below.

Table 6. Effects of CO_2 labels on self-reported positive emotion and guilt

% of participants…	 (n=1210)	 (n=1216)	 (n=1248)
…who felt positive about the carbon reduction they made	31%	29%	34%
…who felt guilty about the impact of their flight	27%	31%	25%

Note: *n=3,674. Data collected by BIT from 14/11/2023 to 29/11/2023.* ***Green shading*** *identifies the statistically highest (or joint highest) in row. Statistical significance threshold 5%.*

This might be because the comparison label directly attributes carbon emissions to the individual consumer, as opposed to the flight. Conversely, the “carbon rating” may have performed best in terms of evoking positive feelings about the carbon reduction made because it most visibly and tangibly demonstrates that the more sustainable flight choice results in less CO_2 being emitted (due to there being fewer CO_2 clouds).

Interestingly, practitioners should not necessarily avoid labels that make people feel guilty, even if we rate subjective experience of the label as highly important: **although the ‘comparison label’ generated more feelings of guilt, it was rated as the most popular**

label, potentially because it makes carbon emissions more tangible. It is also commonly observed that while people don't like to be made to feel guilty, they also recognise the value in giving unvarnished information to (other) people about the environmental impacts of their behaviour. At the end of the survey, all participants, regardless of their assigned treatment group, were presented with the three designed labels and asked to select their preferred one. The "comparison label" received the highest vote share at 39%. The "A-E scale" followed closely behind at 34%, edging out the "carbon rating" which received only 20% of votes. This is not the same rank-order as the label impact on flight choice, observed in the primary findings of the experiment.The written responses of online experiment participants gives some indication of why this might be the case.

"[It] explains the significance of the amount [of carbon dioxide]"

"It's easy to understand and makes you aware of your individual impact"

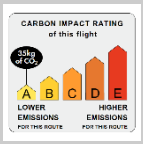
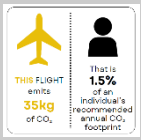
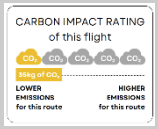
Overall, this demonstrates that even if carbon labels are impactful because they foster guilt in consumers, they are not therefore necessarily unpopular (within reason).

2.6.2. The impact of carbon labels on the 'licence' to take more flights

Another key potential unintended consequence of flight carbon carbon labelling is that people feel as if they are not having a large environmental impact if they choose lower carbon flights, or they feel they are 'doing their bit' by choosing the lower carbon flight, and therefore take more flights - this is called a "licensing effect". This might be particularly severe where a label states or implies a large environmental benefit of one flight over another, but there is no meaningful comparison to (say) taking the train, or foregoing the trip. To investigate this possibility empirically, the post-experiment survey included two questions probing potential licensing impacts.

Between 11 - 15% of participants said that the flights' carbon emissions were lower than expected, which could conceivably encourage someone to feel licensed to fly more. We also observe that between **13-15%** said the **carbon label made them feel that they can take more flights per year.** Results are shown in Table 7 below. We strongly suggest this potential backfire effect is the subject of further study, for example by including non-flight options within the experimental design.

Table 7. Licensing effects of CO_2 information

% of participants…	Numeric CO_2 info (n=1,287)	 (n=1,210)	 (n=1,216)	 (n=1,248)
… who said the flights had lower carbon emissions than expected.	11%	15%	11%	14%
… This carbon label makes me feel that I can take more flights per year than I have been, without emitting too much.		14%	15%	13%

Note: *n=4,961. Data collected by BIT from 14/11/2023 to 29/11/2023.* ***Green*** *or* ***red*** *shading show directionally interesting differences between responses across conditions, the statistically highest (or joint highest) in row. Statistical significance threshold 5%.*

Across different labels, there are multiple features that could explain why these labels might licence people to take more flights. For example, the '5-point rating' label and the 'A-E scale' both inform the consumer that they are in the lowest impact group and that the consumer cannot be performing any better, which could conceivably foster feelings of low impact (even though far lower-impact options are often available - e.g. not flying, or taking the train). Moreover, the 'comparisons' label advertises that a passenger uses only a very small percentage of their recommended annual carbon emissions to make a short-haul flight (only 1.5% in the lowest carbon context)[37]. This could equally make somebody feel that flights are not that impactful on the environment, and therefore encourage further flying.

Though this was not directly tested, it is possible that some people do not intuitively grasp the magnitude of difference between a long-haul and a short-haul flight, instead thinking in approximate terms '*a flight is a flight*', or perhaps *'long-haul is worse than short-haul, by a bit? Twice? Five times*?' For example, London-Paris is c. 350 km, and perhaps just 1.5% of an individual's annual carbon budget, while London-Bangkok is nearly 10,000km, nearly 30 times the distance, and represents a quarter or more of one's annual carbon budget. Misunderstanding this magnitude of difference might lead people to underestimate the impact of a long-haul flight (and thus the 'comparison' labels provide a useful corrective), but also overestimate the impact of a short-haul flight (and thus the 'comparison' label might provide a corrective which actually licences more flying).

2.7. Consumers want to see flight carbon information before or during flight comparison and booking

A key aim of this research was also to understand where best to position flight carbon labels with the flight consumer journey.

[37] The % of annual carbon budget figures were based on the per-capita emissions budget for a UK resident, based on science-based Paris agreement warming targets, i.e. significantly lower than current average emissions.

2.7.1. The flight consumer online consumer journey

In interviews and focus groups, participants explained their typical flight booking habits, without being prompted about carbon emissions and flight sustainability. Journeys were slightly different for trips made for leisure and business.

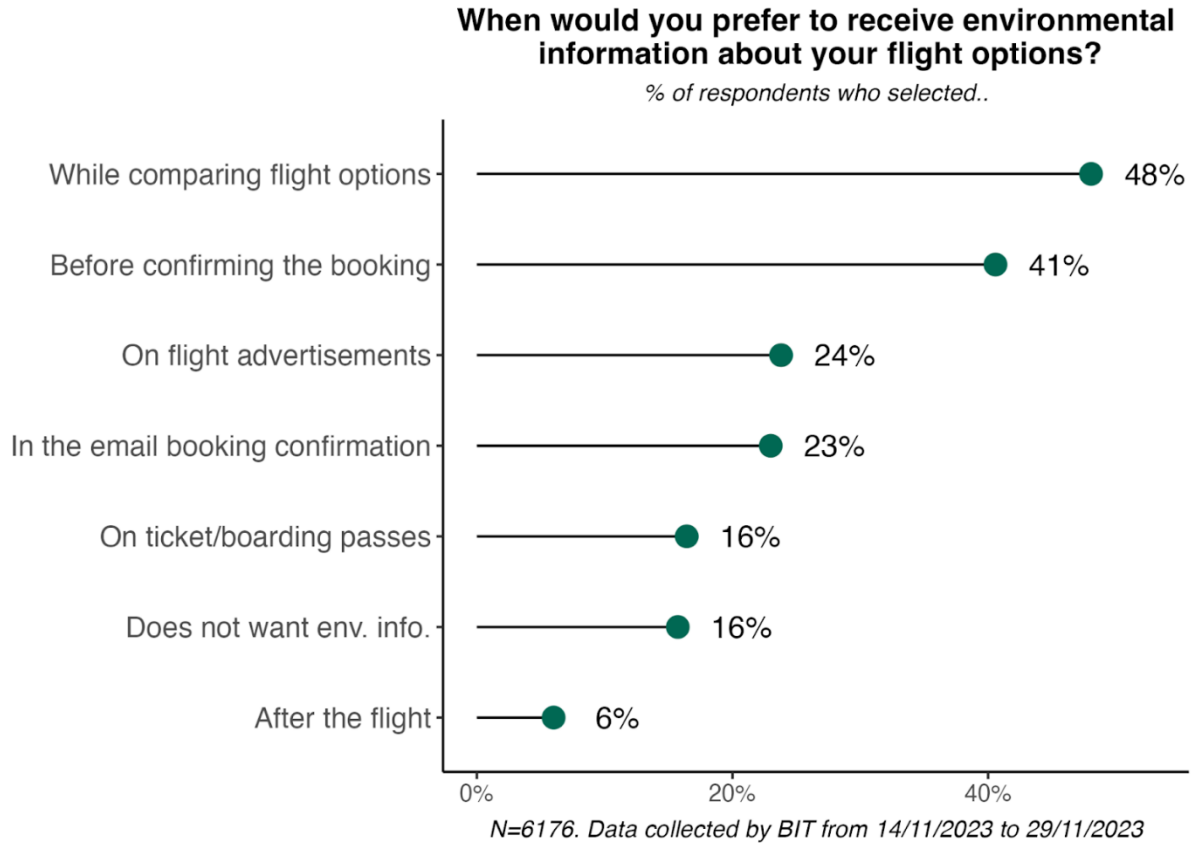
Leisure: People tend to book flights online, **via search engines and airline web pages**. When flying for leisure, the majority of interview participants stated that they used various search engines to search for flights. Once using the search engine to signpost them to the flight they are going to book, most participants said that they would then proceed to the airline site of the favoured flight to book the flight.

Once at the airline site, they would check the flight details again to ensure the flight meets their needs in terms of costs, timings, layover durations, and baggage allowance before booking the flight. **All participants involved in the study stated that cost was the most important factor they look for when booking flights.** Other prominent factors mentioned were time of the flight departure and landing, duration of layover, location of departure airport and baggage allowance.

Business: For business travel, people rely on **intranet platforms provided by employers to book flights**. When flying for business trips, participants who make business trips said they either searched for flights from an intranet platform provided by their employers or used one of the above processes to find a suitable flight and were reimbursed by their employers for the cost of the flight. For those flying for business, the time of the flight was the most important factor, followed by the costs. This is because business fliers need to meet with other professionals at specified times. While the costs for the journey is covered by their employer, it needs to be within approved budgets.

Overall, these typical consumer journeys evidenced from the qualitative research demonstrated the low salience of flight carbon emissions during the flight purchase decision. When participants were asked about what stage of the flight purchase journey they most wanted to see flight carbon emissions or carbon labels, they wanted information at the point of flight decision and booking, rather than before or after. For example, **48% of participants would prefer to see carbon labels when comparing flight options and 41% would prefer before confirming a booking.** Figure 13 below shows the proportion of survey respondents that wanted flight carbon emissions information at different stages of the purchase journey.

Figure 13. Percentage of participants who selected to receive flight carbon labels at different stages of the customer journey.



Description of graph [for accessibility]: *The graph indicates when respondents prefer to receive environmental information about their flight options. The majority, 48%, want this information while comparing flight options. 41% prefer it before confirming the booking. Fewer respondents would like to see it in on-flight advertisements (24%) or in the email booking confirmation (23%). Only 16% want it on ticket/boarding passes, which is the same percentage of those who do not want environmental information at all. After the flight, a minimal 6% would like to receive such information. The data is based on responses from 6176 individuals, collected between November 14 and 29, 2023.*

Moreover, most focus group and interview participants indicated that they would prefer environmental information to be presented on the first page of the flight search results so that they could consider environmental information alongside other flight information they deem important:

> *"When you're browsing, when you're assessing the cost against each flight. I'd say that information there at that point would be probably best."* (Leisure flyer - focus group)

They felt that if the information were provided later in the process of booking the flight, they would book the flight regardless of the environmental information provided.

Participants with visual impairments felt the same about the positioning of information during the flight journey. Moreover, when discussing whether their visual impairments shaped how easily they could interact with flight information online, participants noted that they do not need to use their screen reader when booking flights because the information is clear enough to be accessible for their condition. However, it is noteworthy that further research is needed to explore the impact of wider learning and vision impairments on the flight booking experience. One participant said:

"I do sometimes use that [a screen reader] but not for booking flights because the price for that is quite clear [big enough]. But I use it [a screen reader] for reading the finer text or booking the seat." (Interviewee, visual impairment)

Overall, this data emphasises that nearly half of people want to receive carbon information at a time when it is useful to prioritise which flight to pick – i.e. during flight comparison or before booking. Practitioners should work to ensure that labels are presented at useful and timely moments to maximise their impact.

2.8 Most participants support the implementation of flight carbon carbon labels, despite the added complexity

To fully evaluate the potential of flight carbon carbon labels, we also asked participants on their perceptions of potential policy measures that relate to it.

2.8.1 Support for flight carbon carbon labelling policies

An overwhelming majority (85%) of the 6,176 quantitative research participants **agreed that providing information about the carbon emissions of flights is useful** in helping them understand the environmental impact of flights. This suggests that a majority of participants support the inclusion of carbon emissions information when browsing flight choices. This is despite the fact that 66% of participants also agreed that providing carbon emissions information adds complexity to the booking process, indicating that participants are not necessarily opposed to this additional complexity.

2.8.2 Support for wider policies to achieve Net Zero aviation in the UK

Participants were broadly supportive of net zero policies, with 68% stating that they agree with initiatives aimed at achieving a carbon-neutral society. **55%** of participants agreed that **requiring flight operators and flight booking platforms to provide information on environmental impact** during the booking process constitutes a useful and important step in helping people reduce their carbon emissions. However, simultaneously **82%** of participants acknowledged that such **mandatory disclosures of environmental impacts** may be impractical and may burden airlines. Overall, these findings suggest that participants support policies for Jet Zero that target flight operators and airlines too.

3. Conclusion & Recommendations

This research aimed to explore the impact of different flight carbon carbon labels on consumer flight choices, understanding, and perceptions of low carbon travel. Below, we summarise our main conclusions and recommendations for the next phase of research and policy development.

Conclusion

Our research revealed that **all of the visual flight carbon carbon labels increased self-reported intent for sustainable flight choices to a statistically significant degree versus both the control and simple numeric carbon information**. The best performing label was the 5-point rating scale, which resulted in a 75% increase in participants selecting the least emitting flight versus the control. This label also outperformed the A-E scale and comparison label to a statistically significant degree. Importantly, we find that exposure to simple numeric flight carbon information also significantly increased lower carbon flight selection (by 44% compared to control), demonstrating that even the simplest timely information provision that prompts pro-environmental reflections could have a meaningful impact on consumer choices.

The effect sizes of the impact of flight carbon information and carbon labels on consumer flight choices remained similar across both short-haul and long-haul flights, however, effects disappeared for multistage (vs direct) flight decisions, potentially because the multi-stage flights are less convenient (as well as less sustainable) than direct flights, and participant motivation to avoid hassle crowded out the sustainability co-benefit made salient by the carbon labels.

Flight choices were predominantly shaped by flight prices and logistics (e.g. flight timing, duration). For instance, when asked to select which factors influenced flight choices most, participants that were assigned to our control group (and therefore were not shown the carbon information designs) identified price (78%) and convenience/departure & arrival times (68%) as the two most prevalent factors underpinning their flight choices. Only 9% of participants in the control group prioritised CO_2 emissions as a top-3 factor.

However, we found that **all carbon information labels (numeric and visual carbon labels) remained effective across different price levels**, although effects decreased as the price premium for the lower-carbon flights increased. For example, when flights were all the same price the “5-point Rating scale” label increased the probability of selecting the low-CO_2 flight option by **30 percentage-points** compared to the control group. The impact of this label decreases to **26 percentage-points** when the low-emitting flight is 5% more expensive, and shrinks further to **16 percentage-points** when the price difference grows to 25%. It is also interesting to note that **after participants had seen eco labels, they were more likely to report carbon emissions as being an important decision factor for them**. This is likely a combination of higher social desirability bias, and a legitimate effect whereby consumers really do make decisions based on the information that is present and salient to them at the time. This suggests carbon labels may be able to *engender* preferences for lower carbon flights, rather than merely *reveal* latent preferences.

Participants’ knowledge around flight emissions was mixed. Most interview participants knew that flights generally emit more carbon dioxide compared to other forms of transport, however most acknowledged that they did not fully understand what the impact was, what the specific emissions equated to, or what their individual contribution to climate change

was, from selecting flying as their mode of travel. These gaps in understanding further substantiate the need for the provision of carbon information when booking flights.

The majority of participants rated our flight carbon carbon label designs as easy to understand (90-91%), not overly complex (80-82%), useful for making their flight decision (76 -78%), and trustworthy (85-86%). Importantly, these dimensions were highlighted in the evidence review as key for carbon label impact.

Some drawbacks of the carbon labels are worth considering. For instance, some participants felt that carbon labels made them feel **overwhelmed by information (16-17%),** which implies that further efforts could be made to reduce the complexity of an carbon label that is going to be scaled (albeit noting the risk of having too little information for some consumers – it may not be possible to optimise the design for everyone). Moreover, some participants **said that the flights' carbon emissions were lower than expected (11-15%)** and that the **carbon labels made them feel that they can take more flights per year (13-15%)**, demonstrating that carbon labels could have the potential unintended consequences. We see this risk as particularly deserving of follow-up research, given our experiment was not able to observe flying vs. not-flying behavioural outcomes.

Participants wanted information about flight carbon emissions at the point of flight decision (48%) and booking (41%), rather than before or after (6%). This reflects consumers' general support for the implementation of timely flight carbon carbon labels.

Recommendations

Together, these findings lead to the following recommendations pertaining to the future design and implementation of carbon labels.

Table 8. Recommendations from the research

Recommendation	Description
1. **Carbon labels should be implemented as a means of supporting consumers to make more sustainable flight choices**	The findings from this research show that the provision of carbon information is a promising intervention to effectively support consumers in making more sustainable flight choices. Further, the labels tested were viewed positively and consumers were mostly in favour of their use. Moreover, with the labels leading to a stated willingness to switch airlines, we might expect to see upstream impacts as a result of labels which incentivise airlines to compete on reducing emissions. This would be an important impact, helping to reduce the emissions of all flyers, including those uninterested in the labels.

2. Replicate findings with a real-world field trial	Given the caveats of all online and hypothetical (stated intent) research, these labels (or, the best performer only) should be studied in the real world. Typically this would take the form of a randomised Controlled Trial implemented on a flight booking website, with visitors randomised to see labels or not. This will validate the magnitude of impact.
3. Undertake further research	**Explore backfire and licensing effects**: This study has highlighted a risk of licensing effects, leading to more frequent flying among some participants. This deserves further research to quantify and understand, with the aim of ensuring the label design has a net positive impact on emissions and mitigated backfire effects as much as possible. This could be done initially in an online setting, for example presenting participants with a choice environment which includes non-flying options (e.g. choosing not to take the flight / opt for a closer destination / take a train, etc.). It is also possible the label design itself includes features which mitigate backfire effects, for instance by always including an equivalent train journey as a comparison figure. In time, evaluating the impact of carbon labels on real-world licensing effects would also be important. **Explore accessibility of different label designs**: One limitation of the research approach for this study was that there were just 4 participants who had visual impairments or learning conditions; specifically only representing participants with dyslexia or monocular vision. This means that insights about the accessibility of the flight carbon labels cannot be generalised. Further qualitative research should be undertaken with participants from a greater diversity of conditions that might impact the accessibility (e.g. ensuring they are compatible with assistive technologies) of the label to ensure that the labels enable everyone to make more sustainable choices.
4. Future carbon labels designs should consider clarity, simplicity, salience, and credibility	As carbon label designs continue to be user-tested and iterated, the designs should continue to adhere to the evidence-based principles of effective carbon label design outlined within this report. Namely, the carbon labels should be clear and easy to understand, they should be simple, they should be designed to stand out within the flight booking context and they need to be credible to maintain consumer trust.

	In addition, the findings from this study suggest the following new insights: • The ‘5-point rating’ system works well. We believe this is because the label works better than the others ‘at a glance’ whereby the clouds would be one colour only (e.g. amber, or red) making comparison very quick. The A-E system requires a little more scrutiny. • Making the metric salient, e.g. with the CO2 cloud symbols, may be more intuitive and salient than a generic A-E system.
5. Carbon labels should be standardised and regulated by a central body to ensure consumer trust	For carbon labels to be effective, they need to be perceived as being legitimate and trustworthy by consumers. With this in mind, carbon labels should be regulated and audited by a central body such as the Civil Aviation Authority or from the UK Government. A lack of 54egulateon in this space may lead to the proliferation of independently-designed and implemented labels which may risk undermining the effects of these labels in the aviation sector. For example, perceptions of mistrust and of greenwashing may lead consumers to disregard carbon information.
6. Position carbon labels next to price or time of flight and / or number of layovers	To increase their salience, and the probability that consumers notice and factor carbon information into their flight choices, labels should be positioned alongside key information relating to flights. For example, carbon labels should be presented next to flight price or flight time and duration given that these are key aspects that consumers look for and consider when selecting flights online.

4. Appendices

Appendix 1. Framework for designing effective eco-labels

Table 9 below summarises the key principles for effective eco-labels design. In the table, we outline the aims that should be adhered to when designing eco-labels as well as prompt questions designed to aid practitioners in applying these principles.

Table 9. Prompt questions for evaluating eco-labels.

Aim	Prompt questions
Clarity	
Comprehension	• Is it easy to understand what this label means? Do people understand their impact based on this label? • Are the metrics familiar or understandable to the average person? • Does this symbol make sense given the context? • Is this information framed in a useful way?
Comparability	• How easy is it to compare between magnitudes of carbon emission? • Does the difference between the options appear meaningful? • Does the higher magnitude feel adequately larger than the lower? • Can users compare different flights easily?
Simplicity	• Does additional info make the decision easier / more informed? • Is there too much information on this label? Is there too little information for the label to be useful?
Sensitivity	• Can the same choice be graded differently depending on what it is being compared to? • Is the label sensitive enough to different magnitudes of carbon emissions? (And does this conflict with…) • …Does this have enough range to capture a wide variation of flight emissions levels (e.g. Sydney vs Paris)? • How could we make the label work across all contexts? Can we consider ‘fuel efficient’ flights?

Accessibility	• Are they understandable to particular groups, e.g. visually impaired, learning difficulties, digitally excluded, etc? • What difficult cultural backdrops and worldviews might be relevant to consider? (e.g. comparing emission to 'daily commute' might not be relevant to all consumers)
Salience	
Visual Salience	• Does the label stand out on the screen or is it easy to miss?Is the design identifiable? • Is the difference between different levels salient visually (e.g. different colours)?
Placement, positioning, and timeliness	• Is the label positioned in a salient place on screen, e.g. beside price? • Is the label integrated into other parts of the search process? Pop-out? • When in the customer ticket purchase journey should this label be presented? • Is the label repeated?
Relevance to the consumer	• Is the consumer interested in the information? • How can we make this information personally relevant to the consumer (e.g. analogies such as 'trees planted', 'same as driving for a year', comparison to past bookings, compared to UK average emissions)? • How can we make this information feel emotive and persuasive to a customer, e.g. emphasise the effort to offset/recoup emissions (e.g. you'd have to not drive for a year), use emotive analogies (cutting down trees), use emotion visuals (e.g. animals)? • Is the label displaying information about a flight or an individual, e.g. CO_2 per person, or per flight?
Messenger effects and verification	• Which messengers do consumers know? • Which messengers do consumers respond to? • Can Government sponsorship be embedded into the label?
Other considerations	
Supplementary information	4. What supplementary information might you want to include? Other COM-B factors, e.g. lack of personal accountability, other flight priorities such as cost / convenience, more points for greener flights?

	5. How much information should be included? How should information be included, e.g. pop-up, hover over, link to external materials, educationally framed ‘did you know’’?
Perceived trust and credibility	• Is the information displayed accurate, e.g. how are you measuring flight sustainability? What factors are considered when labelling? • Is there a way that consumers can verify and guarantee the labelling is standardised across flights and companies? • Can this label be used to greenwash? How can we minimise this?
Consistency and standard-isation	• Will providers be able to brand the label or will there be a standard design? • What constraints will there be on branding?

In the ‘aim’ column, the key attributes which make eco-labels effective are outlined. In the ‘prompt questions’ column, the key questions which determine whether labels satisfy these attributes are summarised.

Appendix 2. Sample for the qualitative research

A purposive sampling approach was used to target specific groups of individuals for the research. The qualitative research aimed to study a subset of the general population, with a wide spread of age groups, gender, household income and geographical location. Participants ranged in age from 20-62 years of age. There were 15 males and 13 females.

TRL conducted three online focus groups and four online interviews in total. Table 1 shows the distribution of the sample. Participants flew between 1 to 30 times per year (one flight is made up of a flight to a destination and the return trip). Across the focus groups there were a total of 24 participants, with each session consisting of between 6 to 9 participants. Two focus group sessions involved those who typically flew for leisure. The third focus group consisted of participants who mainly flew for business trips, although participants stated flying for leisure was also common for them.

The four interviews consisted of two participants with dyslexia, one participant who was colour-blind and one participant who was visually impaired (in this case the participant could only see out of one eye).

Table 10. Sample distribution for the qualitative research

Factor	Focus groups	Interviews
Gender		
Males	13 (54%)	2 (50%)
Females	11 (46%)	2 (50%)
Age		
18-30	8 (33%)	1 (25%)
31-50	13 (54%)	1 (25%)
51+	3 (13%)	2 (50%)
Ethnicity		
White	12 (50%)	1 (25%)
Asian	6 (25%)	2 (50%)
African/Caribbean	5 (21%)	1 (25%)
Other	1 (4%)	0 (0%)
Household income		

£0-£39,999	5 (21%)	1 (25%)
£40,000-£79,999	11 (46%)	2 (50%)
£80,000+	8 (33%)	1 (25%)

Appendix 3. Flight habits

Table 11. Air travel habits of participants from the online experiment

Air travel habits		
Has travelled by plane in the past 5 years	84%	
Frequency of air travel	Very frequently (several times a month)	4%
	Moderately often (a few times a year)	36%
	Occasionally (once a year or less)	44%
	Rarely (only in exceptional circumstances)	15%
	Never flown in my life.	1%
Primary reasons for air travel	Business or work-related purposes	15%
	Vacation or leisure travel	92%
Has any physical or mental health conditions or illnesses	20%	
Reduced ability to carry out day-to-day activities	Yes, a lot	28%
	Yes, a little	55%
	Not at all	17%

N=6,176. Data collected by BIT from 14/11/2023 to 29/11/2023.

Appendix 4. Survey questions

Legal consent

Thank you for your interest in taking part in this research. Before you decide whether you wish to proceed, it is important that you understand why the research is being done and what is involved.

This research is being conducted by the Behavioural Insights Team (BIT) and has been commissioned by the Department for Transport who are using the findings to understand how consumers book flights. In the study, you will be asked a series of questions about booking flights and your understanding of the impact of flying.

Your participation in this research is anonymous. There are personal characteristics that we will use to ensure the research is conducted on a group of people representative of the wider population that we are interested in: age band, gender, income band, region, ethnicity, education, and employment status. We receive these from your panel anonymously and have no way of linking this information and/or your responses to our research back to your identity. Any published results from this research will likewise not include any identifiable information. All data that we collect is stored on servers in the UK.

You can withdraw from the research at any time by exiting the survey. However, note that, because the research is anonymous, you can't withdraw your data after completing the study.

Please only proceed with this study if you are happy with this.

Screening question

[screeningTravelled] Have you travelled by plane in the past 5 years?

- Yes
- No, but I would consider travelling by plane in the future → max = 20%
- No, and I would not consider it in the future→ excluded from the study

Introduction

Welcome and thank you for participating in this survey.

Task: During this survey, we want you to imagine that you are booking a flight on a plane. We will show you a series of different flight options for your journey and we want you to choose the option that you prefer.

We will also ask you a few follow-up questions to understand why you made the choices you did.

Duration: The survey should take about 10 minutes to complete and requires your attention, so please only participate if you can dedicate this time!

Please note that you cannot go back to previous pages.

Attention checks

[attCheck1] People are very busy these days and many do not have time to pay attention to everything. We are testing whether people read questions. To show that you've read this text, answer both "Extremely interested" and "Moderately interested".

- Extremely interested
- Very interested
- Moderately interested
- Slightly interested
- Not interested at all

[attCheck2, if AttCheck1 != "Extremely interested" & "Moderately interested"] You didn't select the correct answers to our last question. Your attention to the survey questions is very important for our research, so we'd like to give you another chance to respond. To show that you are paying attention, answer both "Moderately interested" and "Slightly interested".

- Extremely interested
- Very interested
- Moderately interested
- Slightly interested
- Not interested at all

[screenout, If AttCheck1 != "Extremely interested" & "Moderately interested" & AttCheck2 != "Moderately interested" & "Slightly interested"] You have answered our questions incorrectly. We can only accept surveys from people who are paying close attention, so we have ended this survey early. Please click 'Next' to return to your panel website.

Transition

In this final section, we will ask you questions about how you tend to travel and choose flight options when you choose to fly.

Survey – Recall

In the previous section, when looking at the flight booking platforms, which of the following things did you see when making your flight choice?

- Carbon information/label
- The price
- Number of stops (non-stop or 1 stop)
- Flight departure & arrival times
- Baggage allowance
- Airline brand
- All of the above [exclusive]
- None [exclusive]

Which of the following statements reflects your thinking the most :

- The flights had lower carbon emissions than I would have expected.
- The flights had the expected amount of carbon emissions
- The flights had higher carbon emissions than I would have expected.

- I don’t usually think about flights carbon emissions

Survey – Understanding of carbon emissions

To understand your knowledge and intuition about carbon emissions, please estimate the amount (in kg) of carbon dioxide produced per passenger for the following flight options.

It is not important if you don’t know the exact figures; simply input your best estimate.

- A one-way flight from London to Paris, in economy class. [real answer = 44 kg]
  - ____kg
- A one-way flight from London to San Francisco, in economy class. [real answer = 603 kg CO2]
  - _____kg

How confident are you with your answers to the previous question?

- Not at all / Not very / Somewhat / Completely

Please select the statement(s) that are true:

- The distance of a flight affects its carbon emissions (CO2)
- Having layovers can increase carbon emissions (CO2)
- Newer aircraft generally produce fewer carbon (CO2) emissions than older aircraft.
- Two different aircrafts flying the same route emit the same amount of carbon emissions (CO2)
- A flight from London to Paris will produce the same carbon (CO2) emissions as taking a train from London to Paris
- All of them [exclusive]
- None of them [exclusive]

During the exercise, we showed you the amount of CO2 emitted by each flight. Did you find this information useful in understanding the environmental impact of your flight?

- Not at all / Not very / Somewhat / Completely

Survey – Travel choices

The following questions are about your own opinions. There are no right or wrong answers. Please answer as truthfully as possible.

Imagine you are buying a flight to your desired destination in Europe. What are the 3 most important factors from this list that will influence the flight that you pick?

- Price
- Ease of getting to and from the airport from home
- Airline
- Departure/arrival time
- Flight duration
- Luggage allowance

- Flexibility (change date, time)
- Carbon emissions (CO2)
- In flight services (TV, food, etc.)
- Whether you are travelling with others

It can be hard to factor 'carbon emissions' into a flight purchase decision. Which of the following reasons prevents you from choosing flights based on carbon emissions?

- I don't have time to check this information
- Picking flights is complicated enough (e.g. thinking about timing, price, baggage)
- I prioritise other things like ticket price, flight time and duration
- I don't trust the carbon information provided
- I don't understand what carbon emissions are
- I don't think that my personal emissions impact the environment that much
- I don't think emissions are an issue
- None of my friends or family factor carbon emission into flight choices
- I don't know where to find flight carbon information
- Other (please specify) [exclusive]

To what extent do you agree or disagree with the following statements:

- I would be willing to change airlines if it produced less carbon emissions (CO2)
- I would be willing to pay more for my ticket if it produced less carbon emissions (CO2)
- Where possible, I would be willing to take the train or another mode of transportation if it produced less carbon emissions (CO2)
- Most people would be willing to change airlines if it produced less carbon emissions (CO2)
- Most people would be willing to pay more for their flight if it produced less carbon emissions (CO2)
- Where possible, most people would be willing to take the train or another mode of transportation if it produced less carbon emissions (CO2)

[Completely; Somewhat; Not really; Not at all].

Survey – Sentiment

Thank you for participating so far!

We're going to ask you some questions about an environmental label that is currently being developed.

Do you think the carbon information displayed above is:

- easy to understand
- trustworthy

[Completely; Somewhat; Not very; Not at all].

Why is it difficult to understand? Were there any particular elements of the label that you would find confusing?
[Long free text]

Do you think there is...

- Too much information
- The right amount of information

- Too little information

Which of the following statements reflects your thinking the most :
- This carbon label makes me feel that I can take more flights per year than I have been, without emitting too much.
- This carbon label makes me feel that I should reduce the number of flights that I am taking, due to my emissions.
- This carbon label does not change how I feel about taking flights in the future.

During the exercises you did at the start of this survey, we displayed this carbon label next to the flight options. Did you notice this label?
- Yes
- No

How did you feel when you saw the carbon label? Please select the answer(s) that apply.
- [positive] Positive about the carbon reduction I made
- [overwhelmed] Overwhelmed by the amount of information
- [fatigued] Tired of seeing environmental information
- [guilt] Guilty about the impact of my flight
- [nothing] None of the above **[exclusive]**

Do you have any other feedback on this information? (optional)
[Long free text]

Which of these three ecolabels is your favourite?

[select one] [A / B / C/ none of them]**.**

Why do you prefer this version?

[long free text]**.**

Why do you not like any of the labels previously shown?
[long free text]

Survey – Provision of environmental information

More broadly, when booking flights, what specific environmental information, if any, would you like to see? Please select the answer(s) that apply.
- Carbon emissions associated with the flight (e.g. CO2 measured in kilograms per passenger)
- The environmental impact of airlines as a whole (e.g. allowing for comparisons between the overall carbon emissions produced by airlines)
- Information on how airlines are trying to reduce their carbon emissions
- Carbon offset options available for passengers (e.g. compensating for CO2 emissions by paying to support eco-friendly projects)
- Alternative routes where carbon (CO2) emissions will be lower
- Whether sustainable aviation fuel is used (e.g. fuel that reduces emissions from a flight)
- Information about alternative lower-emission travel options (e.g., trains or buses)
- Environmental certifications or ratings of airlines
- None [exclusive]
- Other (please specify)

When would you prefer to receive environmental information about your flight options? Please select the answer(s) that apply.

- Displayed on flight advertisements
- While comparing flight options
- Before confirming the booking
- Displayed in the email booking confirmation
- Displayed on ticket/boarding passes
- After the flight has taken place
- I do not want to receive environmental information about flights [exclusive]
- Other (please specify)

Which sources, if any, do you trust the most to verify and oversee flight environmental information? Please select the answer(s) that apply.

- Airlines
- Airports
- Comparison websites (e.g., Expedia, Kayak)
- Civil Aviation Authority (CAA) or other government agencies
- Government departments (Department for Transport)
- Environmental Non-Government Organisations (e.g. Friends of the Earth, Green Alliance)
- Consumer information associations (e.g., Which?, Citizens Advice)
- Industry associations (e.g., IATA – International Air Transport Association)
- A newspaper / news outlet that I read (e.g. The Sun, the BBC)
- Academic or research institutions
- Social media or online forums
- All of them
- None
- Other (please specify)

Survey – Support environmental information policies

To what extent do you support the following statements: “Providing information about the carbon emissions of flights…

- is useful in selecting flights
- adds complexity in my booking process
- is useful in helping me to understand the environmental impact of flights.

[Completely; Somewhat; Not very; Not at all].

To what extent do you support or not support the following statements: “Mandating flight operators and flight booking platforms to provide information on flights’ environmental impact during the booking process is…

- impractical and may burden airlines
- a useful and important step in helping people reduce their carbon emissions

[Completely; Somewhat; Not very; Not at all].

The UK is committed to achieving Net Zero by 2050. This means that it seeks to reduce greenhouse gas emissions to as close to zero as possible in order to help prevent climate change. To what extent do you support Net Zero policies and initiatives aimed at achieving a carbon-neutral society?

- Strongly support
- Support
- Neutral
- Oppose
- Strongly oppose

Survey – Support environmental information policies

Just a few questions about you to finish off!

How frequently, if at all, do you typically travel by air?

- Very frequently (several times a month).
- Moderately often (a few times a year).
- Occasionally (once a year or less).
- Rarely (only in exceptional circumstances).
- Never flown in my life.

What are the primary reasons for your air travel? Please select the answer(s) that apply.

- Business or work-related purposes
- Vacation or leisure travel
- Other (please specify)

How do you typically search for flights? Please select all the methods you use from the following options.

- Telephone (calling airlines or travel agencies)
- Through a travel agent or travel agency
- In-person visit to airlines' ticket offices
- Airline websites
- Online travel booking websites (e.g., Expedia, Booking.com, Google Flights)
- Email newsletters from airlines or agencies
- Other (please specify)

Do you typically travel for leisure with dependents (e.g. people such as parents or children, that rely on your support) when taking a flight?

- Yes, I often travel with dependents
- No, I usually travel alone
- No, I usually travel with friends/others
- It varies depending on the trip and the circumstances.
- I never travel with dependents.

What are the reasons why you rarely or never travel by air? Please select all that apply.

- Fear of flying
- Flying is expensive
- Environmental concerns
- Health or medical issues
- Prefer other modes of transportation
- Time constraints
- I don't travel abroad
- Other (please specify)

Imagine you wanted to buy an environmentally friendly product (e.g. a product that has been sourced/created in a sustainable way by minimising carbon emissions), such as an item of clothing or food. What could improve your confidence that the product is actually environmentally friendly?

- Credibility of the brand / seller
- The fact that the environmental label is from an independent third-party certification
- Transparency over how they define sustainability.
- Official government endorsement

- Reviews and feedback from other consumers
- Other, please specify

Overall, how concerned or unconcerned are you about climate change, sometimes referred to as global warming?
[Not at all concerned/ Not very concerned / Moderately concerned / Very concerned]

Is English your first language or a second language?
- English is my first language.
- English is my second language.

Do you have any physical or mental health conditions or illnesses lasting or expected to last 12 months or more?
- Yes
- No

People who chose “Yes" to this question were then asked:

Do any of your conditions or illnesses reduce your ability to carry out day-to-day activities?
- Yes, a lot
- Yes, a little
- Not at all

Appendix 5. Subgroup analysis based on participant flight frequency

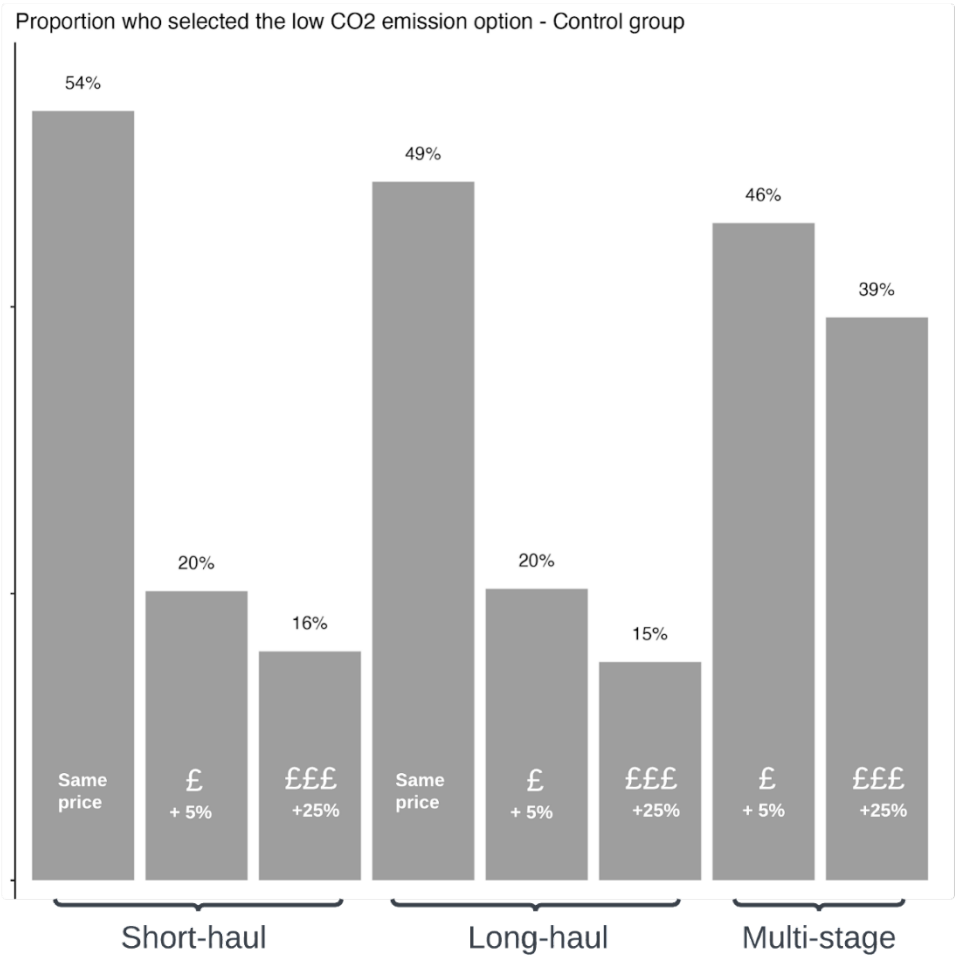
Table 12. Subgroup analysis on flight frequency

Subgroup	Probability of selecting a "low CO_2 emissions" flight	
Flying frequency	Flies more than once a year	Flies once a year or less
	48%	47%
Environmental consciousness	Environmentally conscious	Not environmentally conscious
	50%	38%
Annual income	> £40k	< £40K
	49%	46%

N = 49,264 ; Data collected by BIT from 14/11/2023 to 29/11/2023. Logistic regression, where the independent variable of interest is the subgroup dummy variable. ***Green shading*** *identifies the statistically highest in row. Statistical significance threshold 5%.*

Appendix 6. Control group low-carbon flight choices by flight type

Figure 14. Proportion of participants in the control group who selected the low CO_2 emission option

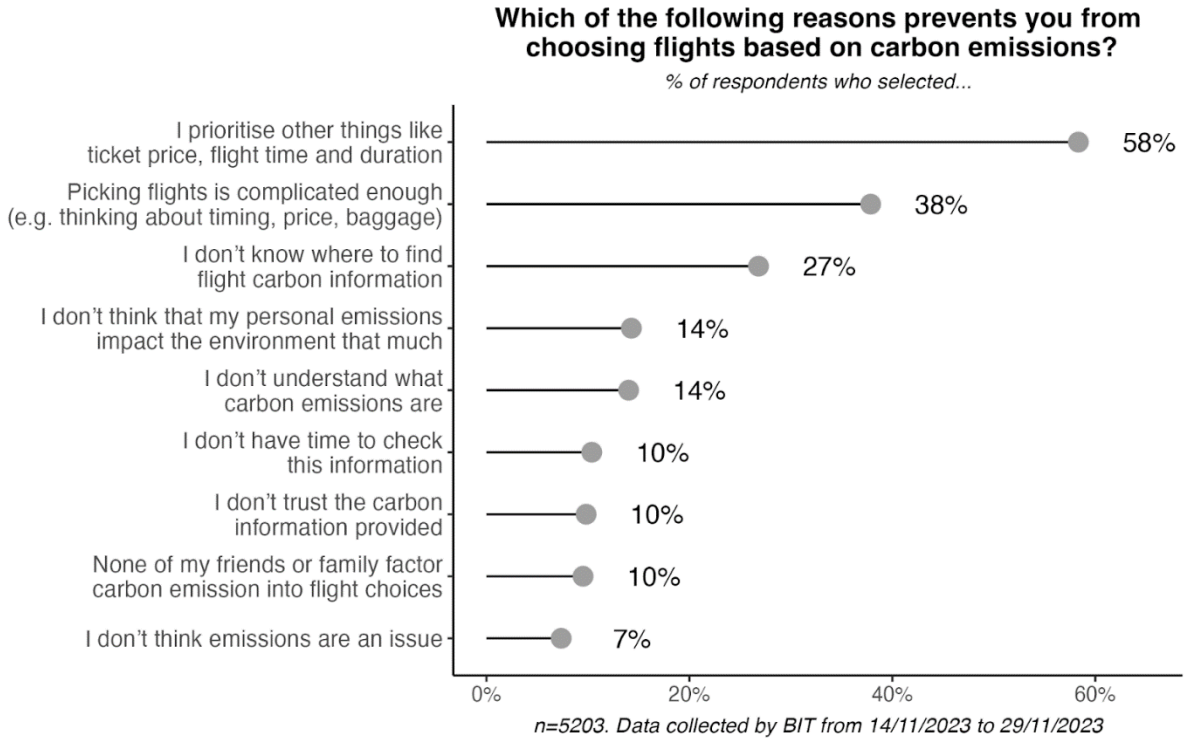


Note : *This figure displays the percentage of participants in the control group who chose the lower carbon emission option across the eight flight scenarios tested. This control condition baseline helps illustrate how preferences naturally varied depending on scenario attributes, independent of carbon labelling interventions. We observe that the proportion selecting low-emissions flights decreased as their price rose relative to high-carbon options. For the multi-stage scenario, a sizable share chose direct flights.*

Description of graph [for accessibility]: *This graph shows a bar graph representing the proportion of participants in a control group who chose the low-CO2 emission flight option across three types of flights: short-haul, long-haul, and multi-stage. For each flight type, there are two bars representing the percentage of participants who selected the low-CO2 option at the same price as a higher-CO2 option, and the percentage who selected it when it was priced 5% or 25% higher than the higher-CO2 option. In the short-haul category, 20% of participants chose the low-CO2 option at the same price, and this choice decreased as the price increased, with 16% choosing it at 5% higher price and only 5% at 25% higher. For long-haul flights, 20% selected the low-CO2 option at the same price, 15% at 5% higher, and 5% at 25% higher. Finally, for multi-stage flights, 46% chose the low-CO2 option at the same price, with a decline to 39% for a 5% price increase and significantly lower at a 25% price increase. The highest preference for low-CO2 options at the same price is observed in multi-stage flights, while the lowest is in short-haul flights.*

Appendix 7. Barriers to engaging with flight carbon emissions

Figure 15. Reasons for not considering carbon emissions in their top 3 important factors when choosing flights



Note : *n=5,203. Data collected by BIT from 14/11/2023 to 29/11/2023. Respondents were those who did not select "carbon emission" among their 3 most important factors.*

Description of graph [for accessibility]: *This graph displays a bar graph detailing the reasons participants do not consider carbon emissions in their top three important factors when choosing flights. The primary reason, selected by 58% of respondents, is prioritising other aspects such as ticket price, flight time, and duration. The second most common reason, at 38%, is that choosing flights is already complicated without considering carbon emissions. About 27% don't know where to find flight carbon information, while both not thinking personal emissions impact the environment much and not understanding what carbon emissions are account for 14% each. A lack of time to check this information, distrust in the carbon information provided, and friends or family not factoring carbon emissions into flight choices each were reasons for 10% of respondents. Lastly, 7% do not think emissions are an issue at all. The graph shows a clear gradient of concerns, with practical and informational barriers being the most significant impediments to considering carbon emissions when booking flights.*

Appendix 8. Impact of carbon information on emissions recall

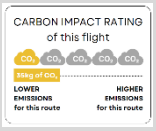
Figure 16. Assessing carbon information retention post-exercise: Accuracy of Emissions Recall/Guesses for two flight itineraries

Note : *Secondary outcome. N=6,176. ** p < 0.01, * p < 0.05, + p < 0.1. Data collected by the BIT from 14 to 29 November 2023. The outcome was constructed as the average number of correct answers to the emission quantity questions (correct answers n°1 : those who accurately recalled/guessed the flights emissions of London-Paris with an error margin of +/- 20% ; correct answers n°2 : those who accurately recalled/guessed the flights emissions of London-San Francisco an error margin of +/- 20%. The results presented were obtained using a multivariate linear regression, including the following covariates : age, gender, income, region, ethnicity, education, employment status, urbanity. Corrections for multiple comparisons using the Hochberg procedure (4 comparisons).*

Description of graph [for accessibility]: *This graph illustrates the proportion of participants who correctly recalled or guessed the carbon emissions quantities for flights from London to Paris and London to San Francisco. There are four bars, each representing a different condition: Control, Numeric CO2 info, and two additional conditions with corresponding icons of a plane and a footprint, likely indicating different types of carbon emissions information provided to the participants. The Control group, without any CO2 information, had a correct recall/guess rate of 0.11 (11%). With Numeric CO2 information provided, this increased significantly to 0.28 (28%). The other two conditions, while not explicitly labelled in the description, are also higher than the Control, at 0.24 (24%) and 0.22 (22%) respectively. The last bar, which has icons suggesting a comparison to everyday activities (like tree planting and light bulb usage), shows a recall/guess rate of 0.21 (21%). Each bar above the Control has two asterisks, indicating that the differences are statistically significant. This suggests that providing travellers with information about carbon emissions in any form can significantly improve their recall or estimation of a flight's environmental impact compared to providing no information at all.*

Appendix 9. Recall of labels

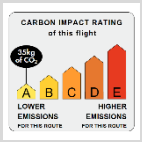
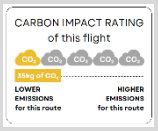
Table 13. Recall of the carbon information

% of participants…	Control (n = 1,215)	Numeric CO_2 info (n=1,287)	 (n=1,210)	 (n=1,216)	 (n=1,248)
… recalling seeing environmental information? [among a long list of other information]	3%	49%	52%	53%	55%
… at the start of this survey, we displayed this carbon label next to the flight options. **Did you notice this label?**			85%	87%	85%

Note: *N=6,176. Data collected by BIT from 14/11/2023 to 29/11/2023.* ***Green shading*** *identifies the statistically highest (or joint highest) in row. Statistical significance threshold 5%.*

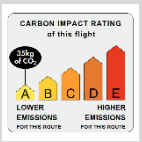
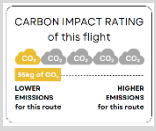
Appendix 10. Sentiments and perceived usefulness of labels

Table 14. Sentiment towards the labels - Full sample

% of participants…	 *(n=2044)*	 *(n=2051)*	 *(n=2081)*
…saying the label is **easy to understand**	91%	91%	90%
…saying this label has **the right level of information**	82%	82%	80%
…saying this label is **trustworthy**	85%	86%	85%

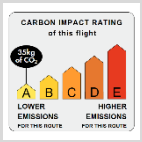
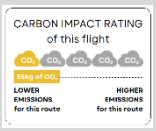
Note: *N=6,176. Data collected by BIT from 14/11/2023 to 29/11/2023.* ***Green shading*** *identifies the statistically highest (or joint highest) in row. Statistical significance threshold 5%.*

Table 15. Sentiment towards the labels - Labels groups only

% of participants…	 *(n=1210)*	 *(n=1216)*	 *(n=1248)*
…who felt overwhelmed by the amount of information	16%	17%	16%
…who felt tired of seeing environmental information	15%	12%	13%

Note: *n=3,674. Data collected by BIT from 14/11/2023 to 29/11/2023.* ***Green shading*** *identifies the statistically highest (or joint highest) in row. Statistical significance threshold 5%.*

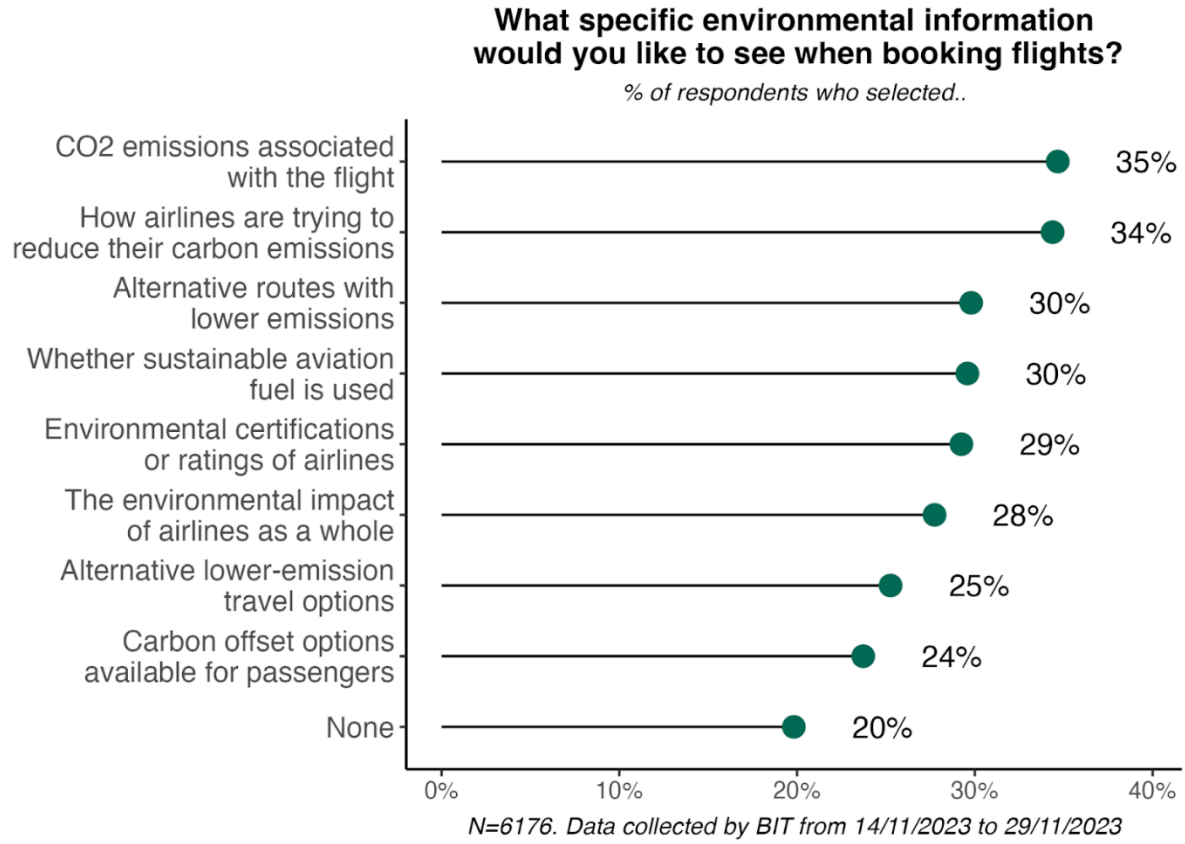
Table 16. Usefulness of the carbon information to understand the environmental impact of flights

% of participants…	Numeric CO_2 info (n=1,287)	 (n=1,210)	 (n=1,216)	 (n=1,248)
…saying the label was **useful to understand** the environmental impact of my flight	72%	76%	78%	77%

Note: *n=4,961. Data collected by BIT from 14/11/2023 to 29/11/2023.* ***Green shading*** *identifies the statistically highest (or joint highest) in row. Statistical significance threshold 5%.*

Appendix 11. What carbon information do people want to see when booking flights?

Figure 17: ***What carbon information do people want to see when booking flights?***



Note : *N=6,176. Data collected by BIT from 14/11/2023 to 29/11/2023.*

Description of graph [for accessibility]: *The graph shows the types of environmental information passengers would like to see when booking flights. CO2 emissions associated with the flight are most desired at 35%. Close behind, 34% want to know how airlines are trying to reduce their carbon emissions. Alternative routes with lower emissions and the use of sustainable aviation fuel both interest 30% of respondents. Environmental certifications or ratings of airlines are chosen by 29%, while the environmental impact of airlines as a whole is selected by 28%. Lower-emission travel options and carbon offset options interest 25% and 24% respectively, and 20% do not want any environmental information. Data is from 6176 respondents, collected from November 14 to 29, 2023.*

Appendix 12. Screener questions for qualitative research recruitment

How old are you? (Select one)

18-25

26-35

36-45

46-55

56-65

66+

What is your gender? (Select one)

Male

Female

Prefer to self-describe (please specify): _____

Prefer not to say

Which of these best describes your ethnic group? (Select one)

Asian – Bangladeshi

Asian – Chinese

Asian – Indian

Asian – Pakistani

Asian – Any other Asian background

Mixed – White and Asian

Mixed – White and Black African

Mixed – White and Black Caribbean

Mixed – Any other mixed group

White – Gypsy/Roma

White – Irish

White – Traveller of Irish Heritage

White – White British

White – Any other White background

Any other ethnic group

Rather not say

Where would you describe your current home location? (Select one)

North East

North West

East Midlands

West Midlands

Yorkshire and the Humber

South East (including London)

South West

Scotland

Wales

Northern Ireland

Other (please specify): _____

What was your household income last year before tax? (Select one)

£0-£25,000

£25,001-£50,000

£50,001-£75,000

£75,001-£100,000

£100,001+

Prefer not to say/don’t know

When was the last time you took part in any market research?

Within the past 6 months [exclude]

Over 6 months and up to 1 year ago [exclude]

Over 1 year and up to 2 years ago [exclude]

Over 2 years and up to 5 years ago

Over 5 years ago

Don’t know [exclude]

Do you or any immediate family work in journalism, market research, aviation, the transport industry, or the government?

Yes [exclude]

No

Prefer not to say [exclude]

In a year, how often do you typically travel by plane?

5 or more times

3-4 times

1-2 times

Less than 1 time

Don’t know [exclude]

Are you responsible for booking your own flights?

Yes – I mostly book my own flights.

No – Someone else usually books flights for me. [exclude]

What is your most common reason for travelling by plane? (Select one)

Business (i.e., I travel by plane as part of my job)

Leisure (e.g., going on holiday, visiting family)

Other (please specify): _____

When travelling by plane, which of the following best describes you? (Select one)

I mostly travel alone or with one other person.

I mostly travel with my family or in a larger group.

Which of the following do you typically book most often?

I mostly book short-haul flights (lasting up to 3 hours)

I mostly book medium-haul flights (lasting over 3 hours but less than-6 hours)

I mostly book long-haul flights (lasting more than 6 hours)

Do you have any of the following? (Please select)

Dyslexia (and no other learning or cognitive impairments)

Colour blindness

A visual impairment, not including colour blindness (i.e., a loss of sight or blurred vision that cannot be corrected using glasses or contact lenses). Please specify the nature of your impairment: _____

None of the above

Thank you for registering your interest in taking part in this research. If you are eligible, you will be contacted by a member of the TRL research team to arrange a time to take part in either an online focus group or interview.

Appendix 13. Topic guide for qualitative research focus groups

The broad purpose of this group discussion is to understand how different people book flights, how they perceive the environmental impacts of flying, and to test different ways of providing environmental information.

This focus group is entirely voluntary, and you are free to leave at any time without providing a reason.

- The discussion should last no more than 1.5hours. To ensure we cover all topics, we may need to ask that we move the conversation on to a different topic.
- Please feel free to request a break at any time.
- Even if you do not have strong opinions your opinions are important to us. Please feel free to provide your thoughts on all the questions, and please remember that there are no right or wrong answers.
- In order to keep to time, we might have to ask you to finish what you're saying so we can move on to the next bit, and so not to take offence if that happens.
- We would be grateful if everyone could refrain from sharing other people's views that were discussed today outside of the group to ensure that the information remains confidential.
- You do not have to discuss anything that makes you uncomfortable. If at any point you do feel uncomfortable, please let us know and remember that you can stop the discussion at any time.
- Your information is treated as confidential and will not be shared with any third party.
- We would like to record the discussion so that we can refer back to the recording for the next part of the study. If you are happy for us to record the discussion, the recording will be destroyed once the research has been completed and any quotes that we may use will be completely anonymised (there will be no direct reference to you in the final report.

Section	Questions and prompts
Introduction	How often do you fly and for what purposes (business/leisure)?
Booking flights	• How do you typically search for flights? o Prompts: online (computer/smartphone), travel agency, other • How do you typically book flights? o Prompts: in-person travel agents, online, specific airlines, what booking platforms? o Do you compare between different flight options? If yes, how do you do this? (Prompts: e.g., between airlines or between those offered by a single airline?) o Do you have a preferred airline? o Do you book flights before or after other elements of your trip, such as accommodation? • What are the most important things you look for when booking flights? o Prompts: cost, time of flight, length of flight, airport, specific seating (window/aisle), specific class (first/economy), flight provider, flight route o How do these factors influence your choice of flight? o Which factor do you feel is most important/top 3? o Which factors are you willing to reconsider in order to reduce cost of travel? Specifically: flight provider, date/time of flight, flight route. • Are there any other factors that may influence your decisions when it comes to booking flights? o Prompts: travelling alone vs in a group/with children, short-haul vs long-haul, business vs leisure, any accessibility needs?

Information	• Have you ever seen or used environmental information when booking a flight? o Where did you see it? What did the information look like? • Does anyone have an awareness or any knowledge of the environmental impact of flying? o Prompt: For instance, do you have any understanding of the carbon intensity of flying? Is there any specific environmental information you would like to be provided with when searching for and booking a flight? • Why/why not? • Where would you like to see this information? • Prompts: flight advertisements, during initial search, comparison sites, before/after booking confirmation, tickets/boarding passes • Often times environmental information on flights includes CO2 emissions. Do you think this information strictly focus on CO2 emissions, or would you also like to see non-CO2 environmental impacts? Prompt: For example, Nitrogen Oxides, noise, particulate matter. • Are there any specific booking platforms (e.g., comparison sites, travel agents) where you would most/least like to see this information?
Trust	• Do you trust environmental information that is given to you, for example on food/product eco-labels? o What would make you trust in any environmental information given to you? o Prompts: Would you accept what is provided by the airline? Do you feel it needs to be validated by a trusted 3rd party? What sources would you trust? (e.g., airlines; flight comparison sites, news outlets, research institutions, etc.) • Is environmental information likely to influence your flight choices? o Why or why not? Are there other factors that are more/less important to you with regards booking flights? § Prompts: choice of airline, flight times, cost, etc.

Labels	• *How easy or difficult does the label make it to compare between flights?* • Is the label clear on whether the carbon impact is high/medium/low • Why? What design elements help your understanding? • Is there anything that you feel could be done to improve these designs?
Labels	• *How easy or difficult does the label make it to compare between flights?* • Is the label clear on whether the carbon impact is high/medium/low • Why? What design elements help your understanding? • Is there anything that you feel could be done to improve these designs?

Labels	• *How easy or difficult does the label make it to compare between flights?* • Is the label clear on whether the carbon impact is high/medium/low • Why? What design elements help your understanding? • Is there anything that you feel could be done to improve these designs?
Labels	• *How easy or difficult does the label make it to compare between flights?* • Is the label clear on whether the carbon impact is high/medium/low • Why? What design elements help your understanding? • Is there anything that you feel could be done to improve these designs?
Summary of labels	• Which, if any, of these carbon labels do you find the **easiest** to understand? • Which, if any, of these carbon labels do you find the **hardest** to understand • What additional information might you want to also see included? • Seeing these examples, do you have any further thoughts on how these might influence your flight-booking decisions? • Why/why not?

Appendix 14. Topic guide for qualitative research interviews

Intro

The broad purpose of this discussion is to understand how people book flights, how they perceive the environmental impacts of flying, and to user-test different ways of providing environmental information. In particular, with these interviews we are interested in understanding any accessibility challenges you may face in booking flights or accessing related information.

We anticipate the discussion to last around 60 minutes.

With your permission we will record the session. Recordings will only be used to support with notetaking. These will not be shared with anyone outside of the project team and will be deleted at the end of the project.

This discussion is entirely confidential. All data collected from this discussion, including any quotes we use in the report, will be completely anonymised. There will be no way to link any quotes to a specific individual.

Please remember that there is no right or wrong answer to any of the questions. We encourage you to speak freely to share your perspectives and experiences. You are free to leave the call at any point without giving a reason.

	Please put Y or N against each statement	Yes	No
1	I confirm that I have read the information sheet for the above study, I have had the opportunity chance to consider the information, ask questions and I have had any questions answered.		
2	I understand that my taking part is voluntary and that I am free to withdraw at any time without giving any reason. I understand that if I decide to withdraw, any data that I have provided up to that point may still be included.		
3	I agree to the processing of my personal information as described in the information sheet and privacy notice.		
4	I understand that my data will be anonymised and that my anonymised data may be used in future research.		
5	I understand that the interview will be video/audio recorded		
6	I agree to take part in this research project.		

Section	Objective and key questions
Introduction 2 mins	*Objective: To build rapport and get to know the individual.* • Introduction • Overview of the session
Booking flights 15 mins	*Objective: Explore people's current flight-booking behaviours* • How do you typically search for flights and book flights? • Prompts: online (computer/smartphone), travel agency, other • What booking platform do you use? • Do you face any challenges using these platforms? If so, what? • *Prompts: do you have any accessibility needs that are not met on these platforms?* • Are there any tools you use (e.g., screen readers, have someone else do it for you) to overcome these challenges? • What are the most important things you look for when booking flights? • Prompts: cost, time of flight, length of flight, airport, specific seating (window/aisle), specific class (first/economy), flight provider, flight route • How do these factors influence your choice of flight? • Which factor do you feel is most important/top 3? • How flexible are you with these factors in order to reduce cost of travel? Specifically: flight provider, date/time of flight, flight route. • Are there any other factors that may influence your decisions when it comes to booking flights? • Prompts: availability of special assistants, travelling alone vs in a group/with children, short-haul vs long-haul, business vs leisure.

Considering environmental information 20 mins	*Objective: Explore the role that environmental information plays in people's flight-booking behaviours* • Have you ever come across or used environmental information when booking a flight? • Where about? What did the information look like? • Are you aware of the environmental impact of flying? • Prompt: For instance, do you have any understanding of the carbon intensity of flying? *Inform participants: Airplanes emit various gases (CO2, Nitrogen Oxides) and atmospheric particulates (sulfur oxides, black carbon) that contribute to climate change and damage the environment. Providing these details about a flight could help better inform potential fliers about their flight travel choices.* • Is there any specific environmental information you would like to be provided with when searching for and booking a flight? • Why/why not? • Where would you like this information to be provided? • Prompts: flight advertisements, during initial search, comparison sites, before/after booking confirmation, tickets/boarding passes • Often times environmental information on flights includes CO2 emissions. Do you think this information strictly focus on CO2 emissions, or would you also like to see non-CO2 environmental impacts? Prompt: For example, Nitrogen Oxides, noise, particulate matter. • Are there any specific booking platforms (e.g., comparison sites, travel agents) where you would most/least like to see this information? • Do you trust environmental information that is given to you, for example on food/product eco-labels? • What would make you trust in any environmental information given to you? • Prompts: Would you accept what is provided by the airline? Do you feel it needs to be validated by a trusted 3rd party? What sources would you trust? (e.g., airlines; flight comparison sites, news outlets, research institutions, etc.) • Is environmental information likely to influence your flight choices? • Why or why not? Are there other factors that are more/less important to you with regards booking flights? • Prompts: choice of airline, flight times, cost, etc.

User-testing of carbon emission labels 20 mins	*Objective: Explore people's attitudes and understanding of carbon labels* • [present example carbon label designs] • Do you feel that these labels provide you with the environmental information you would like to know? • Why? What design elements help your understanding? • What additional information might you also want to see included? • Is there anything that you feel could be done to improve these designs? • Prompts: Is the information clear? Can you distinguish between colours well enough? Is language simple to read and understand? • Do you have any alternative ideas for what might work? • Seeing these examples, do you have any further thoughts on how these might influence your flight-booking decisions? • Why/why not? ---------- • Which of these carbon labels do you find the easiest and hardest to understand?
Debrief 3 mins	*Objective: Summarise key points covered and provide additional detail on purpose of this work* • Discussed how you book flights, the role of environmental information, and your opinions on some carbon labels • Highlight any key talking points raised • Ask if there are any final points anyone wants to add on anything that's been covered • Detail how the findings of this work will be used • We will explore key themes raised from these group discussions; these will be incorporated into a written report presented to the DfT and contribute to the *Jet Zero Strategy* which aims to reduce carbon emissions among air travel • Any final questions on anything? Thanking them and details of thank you payment.