



Behavioural Insights Team

An Evaluation of Low Cost Workplace-Based Interventions to Encourage Use of Sustainable Transport

Client: [Department for Transport](#)

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Executive Summary

Project background

Facilitating transport choices is a central part of much of what the Department for Transport (DfT) does. There is growing evidence across Government that demonstrates the significant contribution that behavioural insights (BI)* can have in achieving better policy outcomes; however, the evidence base in transport is less well developed and there are many areas in this field, such as sustainable travel, which provide opportunities for exploring the impact of BI.¹

Increasing sustainable travel can help create growth in the economy and tackle climate change by cutting carbon emissions. It also influences our health, by improving air quality and physical activity, and can drive productivity by reducing congestion and providing easier access to jobs.

DfT commissioned the Behavioural Insights Team (BIT) to work with a single site employer to design and evaluate low-cost, scalable interventions aimed at increasing the sustainable travel of employees. As the UK's largest single site employer, with about 76,000 staff who work for 350 employers, Heathrow Airport provided a large scale setting to test the impact of behavioural insights on increasing sustainable travel, with almost half of employees travelling in Single Occupancy Vehicles at the outset of the study. The Heathrow Commuter Team (HCT), part of Heathrow Airport Limited, has historically been successful in increasing the numbers of staff who choose to travel sustainably to work. BIT and HCT worked together to design interventions aimed at increasing sustainable travel among airport staff; the primary aim was to ascertain to what extent low cost and light touch interventions can shift behaviour change of employees commuting to Heathrow. In addition, DfT were also keen to:

1. ensure that the results from the trial would add value to the evidence base and inform the design, evaluation and practices of future sustainable travel programmes; and
2. inform other large employers, workplaces, practitioners and decision makers wishing to consider behavioural approaches to promoting sustainable travel.

BIT and HCT worked together to develop interventions based on the latest behavioural science research and to test the impact using a rigorous and robust methodology. We tested eleven interventions across six trials aimed at increasing car sharing, increasing public transport use, and decreasing single occupancy vehicle (SOV) use. This report brings together all of the evidence we have gathered by conducting these trials.

The Heathrow context

The table below shows modes of transport for Heathrow employees from the 2013 Heathrow Staff Survey, conducted by Ipsos MORI.

* Behavioural insights draws on research from many disciplines including behavioural economics, psychology and sociology to understand how individuals and organisations behave and make decisions in everyday life. Understanding people's needs and preferences and how they respond to different contexts and incentives can help us design and deliver better policies and services.

Table i: Modes of transport for Heathrow employees

Mode	Percentage of employees
Single Occupancy Vehicle (SOV) driver	49%
Public Transport	45%
Car Sharing (passenger or driver)	4%
Bicycle	1%
Walking	1%

2013 Heathrow Staff Survey, Ipsos Mori. N=75,780

The airport's designated Heathrow Commuter Team (HCT), established 2008, already runs a number of initiatives for its staff, including a car sharing scheme, discounted travel, and a cycle hub. Over the past eight years, the airport has reduced the percentage of staff who drive to work alone by 12% from 2008, with just under half of staff (49%) in 2013 driving to work alone. Going forward, the airport committed to reducing single occupancy car journeys by staff by a further 5% by 2019, and the project was keen to evaluate the contribution that low-cost, scalable behavioural interventions could have towards this objective.

How and why we chose these interventions

The design of interventions followed a systematic approach. After establishing an understanding of the barriers preventing sustainable transport and identifying strong theories and mechanisms likely to address them, we designed practical interventions. For many of these interventions, Heathrow was already planning to do them (business as usual) and we added elements to make the interventions more behaviourally-informed and to rigorously test them. The table below summarises the interventions, the behavioural insights underpinning them, and the headline findings. A more detailed rationale for each intervention, which draws on findings from a literature review and qualitative research, is provided in the relevant chapters in the report.

We also did some exploratory qualitative work around a cycling campaign where employees could borrow an electric bike or a regular bike for two weeks to try out cycling to work. The findings from that piece of work are detailed in the report, but since we were unable to implement interventions at scale, they are excluded from the table below.

Table 2: Summary of interventions and behavioural insights

Trial	Interventions	Behavioural Insights	Findings
1A	<p>Sending letters to increase car sharing registration</p> <ul style="list-style-type: none"> ◆ Control (no letter) (n= 39,931) ◆ Standard letter (n=5,000) ◆ Call to action letter (n=5,000) ◆ Testimonial letter (n=5,000) 	<ul style="list-style-type: none"> ◆ Savings made salient ◆ Desired action is made easy (clear call to action) ◆ Modelling behaviour (testimonial) ◆ Addresses perceived barriers to car sharing (testimonial about shift patterns and distance) 	<p>Overall, less than 1% of people across the control and interventions registered to the car share scheme with; .05% of people in the control group registering, .28% of people who received the standard letter, .14% of people who received the call to action letter, and .24% of people who received the testimonial letter.</p> <p>Sending letters was significantly more effective at prompting registration than no letters.</p> <p>There was no significant difference between the standard letter and the testimonials.</p>
1B	<p>Sending emails to registered car sharers to become active members</p> <ul style="list-style-type: none"> ● Control email (n= 300) ● Matching email (n= 314) ● Matching email + opportunity cost made salient (n= 314) 	<ul style="list-style-type: none"> ◆ Make it easy (matching) ◆ Overcomes perceived barriers to car sharing (distance) ◆ Makes opportunity cost salient (overcomes opportunity cost neglect) 	<p>The emails had no effect on influencing car sharers to become active members, with only one person from the trial becoming an active member one month after the emails were sent out.</p> <p>About one third of the emailed participants opened the email, and one third of those who opened the email clicked through the link to search for a car sharing match.</p> <p>There was no significant difference in click-through rates across the three conditions.</p>

Trial	Interventions	Behavioural Insights	Findings
2A	<p>Offering a one-week free bus trial to increase bus use</p> <ul style="list-style-type: none"> ◆ Letter with bus information (n=2520) ◆ Letter + offer of a one week free trial (n=7560) 	<ul style="list-style-type: none"> ◆ Robust evaluation of a free trial ◆ Overcomes psychological barrier of using the bus for the first time ◆ Incentives 	<p>There was no statistical difference between the groups on bus usage as measured by travelcard activity. In the control group 2.21% of employees registered for the travelcard and 1.45% purchased the travelcard. In the free trial condition 2.22% of employees registered for the travelcard and 1.31% purchased the travelcard.</p> <p>103 (1.36%) new bus users took advantage of the free-trial, but only 10 of those people went on to register for a travelcard and 8 of them completed the transaction and purchased a travelcard.</p>
2B	<p>Sending follow-up letters to those who did not partake in the free bus trial to increase bus use</p> <ul style="list-style-type: none"> ◆ Control (no follow-up letter) (n=2431) ◆ Follow-up letter (n=2505) 	<ul style="list-style-type: none"> ◆ Loss aversion ◆ Social norms 	<p>The follow-up letter had no significant result on either registration or purchasing behaviour.</p> <p>80 individuals who were offered the free trial but did not take advantage of it ended up registering for a travelcard and 49 of them purchased but this was evenly split between those who received a follow up letter and those who did not.</p>

Trial	Interventions	Behavioural Insights	Findings
3A	<p>Sending a personalised commuter plan (PCP) by email with tailored journey information and information about discounted Heathrow travel products</p> <ul style="list-style-type: none"> ◆ Control (no PCP) (n=305) ◆ PCP + option to sign-up for one-to-one session (n=790) 	<ul style="list-style-type: none"> ◆ Personalised information ◆ Robust evaluation of electronic dissemination of PCP 	<p>We found no significant effect of delivering a PCP on commuting behaviour.</p> <p>Of the 790 people offered PCPs and the opportunity to sign-up for a one-to-one, 21 signed up (2.66% take-up rate).</p>
3B	<p>Providing a one-to-one session for those who received a PCP and signed up for a personal session</p> <ul style="list-style-type: none"> ◆ Control (signed up for one-to-one but were waitlisted so did not receive it during the trial) (n=10) ◆ One-to-one session (n=11) 	<ul style="list-style-type: none"> ◆ Implementation intentions (prompting people to create specific plans so they are more likely to follow through) 	<p>We were unable to detect an effect of a one-to-one compared to the people who signed up for a one-to-one but were put on a waitlist however, the sample size was very small (which is of interest in itself)</p> <p>Only 4 of the 11 who were assigned to a one-to-one attended the session.</p>

Overarching conclusions

A range of light touch interventions were trialled, and many of them did not yield a significant effect. This highlights the complex challenge of increasing sustainable travel of staff, using low cost behavioural measures, particularly in a context such as Heathrow where sustainable travel is already actively promoted. Nevertheless, the results have led to a range of insights, discussed below. Of significance is that these results challenge other findings which were reached from studies that were run with less rigorous methods. This underscores the importance of using a robust testing methodology.

The divergence between stated preferences and observed behaviour

A key learning from this project is not to take self-reported opinions at face value when devising transport interventions. The gap that sometimes exist between stated preferences and observed behaviour is a well-documented phenomenon, which was reaffirmed by this project. Despite nearly the majority of drivers expressing that they would car share if they could find someone with a similar shift pattern who lives near them, registration rates for the car sharing scheme were unexpectedly low. This finding suggests that proximity to other sharers may not be enough; there may be other cultural, attitudinal, logistical factors that may exist. It would have been beneficial to have additional qualitative evidence surrounding the results of these trials to help us explain these findings. These findings support the notion that changing perceptions (through the provision of information), if it does not lead to a change in behaviour, may not necessarily be good value for money.

Therefore, in future evaluations that attempt to change people's travel behaviour, findings from self-reported surveys should not be used in isolation but should be complemented with observational data, ethnography, user research, design thinking and other research methods.

Sustainable travel programmes seeking to change travel behaviour should ensure that appropriate and robust research and evaluation approaches are used

The studies and their findings reiterate the vital importance of undertaking good quality research and evaluation to inform policy delivery and decisions. We were unable to detect an effect for interventions that have previously been cited as impactful (e.g. free bus use, PCPs) and had used less robust methods. While these findings may be limited to this context, there is merit in running robust evaluations in other contexts. Where possible these studies should use objective indicators of behaviour and not self-reported measures.

What might work better

The literature in this field shows mixed results and there is much to be done to understand what works at encouraging sustainable travel behaviour. It is important for us to keep testing innovative ideas and robustly evaluating them in order to achieve gains in this space.

While light-touch nudges may not be effective at encouraging mode shift in a business-as-usual context where there has already been concerted efforts, behavioural science can still play a role in reducing SOV use and promoting active travel. We consider that several strategies may yield better results:

Based on consideration of the trials we ran and the lessons we learned based on the experience of running these trials, we think the following types of intervention may work better:

- ◆ **More intensive or targeted interventions.** For example, car parking charges, interventions that pay people not to drive to work, vanpools or workplace-specific shuttles that effectively act like public transport but instead of traveling along a fixed route provide door-to-door service for a group of employees. More restrictive measures, such as preventing employees from parking a certain number of days each week may also be more likely to be effective.
- ◆ **The timeliness of the interventions.** The literature shows that people are more likely to change their behaviours, including travel behaviour, at key points in time, such as when they change jobs, move house, have a child, retire, or change their household structure (e.g. marriage or divorce).² Sustained travel behaviour changes have also been shown to occur after regular service is disrupted.³ These types of interventions, and others, may be more effective when delivered at a time when people are re-evaluating their travel choices and are beginning to form new habits.
- ◆ **Pairing behaviour change with more direct measures such as improvements to infrastructure and services.** The behavioural toolkit is complementary to, rather than a substitute for, the traditional policymaking toolkit of spreading information, providing incentives or disincentives, and regulating. Sometimes, behavioural science in conjunction with more direct measures, can lead to more effective results.

Structure of this report

The following four chapters detail various interventions that took place from early spring to late autumn 2015, followed by a concluding chapter. More specifically:

- ◆ Chapter 1 provides an introduction to this programme of work, an overview of the context at Heathrow, and a mix of the qualitative and quantitative findings underpinning the trials,
- ◆ Chapter 2 details two trials surrounding increasing car sharing,
- ◆ Chapter 3 details trials surrounding increasing public transport use,
- ◆ Chapter 4 details the effectiveness of an personalised commuter plan to encourage mode shift, and
- ◆ Chapter 5 details a free e-bike trial cycling scheme,
- ◆ Chapter 6 concludes with the broader lessons learned from this project at Heathrow and the implications for applying behavioural insights to encouraging sustainable transport more generally

Chapter 1: Introduction

Background to the trial at Heathrow

Facilitating transport choices is a central part of much of what the Department for Transport (DfT) does. There is growing evidence across Government that demonstrates the significant contribution that behavioural insights (BI)* can have in achieving better policy outcomes; however, the evidence base in transport is less well developed and there are many areas in this field, such as sustainable travel, which provides opportunities for exploring the impact of BI.⁴

Sustainable travel can support a number of Government objectives. It can help create growth in the economy and tackle climate change by cutting carbon emissions. Sustainable travel also influences our health, by improving air quality and improving our fitness. In addition, it can drive productivity by reducing congestion and providing easier access to jobs.

From an environmental perspective, transport was estimated to be the sector with the second highest greenhouse gas emissions in the United Kingdom, making up a total of 21% of emissions in 2013. Road transport, in particular passenger cars, are the most significant source of emissions within this sector.⁵ According to the 2014 National Transport Survey of England, 65% of commuting journeys were made by car.⁶ The Government made a commitment to cut greenhouse gas emissions under the Climate Change Act, passed in 2008; shifting commuter patterns towards sustainable, lower emission transport is one way to help achieve this reduction.

In this report, sustainable travel is defined as car sharing; public transport; and cycling. Heathrow Airport, which has about 76,000 staff that work for 350 employers, was used as an example of a large single site employer to test interventions. As the UK's largest single site employer, the airport provided a large scale setting to test the impact of behavioural insights on increasing sustainable travel, complementary to the success of its existing sustainable travel schemes.

The table below shows modes of transport for Heathrow employees from the 2013 Heathrow Staff Survey, conducted by Ipsos MORI.

* Behavioural insights draws on research from many disciplines including behavioural economics, psychology and sociology to understand how individuals and organisations behave and make decisions in everyday life. Understanding people's needs and preferences and how they respond to different contexts and incentives can help us design and deliver better policies and services.

Table 1.1: Modes of transport for Heathrow employees

Mode	Percentage of employees
Single Occupancy Vehicle (SOV) driver	49%
Public Transport	45%
Car Sharing (passenger or driver)	4%
Bicycle	1%
Walking	1%

With respect to sustainable travel, the airport's designated Commuter Team already runs a number of initiatives for its staff, including:

- ◆ **Car sharing:** Heathrow has an exclusive car share scheme for airport workers run by Liftshare. Active members of the scheme are entitled to priority parking in Heathrow managed car parks and access to a 24 hour emergency ride home facility.
- ◆ **Discounted Travel:** the airport runs a wide range of discounts on connected trains and buses.
- ◆ **Cycling:** the Airport operates two initiatives to encourage cycling: a Cycle Hub and Cycle Parking. The Cycle Hub membership scheme (which is free) offers free servicing, links to cycle training and servicing courses, and provides parking points for bikes across the airport.

To support existing initiatives and to understand what may be effective for promoting sustainable travel, BIT and DfT partnered with the Heathrow Commuter Team (HCT) to run a series of randomised controlled trials.* BIT and DfT worked together to develop interventions based on the latest behavioural science research and to evaluate the results using a rigorous and robust methodology.

How and why we chose these interventions

The design of interventions followed a systematic approach. First we established an understanding of the barriers preventing sustainable transport, and then identified strong theories and mechanisms likely to address these barriers. The interventions were designed to apply these insights in a practical setting.

In order to understand the context of commuting to Heathrow and the broader literature surrounding commuting behaviour, BIT undertook a programme of evidence gathering. This included a literature

* For an explanation of randomised controlled trials and their benefits see Haynes, L., Goldacre, B., & Torgerson, D. (2012). Test, learn, adapt: developing public policy with randomised controlled trials. *Cabinet Office-Behavioural Insights Team*.

review, quantitative analysis of Heathrow's staff survey, and a small scale primary data gathering exercise using qualitative methods of interviews with Heathrow employees. Then, working in conjunction with DfT, HCT, and the project advisory group, we held two workshops to generate ideas and come to a collaborative view of the interventions to be trialled. As well as their potential efficacy in tackling the barriers to sustainable travel, potential interventions were assessed according to the feasibility of implementing them at Heathrow and their potential transferability and relevance to other settings.

The key findings from the preliminary research are described below.

Quantitative Research

Every five years, Heathrow, in partnership with Ipsos MORI, conducts a comprehensive employment survey. Using data extracted from the Ipsos MORI Heathrow Employment Survey (2013), we identified different aspects of the data from the original report and examined their relevance to the potential interventions. Specifically, we identified segments of the employee population that could be receptive to transport interventions, and the types of interventions that may have the greatest impact. Based on our analysis of the survey data, we identified three areas with potential for behavioural interventions, based on employee numbers and attitudes.*

- 1. Increasing car sharing by overcoming misconceptions about the difficulty of finding a car sharing partner.** Segmenting the data suggests that car-sharing may have the greatest potential for improvement, with 61% of current drivers expressing an interest; yet only 10% of employees being registered and only a quarter of those actively engaged. The barrier these potential car-sharers reported is the perceived difficulty in finding a co-sharer and the misconception that no colleagues live nearby. This indicated that we could create an effective well-advertised behaviourally-informed intervention promoting the automatic matching system to increase car sharing.
- 2. Increasing public transport by providing a financial incentive.** 56% of current drivers also expressed interest in using public transport, albeit the largest perceived obstacles such as a need for more direct and frequent transport links are less suited to behavioural interventions. However, 26% of these drivers stated a willingness to switch to public transport as a result of a financial incentive (cheaper fares). We identified the scope to form an intervention around discounted tickets or short-term free travel.
- 3. Limited opportunity for a cycling intervention.** By comparison relatively few employees stated a willingness to consider cycling – 82% of employees said they would never consider cycling. Of those non-cyclists, most would be incentivised only by the provision of safer cycling routes. More practicable incentives, such as new showers, lockers, secure storage and on-site bicycle maintenance, seemed to be of relatively little interest (and in some cases are already provided by employers at Heathrow). The statistical data suggested that a

* Aware of the possibility of an attitude-behaviour gap, we did not design our interventions solely based on these self-reports. In the coming chapters, we provide more details surrounding the rationale behind each intervention.

cycling intervention would have a relatively small impact in absolute terms but may still yield a significant relative improvement, given the very small number of current cyclists.

Qualitative Research

To build on our understanding of commuting patterns and motivations, we conducted a light touch qualitative research exercise. Over the course of two days in the autumn of 2014, we undertook 58 short semi-structured one-to-one interviews inside and outside the landside staff canteens across Terminal 2 and Terminal 3, and in two staff car parks during shift-change hours. We asked interviewees about their feelings towards their current commute, motivations for their commuting choice, and barriers preventing them from taking up other forms of commuting. We also questioned them about the costs of their current commute, and asked them to estimate the costs of alternative commutes. See Appendix A for more details on the qualitative research process and methodology. Below we highlight some of the key findings:

Single occupancy vehicle drivers (SOV)

- ◆ Single occupancy vehicle (SOV) drivers described their commutes positively (quick, easy, convenient). SOV drivers were particularly positive about commuting during non-rush hour times, as this made their journeys shorter.
- ◆ Some SOV drivers have activities before and after work that they felt meant they would be unable to easily car share, cycle or take public transport.
- ◆ SOV drivers found it hard to quantify the cost of driving to work.

Car sharing

- ◆ The main barriers to car sharing cited by Heathrow employees were that they didn't know of anyone living near them and that their shift hours meant it was difficult to match their commute to other people.

Public transport

- ◆ The main barrier to taking public transport mentioned by Heathrow employees was the lack of nearby services in their area and taking public transport would take them longer than driving.
- ◆ Public transport users were generally less positive about their commutes than SOV drivers. They tended to mention delays, irregular services and overcrowding on buses and tubes.
- ◆ Employees that used public transport emphasised that it saved them money compared to driving, was easier than driving and meant they could go straight into the terminal buildings instead of having to park outside the terminals and get an additional bus in.

Cycling

- ◆ Heathrow employees cited a variety of challenges facing cyclists. The most cited barrier was living too far away from Heathrow or not having a route to work that would be possible to cycle.
- ◆ Cyclists were unhappy about the recent changes to the cycle routes into Heathrow and changes to cycle parking.

Ultimately, we aimed to design interventions in a way such that the results of this trial could be more widely applied to other large employers or cities encouraging sustainable travel.

The trials

Based on the preliminary qualitative and quantitative work outlined in this introduction, we tested eleven interventions across six trials aimed at increasing car sharing, increasing public transport use, and decreasing SOV use. This report brings together all of the evidence we have gathered by conducting these trials.

Chapter 2: Car Sharing

BIT ran two trials in April and May 2015 to increase the number of people registered to the car sharing scheme and to convert inactive registered members to active members.

Intervention conditions for Trial 1: Increasing car sharing registration:

- ◆ Control group: no intervention (n=39,931)
- ◆ Standard letter: employees received a letter about car sharing and how they can register (n=5,000)
- ◆ Call to Action: employees received the standard letter with a clear call to action heading directing them to go to the website to register (n=5,000)
- ◆ Testimonial: employees received the standard letter, featuring two photos and testimonials of Heathrow employees who have been using the car sharing system for years (n=5,000)

Intervention conditions for Trial 2: Increasing active car sharers:

- ◆ Control email: the business as usual email encouraging registered members to become active car sharers (n=300)
- ◆ Matching email: the business as usual email with suggestions for potential matches (n=314)
- ◆ Matching and opportunity cost email: the matching email with an additional line that makes the opportunity cost of driving alone salient (n=314)

Results:

- ◆ Overall, less than 1% of people across the control and interventions registered to the car share scheme with .05% of people in the control group registering, .28% of people who received the standard letter, .14% of people who received the call to action letter, and .24% of people who received the testimonial letter.
- ◆ Sending letters was significantly more effective at prompting registration than no letters.
- ◆ The standard letter yielded the most registrations and was significantly better than the Call to Action, but there was no statistical difference between it and the Testimonial.
- ◆ For the second trial, there was no significant difference in click through rates or activating registered car sharers between the three emails.

Lessons learned:

- ◆ Although the majority of Heathrow employees expressed a willingness to try car sharing, their stated intentions and stated barriers do not seem to match up with actual behaviour. While we knew from the outset that there would be a gap between stated preferences and behaviour, which the trials reaffirmed, the magnitude of difference surprised us.
- ◆ It seems that a more intensive intervention that changing messaging in communications is necessary to encourage people to join and become active members in a car sharing scheme.

The potential for car sharing at Heathrow

Heathrow has an exclusive car share scheme for airport workers, which was created in 2002 and is administered by Liftshare via automated software that matches members of the scheme to each other based on home location and commuting patterns. Active members are entitled to priority parking in Heathrow managed car parks and access to a 24 hour emergency ride home. To access the scheme, employees need to register by going to the website and filling out a one page form with basic details such as name, email, address, and providing information about their journey to and from work. After registering, employees can become active members by searching for matches on the scheme, creating a BUDi group* and start car sharing. Despite these advantages, uptake remains low, with around 2,000 people actively participating in the Heathrow car sharing scheme out of about 8,000 registered members.

About half of Heathrow employees (approximately 32,750) currently drive Single Occupancy Vehicle (SOVs) to work.⁷ Research carried out by Ipsos MORI identified a number of reasons why employees commute by car: primarily, Heathrow employees value the convenience, and believe it to be a cost-effective way of commuting.⁸ Commuters do not have to bear the full cost of driving, since their employers pay for their car park passes that cost between £600-£3,500 per year (depending on location). Furthermore, many feel that the travel alternatives are not practical, either due to a lack of suitable public transport services, assumed greater expense, or inconvenience. Car sharing offers some obvious advantages, such as financial savings due to shared fuel costs and can also be perceived to offer greater comfort than public transport. Most SOV drivers expressed an interest in car sharing; however fewer than half were aware of Heathrow's car sharing scheme. Quantitative research on Heathrow employees' travel choices suggests that 61% of drivers were interested in car sharing, and 41% of drivers would be encouraged to car share if they could be helped with finding someone with similar shift patterns.⁹ This finding was reinforced by BIT's qualitative research which also suggested that SOV drivers are interested in car sharing, and the most commonly stated reason for not doing so is a belief that nobody lives nearby.¹⁰

Wider Literature

Furthermore, the wider literature also shows that other common barriers exist towards people choosing not to car share that are more pragmatic and personal such as being cautious of sharing with strangers or issues around safety and security.¹¹ The literature also identifies various attitudinal, organisational and logistical barriers to car sharing as a commute mode, including the extra travel time required to collect and drop off passengers; the difficulty of finding car-share 'matches' and the lack of privacy compared to driving alone.^{12,13} This suggests that providing standard information or communications alone may not be enough to persuade some to register to car share.

Based on the evidence from our research, the high prevalence of staff driving to work, and the large numbers of people who live in reasonable proximity to Heathrow, we decided to run two trials to understand what may work for increasing car sharing in the Heathrow context.

* A BUDi team is a group formed when two or more people are car sharing and indicate that on the Liftshare site.

† Single Occupancy Vehicles refers to the driver being the only occupant in the vehicle.

Trial 1: Overcoming barriers to car sharing by highlighting savings, social norms, and providing a clear call to action

Aim

The aim of this trial was to test the efficacy of a letter campaign promoting car sharing, which highlighted to Heathrow employees the benefits of the car sharing scheme. The interventions aimed to increase the number of registered car sharers and the numbers actively car sharing on the Heathrow car-sharing scheme.

Relevant behavioural insights

The behavioural insights literature suggests that individuals can be heavily influenced by who is communicating the information and that potentially a message being delivered by a peer may resonate more in changing behaviour than from a supposed expert.¹⁴ Therefore, in one arm of this trial we used testimonials of current Heathrow employees who car share to increase the number of employees registering to the scheme. These testimonials highlighted that it is easy to find people nearby with similar shift patterns, which we hoped would demonstrate that car sharing is plausible and would partly help to address this particular concern enough for individuals to at the very least register and assess their options.

Research has also shown that a clear call to action on a letter makes it easy for the recipient to know what is being asked of him or her and is therefore more likely to take the requested action. This has been effective at encouraging people to pay fines,¹⁵ to join the organ donation registry,¹⁶ and to pay their taxes.¹⁷

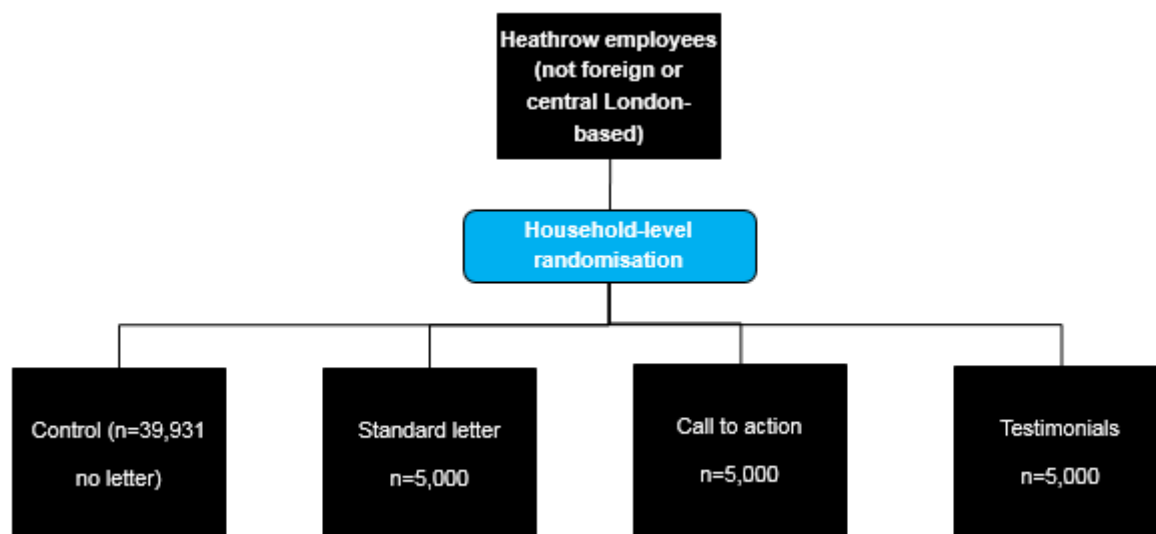
Interventions

This trial consisted of four arms:

- ◆ Control group: no intervention.
- ◆ Standard letter: employees received a letter about car sharing and how they can register.
- ◆ Call to Action: employees received the standard letter with a clear call to action heading directing them to go to the website to register.
- ◆ Testimonial: employees received the standard letter, featuring two photos and testimonials of Heathrow employees who have been using the car sharing system for years.

The letters can be found in [Appendix B1](#). Figure 1, below, is a visualisation of the trial design.

Figure 1: Car Sharing Letter Trial Design



Sample selection

The sample was selected from employees who work at Heathrow and have Heathrow security passes. Moreover, we excluded staff based abroad or living in a postcode in central London to mitigate the risk of highlighting car sharing to those who may be taking public transport already. More information about the dataset from which the sample was selected and a detailed list of the exclusion criteria can be found in [Appendix B2](#) and power calculations can be found in [Appendix B3](#).

The final sample eligible for this trial was **54,931**.

Due to financial constraints, only 15,000 letters could be mailed, so 15,000 people were randomly selected from this sample and assigned to the various treatment arms. 39,931 were randomly selected and assigned to the control.

Outcome measures

There were two primary outcome measures in this trial. The first is the propensity of participants to register to the car sharing system.

The second primary outcome measure is the number of people who became active car sharers. Although we explored a number of ways to observe actual car sharing behaviour, such as using number plate reading cameras or collecting data from pass swiping, these measures were found to be unfeasible due to cost and the lack of existing technology. In the absence of observed car sharing activity, we decided to use joining a BUDI group as a proxy for active car sharing. Because it takes time for people to find matches and become part of a BUDI group once they have registered, we conducted our BUDI group analysis on data two months after the letters were sent.

Secondary outcome measures of interest included the number of visits to the car sharing website per condition. Each letter condition had a unique URL directing employees to the car sharing registration form, so it was possible to detect how many times each website was visited.

Furthermore, we were able to detect the conversion rate – the number of people who registered to the scheme as a proportion of the total number of people who visited that version of the website.

Results

In this section, we discuss the results from the primary and secondary analyses. The regression model and tables can be found in [Appendix B4](#). Table 2 below summarises the car sharing registration results.

Table 2: Summary of car sharing registrations

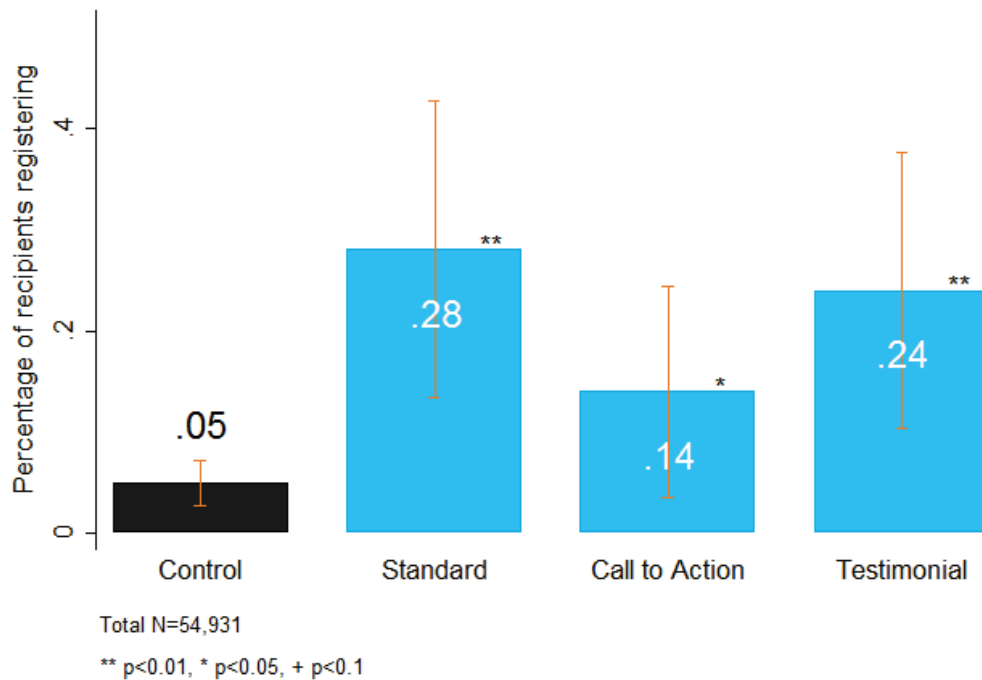
	Control	Standard	Call to Action	Testimonials
Number of car sharing registrations per 1,000 people	0.5	2.8	1.4	2.4

Primary analysis: The effect of treatment on registration and joining a BUDi group

Overall, the percentage of recipients registering across the control and intervention arms was lower than anticipated, at less than 1 per cent of the sample of 54,931 employees (0.22% of the sample of 15,000 letter recipients). Nonetheless, the analysis on the effect of treatment on registration and joining a BUDi group compared to the control suggests that:

- Sending a letter (of any type) notifying employees about the car sharing scheme makes employees statistically significantly more likely to register for the scheme than not receiving the letter and finding out about the scheme through the regular channels (e.g. posters and leaflets in the staff canteens, the website, etc.).
- In the trial, we saw that over five times as many people responded to the standard letter than those who received no letter and yielded the most registrations. There was no statistically significant difference between the standard letter and the testimonial letter.
- Participants who received the standard letter informing them of the scheme were twice as likely to register as those who received the Call to Action letter. This was statistically significant.
- There was no statistically significant effect of any treatment on joining a BUDi group, and overall a small number of people joined BUDi groups (seven people, four of whom were in the control group).

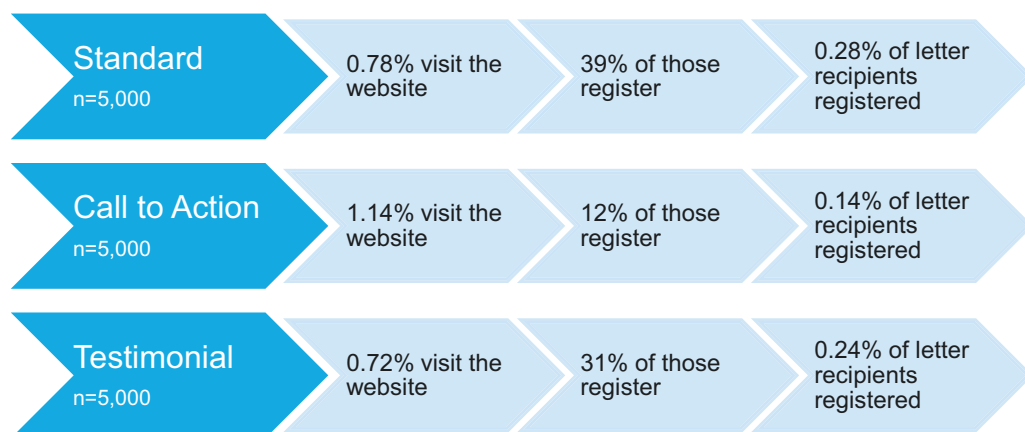
Figure 2: The effect of treatment on registration



Secondary analysis: The effect of treatment on website visits and conversion rates

For this trial, we were also interested in the effect of the treatment on website visits and conversion rate, namely the percentage of people who received each letter and then went on to both visit the website and register to the scheme. See Figure 3, below, for a diagram illustrating the effects of each treatment arm on visiting the website and registering.

Figure 3: The effect of treatment on visiting the website and registering

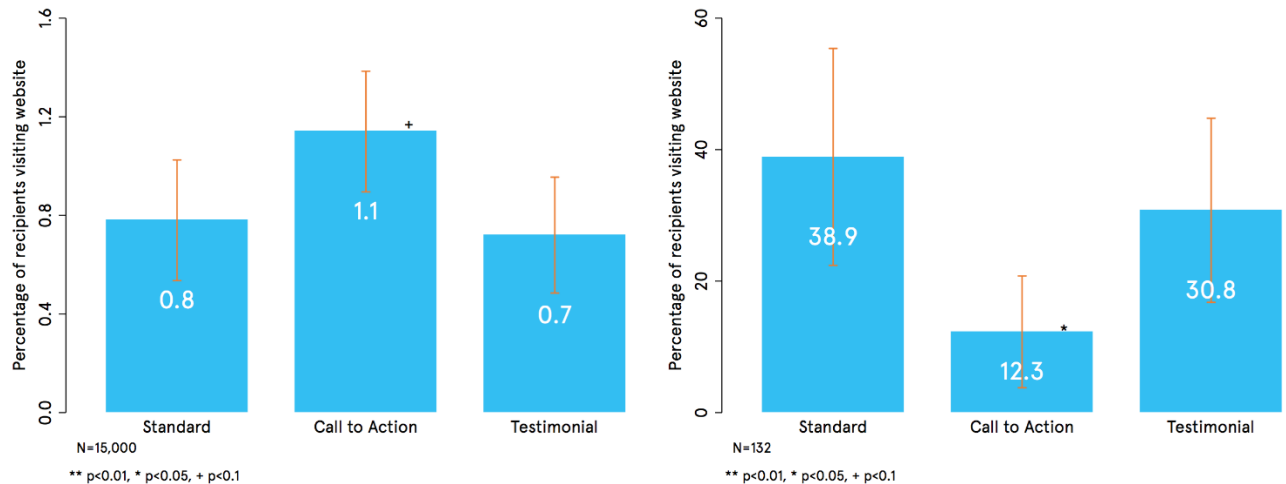


The analysis showed that:

- The Call to Action letter performed the best in terms of getting people to visit the website; however once they were on the site, they were the least likely to register (Figure 4).

- Only 12% of those who received the Call to Action letter and visited the website continued on to complete the registration process. Nearly 40% of those who received the Standard letter and visited the website to register followed through with their registration. (Figure 5).

Figure 4: The effect of treatment on website visits **Figure 5:** The effect of treatment on conversion rates



Road shows/In person events

The Heathrow Commuter Team's approach to increasing registration and usage of the car sharing scheme has mostly focused on road shows and events. This has some clear advantages over sending letters in that staff can answer immediate questions and the availability of a tablet device allows for instant registrations on the spot. However, we were keen to implement interventions that were low cost and transferable. Running an event can be quite labour intensive, you can only speak to a limited number of people simultaneously and other organisations may not have dedicated commuter teams to dedicate to plan these events. Therefore we wanted to ascertain whether:

- It would be possible to encourage a similar number or more individuals to register by simply targeting more people simultaneously on a much wider scale through the medium of letters. (HCT had not previously run a mailing campaign for car sharing before).
- If it was the case, that you could get sizeable numbers registering, whether a particular type of intervention (e.g. testimonial) was more effective than other types of interventions in encouraging registration.

It was not feasible to directly compare the effectiveness of these letters to Heathrow's standard procedure of conducting road shows/in-person events at the terminals to increase car registration.* This is primarily because of the inability to produce a comparison group and see who would sign-up without these events. Furthermore, it would be misleading to directly compare the outcomes of these two different approaches, as the groups targeted by the road shows (held immediately before the letter campaign) and the letter campaign itself are systematically different. However, we were

* This normally involves Heathrow Commuter staff setting up a stall and approaching employees to encourage them to sign up for car sharing. Promotional giveaways (pens, air fresheners, ice scrapers) are provided and the commuter staff have access to a tablet to allow employees to enter their details and register immediately on the car sharing website.

able to roughly compare the costs associated with one of these events that took place a couple of months before the mailing campaign and the costs of the letter campaign. The results suggest that the cost per registration was twice as high for the mailings as it was for the live events; however, we do not have the data for the number of active BUDi groups resulting from these live events so we cannot conclude on the road shows' effectiveness at promoting car sharing behaviours.

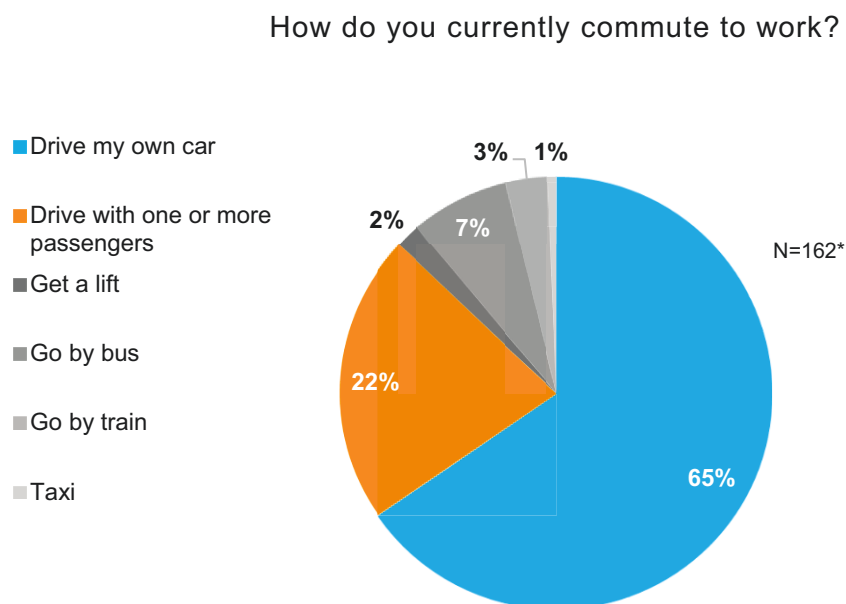
These findings suggest that there is a high 'friction cost' to registering for car sharing which must be overcome. To the extent that this is a common concern for travel decisions, it suggests that in this context, more resource-intensive personal interventions may yield greater returns on investment than lower cost light-touch interventions, or at least on proxy measures.

Alternatively, other information or a different intervention may have been more effective than testimonials. For example, it would be interesting to test how a more personalised and tailored letter affects registration, such as using a heat map that shows commuters nearby who share the same work patterns. As we will discuss in the conclusion of this section, 'light-touch' interventions may not be broad enough to address the full range of barriers. It is possible that a range of more intensive or sustained measures with successive sweeps would be required to achieve greater registration and active car sharing.

How did the new car sharers previously commute to work?

When conducting this trial, we were concerned that we might shift people already taking more sustainable modes of transport (e.g. public transport or cycling) towards car use. We also were aware of the prevalence of informal car sharing at Heathrow and were not sure if the new registrants would be individuals who have decided to car share for the first time or had previously been car sharing and had decided to register to access the benefits of the Heathrow Car Share system. We added a question to the registration form asking all new registrants about their current form of commuting. The results, shown in Figure 6, highlight that the majority of new registrants were previously SOV drivers (65%) and that only 10% of new car sharers had previously commuted by taking public transport.

Figure 6: New car sharing registrants by previous mode of transport



Trial 2: Overcoming barriers to car sharing by making it easy and making costs salient

Aim

The aim of this trial was to test the efficacy of different types of emails in increasing the number of inactive registered car sharers who become active car sharers. Staff who have registered on the car sharing scheme but have not indicated that they are part of a BUDI group are considered inactive. Specifically, our intervention aimed to help overcome the perceived difficulty of finding someone to car share with (by using the Liftshare system to suggest potential matches who live nearby and have similar shift patterns), and to make salient the cost benefits of car sharing.

Relevant behavioural insights

There is a broad body of literature, backed up by numerous trials run by BIT, which shows that small, effortful processes ('friction costs' and 'hassle factors') often have a disproportionate impact on people's behaviour¹⁸. For example, BIT has shown that simply directing people straight to an online form, rather than to a webpage on which the form was located (merely removing one mouse-click) significantly increased the rate of people who filled in the form to pay their taxes on time. Similarly, the process of finding a suitable match to car share with is likely to require some effort, and with the best of intentions, many people may simply not get around to doing this. We might therefore expect an uplift in active users if we make this step simpler and less effortful.

Perceived effort is often as important as actual effort, and the research carried out by Ipsos MORI and by BIT identified a common belief that it would be difficult to find a car sharer who lives nearby

* This number is larger than the total number of people who registered during our trial because it includes people who registered who were not part of the trial (e.g. new joiners) and because it extends a few months after the trial concluded.

and has similar shifts. Again, overcoming this belief and making the matching process easier may therefore afford an increase in active users.

There is also a financial benefit to car sharing that people may be unaware of. The literature has shown that people tend to itemise their expenses into discrete categories (e.g. commuting costs, which are perceived as quite separate from a holiday budget).¹⁹ Therefore, the fact that every pound saved on commuting costs can be spent on a holiday is often not salient when making financial decisions. Highlighting this ‘opportunity cost’ to people may therefore encourage them to take the more cost-effective option of car sharing; therefore, one of the intervention emails provided information about the amount of money one could save by car sharing and *explicitly* stated how that money could be used elsewhere. This has shown to be an effective intervention that affects decision-making.²⁰

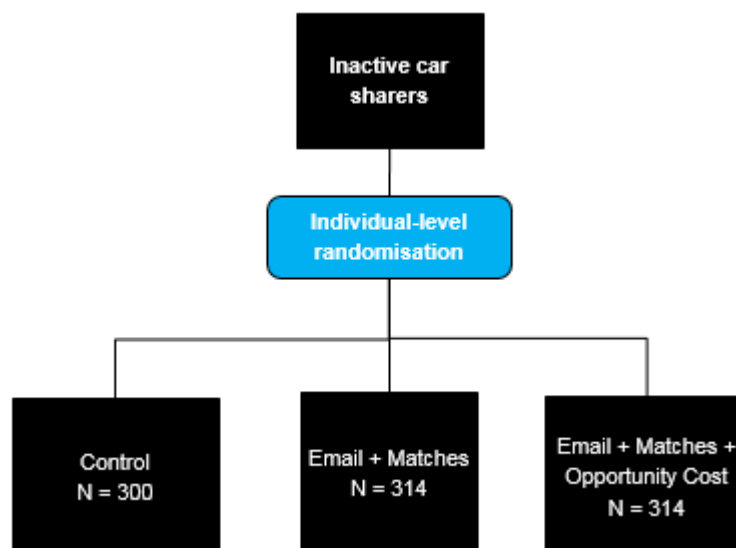
Interventions

The trial consisted of three arms:

- ◆ Control email: the business as usual email encouraging registered members to become active car sharers.
- ◆ Matching email: the business as usual email with suggestions for potential matches.
- ◆ Matching and opportunity cost email: the matching email with an additional line that makes the opportunity cost of driving alone salient.

Templates of the emails can be found in [Appendix B5](#). Figure 7, below, is a visualisation of the trial design.

Figure 7: Trial Design



Sample selection

The participant pool was all registered car sharers on Heathrow's Liftshare system. The sample was limited to members who have a registered journey, but are not members of a BUDi group. Power calculations can be found in [Appendix B6](#).

The final sample eligible for this trial was **928**.

Outcome measures

The primary outcome measure is whether a participant joins a BUDi group, a good proxy for active car sharing (as explained above).

A secondary outcome measure is the click through rate for each of the emails, to see which email was most effective at getting people to take action.

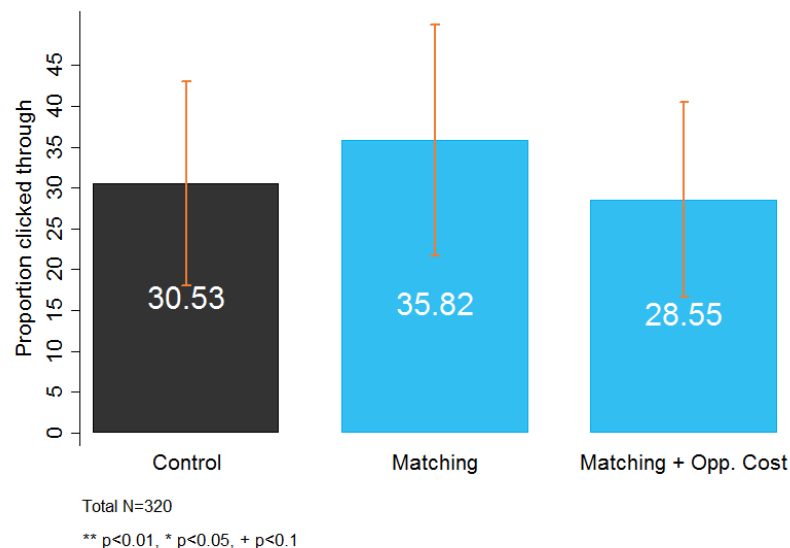
Results

In this section, we discuss the results from the analyses and the regression table can be found in [Appendix B7](#).

One month after the emails were sent out, only one person from this trial had found a BUDi group.

Overall, about one third of the emailed participants actually opened the email, and, as shown in figure 8, one third of those who opened the email clicked through the link to search for a BUDi group. There was no significant difference in click through rates across the three conditions.

Figure 8: The effect of treatment on click-through rates (conditional on opening the email)



Conclusion

The first trial highlights two key principles of our work: First, that actual behaviour does not always match up with stated intentions. As discussed above, according to the 2013 Staff Survey, 61% of Heathrow employees who drive to work (which translates to over 22,000 people) said they would

consider car sharing. 41% of drivers stated they would be encouraged to car share if they could find someone to car share with (which translates to over 15,000 people). However, when we did notify people of how they could take the first step to car sharing (register) and how through registering they would have access to the platform on which they could find someone to car share with, less than 1 per cent of those contacted signed up. Even fewer went on to actively car share in the two months following the letter trial. This indicates that proximity and similar shift patterns may not be enough and that other psychological factors may still be prevalent such as apprehension towards other car sharers.

Second, these results highlight the importance of testing interventions. Over 30,000 people were theoretically interested in car sharing. Before the trial, we knew that we could only contact 15,000 individuals and expected a reasonable number of registrations. However, we received less than 100 new registrations, which was out of step with the stated interest in car sharing.

The letter that drove the most people to the website did not translate into the most registrations. The simplest intervention – the letter informing people of the scheme had the highest percentage of registrations and had the highest conversion rate. This seems to indicate that though nudges may be effective at getting people to take the first step in a multi-step behaviour change process, further intervention or design is required to get people to follow-through with the action. Whereas when people already have a desire to change behaviour but lack information, providing that information itself without additional behavioural interventions can be sufficient to encourage action. Furthermore, the Call to Action may have been too prominent and distracted from some of the information on the letter, which may explain why the registration rate is significantly lower than those who received the Standard letter.

This trial also sheds light on the problematic nature of proxy measures. If we were just to look at website visits, we would draw one conclusion, but the ability to see registrations changes that story. Similarly, the in-person events may have been more effective at getting registrations, but we do not have the granular data from those events to see how likely those who registered at the in-person event are to actively car share. We would expect that social pressure would increase the number of people registering at these events, but we do not know how that translates into active use. This could be analogous to how employees, when asked, express a stated preference for car sharing, but ultimately don't follow through on those intentions even when it is made easy.

When we initially planned the email activation trial, we had hoped that the first car sharing trial would have generated many new registrations to the car sharing system. Therefore, the email trial would have been able to serve as a way of alerting the inactive registered users to the many new potential sharers. From this trial, we learned that all three emails were equally effective at capturing the attention of one third of the people who opened them, inspiring them to click through; however, the emails taken together were not effective at activating car sharers. We speculate that because there were not as many new registered users in the system as we had hoped for, there were few new potential matches with which to connect registered, but inactive users. Therefore, inactive users who had previously searched for a BUDi group and were not satisfied with their options, may have searched again to find similar results.

In the Heathrow context, where employees do not have to pay for their parking, these trials show that a simple light touch letter or email intervention is not enough to shift SOV drivers into car sharing. Although it is worth highlighting that all letters are significantly better than no letter and that the Standard letter is at least five times more effective than no letter. The low absolute number of registrations from the letter trial, in contrast to higher levels of registration from in-person events, provides evidence to support the use of in-person road shows in Heathrow to increase car sharing registration; however, more research is needed to determine if this leads to an increase in actual car sharing behaviour. In other contexts, where employees pay for parking, such interventions may be more effective. Furthermore, additional harder measures may be necessary to accompany promoting the car sharing scheme; for example infrastructural changes such as additional lanes or car parking spaces for car sharers, may have an impact on increasing car sharing.

Chapter 3. Public Transport

BIT ran two trials in April 2015 to increase public transport use. One was based upon a free one-week bus pass, and the other, drawing upon those who were offered but did not take-up the free trial, provided feedback based upon loss-aversion. In each case uptake was measured by the number of people who registered and purchased discounted travelcards for the Reading AirRail Coach Service and the Slough Blue Line Bus Service.

Intervention conditions for the free one week bus trial:

- ◆ Control group: employees received a letter that included information about the bus service (n=2,520)
- ◆ Free trial: employees received the control letter in addition to 7 vouchers to use on the bus or coach to and from Heathrow during one week in April. The letter also explained how to use the vouchers (n=7,560)

Intervention conditions for the loss aversion feedback follow-up trial:

- ◆ Control group: employees who did not use the free trial received no follow-up (n=2,431)
- ◆ Follow-up: employees who did not use the free trial received a follow-up letter using loss aversion pointing out the opportunity they missed but encouraging them to still buy the discounted travel product (n=2,505)

Results:

- ◆ There was no statistical difference between both groups on bus usage as measured by travelcard activity.
- ◆ In the control group 2.21% of employees registered for the travelcard and 1.45% purchased the travelcard and in the free trial condition 2.22% of employees registered for the travelcard and 1.31% purchased the travelcard.
- ◆ Following up with individuals who did not take advantage of the free trial with a message emphasising loss aversion did not have a significant effect on travelcard registration or purchasing behaviour.

Lessons learned:

- ◆ In this context, where we could only offer free travel for one week, providing information was shown to have the same effect as offering a free trial in promoting public transport uptake.
- ◆ As a result of this trial, the Heathrow Commuter Team is no longer organising one-week free bus trials.

Background

While about half of Heathrow employees (approximately 32,750) currently drive Single Occupancy Vehicle (SOVs) to work²¹, 45% take public transport.²² The qualitative research conducted with Heathrow staff suggested that employees, particularly SOV drivers had some negative preconceptions about public transport. Furthermore, many felt that it is not practical, either due to a lack of suitable public transport services, assumed greater expense, or inconvenience. According to the Heathrow employment survey, 56% of current drivers expressed interest in using public transport, albeit the perceived obstacles such as a need for more direct and frequent transport links were less suited to a behavioural intervention. However, a substantial proportion of these drivers stated a willingness to switch to public transport as a result of a financial incentive (cheaper fares), and as such, we identified the scope to form an intervention around discounted tickets or short-term free travel, with behavioural insights to help turn a one-off behaviour into a habit.

The trials informed individuals of the low cost for Heathrow employees to commute using bus/coach services and tested whether offering a free trial can help people overcome the barriers associated with commuting using public transport. The literature, discussed below, has shown that free trials can lead to higher use of public transport and our first trial evaluated a one week free bus trial. The second trial evaluated whether sending feedback highlighting loss aversion to those who did not take advantage of the free trial made it more likely for those individuals to then go on to use the bus regularly.

Trials: Overcoming barriers to public transport by offering a one week free bus trial and following up with those who did not use their free trial with a loss aversion feedback letter

Aims

The primary aim of this trial was to test the effectiveness of a 'try before you buy' offer in increasing the uptake of public transport, specifically bus usage in Slough and coach usage in Reading. We set out to learn whether a one week free bus pass would be effective at getting Heathrow employees to start commuting using the bus more regularly, which would be evidenced by their purchasing a monthly or annual travelcard.

The aim of the follow-up trial was to test the effectiveness of loss aversion following the 'try before you buy' offer on encouraging public transport use. We hoped to learn whether this immediate feedback would be effective at getting Heathrow employees (who chose not to take advantage of the 'try before you buy' offer) to start commuting using the bus, evidenced by their purchasing a regular travelcard.

Relevant behavioural insights

Several studies have shown that a free bus trial can increase public transport use; however, these studies rely on participants to self-select to participate in the study (leading to selection bias) and they rely on self-reported measures. A study in Kyoto found a 20% increase in public transport that continued a month after an intervention of one month's free travel; the authors hypothesise this was caused by a combination of habit formation and overcoming negative preconceptions about public transport.²³ A randomised controlled trial in Copenhagen showed similar results, with a month's free

travel causing a doubling in public transport use during the free period, fading to a 40% increase 5 months later;²⁴ however, in this study only self-reported travel was measured, once before and twice after the free trial. This study is also somewhat biased as everyone involved discussed their travel habits as part of the pre-trial survey. A study in Switzerland in 2008 required participants to travel by public transport and used the free trial as the incentive to participate in a study, but none of the participants shifted modes by the end of the trial.²⁵ The authors then conducted a follow-up study at the Massachusetts Institute of Technology, with a larger sample, without a control group and everyone received a free pass and about 30% of the participants switched to public transportation after the intervention.²⁶ By undertaking this trial, we sought to fill a gap in the literature by robustly testing the effect of offering a free trial with a control group and the use of a more objective outcome measurement.

Although the free offer in this trial is for a shorter period (one week rather than one month), which may reduce its effectiveness (specifically regarding habit formation), it has been shown that even one day's worth of free public transport can increase future use by helping individuals overcome their negative perceptions. When car drivers in Manchester were given free bus passes for a day, nearly half rated the experience better than expected and 65% of infrequent users* reported taking the bus again in subsequent weeks.²⁷ Similar results were found in Leicester, where 45% of those who received a free bus pass for a day rated the experience better than anticipated and 52% of infrequent users reported to use the service again in the immediate future.²⁸ Our trial at Heathrow was designed to enable employees to test public transport in a low-risk, low-cost setting.

The idea behind the loss aversion feedback follow-up trial is that we respond more powerfully to losses than gains, and our drive to avoid losses is a powerful motivator for human behaviour.²⁹ Using a loss frame has been successful at motivating people to sign up to the organ donation registry,³⁰ to pay their taxes,³¹ and to increase productivity.³² However, loss framing does not always work and therefore, it is important to test.³³

Interventions

The first trial consisted of two arms:

- ◆ Control group: employees received a letter that included information about the bus service.
- ◆ Free trial: employees received the control letter in addition to 7 vouchers to use on the bus or coach to and from Heathrow during one week in April. The letter also explained how to use the vouchers.

Since the letters were introducing a new route, we were unable to have a control group that did not receive any information.

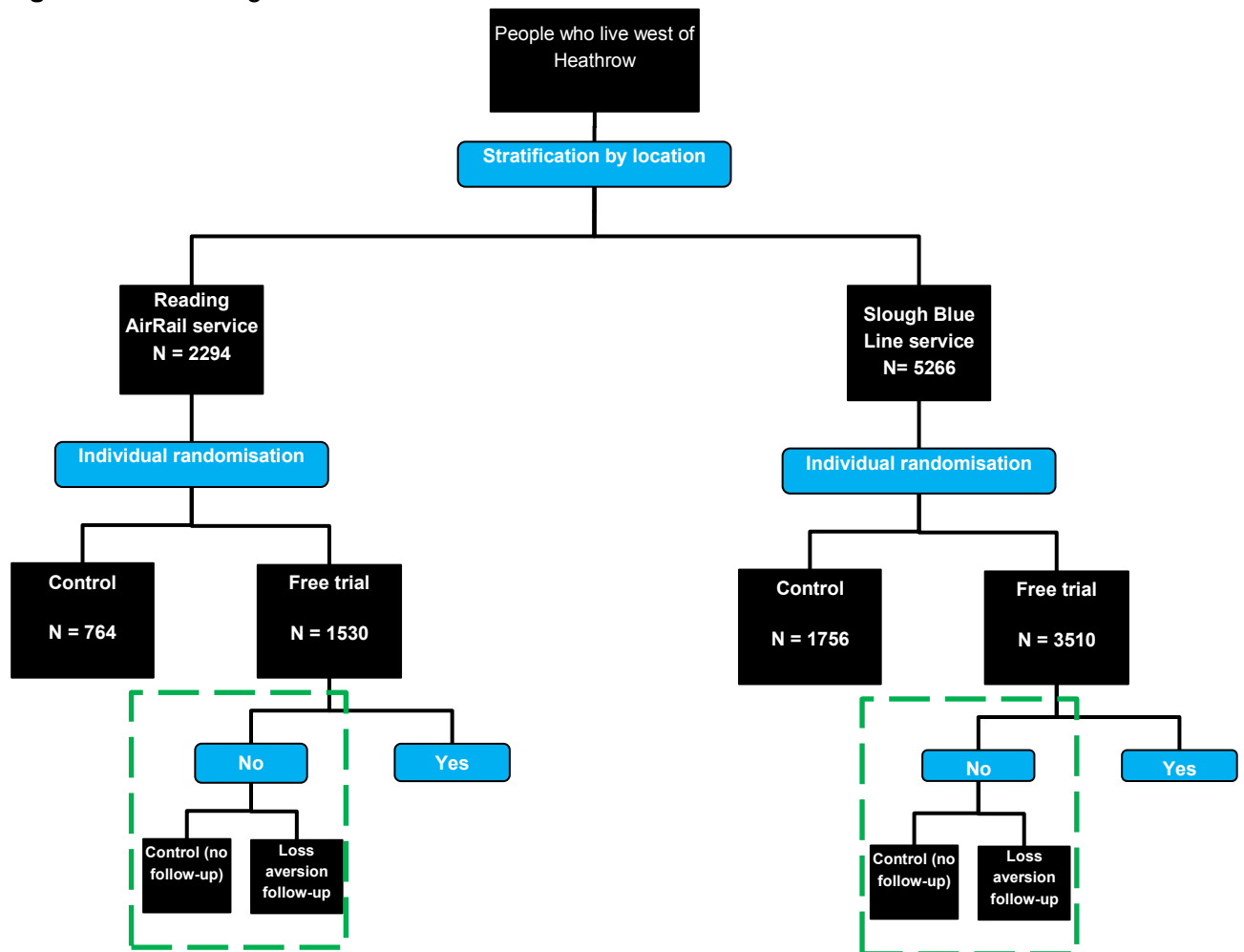
* Frequent users were those who reported to taking the bus more than once a week or once a week; infrequent users were those who only reported taking the bus several times a year, once a year or less, or never.

The second trial, drawing entirely upon employees in the first trial who were offered but did not use the free public transport, consisted of two arms:

- ◆ Control group: employees who did not use the free trial received no follow-up.
- ◆ Follow-up: employees who did not use the free trial received a follow-up letter using loss aversion pointing out the opportunity they missed but encouraging them to still buy the discounted travel product.

The letters can be found in [Appendix C1](#). Figure 9, below, is a visualisation of the trial design.

Figure 9: Trial Design



Sample selection

The sample for the free bus trial was selected from employees who work at Heathrow, who have Heathrow security passes, and who live in Reading and Slough. More information about the dataset from which the sample was selected, a detailed list of the exclusion criteria can be found in [Appendix C2](#) and power calculations can be found in [Appendix C3](#).

The final sample eligible for this trial was **7,560**.

The sample for the follow-up trial was the subset of individuals who were in the treatment group of the first trial (offered a free trial), but did not take up the free trial.

The final sample for the follow-up trial was **4,936**.

Outcome measure

The primary outcome measure for both of these trials is the propensity of participants to buy discounted travel products. This outcome measure is a proxy for bus use – since we cannot monitor whether individuals continue to take the bus, we can only see whether they buy these products. These products are significantly discounted and therefore would be a good indicator of future bus use. An outcome measure of interest for the secondary analysis is the number of times an individual in the free trial condition uses the vouchers.

The travelcards are discounted travel tickets that Heathrow employees are eligible to purchase which significantly reduces the price of travel on certain forms of public transport. More detailed information about the travelcards can be found in [Appendix C4](#). It is important to note that if an individual in Slough intends to take the bus more than four days in a month, it makes sense to buy the travelcard, and if an individual in Reading intends to take the coach more than five days in a month, it makes economic sense to buy the travelcard. The letters ([Appendix C1](#)) make the cost implications of the heavy subsidy very clear.

Results

In this section, we discuss the results from the analysis. The regression model and tables can be found in [Appendix C5](#).

Primary analysis: The effect of a free trial offer on travelcard activity

Overall, there was no statistically significant difference found in registration rates or purchasing rates between the control and treatment groups. Our analysis found:

- In the control group, 2.21% registered to get travelcard and 1.45% purchased the travelcards. Whereas 2.22% of those offered the free trial registered and 1.31% purchased. These differences are not significant. (Figure 10). In this case, receiving a standard information letter was just as effective as the free trial, and suggests that offering a free trial may not be the most cost effective way to increase regular public transport use.
- The follow-up letter had no significant result on either registration or purchasing behaviour.
- 80 individuals who were offered the free trial but did not take advantage of it ended up registering for a travelcard and 49 of them purchased, but these people were split relatively evenly between the control and loss aversion follow-up conditions. In order to better understand why these people did go on to register and purchase travelcards, it would be interesting to undertake follow-up qualitative research.

Figure 10: Proportion of travelcard activity by trial arm

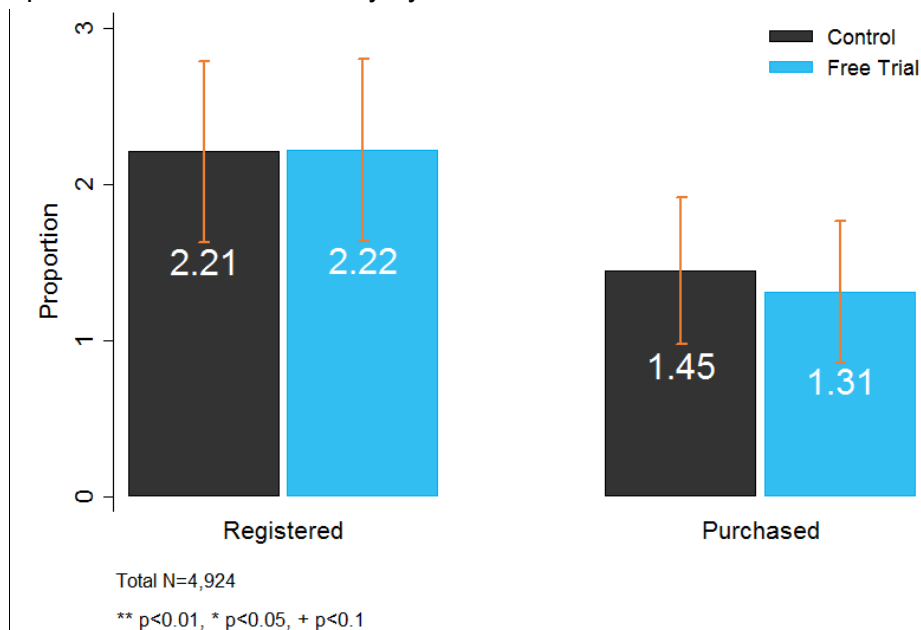
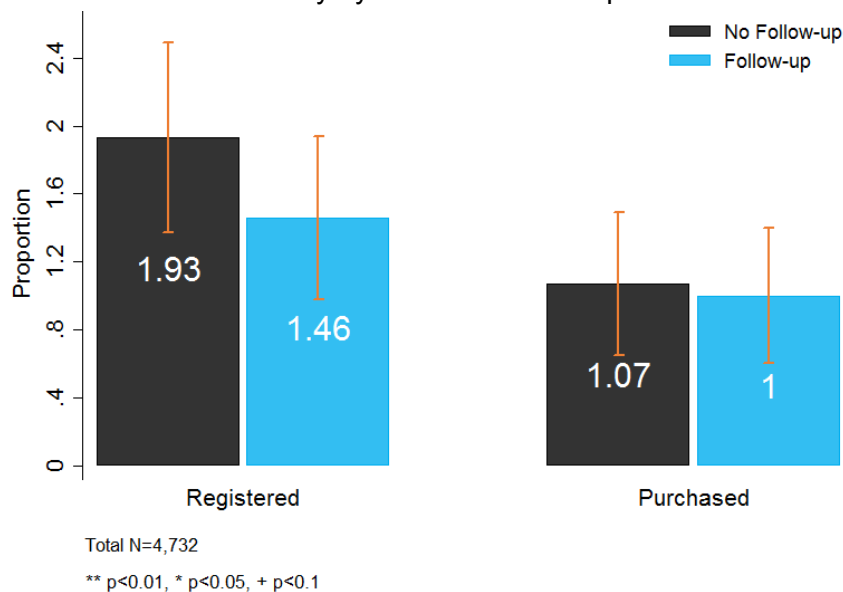


Figure 11: Proportion of travelcard activity by feedback follow-up arm



Secondary Analysis: The effect of using the free trial on travelcard activity

In addition to the main trials, we also investigated the travelcard registration and purchase rates between commuters that took up the free trial, versus those that didn't. Of those who used the free vouchers (103), 10% registered and 8% purchased the travelcard subsequently (of those who did not take advantage of the vouchers (4,732), 2% registered and 1% purchased the travelcard). It is impossible to say whether the use of the free trial encouraged these employees to buy a travelcard, or whether these employees were planning to buy a travelcard anyway, and were therefore more inclined to make use of the free trial before they did so. The reason we are including this information is because some of the studies cited earlier may not include a proper control group. They may only

follow-up with those who redeemed a free bus trial or would compare those who took up a free bus trial with those who did not, which would provide misleading results.

Conclusion

The results from these trials indicate that *offering* a free trial or following-up with loss aversion messaging does not significantly increase the uptake of travelcard registrations or purchases.

One of the barriers to bus use is a negative perception of buses and one of the motivations that people stated could encourage them to take public transport is discounted travel. This trial shows that other acknowledged (and potentially unacknowledged) barriers may play a strong role in determining behaviour, but further robust trials are needed to establish which are the most important barriers or strongest incentives.

One limitation of the way we collected data is that we can only see who went on to purchase a travelcard, but we do not know if those who used the free trial but did not purchase a travelcard still may have increased their bus use. However, given the cost differential between a return journey and a monthly pass, it makes economic sense for individuals living in Slough to purchase a monthly bus pass if they use the bus more than four times a month, and if individuals in Reading use the bus more than five times a month.

This result is interesting, as the literature often shows that 'free offers' have been effective in other contexts.^{34,35,36,37} However, as pointed out earlier, our trial is different from these studies because the existing literature has tended to use a self-selected sample that knew it was participating in an experiment about travel behaviour, relied on self-reported data as opposed to objective measures, and did not always have a control group. Furthermore, other studies have longer trial periods, which may affect habit formation.

One notable recent study with a similar design and similar results was conducted in Norway with employees of six different companies. That study also finds no significant differences between the provision of tailored information about local public transport options for commuting and the provision of such information and a free 7-day public transport. In that study participants volunteered to join the project and data was collected through self-reported surveys.³⁸ A limitation in both of our study and that study is that one week may not be long enough to influence habit formation.

This study has filled a gap in the current literature, by robustly testing an intervention in a way that avoids selection bias and survey response bias.

These results indicate that in Heathrow's context, offering a free trial may not be an effective way to increase travelcard registration rates or purchases. This possibly indicates that the perception of public transport, which the free-trial was attempting to overcome, is not the main barrier preventing the uptake of travelcards (or alternatively that offering a free trial isn't sufficient to overcome pre-conceptions if people don't actually use the free trial). Although the intervention did not have the expected effect, it does highlight that funding may be better spent attempting to address other barriers. In fact, HCT has stopped organising free bus trials to increase public transport use.

Chapter 4. Evaluating 'Your Commuting Options' travel plan

In January and February 2016, we ran a trial at the Heathrow Compass Centre (an administrative building) with the aim of decreasing the amount employees drove single occupancy vehicles (SOVs) to work. This trial involved providing personalised commuting plans (PCP) with alternative routes to work and information about discounted Heathrow travel products.

Intervention conditions for the PCP

- ◆ Control group: employees did not receive any personalised travel information (n=305)
- ◆ PCP group: employees received an email with their personalised travel options attached. The body of the email encouraged them to sign up for a one-to-one session to review their travel options with someone from the Heathrow Commuter Team (n=790)

Intervention conditions to evaluate the effectiveness of a one-to-one session

- ◆ Control group: employees who signed up for a one-to-one but were not given one during the trial period (but they were given one after) (n=10)
- ◆ One-to-one group: employees who signed up and received a one-to-one session with a member of the Heathrow Commuter Team. During the one-to-one they wrote down implementation intentions (n=11)

Results:

- ◆ We found no significant effect of delivering a PCP on commuting behaviour. We were also unable to detect an effect of assigning people to receive a one-to-one on commuting behaviour; however, the sample size was very small (which is of interest in itself).
- ◆ Of the 790 people offered PCPs and the opportunity to sign-up for a one-to-one, 21 signed up (2.66% take-up rate).
- ◆ Only 4 of the 11 who were assigned to a one-to-one turned up for the session.

Lessons learned:

- ◆ The low response rates suggest that more powerful interventions (less light touch) should be tested.
- ◆ Rigorous evaluations should be conducted for similar programmes in the future.
- ◆ As a result of this trial, the Heathrow Commuter Team is no longer creating and distributing PCPs for the 76,000 Heathrow employees. Instead they are incorporating PCPs into their business as usual toolkit so all employees can request a PCP to explore their travel options.

Background

The Compass Centre, an administrative building on the perimeter of Heathrow Airport, is the headquarters for Heathrow Airport Limited and was selected for the pilot site of disseminating personalised commuting plans (PCPs). While about half of Heathrow employees (approximately 32,750) currently drive Single Occupancy Vehicle (SOVs) to work,³⁹ 76% of Compass Centre employees drive their own car to work at least once a month; 59% drive every day.*

As discussed above, according to the Ipsos MORI Heathrow Employment Survey 2013, as well as qualitative research carried out by BIT and DfT, SOV drivers perceive that public transport would be inconvenient, or believe car-sharing to be impossible due to a lack of employees living near them. Furthermore, many drivers are unaware of the existing car-sharing service or the discounts available on public transport. All of these issues are largely rooted in a lack of accurate information, and the difficulty (or lack of effort required) in finding that information. Simply ensuring that people are aware of their options and doing the research for them (making it easy) may therefore go some way to ensuring that people will make better commuting decisions. For example one study has shown the effectiveness of increased information about alternative modes in reducing the frequency of car-trips among those with a strong car habit.⁴⁰

In addition to providing important information, this intervention evaluates whether the delivery of an informational intervention is enhanced in a one-to-one setting.

Trials: Evaluating the effectiveness of emailing a PCP and following up by delivering one-to-one sessions to those who were interested

Aims

The primary aim of this trial was to test the effectiveness of emailing a PCP on decreasing SOV use. The PCP provides tailored information to individual employees about different routes that individual could take using different transport modes and also includes information about discounted Heathrow travel products.

Everyone emailed a PCP was also offered a chance to sign up to a one-to-one session to go over their options with an expert from HCT. We hoped to learn whether this one-to-one itself would be effective at getting Heathrow employees to reduce SOV commuting or whether those who sign up for one-to-ones are more motivated and would have changed their behaviour regardless of the one-to-one.

Relevant behavioural insights

There is reasonable evidence that personalised travel plans (PTPs) have a positive effect, with one meta-review drawing upon interventions across 8 regions in the UK, finding an 11% average reduction in car use;⁴¹ however, another meta-review identifying 17 primary studies (of which 6 were RCTs and the other 11 were non-randomised longitudinal before-after studies), finds reductions in car use between 1% and 14.7%, with 11 of the reported reductions not statistically

* These figures come from employees based at the Compass Centre who filled out the survey discussed below, found in [Appendix D2](#).

significant.⁴² A meta-analysis reviewing the components of 10 studies of what makes a PTP make it most effective has shown that including implementation intentions (whereby a person details the when, where, and how they plan to achieve their goals, a phenomenon widely documented in the behavioural literature⁴³) makes a PTP significantly more effective.⁴⁴ The meta-analysis also highlighted the generally low standard of the evaluation methodologies and called for more robust RCTs. Therefore, we have conducted this trial to add to the evidence base on the impact of PTPs, since the personalised commuter plan in this trial is a type of PTP.

The policy context for this intervention is that there is a real need within the transport sector to add to the evidence base on the potential impact of PTPs. The literature identifies problems with evaluations of PTPs due to the independence of evaluator (or lack thereof), small sample size, and survey response biases. Chatterjee (2009), drawing on evaluation findings from a research project conducted on behalf of DfT, emphasises the need for independent evaluators who can collect aggregate-level travel data with which to corroborate survey-based results.⁴⁵ Additionally, traditional PTPs can be very resource intensive and expensive to deliver, therefore it is in the wider policy interest to assess the impact of a scaled down version, where people can opt for a more intensive session.

This trial evaluates the effect of delivering a light touch personalised commuter plan, designed to “build on the benefits of conventional’ PTP by combining it with the time and cost advantages of instant, online trip planning”⁴⁶ and the additional effect of engaging with those who are interested in a one-to-one session with an advisor. To make these one-to-ones as effective as possible, we also included an opportunity for participants to write down a behavioural plan with their implementation intentions at the end of the session.

Interventions

The first trial consisted of two arms:

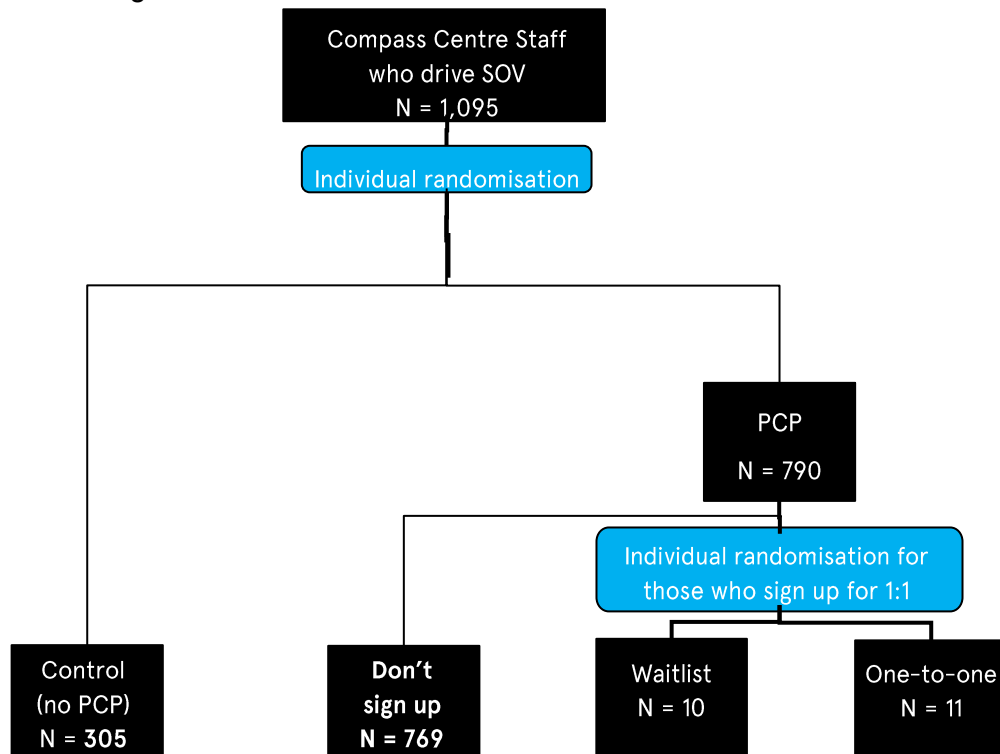
- ◆ Control group: employees did not receive any personalised travel information.
- ◆ PCP group: employees received an email with their personalised travel options attached. The body of the email encouraged them to sign up for a one-to-one session to review their travel options with someone from the Heathrow Commuter Team.

The second trial, drawing entirely upon employees in the first trial who signed up for a one-to-one

- ◆ Control group: employees who signed up for a one-to-one but were not given one during the trial period (but they were given one after).
- ◆ One-to-one group: employees who signed up and received a one-to-one session with a member of the Heathrow Commuter Team. During the one-to-one they wrote down implementation intentions.

A sample PCP and sample implementation intention card can be found in [Appendix D1](#). Figure 13, below, is a visualisation of the trial design.

Figure 13: Trial Design



Sample selection

The sample for the PCP trial was selected from employees who work at the Compass Centre, filled out a travel survey, and have commuted to work by SOV at least one day in the month preceding the survey. More about the survey, administered in January 2016, can be found in [Appendix D2](#) and power calculations can be found in [Appendix D3](#).*

The final sample eligible for this trial was **1,095**.

The sample for the follow-up trial was the subset of individuals who signed up for a one-to-one session.

The final sample for the follow-up trial was **21**.

Outcome measure

There are a number of outcome measures used to determine the success of the intervention. The initial survey was used to collect information about individuals' commuting habits over the previous month. Through a post-intervention survey, administered one month after the delivery of the final one-to-one (and two months after the PCPs were sent out) we collected information about employees' commuting habits.

* It is worth noting that this trial took place after the car sharing and bus trials described above and the outcome may have been affected by the target population having been previously contact; however, this was not a great concern since the effect sizes in the previous trials were so small.

The primary outcome measure is the number of trips made driving an SOV. We could not monitor observable behaviour and therefore must rely on self-report. Although self-reporting is not without risks of measurement error, the participants in the trial had no incentive to be less than truthful, and the behaviour (commuting) is a regularly repeated behaviour and easily recalled. Furthermore, we cross validate these self-reported measures with objective secondary measures, including the number of people who registered for car sharing, the number of people who purchased discounted travel cards, and the number of people who registered for the Cycle Hub.

The first measure is the number of days in the past 5 days an individual drove an SOV to work (a number between 0-5), and the second measure is the frequency of times they drove an SOV to work in the past month (intervals: never, once or twice, 3-5 times, 6-10 times, more than 10 times but not every day, or every day).

The secondary analysis consists of objective one-off measures. Although these measures are not exhaustive – for example, they do not account for regular journeys made using Transport for London buses or the Underground and they fail to indicate how many sustainable journeys an individual takes on a regular basis, they do provide objective data on the number of people who registered for the car sharing scheme, the number of discounted travel tickets purchased, and the number of people who register for the Heathrow Cycle Hub. The Heathrow Commuter Team has access to individualised data for all of these measures, with the exception of certain discounted travel products.

It is worth noting that the outcome measures were collected at the end of March 2016, which is not necessarily a time when people are likely to cycle. Therefore, while there is a chance that the PCP could have had an impact on cycling behaviour later on, during the summer, but based on the low figures surrounding other measures, we do not think this is likely.

Results

In this section, we discuss the results from the analyses. The regression model (including the analysis strategy which includes the last observation carried forward) and tables, as well as a diagram capturing the response rates, can be found in [Appendix D4](#).

- 21 of the 790 who received a PCP signed-up for a one-to-one session.
- Of those 21 employees, 11 were invited to attend the session and confirmed their ability to attend the session, but in the end only four employees turned up. Whereas common evaluations of personalised travel plans sometimes only report on the results of those four motivated employees (less than 1% of the targeted group), we have deliberately constructed this trial so that we could disentangle the effects of motivation and of the intervention itself.

Primary analysis: The effect of the PCP and one-to-one offers on commuting behaviour

- Overall, we were unable to detect an effect of providing a PCP on SOV car use, two months following the distribution of the PCP. The findings are illustrated in Figures 14 and 15, below.

- Overall, we were unable to detect an effect of providing a one-to-one, one month following the delivery of the one-to-one, compared to delaying the delivery of the one-to-one to those who signed up. The findings are illustrated in Figures 16 and 17, below.

Figure 14: Reduction in number of SOV days driven in the past 5 between people who did not receive a PCP (control) and people who were sent a PCP (treatment)

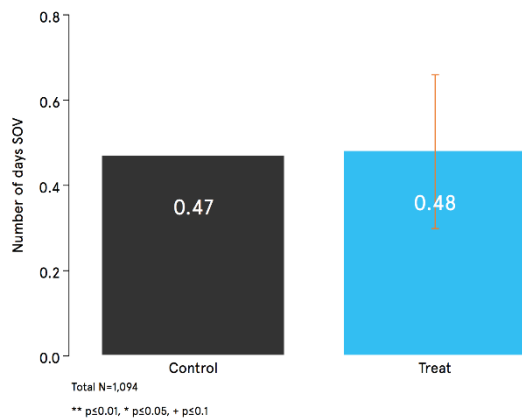


Figure 15: Reduction in frequency of monthly SOV days between people who did not receive a PCP (control) and people who were sent a PCP (treatment).

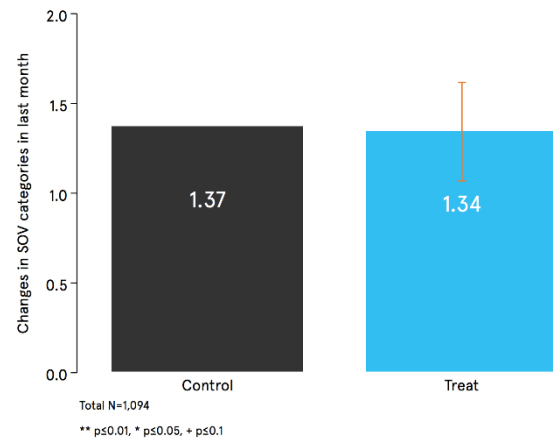


Figure 16: Reduction in number of SOV days driven in the past 5 days between people who signed up for a one-to-one (control) and people who were assigned to receive a one-to-one (treatment)

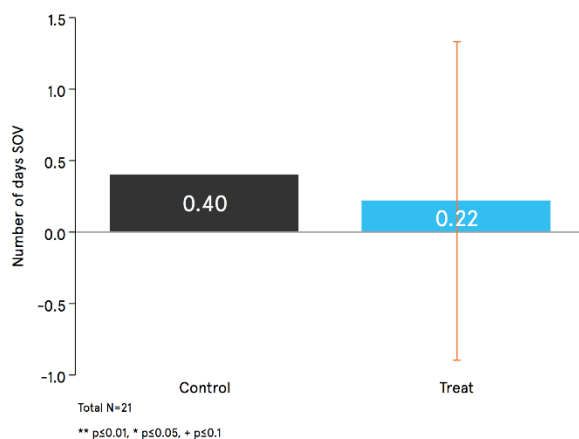
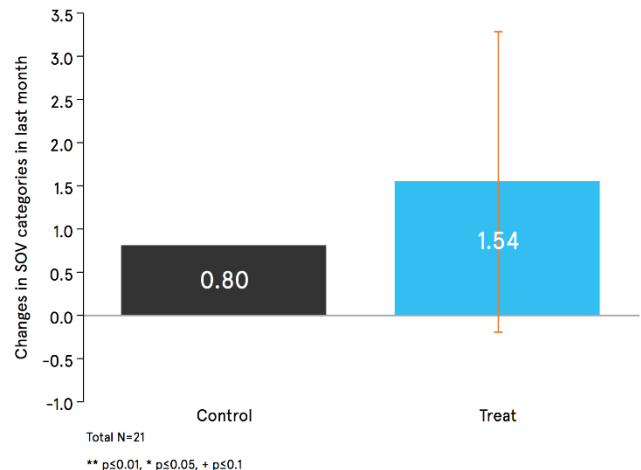


Figure 17: Reduction in frequency of monthly SOV days between people who signed up for a one-to-one (control) and people who were assigned to receive a one-to-one (treatment)



Secondary analysis: The effect of the PCP and one-to-one offers on objective measures

As described above, we sought to conduct a secondary analysis on the effect of the PCP and one-to-one offers on objective, one-off measures. Table 4, below, shows that the PCP offer and the one-to-one offer had no significant effect on increasing car sharing registrations, travelcard purchases, and cycle hub registrations. The measures were collected three months after the trial concluded, in March 2016, at the same time as the second survey was administered.

Table 4: Effect of the PCP and one-to-one on secondary measures

Secondary measures	Control	PCP only	1 to 1
Car sharing registrations	1 (.33%)	6 (.77%)	2 (18%)
Travelcard purchases	0	0	0
Cycle hub registrations	1 (.33%)	6 (.77%)	0
Sample size	305	779	11

Conclusion

We chose to undertake this trial and evaluation in order to test what works and add robust evidence to the literature. The lack of statistically significant results shows that we cannot detect an effect for distributing a PCP or delivering one-to-ones on the number of SOV journeys made to work. Furthermore, the response rates for the one-to-one sessions were low, with only 2.7% of people offered the PCP signing up, and of the 11 people who were assigned to receive a one-to-one, only 7 attended. While a larger sample of one-to-ones may have yielded significant results, it is important to recognise that merely offering one-to-one sessions is unlikely to be an effective intervention to drive large scale behaviour change, given the low rates of take up and engagement.*

While the elements included in our trial: providing information, discounted travel, and implementation intentions (for those who attended the one-to-one), are only some components that fall under the umbrella of PTPs. Therefore, though our findings cannot be generalised to all PTPs, our research indicates that more powerful interventions (less light touch) should be tested. The context of the intervention will also matter and will be highly dependent on factors such as distribution of local employment, facilities, range, accessibility and quality of existing transport network, and recent changes in infrastructure. Therefore, practitioners will need to be selective in how they apply similar interventions and think carefully about why the interventions might work in their area, in addition to thinking carefully about how to target and when to implement such interventions. Furthermore, the results from our trial echo the need for further rigorous evaluations to be conducted for similar programmes in the future.

* A Mann-Whitney U test was performed to ensure there would be sufficient power and the null results still held

Chapter 5. Cycling

From June until October 2015 we collected qualitative data on a 'Try a bike on us' cycling scheme run by Heathrow Commuter Team.

Reasons for a qualitative evaluation of the scheme instead of a trial:

- ◆ Low levels of cycling infrastructure which was exacerbated by construction
- ◆ Small sample size
- ◆ Late addition of e-bikes to the scheme

The main characteristics of participants in the scheme:

- ◆ 89% of participants were male
- ◆ 60% of participants were between the ages of 35-54
- ◆ Over 50% of participants previously commuted by car

Lessons learned from the 21 participants who filled out a post-survey:

- ◆ E-bikes did encourage some people who lived far from Heathrow to cycle or to cycle more often.
- ◆ Those who borrowed regular bikes and filled out the survey were more likely to cycle to work and outside of work during the scheme and were more likely to continue cycling to work after the scheme ended.
- ◆ Those who borrowed regular bikes were also more likely to experience more benefits to cycling than their counterparts who borrowed e-bikes.
- ◆ The discrepancy between the average days cycled for the e-bike and regular bike groups could be indicative of the different types of people each bike attracted, and therefore we recommend exercising caution before drawing conclusions based on the data.

Background

Increasing cycling is a priority for policy makers. To promote cycling, in 2011, Heathrow became the first airport in the UK to offer its employees the government 'cycle to work' scheme and to provide an onsite bike shop. Currently, less than 1% of Heathrow employees cycle to work. Perceptions of risk and the barrier of distance are factors that deter many employees from cycling; in fact, 82% of employees stated that they would never consider cycling to work. Of the 17% who would consider cycling, most would do so if safer routes were provided. Therefore, we felt any behavioural intervention we could introduce would have a limited impact without wider infrastructure changes.

When scoping potential interventions, we learned that the Heathrow Commuter Team was planning to run a 'Try a bike on us' cycling scheme. In order to understand the impact of such a scheme, we carried out research about the type of people it attracted and their perceptions of the scheme.

In this chapter, we will provide reasons for conducting a qualitative evaluation instead of a full behavioural insights trial, qualitative research from the 'Try a bike on us' cycling scheme, and the lessons learned.

Reasons for a qualitative evaluation of the scheme instead a trial

We had initially intended to run a trial to see the effect of monetary versus non-monetary incentives at promoting continued cycling behaviour at the end of the bike-loan period, but there were various reasons why we decided against it. These reasons included:

- ◆ **Cycle lane closures**– throughout our partnership with Heathrow, there was extensive ongoing construction causing the cycle lanes leading to the terminals being closed. Cyclists could still access the terminals by riding on the main roads, but most employees considered this too dangerous. Other cyclists would ride to the perimeter and then take a bus to the terminals from the staff car parks, which reduced the usual time efficiencies gained by cycling instead of driving.
- ◆ **Small sample size** – Before the launch of the scheme, we could not predict the sample size, but given the relatively low interest in cycling at Heathrow, we did not expect a sample size large enough to detect effects from an intervention. Our expectation of a low sample size was also informed by the literature; for example, researchers in the UK recruited non-cycling staff at a university to commute by bike for a two-week period.⁴⁷ The authors had a very difficult time recruiting participants, even after providing loaner bikes, opening the study up to students, and giving participants a chance to win one of the 10 bikes. In total they were only able to recruit 22 cyclists to participate in their study.
- ◆ **Introduction of e-bikes**– a couple of weeks before the scheduled trial, we learned that electronic bikes (e-bikes) would be offered in addition to regular bikes. This further reduced our sample size (since we would have to conduct separate analyses for each bike type), eliminated our ability to provide financial incentives for the purchase of an e-bike (because the Heathrow Cycle Hub does not sell them).

Heathrow's cycle scheme

The 'Try a bike on us' scheme provided Heathrow employees with free e-bikes or standard bikes for two weeks and ran in Summer 2015. As part of this scheme, Heathrow provided participants with free helmets, safety jackets, locks and lights. The scheme began in the middle of June 2015, its launch deliberately coinciding with National Bike Week. Publicity for the scheme largely centred on the partnership with BMW, which provided 25 Cruise e-bikes. Ninety-one people participated in the scheme, with 74 people borrowing e-bikes and 17 borrowing regular bikes. Due to popular demand, the scheme, originally intended to conclude in late August, was extended to October.

Characteristics of cycling scheme participants

The following information was gathered from surveys participants filled out. Pre-cycling surveys were to be administered to each scheme participant at the time of bike collection and post-surveys were sent out one month after the participant returned the bike. We were able to collect the following data: We received data from 57 individuals, 21 of whom filled out the post-survey one month after returning the bike. Of the 21 individuals who filled out the post-survey, 19% borrowed regular bikes and 81% borrowed e-bikes, which is proportionate to the division amongst all of those who participated in the scheme.

Demographics of the participants

The participants who responded were predominantly male (89%). From the graphs below we can see that the scheme predominantly attracted those between 35-54 years of age (Figure 18), those with access to at least one car (Figure 19), and those with morning start times (Figure 20). Only 10% of respondents indicated that cycling was their main mode of commuting to work (Figure 21).

Figure 18: Age of participants (n = 57)

■ 18-24 ■ 25-34 ■ 35-44 ■ 45-54 ■ 55-64

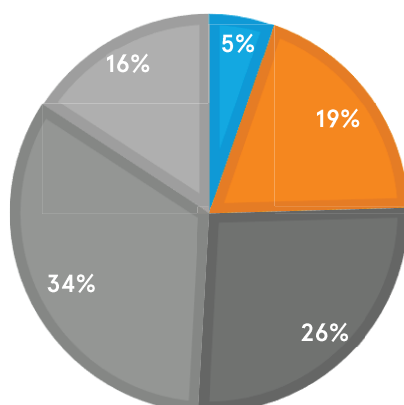


Figure 19: Car access (n = 57)

■ No cars ■ 1 car ■ 2 cars ■ 3 or more cars

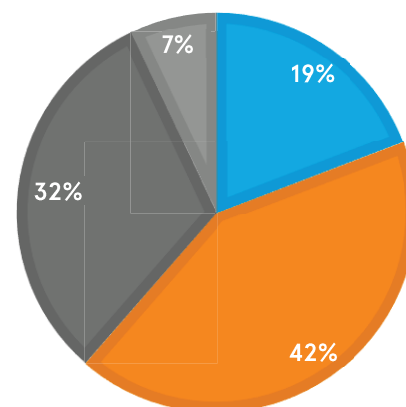


Figure 20: Shift start times

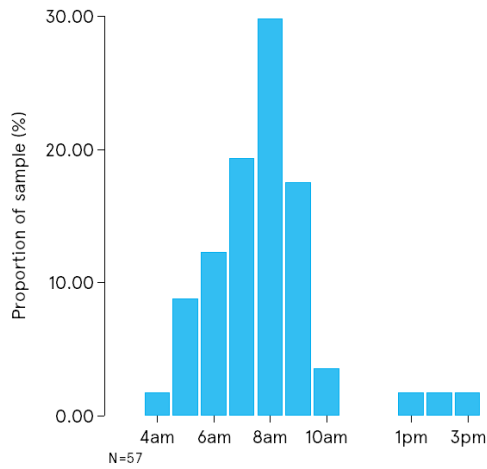
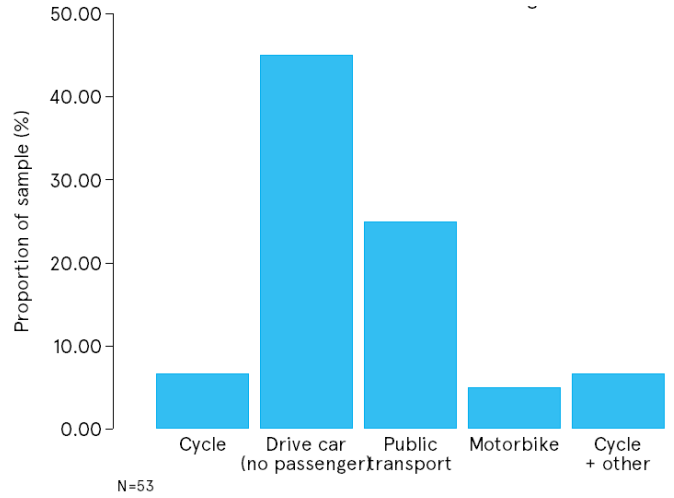
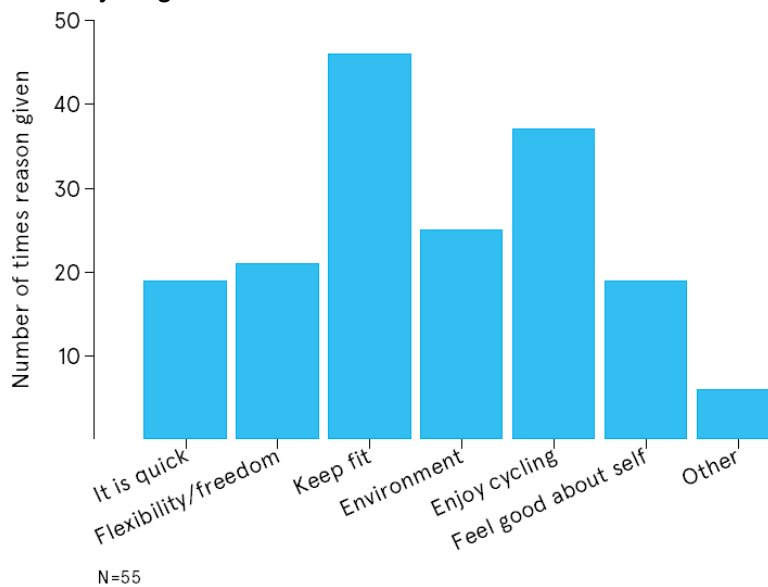


Figure 21: Usual mode of commuting



The majority of the people who participated in this scheme were motivated to cycle to keep fit and because they enjoyed cycling (Figure 22). HCT predicted that a key benefit of cycling, particularly for those who live near Heathrow, is the speed at which it would allow one to get to work (without having to sit in traffic), but as shown below, it ranked relatively low in participants' mind.

Figure 22: Reasons for cycling



Participants' experiences of the cycle scheme

81% of the people who participated in the scheme chose to borrow an e-bike. When asked why they opted for an e-bike:

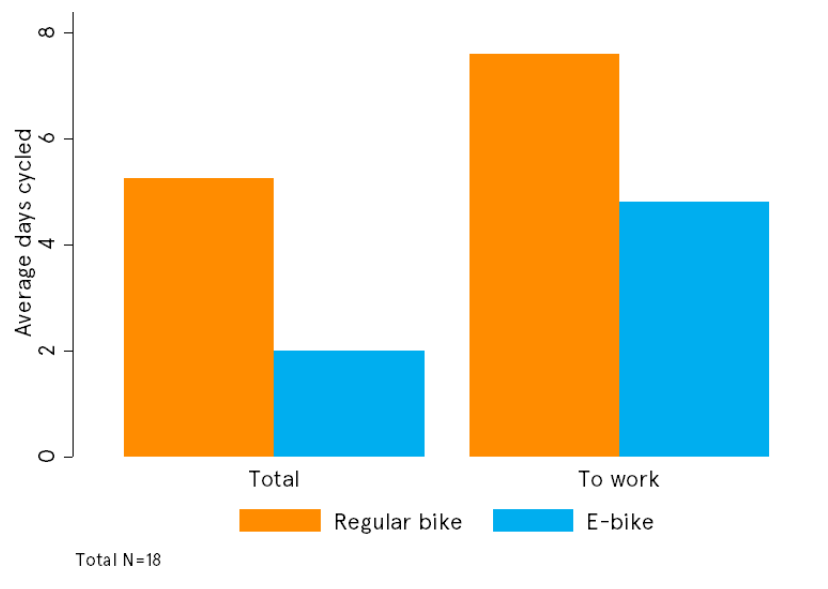
- ◆ Most people had never tried an e-bike and were curious to see what it would be like; and
- ◆ Some thought an e-bike would make them more likely to ride to work.

We can see from Figure 23 that those who borrowed an e-bike cycled to work, on average, only 20% of the time (2 out of 10 potential working days) and used the e-bike, on average, for fewer than

half of the days they had it in their possession. Qualitative research revealed that a number of respondents did not use the e-bike to commute to work because of the construction to get to the terminals and the lack of adequate storage at the terminals. Those who borrowed regular bikes and responded to this question (n=4), on average, used them to commute to work and in total, on average, about 50% of the time they were in possession of the bike.

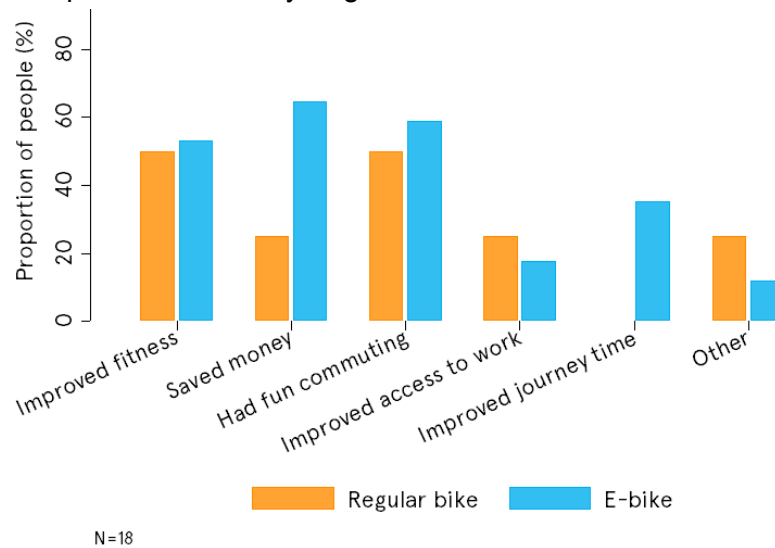
We found that many respondents enjoyed the ride and that the e-bike indeed gave an extra boost, either by making it easier for those who live too far to cycle to work or by enabling those who already cycle to increase the amount they cycle. The discrepancy between the average days cycled for the e-bike and regular bike groups could be indicative of the different types of people each bike attracted, and therefore we recommend exercising caution before drawing conclusions based on the data below (e.g. that regular bikes are more effective at getting people to cycle more).

Figure 23: Average days cycled by bike type



Furthermore, individuals who borrowed regular bikes realised more of the benefits of cycling, such as saving money and having fun while commuting. Only those who rode e-bikes enjoyed the benefits of a faster commute, confirming that in this context, it may not be worthwhile trying to promote cycling to Heathrow on the basis of a faster journey.

Figure 24: Benefits experienced from cycling



Post scheme feedback

Of those who borrowed an e-bike 9 people (53%) stated that they plan to continue cycling to work and 4 people (75%) of those who borrowed a regular bike intend to continue cycling.

The main reasons for not continuing to cycle include:

- ◆ Journey length (takes too long)
- ◆ Construction on the tunnels
- ◆ No shower facilities
- ◆ Perceived danger to commute to Heathrow

The most common feedback in response to the scheme is that participants:

- ◆ Wished the scheme was longer
- ◆ Wanted the scheme to repeat once the tunnels re-open
- ◆ Wanted safe place to keep these expensive bikes near the terminals
- ◆ Wanted an option to buy the e-bikes

Lessons learned

- ◆ When marketing a cycling scheme in this context, it may be better to appeal to people's desires to be fit, save money, and have fun, and focus less on the sustainability or convenience of cycling.

6. Conclusion

Through this collaboration we set out to examine whether low cost interventions, designed using insights from behavioural science, could be effective at promoting sustainable commuting behaviours. From the outset, we expected this to be a challenge, given the deeply personal and emotional attachments people have to the way they travel, the habitual nature of commuting, and the limited success documented in the literature.

We gained valuable insights through the project, particularly on the extent of the divergence between people's attitudes, stated intentions and observed behaviours and on the value of rigorous evaluation that use objective and reliable methods to understand causal mechanisms and diagnose real barriers to behaviour change in designing and targeting interventions. As a result, we have identified areas for further consideration and research. This project should be seen as the first of many opportunities to trial, evaluate, and build evidence.

The unique features of the Heathrow context

Before elaborating on the lessons learned, it is worth highlighting some of the unique features of Heathrow. On one hand, as described in the introduction, Heathrow Airport, the largest single site employer in the UK, provided an opportunity to test a variety of interventions on a large enough scale to detect effects. Furthermore, Heathrow Airport is well connected by train, tube, and bus, providing plenty of public transport alternatives in addition to a well-established car sharing scheme.

However, Heathrow already does a lot of work to increase sustainable travel through its designated commuter team within the sustainable transport team. HCT was set up in 2008 with a remit to help staff across the airport choose more cost effective and environmentally friendly ways to travel to work. Over the past eight years, HCT has worked to educate staff about their commuting options through their website, walk-in centre on the perimeter of the airport, through information posted in staff canteens and meeting rooms, and through road shows in the terminals. HCT helps people sign up to the car sharing scheme, sells some of the discounted travel products employees are entitled to, and provides information about the Cycle Hub.

HCT runs many professional marketing campaigns and events that employ various behavioural insights to encourage sustainable transport, and has therefore potentially achieved many of the 'quick wins'/'low hanging fruit' – that is, the people on the margins who are considering mode shift may have been influenced prior to this trial, due to the successful campaigns executed by the Commuter Team. As a result of HCT's sustained efforts, the challenge was to tackle the more entrenched behaviours. Their campaigns have included leveraging social networks, providing financial incentives, providing free travel options for a limited time, and intervening at timely moments; so although these trials may have shown little or no effect sizes, it is important to recognise that they could have a larger impact in other contexts in which few interventions have been introduced before.

Furthermore, during the 2012 Olympic Games and Paralympic Games, Heathrow had to prepare for unprecedented increase in staff levels due to restricted leave. HCT used a variety of incentives to get just under 2,500 employees across the four busiest staff car parks to suspend their car park

passes for two months during the Games. 4,500 members of staff applied to the Car Park Pass Swap scheme for July and August 2012, but almost half of them were ineligible to participate. There are two main factors that helped make this campaign so effective: commuters were paid, either with fuel cards to car share, or with vouchers for two months of free travel, in exchange for turning in their parking pass. Also the Olympics itself operated as a unifying force and the commuter team was able to appeal to workers' sense of identity as individuals who are proud to be hosting the Olympics in their country. While this approach effectively worked for the two month duration of the Olympic Games, after the Olympics, people went back to normal driving/commuting patterns. This indicates that creating long term sustainable transport behaviour change is a complex and challenging task.

Some of the interventions or behavioural insights underpinning them may be effective in other contexts; there may be value re-running similar interventions in settings where there has not been a concerted effort to shift modes of transport.

The divergence between stated preferences and observed behaviour

This project provided further evidence of the gap between attitudes and observed behaviours and should reaffirm to practitioners that they should not take self-reported opinions, especially those reported to employers, at face value when devising transport interventions. The gap between stated preferences and observed behaviour is a well-documented phenomenon which was reaffirmed by this project the magnitude of difference surprised us.

Despite nearly the majority of drivers expressing that they would car share if they could find someone with a similar shift pattern who lives near them, registration rates for the car sharing scheme were unexpectedly low. It would have been beneficial to have additional qualitative evidence surrounding the results of these trials to help us explain these findings. These findings support the notion that changing perceptions (through the provision of information) may not lead to a change in behaviour, and therefore may not be good value for money.

Therefore, in future trials that attempt to change people's travel behaviour, we recommend spending more time identifying potential barriers through observation, ethnography, and other methods, and placing less emphasis on what people say would encourage them to shift modes.

Sustainable travel programmes seeking to change travel behaviour should ensure that appropriate and robust research and evaluation approaches are used

The studies and their findings reiterate the vital importance of undertaking good quality research and evaluation to inform policy delivery and decisions. We were unable to detect an effect for interventions that have previously been cited as impactful (e.g. free bus use, PCPs) and had used less robust methods. While these findings may be limited to this context, there is merit in running robust evaluations in other contexts. Where possible these studies should use objective indicators of behaviour and not only self-reported measures.

What might work better

Based on these trial results, we think the following types of intervention may work better:

Based on consideration of the trials we ran and the lessons we learned based on the experience of running these trials, we think the following types of intervention may work better:

- ◆ **More intensive or targeted interventions.** For example, car parking charges, interventions that pay people not to drive to work, vanpools or workplace-specific shuttles that effectively act like public transport but instead of traveling along a fixed route provide door-to-door service for a group of employees. More restrictive measures, such as preventing employees from parking a certain number of days each week may also be more likely to be effective.
- ◆ **The timeliness of the interventions.** The literature shows that people are more likely to change their behaviours, including travel behaviour, at key points in time, such as when they change jobs, move house, have a child, retire, or change their household structure (e.g. marriage or divorce).⁴⁸ Sustained travel behaviour changes have also been shown to occur after regular service is disrupted.⁴⁹ These types of interventions, and others, may be more effective when delivered at a time when people are re-evaluating their travel choices and are beginning to form new habits.
- ◆ **Pairing behaviour change with more direct measures such as improvements to infrastructure and services.** The behavioural toolkit is complementary to, rather than a substitute for, the traditional policymaking toolkit of spreading information, providing incentives or disincentives, and regulating. Sometimes, behavioural science in conjunction with more direct measures, can lead to more effective results.

Concluding remarks

The literature in this field shows mixed results and there is much work to be done to understand what works to encourage sustainable travel behaviour at scale. It is important to keep testing innovative ideas and robustly evaluating them in order to achieve gains in this space.

Appendices

Appendix A: Qualitative research methodology

Three researchers from BIT and DfT undertook semi-structured one-to-one interviews over the course of two days to understand Heathrow employees' commuting behaviour. This research used a convenience sampling methodology, taking place inside and outside the landside staff canteens across Terminal 2 and Terminal 3, and in two staff car parks during shift-change hours.

We analysed the qualitative data we collected using a thematic analysis methodology, through an iterative coding process. We transcribed the interviews and generated initial codes for various ideas and concepts found within the interview content. We used Dedoose, a mixed method research software package, for the coding process. We observed meaningful patterns (or "themes") were from these codes, and then reviewed, defined, and named the themes.

Discussion Guide

Recruiting: Hi, my name is [name], a researcher working with Heathrow. Can I ask you a few questions about your commute? It won't take very long, do you mind filling out this short survey followed by a quick conversation?

Hand them the form

Intro: Great, thank you for agreeing to be interviewed today (state date).

Are you ok with me recording this interview so that I can remember what is said?

Start recording

ALL

- 1. Please can you describe your normal commute to and from work? *Ensure to ask about return journey***
 - 2. What do you like about your current commute? Dislike?**
-

IF PRIVATE CAR (SOV):

Why do you normally choose to drive to work by car?

Have you ever taken other modes of transport?

If yes, what were they? Why did you try them? How was it? How long did you try it for? How did it compare to travelling by car?

If not, have you considered taking other modes of transport? (Why or why not?)

Is there anything that would make you consider car sharing?

Is there anything that has prevented you from car sharing?

Are you aware of the Heathrow Car Share scheme? Have you signed up? (If yes, ask why they haven't started car sharing)

If you knew of someone nearby who had the same shift pattern as you, would you consider car sharing?

Is there anything that would make you consider taking public transport?

Is there anything that has prevented you from using public transport?

(If applicable): Do you know where your nearest public transport link is?

Are you aware that Heathrow offers public transport discounts?

Is there anything that would make you consider cycling to work?

Is there anything that has prevented you from cycling to work?

I would now like to ask you some questions about the cost of your commute:

Could you estimate the cost of your normal commute (per day? Month? Year?)?

Could you estimate how much you think it would cost you to take public transport?

Could you estimate how much you think it would cost if you were car sharing?

End

Finally, thinking about which organisation you most closely identify yourself with, would you say you identify most with Heathrow Airport, your Terminal, your employer, or others?

Thank you for taking the time to speak with me today. Would you mind being contacted to have a follow-up conversation? If so, what is your number and when is the best time to call?

IF PUBLIC TRANSPORT

Why do you travel to work by public transport?

Have you switched from another mode of transport? If yes, what made you switch?

Would you recommend it to others?

Can you think of anything that would improve your journey on public transport?

Are you aware of other Heathrow commuter public transport discounts? Are you currently using any of them?

End

Finally, thinking about which organisation you most closely identify yourself with, would you say you identify most with Heathrow Airport, your Terminal, your employer, or others?

Thank you for taking the time to speak with me today. Would you mind being contacted to have a follow-up conversation? If so, what is your number and when is the best time to call?

IF CYCLING:

Why do you travel to work by bike?

Can you think anything that would improve your cycling journey to work?

Would you recommend it to friends?

End

Finally, thinking about which organisation you most closely identify yourself with, would you say you identify most with Heathrow Airport, your Terminal, your employer, or others?

Thank you for taking the time to speak with me today. Would you mind being contacted to have a follow-up conversation? If so, what is your number and when is the best time to call?

IF CARSHARING:

Why do you choose to travel to work by car sharing?

How did you find someone to car share with? (work colleague, friend, family, Heathrow scheme)?

Have you switched from another mode of transport? If yes, what made you switch?

Is there anything that would make it better?

Would you recommend it to friends?

How much does it cost you?

How much would it cost you to take public transport?

End

Finally, thinking about which organisation you most closely identify yourself with, would you say you identify most with Heathrow Airport, your Terminal, your employer, or others?

Thank you for taking the time to speak with me today. Would you mind being contacted to have a follow-up conversation? If so, what is your number and when is the best time to call?

Appendix B: Car sharing

Appendix B1: Letters

Standard

Heathrow Commuter

Helping you make better travel choices

Date: 25/02/15

Name of recipient
first line of address
second line of address
county
postcode

Dear FIRST NAME



As an airport colleague, you can join the **Heathrow carshare scheme**. You will benefit from **priority parking** in car parks or next to your building and have access to the **free emergency ride home facility**.

You are only four easy steps away from car sharing:

Register



Register by filling out a short form at lfts.co/hthrow

Search



Search for others to car share with in your area making similar journeys on the same shift patterns as you.

Make contact



Send a message to other car sharers to see if they want to share a journey. If they do then you can create a budi team.

Your priority pass



Your car share priority pass will be sent to you within seven working days of you creating a budi team.

Get to work through **car sharing** and you could save **£500* a year**.

You are one of over 76,000 people who commute to Heathrow and could share your journey with other airport colleagues. To find other car sharers register by going to lfts.co/hthrow

Feel free to contact the Heathrow Commuter Team with any questions you may have on 020 8745 2766 or by emailing carshare@heathrow.com

Yours Sincerely
Heathrow Commuter Team

*This figure has been based on a commute of a 10 mile round trip.

Heathrow Commuter, Heathrow Academy, Newall Road, Hounslow, Middlesex, TW6 2AP

Heathrow
Making every journey better

Call to Action

Heathrow Commuter

Helping you make better travel choices

Date: 25/02/15

Name of recipient
first line of address
second line of address
county
postcode

Dear FIRST NAME

As an airport colleague, you can join the **Heathrow carshare scheme**. You will benefit from **priority parking** in car parks or next to your building and have access to the **free emergency ride home facility**.



Register to the **Heathrow carshare scheme** by going to lfts.co/cshare

You are only four easy steps away from car sharing:

Register 	Search 	Make contact 	Your priority pass P 
Register by filling out a short form at lfts.co/cshare	Search for others to car share with in your area making similar journeys on the same shift patterns as you.	Send a message to other car sharers to see if they want to share a journey. If they do then you can create a budi team.	Your car share priority pass will be sent to you within seven working days of you creating a budi team.

Get to work through **car sharing** and you could save **£500* a year**.

You are one of over 76,000 people who commute to Heathrow and could share your journey with other airport colleagues. To find other car sharers register by going to lfts.co/cshare

Feel free to contact the Heathrow Commuter Team with any questions you may have on 020 8745 2766 or by emailing carshare@heathrow.com

Yours Sincerely
Heathrow Commuter Team

*This figure has been based on a commute of a 10 mile round trip.

Heathrow Commuter, Heathrow Academy, Newall Road, Hounslow, Middlesex, TW6 2AP



Testimonial

Heathrow Commuter

Helping you make better travel choices

Date: 25/02/15

Name of recipient
first line of address
second line of address
county
postcode

Dear FIRST NAME

As an airport colleague, you can join the **Heathrow carshare scheme**. You will benefit from **priority parking** in car parks or next to your building and have access to the **free emergency ride home facility**.



Rachael,

Heathrow Airport Limited

"I currently car share everyday and save over £200 a month, depending on how many share – it's a shame we can't squeeze more people in the car!"



Satbir, Gate Gourmet:

"I was surprised to find so many staff making the same journey as me and at the same shift times."

You are only four easy steps away from car sharing:

Register



Register by filling out a short form at lfts.co/hshare

Search



Search for others to car share with in your area making similar journeys on the same shift patterns as you.

Make contact



Send a message to other car sharers to see if they want to share a journey. If they do then you can create a budi team.

Your priority pass



Your car share priority pass will be sent to you within seven working days of you creating a budi team.

Get to work through **car sharing** and you could save **£500* a year**.

You are one of over 76,000 people who commute to Heathrow and could share your journey with other airport colleagues. To find other car sharers register by going to lfts.co/hshare

Feel free to contact the Heathrow Commuter Team with any questions you may have on [020 8745 2766](tel:02087452766) or by emailing carshare@heathrow.com

Yours Sincerely

Heathrow Commuter Team

*This figure has been based on a commute of a 10 mile round trip.

Heathrow Commuter, Heathrow Academy, Newall Road, Hounslow, Middlesex, TW6 2AP

Heathrow
Making every journey better

Appendix B2: Sample eligibility criteria

The sample are employees who work at Heathrow and who have Heathrow security passes. Employees were identified using Heathrow's MAIDE data set, which has a list of over 80,000 entries which include the names, addresses, and company names for people who have these passes. It should be noted that not all Heathrow employees have Heathrow security passes and if an employee has a land-side and an air-side pass, that employee would be listed twice in the data set. When an employee moves house, the information in the data set is not necessarily updated.

In order to create the final list of individuals who will receive the mailing several steps were taken to clean the MAIDE data set. The data set was cleaned and all duplicated entries and entries with missing addresses were removed. The list below shows all of the exclusion criteria:

- ◆ **Active car sharers** - Employees who were registered in car sharing BUDI groups already
- ◆ **Travelcard holders** – Employees who have travelcards (active users or pending users waiting approval from Heathrow) because we did not want to shift them away from public transport to car sharing.
- ◆ **Employees with Foreign Addresses** - Entries whose addresses are not in Great Britain
- ◆ **Heathrow Addresses and Embassy Addresses** - Since the letters are intended to go to employees' homes, all addresses that were embassies or based in Heathrow
- ◆ **Multiple Employee Households** - Where there were two or more employees residing at the same address, all but one employee at that location were excluded from the trial
- ◆ **Employees living in Central London** – Central London addresses (postcodes beginning with WC and EC) because public transport is easily accessible to them
- ◆ **Employees living in Reading, Woking, and Slough** – These addresses were excluded because there are bus/coach services from those locations and we will be contacting those employees in a subsequent trial (TP 2015006).

Appendix B3: Power calculations (letters)

The purpose of this section is to outline the various considerations that should be met in determining an appropriate sample size to comprehensively evaluate the effectiveness of this trial. Power calculations are a statistical technique which estimate the appropriate sample size needed to detect a significant difference between the control and treatment conditions. Specifically this looks at the relationship between the effect size, sample size, significance level and statistical power.

Below we set out some assumptions which shape the calculations. These assumptions are put forward in order to determine whether our hypothesis, that the intervention arms will increase the proportion of individuals registered with the car share scheme as compared to the control group, is satisfied. As we expand on in the next section, we use baseline measures of current car share registration among Heathrow staff to approximate a minimum detectable effect size.

- ◆ **Sample size.** Number of observations=49,438 (the total sample (N=54,931) was reduced by 10% to account for anticipated unusable contact data, given that the pre-cleaned data set included 10% more employees than actually work at Heathrow; since letter bounce backs will be measured to a certain extent, we will be able to account for some of the people who did not receive the letter).
- ◆ **Number of trial arms.** The number of arms will be four, representing the control arm along with the three treatment conditions. With 5,000 letters per treatment arm.
- ◆ **Clustering.** There is no clustering.
- ◆ **Baseline proportion (minimum detectable effect size).** Based on data from Heathrow car share registrations, we see a baseline proportion of 10.5% of staff members registered with the service. This figure describes registered users over the life time of the car share scheme at Heathrow. For the purposes of estimating a predicted effect size, we conservatively reduce this to 5%. This is based on an assumption that those that are not yet registered with the service will be more difficult to engage. This conservative estimate also takes account of the fact that there will be no advertisement campaign running by Heathrow on increasing car sharing during the trial's implementation and that the original baseline figure was based over the life time of the car share scheme at Heathrow.
- ◆ **Hypotheses:**
 - Null hypothesis= there is no difference between the groups in whether they register on the car share website.
 - Alternative hypothesis=there is a significant difference between the groups related to the minimum detectable effect size.
- ◆ **Significance level.** This refers to the probability of incorrectly rejecting the null hypothesis. It is standard practice to set this value at 0.05 (two-tail).
- ◆ **Power.** This refers to the probability of correctly detecting an effect and thus accepting the alternative hypothesis when it is true. It is standard practice to set this value you at 0.80 or above. The table below outlines the range of statistical power values based on varying sample sizes of the treatment arms.

N per arm (min)	Effect size	Sig. level	Power
5000	5%	0.05	0.911

This calculation was run through R, a free and open source resource which is used for statistical tests. The code can be found below:

```
test <- pwr.2p2n.test(n1=5000, n2=35000, h=0.05, sig.level = .05, power = , alternative = "two.sided")
```

test\$power

Appendix B4: Regression tables (letters)

This is the regression analysis for the effects of the car sharing intervention letters. In the first column of table 1 we estimate a simple regression model*;

$$C_i = \alpha + \beta_1 T_i + u_i$$

Where C_i is a binary variable set to 1 if a participant i registers to the car sharing website or 0 else. T_i is our treatment variable which indicates which treatment the individual received. Dummy variables were created (a binary variable was created for each of the three treatments, set to 1 if a participant i received that particular treatment or 0 else.), u_i is an i.i.d. error term. In column 2 we estimate the effect on treatments on registrations prior to treatment being received, which functions as a balance check. That none of our interventions were significant by this measure is encouraging.

	(1) Registration	(2) Prior to treatment
Standard	0.0023*** (0.0005)	0.00002 (0.0004)
Call to Action	0.0009* (0.0005)	0.00022 (0.0004)
Testimonial	0.0019*** (0.0005)	0.00002 (0.0004)
Control	0.0005** (0.0002)	0.00078*** (0.0001)
<i>N</i>	54931	54931

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Using the model specified above, we ran a regression to see the effect of treatment on BUDI registration. Below we include the regression table:

	(1) BUDI
Standard	-0.228571 (0.136092)
Call to Action	(0.171511) -0.216667
Testimonial	-0.216667 (0.142607)
Control	0.300000** (0.087329)
<i>N</i>	53

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

* Note that we have selected an OLS model here rather than an alternative (logistic, probit), due to the structure of our data (binary variables on LHS and RHS) preventing problems arising from OLS's unrestricted range, and OLS being easier to interpret.

Using the same regression model specified above, we regressed the number of website hits on treatment type to see which letter drove the most people to go to the website.

	(1)
	Click Through
Call to Action	0.0036* (0.0019)
Testimonial	-0.0006 (0.0019)
Standard	0.0078*** (0.0013)
<i>N</i>	15000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Using the same regression model specified above, we regressed the conversions (the number of registrations per website visit) on treatment type to see how effective each letter was at getting people to register to the car sharing scheme, conditional on visiting the website.

	(1)
	Click Through
Call to Action	-0.2661** (0.0899)
Testimonial	-0.0812 (0.0976)
Standard	0.3889*** (0.0704)
<i>N</i>	132

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix B5: Sample emails

Control Email

Hi FIRSTNAME,

We noticed that you are not yet part of an active BUDi team on the Heathrow Carshare scheme.

It couldn't be easier to find someone to share with. Just click the button below to access the great benefits of sharing – saving money, priority parking and access to a ride home in the event of an emergency.

BUTTON

If you need any help or have any questions, please call us on 0207 745 2766 between Monday and Friday 09.00 – 15.00 hrs.

If you're not car sharing yet, what are you waiting for?

Heathrow Commuter Team

Matching Email

Hi FIRSTNAME,

We noticed that you are not yet part of an active BUDi team on Heathrow Carshare scheme.

It couldn't be easier to find someone to share with. It looks like your journey has X matches, so why not take a look and see if there's someone you could share with?

- PERSON A travelling from PLACE to Heathrow
- PERSON B travelling from PLACE to Heathrow

Just click the button below to view your matches and access the great benefits of sharing – saving money, priority parking and access to a ride home in the event of an emergency.

BUTTON

If you need any help or have any questions, please call us on 0207 745 2766 between Monday and Friday 09.00 – 15.00 hrs.

If you're not car sharing yet, what are you waiting for?

Heathrow Commuter Team

Matching & Opportunity Cost Email

Hi FIRSTNAME,

We noticed that you are not yet part of an active BUDi team on Heathrow Carshare scheme.

If you're driving to work on your own, you spend about £2, 127* per annum on fuel. By car sharing and splitting the cost, you could have £1, 063 per annum to spend on something else.

It couldn't be easier to find someone to share with. It looks like your journey has X matches, so why not take a look and see if there's someone you could share with?

- PERSON A travelling from PLACE to Heathrow
- PERSON B travelling from PLACE to Heathrow

Just click the button below to view your matches and access the great benefits of sharing – saving money, priority parking and access to a ride home in the event of an emergency.

BUTTON

If you need any help or have any questions, please call us on 0207 745 2766 between Monday and Friday 09.00 – 15.00 hrs.

If you're not car sharing yet, what are you waiting for?

Heathrow Commuter Team

*This is the cost for the average registered car sharing member, who lives 10 miles based on a 2 way trip from Heathrow. To see how much you'd save visit

<http://www.heathrowairport.com/calculator>

Appendix B6: Power calculations (emails)

N per arm	Number of arms	MDES	Power
300, 300, 314	3	11.21% (11.34%)	80%

The figures in the above table states that based on our calculations and sample size (with two), the trial will have an 80% chance of accurately detecting an effect where there is an increase of 11.21% (MDES) in one group over the other. The code can be found below:

```
library(pwr)
p1<-0.5
h <- pwr.2p2n.test(n1=300, n2=314, h=, sig.level = .05, power = 0.8, alternative = "two.sided") #
Standard test of proportions using the new 'n'
abs(p1 - (sin(asin(sqrt(p1))-(h$h/2)))^2) # Calculate the outcome proportion under the proposed
MDES
```

Appendix B7: Regression tables (emails)

Using the same regression model specified in Appendix A3, we regressed the number of clicks on the email condition and found no significant effects.

	(1) click
email2	0.0532 (0.81)
email3	-0.0195 (-0.30)
Constant	0.305*** (6.39)
Observations	320

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix C: Public Transport

Appendix C1: Sample Letters

Control Slough (front)

Heathrow Commuter

Helping you make better travel choices

Date: 25/02/15

Name of recipient
first line of address
second line of address
county
postcode

Dear FIRST NAME

Commute for **£1*** a day
if you buy our Travelcard



We have negotiated a huge discount for you on bus travel to the airport.
This now means you can travel to and from work for only **£25** per month!

The Heathrow Travelcard is valid on
the following bus routes in your area:

60 61 71 75 76 77 78

These buses are frequent and can even get you into work for the **4am** early shift.

It's a great deal at just £25 per month, give the bus a go!

Don't forget to look at the Heathrow Travelcard £25 product network map overleaf.

To register and purchase your Travelcard
visit heathrow.com/travelcard

Kind Regards
Heathrow Commuter Team

Heathrow Commuter, Heathrow Academy, Newall Road, Hounslow, Middlesex, TW6 2AP

*Based on a £1 return journey on a £25 monthly Travelcard over 25 working days.

Heathrow
Making every journey better

Control Slough (back)

How to register for your Heathrow Travelcard

- 1 Create your account**
Online
Register your details and upload your passport style photograph at heathrow.com/travelcard
Or
In person
Come into the Heathrow Commuter office so we can create your account by bringing in your airport ID*



- 2 Get security approval**
Once we receive all the security approvals we will then approve your account.
Online
Email us a scan / photocopy of both sides of your Airport ID*.
Or
In person
Bring your Airport ID* to your appointment for security approval.

Your Travelcard will then be approved

- 3 Buy your travelcard product**
Online
Log on to your Heathrow Travelcard account and begin purchasing.
Or
In person
Call us and purchase over the phone or visit us and purchase in person.

Your Travelcard products

Monthly	Annual
£25	£250

Travelcard products are available to collect from our office at the **Heathrow Academy** from **12:00 the next working day** after purchase. Alternatively they can be posted to your registered address via Royal Mail First Class, which can take up to seven days to arrive.

*If you do not have an airport ID you will need to show a copy of your company ID with a supporting letter from your employer confirming your employment at Heathrow.



Heathrow
Making every journey better

Control Reading (front)

Heathrow Commuter

Helping you make better travel choices

Date: 25/02/15

Name of recipient
first line of address
second line of address
county
postcode

Dear FIRST NAME



Commute for **£3.60*** a day if you buy our Travelcard

We have negotiated a huge discount for you on coach travel to the airport.
This now means you can travel to and from work for only **£90** per month!

1

The Reading RailAir is the dedicated non-stop luxury service that links Reading station with Heathrow.

2

The coach runs every 25 minutes and the journey takes approximately 45 minutes.

3

The service now drops off at the Compass Centre using the bus stop on Nelson Road as well as its usual stops at Terminal 5 and the Central Terminal Area.

These coaches are frequent and can even get you into work for **5am**.

It's a great deal at just £90 per month, give the coach a go!

Don't forget to look at the Heathrow Travelcard Reading RailAir product network overleaf.

To register and purchase your Travelcard visit heathrow.com/travelcard

Kind Regards
Heathrow Commuter Team

Heathrow Commuter, Heathrow Academy, Newall Road, Hounslow, Middlesex, TW6 2AP

*Based on a £3.60 return journey on a monthly Travelcard over 25 working days.

Heathrow
Making every journey better

Control Reading (back)

How to register for your Heathrow Travelcard

1 Create your account

Online

Register your details and upload your passport style photograph at heathrow.com/travelcard

Or

In person

Come into the Heathrow Commuter office so we can create your account by bringing in your airport ID*

2 Get security approval

Once we receive all the security approvals we will then approve your account.

Online

Email us a scan / photocopy of both sides of your Airport ID*.

Or

In person

Bring your Airport ID* to your appointment for security approval.

Your Travelcard will then be approved

3 Buy your Travelcard product

Online

Log on to your Heathrow Travelcard account and begin purchasing.

Or

In person

Call us and purchase over the phone or visit us and purchase in person.



Your Travelcard products

Monthly	Annual
£90	£900
£100*	£1000*

*Also valid on local Reading buses

Travelcard products are available to collect from our office at the **Heathrow Academy from 12:00 the next working day** after purchase. Alternatively they can be posted to your registered address via Royal Mail First Class, which can take up to seven days to arrive.

*If you do not have an airport ID you will need to show a copy of your company ID with a supporting letter from your employer confirming your employment at Heathrow.

Heathrow Travelcard Reading RailAir product network



Heathrow
Making every journey better

Free Trial Slough (front)

Heathrow Commuter

Helping you make better travel choices

Date: 25/02/15

Name of recipient
first line of address
second line of address
county
postcode

Dear FIRST NAME

Try the bus, free on us

We think the bus is a cheap and convenient way for you to commute to work. To help you make up your mind, we would like to give you seven days of free travel.

When you board the bus, simply tear off and present the relevant voucher to the driver in exchange for a free return ticket for that day.

Commute for **£1* a day** if you buy our Travelcard

We have negotiated a huge discount for you on bus travel to the airport. This now means you can travel to and from work for only **£25** per month!

The Heathrow Travelcard is valid on the following bus routes in your area:

60 61 71 75 76 77 78

These buses are frequent and can even get you into work for the **4am** early shift.

It's a great deal at just £25 per month, give the bus a go!

Don't forget to look at the Heathrow Travelcard £25 product network map overleaf.

To register and purchase your Travelcard visit heathrow.com/travelcard

Kind Regards

Heathrow Commuter Team

Heathrow Commuter, Heathrow Academy, Newall Road, Hounslow, Middlesex, TW6 2AP
*Based on a £1 return journey on a £25 monthly Travelcard over 25 working days.

Heathrow
Making every journey better



Monday Your free return journey Exchange this voucher for a return journey ticket. Only valid: Monday 20 April 2015	 	FREE
Tuesday Your free return journey Exchange this voucher for a return journey ticket. Only valid: Tuesday 21 April 2015	 	FREE
Wednesday Your free return journey Exchange this voucher for a return journey ticket. Only valid: Wednesday 22 April 2015	 	FREE
Thursday Your free return journey Exchange this voucher for a return journey ticket. Only valid: Thursday 23 April 2015	 	FREE
Friday Your free return journey Exchange this voucher for a return journey ticket. Only valid: Friday 24 April 2015	 	FREE
Saturday Your free return journey Exchange this voucher for a return journey ticket. Only valid: Saturday 25 April 2015	 	FREE
Sunday Your free return journey Exchange this voucher for a return journey ticket. Only valid: Sunday 26 April 2015	 	FREE

Free Trial Slough (back)

Terms and conditions

Valid on day of travel printed on front of the voucher.
This voucher cannot be exchanged or transferred.
This voucher has no monetary value.
Terms of carriage of the operator apply.
Only valid on First Group Services.

Terms and conditions

Valid on day of travel printed on front of the voucher.
This voucher cannot be exchanged or transferred.
This voucher has no monetary value.
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Only valid on First Group Services.

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How to register for your Heathrow Travelcard

1 Create your account

Online

Register your details and upload your passport style photograph at heathrow.com/travelcard

Or

In person

Come into the Heathrow Commuter office so we can create your account by bringing in your airport ID*

2 Get security approval

Once we receive all the security approvals we will then approve your account.

Online

Email us a scan / photocopy of both sides of your Airport ID*.

Or

In person

Bring your Airport ID* to your appointment for security approval.

Your Travelcard will then be approved 

3 Buy your Travelcard product

Online

Log on to your Heathrow Travelcard account and begin purchasing.

Or

In person

Call us and purchase over the phone or visit us and purchase in person.

Travelcard products are available to collect from our office at the **Heathrow Academy from 12:00 the next working day** after purchase. Alternatively they can be posted to your registered address via Royal Mail First Class, which can take up to seven days to arrive.

*If you do not have an airport ID you will need to show a copy of your company ID with a supporting letter from your employer confirming your employment at Heathrow.

Heathrow Commuter, Heathrow Academy, Newall Road, Hounslow, Middlesex, TW6 2AP



Your Travelcard products

Monthly	Annual
£25	£250



Heathrow
Making every journey better

Free Trial Reading (front)

Heathrow Commuter

Helping you make better travel choices

Date: 25/02/15

Name of recipient
 first line of address
 second line of address
 county
 postcode

Dear FIRST NAME



Try the coach, free on us

We think the coach is a cheap and convenient way for you to commute to work. To help you make up your mind, we would like to give you seven days of free travel.

When you board the coach, simply tear off and present the relevant voucher to the driver in exchange for a free return ticket for that day.

Commute for **£3.60* a day** if you buy our Travelcard

We have negotiated a huge discount for you on coach travel to the airport. This now means you can travel to and from work for only **£90** per month!

- 1** The Reading RailAir is the dedicated non-stop luxury service that links Reading station with Heathrow.
- 2** The coach runs every 25 minutes and the journey takes approximately 45 minutes.
- 3** The service now drops off at the Compass Centre using the bus stop on Nelson Road as well as its usual stops at Terminal 5 and the Central Terminal Area.

These coaches are frequent and can even get you into work for **5am**.
 It's a great deal at just **£90** per month, give the coach a go!

Don't forget to look at the Heathrow Travelcard Reading RailAir product network overleaf.
 To register and purchase your Travelcard visit heathrow.com/travelcard

Kind Regards
Heathrow Commuter Team

Heathrow Commuter, Heathrow Academy, Newall Road, Hounslow, Middlesex, TW6 2AP
 Based on a £3.60 return journey on a monthly £90 Travelcard over 25 working days.



<p>Monday</p> <p>Your free return journey</p> <p>Exchange this voucher for a return journey ticket. Only valid on: Monday 20 April 2015</p>		<p>FREE</p> <p>XXXXXX</p>
<p>Tuesday</p> <p>Your free return journey</p> <p>Exchange this voucher for a return journey ticket. Only valid on: Tuesday 21 April 2015</p>		<p>FREE</p> <p>XXXXXX</p>
<p>Wednesday</p> <p>Your free return journey</p> <p>Exchange this voucher for a return journey ticket. Only valid on: Wednesday 22 April 2015</p>		<p>FREE</p> <p>XXXXXX</p>
<p>Thursday</p> <p>Your free return journey</p> <p>Exchange this voucher for a return journey ticket. Only valid on: Thursday 23 April 2015</p>		<p>FREE</p> <p>XXXXXX</p>
<p>Friday</p> <p>Your free return journey</p> <p>Exchange this voucher for a return journey ticket. Only valid on: Friday 24 April 2015</p>		<p>FREE</p> <p>XXXXXX</p>
<p>Saturday</p> <p>Your free return journey</p> <p>Exchange this voucher for a return journey ticket. Only valid on: Saturday 25 April 2015</p>		<p>FREE</p> <p>XXXXXX</p>
<p>Sunday</p> <p>Your free return journey</p> <p>Exchange this voucher for a return journey ticket. Only valid on: Sunday 26 April 2015</p>		<p>FREE</p> <p>XXXXXX</p>

Free Trial Reading (back)

Terms and conditions

Valid only on day of travel printed on front of the voucher.
This voucher cannot be exchanged or transferred.
This voucher has no monetary value.
Terms of carriage of the operator apply.
Only valid on RailAir Services.

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How to register for your Heathrow Travelcard

1 Create your account

Online

Register your details and upload your passport style photograph at heathrow.com/travelcard

Or

In person

Come into the Heathrow Commuter office so we can create your account by bringing in your airport ID*

2 Get security approval

Once we receive all the security approvals we will then approve your account.

Online

Email us a scan / photocopy of both sides of your Airport ID*.

Or

In person

Bring your Airport ID* to your appointment for security approval.

Your Travelcard will then be approved

3 Buy your Travelcard product

Online

Log on to your Heathrow Travelcard account and begin purchasing.

Or

In person

Call us and purchase over the phone or visit us and purchase in person.



Your Travelcard products

Monthly	Annual
£90	£900
£100*	£1,000*

*Also valid on local Reading buses

Travelcard products are available to collect from our office at the **Heathrow Academy from 12:00 the next working day** after purchase. Alternatively they can be posted to your registered address via Royal Mail First Class, which can take up to seven days to arrive.

Heathrow Travelcard Reading RailAir product network



*If you do not have an airport ID you will need to show a copy of your company ID with a supporting letter from your employer confirming your employment at Heathrow.

Heathrow Commuter, Heathrow Academy, Newall Road, Hounslow, Middlesex, TW6 2AP

Heathrow
Making every journey better

Loss Aversion Follow-Up Slough (front only – back is the same as Control Slough back)

Heathrow Commuter

Helping you make better travel choices

Date: 25/02/15

Name of recipient
first line of address
second line of address
county
postcode

Dear FIRST NAME



You missed out on £30 worth of travel by not taking the bus free on us.

Not only did you miss out on the benefits of cheaper travel, but each day you drive to work you continue to lose money.

Don't worry, you can start saving by purchasing a discounted Travelcard today and join the thousands of Heathrow employees who are already enjoying the benefits. Don't forget to look at the Heathrow Travelcard £25 product network map overleaf.

To register and purchase your Travelcard visit heathrow.com/travelcard

Kind Regards
Heathrow Commuter Team

Heathrow Commuter, Heathrow Academy, Newall Road, Hounslow, Middlesex, TW6 2AP
*A return daily ticket to Slough can cost up to £6.

Heathrow
Making every journey better

Loss Averion Follow-Up Reading (front only – back is the same as Control Reading back)

Heathrow Commuter

Helping you make better travel choices

Date: 25/02/15

Name of recipient
first line of address
second line of address
county
postcode

Dear FIRST NAME



You missed out on £86 worth of travel by not taking the coach free on us.

Not only did you miss out on the benefits of cheaper travel, but each day you drive to work you continue to lose money.

Don't worry, you can start saving by purchasing a discounted Travelcard today and join the thousands of Heathrow employees who are already enjoying the benefits. Don't forget to look at the Heathrow Travelcard Reading RailAir product network overleaf.

To register and purchase your Travelcard visit heathrow.com/travelcard

Kind Regards
Heathrow Commuter Team

Heathrow Commuter, Heathrow Academy, Newall Road, Hounslow, Middlesex, TW6 2AP

Heathrow
Making every journey better

Appendix C2: Sample eligibility criteria

The sample is drawn from employees who work at Heathrow who have Heathrow security passes. Employees living in Reading and Slough were identified using Heathrow's MAIDE data set, described above. Most of these participants are not eligible for our trial due to where they live, and are therefore excluded. These locations were selected because Heathrow Commuter Team was able to negotiate a deal to run this trial with the First Group operators of the Reading AirRail coach service and the Slough Blue Line bus services.

In households that had more than one Heathrow employee, one employee was randomly selected for inclusion in the trial (and subsequently either randomised into the control or treatment group) and the other employee(s) in the household were dropped from the sample. Current travelcard users were also excluded from the sample.

Based on the above, the final sample eligible for this trial was **7,564** (out of a possible 10,078).

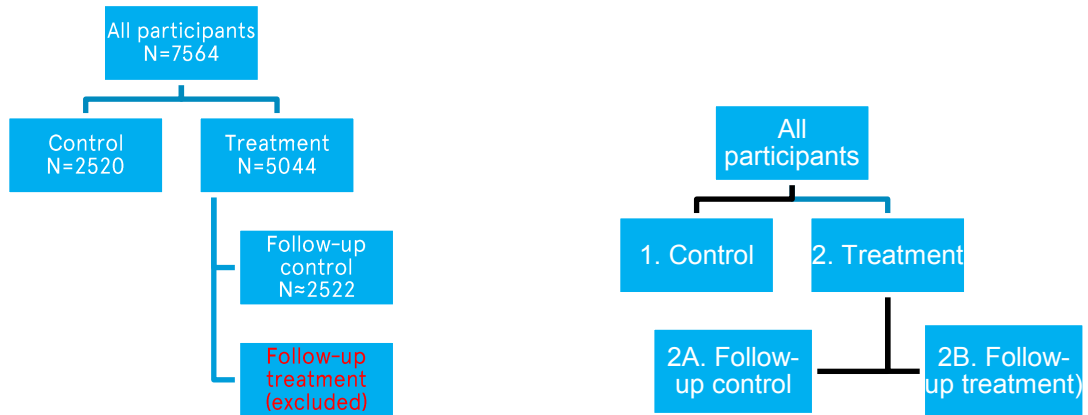
Sample to be included in this analysis

As part of this research on increasing the number of individuals purchasing monthly bus tickets and thus hopefully using more sustainable transport, we ran separate trials which are linked. Participants originated from the same initial sample of individuals, and will receive the same initial intervention of a free trial for one week. Following this intervention, an additional trial, described below, took place among those who did not take up the free trial. Half of the individuals who did not use the free trial were allocated into a follow-up treatment group, while the other half were part of the control group.

For the purposes of analysis, we only consider those that receive one intervention, thereby treating them differently to those that received additional interventions (those who received the intervention in the follow-up studies). In terms of analysis of the treatment group, we plan on restricting this to only the participants who are initially allocated to the treatment condition, or those who are assigned to the treatment condition and subsequently are assigned to the control condition for the follow-up trial.

On the left, figure C2, below, shows that those individuals who receive a follow-up treatment in our second study will be excluded from the free trial analysis as they are likely to behave differently to those that have only received one letter of communication. The expected total sample size for this trial is approximately 7564 (2520 control, 2522 treatment). The illustration on the right provides another visualization of the analysis, for both the free trial and the follow-up trial. The free trial analysis compares Group 1 and Group 2A shown below, and the follow-up analysis compares Group 2A and Group 2B.

Figure C2: Sample analysis strategy



Appendix C3: Power Calculations

Control n	Treatment n	MDES	Power
2268	2269	4.15%	80%

The figures in the above table states that based on our calculations and sample size (n=4537), the trial will have an 80% chance of accurately detecting an effect where there is an increase of 4.15% (MDES) in one group over the other. The power of the test increases (i.e. becomes >80%) where the MDES increases (i.e. becomes >4.15%). The code can be followed below:

```

nPerArm <- 2268
nPerArm2 <-2269
test <- pwr.2p2n.test(n1=nPerArm, n2=nPerArm2, h=, sig.level = .05, power = 0.8, alternative = "two.sided")
treatmentProportion <- (sin(asin(sqrt(baselineProportion)))-(test$h/2))^2
baselineProportion - treatmentProportion
  
```

Appendix C4: Travelcard Information

Travelcards are discounted travel tickets that Heathrow employees are eligible to purchase which significantly reduces the price of travel on certain forms of public transport. For example, a return ticket on the Slough service is £6/day, whereas the discounted travelcard is £25/month (and the regular travelcard for non-Heathrow employees is £86/month). If an individual in Slough intends to take the bus more than four days in a month, it makes sense to buy the travelcard. For the Reading AirRail service, a return ticket is £17/day, whereas the discounted travelcard is £90/month (and the regular travelcard for non-Heathrow employees is £100/month). If an individual in Reading intends to take the bus more than five days in a month, it makes economic sense to buy the travelcard.

Appendix C5: Regression Tables

This analysis examined the effect of receiving a free trial offer on the registration and purchase of travelcards. In total, 4,926 commuters participated in this trial. The data was analysed using an OLS regression as described in trial protocol 2015006.

In the first column of Table 1 we estimate a simple regression model*;

$$C_i = \alpha + \beta_1 T_i + u_i$$

Where C_i is a binary variable set to 1 if a participant i registers to purchase a travelcard or 0 else. T_i is our treatment variable which is set to 1 if the participant received the treatment or 0 else. u_i is an i.i.d. error term. In column 2 we estimate the effect on treatments on purchasing the travelcard.

	(1) Registered for Travelcard	(2) Purchased Travelcard
treat	0.0000794 (0.02)	-0.00132 (-0.40)
Constant	0.0221*** (7.49)	0.0145*** (6.18)
Observations	4924	4924

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Using the same regression model specified above, we analysed the data to see whether receiving a letter exploiting loss aversion made one more likely to register for or purchase a travelcard.

	(1) Registered for Travelcard	(2) Purchased Travelcard
Loss aversion follow-up	-0.00477 (-1.27)	-0.000755 (-0.26)
Control group	0.0193*** (7.23)	0.0107*** (5.12)
Observations	4732	4732

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We examined the effect of using the free trial on registration and purchasing behaviour. Although we cannot make any causal claims based on the results, since the sample that took up the free trial were probably also more likely to get a travelcard in the first place, we wanted to quantify this effect.

	(1) Registered for Travelcard	(2) Purchased Travelcard
Used the free trial	0.802*** (5.98)	0.0673*** (6.29)
Did not use the trial	0.0169*** (8.63)	0.0104*** (6.63)
Observations	4835	4835

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

* We have selected an OLS model here rather than an alternative (logistic, probit), due to the structure of our data (binary variables on LHS and RHS) preventing problems arising from OLS's unrestricted range, and OLS being easier to interpret.

Robustness Check

We ran the regressions above controlling for location and when doing so we found that the coefficient for the treatment effect remained insignificant, therefore affirming the robustness of our analysis.







Appendix D: Personalised Commuting Plan (PCP)

Appendix D1: Sample PCP and Sample Implementation Intention

Sample PCP

The follow is an image of the PCP that was sent as an attachment to an email. The email, not pictured below, is where the participants were invited to sign up for a one-to-one session.

Helping you make better travel choices

ID:27

Heathrow Commuter
 Heathrow Academy
 Newall Road
 Hounslow
 TW6 2AP
 E: commuter@heathrow.com
 W: heathrow.com/commuter
 T: 0208 745 2766


Dear [REDACTED]

Your personalised commuting plan to Heathrow

We have produced a personalised commuting plan for you going from [REDACTED] to **Heathrow Terminal 5, United Kingdom**, arriving by **07:00**

This plan will help show you travel choices that could save you time, money and be more convenient. Heathrow Commuter can help you to refine this plan and to tailor your options to meet your shift patterns and set out what discounts or benefits are available to you.

Results are ranked based on arrival time:

Mode	Depart	Arrive	Duration	Changes
  Car-share <small>Includes 15 mins travel from carpark</small>	4:45 am	5:16 am	31 min	1
 	5:52 am	6:22 am	30 min	0
  	6:06 am	6:46 am	40 min	1
 	6:14 am	6:55 am	41 min	0
 	6:33 am	6:56 am	23 min	0
  Drive alone <small>Includes 15 mins travel from carpark</small>	6:28 am	7:00 am	31 min	1
 	6:22 am	7:00 am	37 min	0

If you need further help, we can arrange to discuss your options either over the telephone or face to face to take you through your travel options and help you make better travel choices.

Many thanks,

Heathrow Commuter

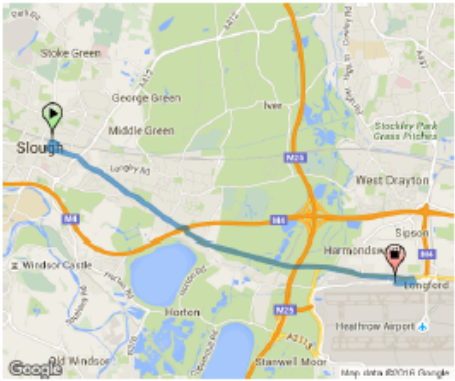
1. Car-sharing: 1 match has been found

If you would like to register your journey or sign in to see more about these options from Heathrow Airport, please visit: www.heathrow.com/carshare





Slough Station, Berkshire - N 4 Car Park, Heathrow Airport

seeking or offering a lift

On: **Mon, Tues, Wed, Thur, Fri, Sat, Sun**
 Leaving at: **04:45 (+/- 15min)**
 Returning journey starts at: **14:15 (+/- 15min)**
 Transfer from car: **15 mins**
 Estimated cost: **£0.85 (+ parking, tolls etc.)**



2. Public Transport: 30 min







 Departs 5:52 am Arrives 6:22 am 30 min	2 mins  Walk to Slough 27 mins  Bus towards Heathrow Airport Terminal 5 (First in Berkshire & The Thames Valley - Heathrow Airport Terminal 5 - Burnham [line: 78]) HTC 1 min  Walk to Heathrow Terminal 5, United Kingdom
--	--

Heathrow Travelcard – Available for part of your journey

Heathrow colleagues can receive a third off selected bus, coach and train routes with a monthly or annual travelcard.

To purchase a travelcard colleagues are required to create an account by registering their details online and upload a digital passport style photograph. Alternatively you can come in and see us at the Commuter office between 09.00 and 15.00 Monday to Friday.





3. Public Transport: 40 min *

 Departs 6:06 am Arrives 6:46 am 40 min	1 mins  Walk to Slough 11 mins  Train towards London Paddington (Great Western Railway - Oxford - London Paddington [line: Great Western Railway]) 1 mins  Walk to West Drayton (Stop F) 14 mins  Bus towards Heathrow Terminal 5 (Transport for London - Heathrow Airport Terminal 5 - Hayes Town [line: 350]) Oyster 2 mins  Walk to Heathrow Terminal 5, United Kingdom
--	--

Oyster card or Contactless Payment

The cheapest way to pay for your travel is by using either an Oyster Card or by making a contactless payment. To purchase an Oyster card go to: www.heathrow.com/staffoyster







4. Public Transport: 41 min

 Departs 6:14 am Arrives 6:55 am 41 min	2 mins  Walk to Slough 20 mins  Bus towards Hounslow Bus Station (Transport for London - Slough Town Centre - Hounslow [line: 81]) Oyster 19 mins  Walk to Heathrow Terminal 5, United Kingdom
--	--

Oyster card or Contactless Payment

The cheapest way to pay for your travel is by using either an Oyster Card or by making a contactless payment. To purchase an Oyster card go to: www.heathrow.com/staffoyster

5. Public Transport: 23 min

  			3 mins	 Walk to XXXXXXXXXX Station (Stop B)
Departs	Arrives	23 min		
6:33 am	6:56 am			
			19 mins	 Bus towards Heathrow Airport Terminal 5 (First in Berkshire & The Thames Valley - Clewer - Heathrow Airport Terminal 5 [line: 77]) HTC
			1 min	 Walk to Heathrow Terminal 5, United Kingdom

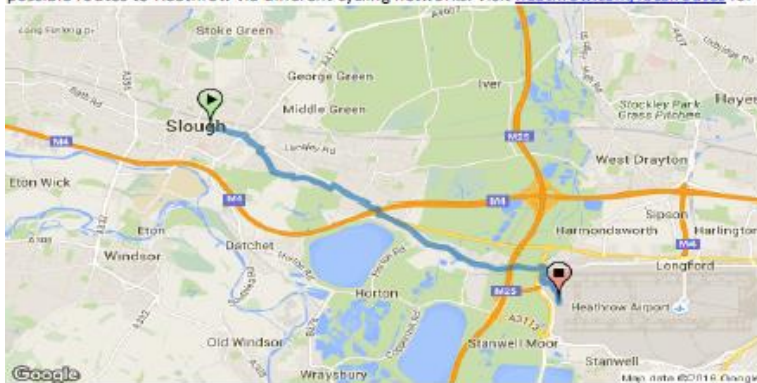
Heathrow Travelcard – Available for part of your journey

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To purchase a travelcard colleagues are required to create an account by registering their details online and upload a digital passport style photograph. Alternatively you can come in and see us at the Commuter office between 09.00 and 15.00 Monday to Friday.

6. Cycling 37 min

Your approximate cycling distance is **6 miles** and will take around **37 min** and burn **121 calories**. The map below shows possible routes to Heathrow via different cycling networks. Visit heathrow.com/localroutes for a detailed map.



Heathrow Cycle Hub

We have a cycle centre for airport employees, the first of its kind anywhere in the UK. Employees can register online to become a member or visit the commuter team and take advantage of the 10% discount off all purchases, free labour during a service with 10% off all parts needed and free maintenance training.

Register for the benefits, visit heathrow.com/cycle

Cycle Facilities

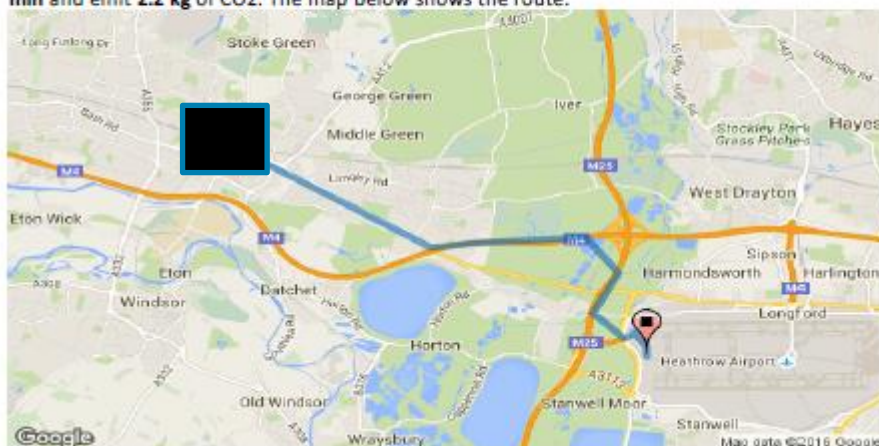
All terminals and major buildings such as Compass Centre and BA Waterside will have cycle facilities such as lockers or showers. Please contact Heathrow Commuter on any further queries by emailing commuter@heathrow.com

Cycle Parking

All terminals and major buildings will have parking facilities next to their place of terminal areas. Please contact Heathrow Commuter by on any further queries by emailing commuter@heathrow.com

7. Driving Alone: 31 min

Your approximate driving distance has an estimated cost of **£1.70 (+ parking, tolls etc.)**, is **7.1 miles**, will take around **31 min** and emit **2.2 kg** of CO2. The map below shows the route.



* First Great Western Discount

If you currently hold a LHR ID card, you are entitled to the following discounted travel from all stations between Paddington and Reading including the Maidenhead, Twyford, Windsor and Greenford branch lines to/from Heathrow Airport on the Heathrow Connect Service.

Season Tickets

Heathrow Airport workers who hold a LHR ID card are entitled to a 75% discount on a weekly, monthly and annual season ticket; the discount applies to the FULL fare tickets only.

To purchase your season ticket simply go to your local First Great Western ticket office and show a valid LHR Heathrow Airport ID card to get a 75% discount on the full ticket price. As with most season tickets, you will need to fill out a season ticket application form and get a photo ID card. You can do this from the following stations:

- Paddington
- Langley
- Greenford
- Ealing Broadway
- Slough
- Castle Bar Park
- Acton Mainline
- West Ealing
- Burnham
- Hayes
- Hanwell
- Taplow
- Southall
- Maidenhead
- West Drayton
- Iver
- Twyford
- Reading

You will not be able to purchase your season ticket from Heathrow Express Ticket Offices located at Heathrow Airport and Paddington or the Heathrow Commuter office..

For more information please call +44 (0) 345 604 1515.

Occasional travel/non-Season tickets on Heathrow Connect

You can still get discounts on non-Season tickets with your airport LHR ID card. All Heathrow Airport workers with a LHR ID card are entitled to a 75% discount on a Standard Single and Standard Open Return ticket; the discount applies to your FULL journey. The discount is available from the First Great Western stations stated above and Heathrow Express Ticket Offices at Heathrow only.

Please note a penalty fares system is in operation on this route between London Paddington and Hayes and Harlington. Please ensure you purchase your ticket prior to boarding. Please note you must show your staff ID.

Sample Implementation Intention

Heathrow Commuter

Helping you make better travel choices



We hope you found this session looking at your travel options helpful.

Now it's time for you to try something new.

I (name) want to try a different way of getting to work.

I am going to try: cycling / car sharing / public transport / Other (specify).....

I am going to start doing this by (date):.....

What do I need to do to make this happen?:


Action	By

Heathrow
Making every journey better

Appendix D2: Survey

Pre-Survey

The survey collecting pre-survey measures was included as part of the Compass Centre Access and Travel Plan – Discovery Phase survey. As part of this survey, employees had to give details about their access passes, car park passes, and other information relevant to building security. See below for elements of the survey relating to their travel. If earlier in the survey employees indicated that they commute by one mode of transport and have never travelled a different way, then they did not receive the following page.

**Compass Centre Access and Travel Plan - Discovery Phase**

About Your Travel

*** 21. What mode of transport did you use to commute on each of the last five days you worked (for the longest portion of your journey)?**

Mode of Transport	
Day 1	<input type="text"/>
Day 2	<input type="text"/>
Day 3	<input type="text"/>
Day 4	<input type="text"/>
Day 5	<input type="text"/>

If you selected other, please specify here:

*** 22. In the past month, how frequently did you commute using the following modes of transport (for the longest portion of your journey)?**

	Never	Once or twice	Between 3-5 times	Between 6-10 times	More than 10 times but not everyday	Everyday
In a car (with no passengers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In a car (with other passengers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public Transport	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cycling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work from home	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you selected other, please specify here:

PrevNext

Appendix D3: Power Calculations

These power calculations show the trade-offs between the number of people we assign to the treatment group and the effect size we are able to detect with 80% power. With more

people in the treatment group, we increase the number of potential 1:1 sign-ups, but we lose the ability to detect smaller effect sizes.

Control n	Treatment n	MDES (days)	MDES (%)
557.5	557.5	0.1615	3.6%
400	715	0.17255	3.8%
300	815	0.1785	3.9%
200	915	0.2125	4.7%

Based on the calculations above, we have chosen to divide the population by assigning 313 people to the control group and 800 to the treatment.

Control n	Treatment n	MDES (days)	MDES (%)
315	800	.1758	3.84

After doing these power calculations we realised that there were some duplicates in the data and therefore, based on the calculations above, we chose to divide the population by assigning 305 people to the control group and 790 to the treatment.

With this division, the trial will have an 80% chance of accurately detecting an effect where there is a decrease number of days on average one drove to work of 3.84% (MDES). We have chosen this division because it enables to send out as many PTPs (thereby maximising the chances of people signing up for a 1:1), while maintaining a large enough control group to detect an effect even if many people in the control group do not fill out the post survey. The code can be found below:

```
#Continuous outcome variable; no clustering
standardDeviation <- 1.16
nPerArm <- n/arms
test <- pwr.t2n.test(n1=300, n2=813, d=, sig.level = .05, power = 0.8, alternative = "two.sided")
#test$d * standardDeviation
test$d
test$d*standardDeviation
```

Appendix D4: Regression Tables

This analysis examined the effect of receiving a PCP on SOV commuting behaviour. In total, 1,095 commuters participated in this trial. The data was analysed using an OLS regression as described in trial protocol 2015007.

In order to maximise power, we estimate changes in these variables between the pre and post survey, using a “last observation carried forward” method for those participants who did not complete the post survey. In effect, this assumes that participants who did not complete the post survey did not change their behaviour at all.

We have two primary questions of interest:

1. What is the effect of the PCP on travel behaviour?
2. What is the effect of the one to one session on travel behaviour?

In columns 2 and 4 of table 1 below, we answer question 1, while in columns 1 and three we answer question 2. In all cases, for the relevant samples we estimate a model;

$$\Delta Y_i = \alpha + \beta_1 T_i + u_i$$

Where ΔY_i is the change in the outcome measure for individual i between period one and period 2. T_i is a binary treatment indicator for the relevant treatment, and u_i is an i.i.d error term.

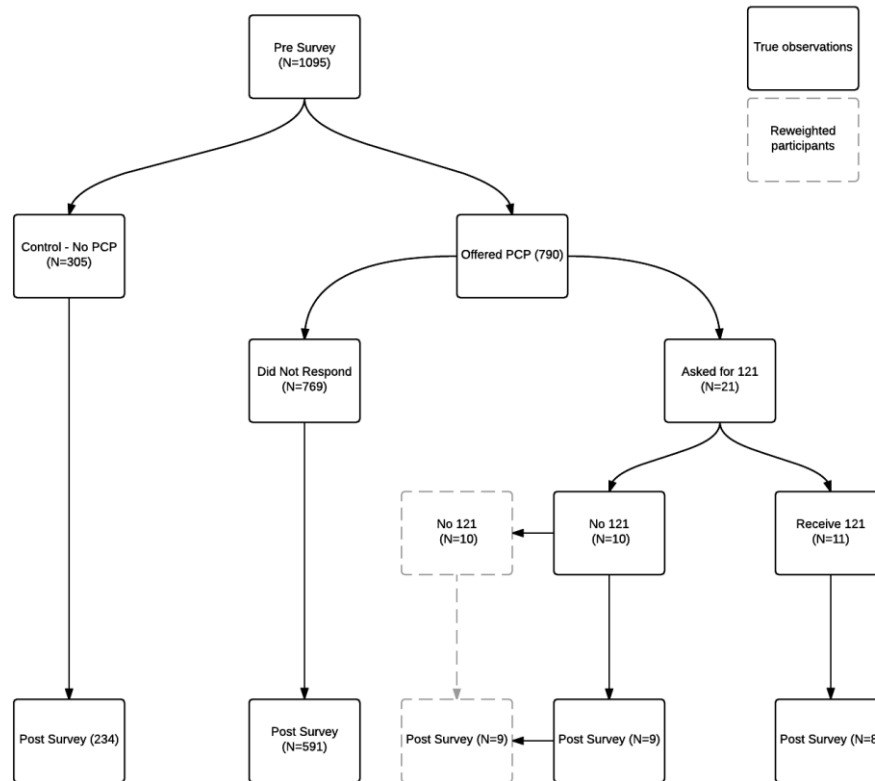
In addition to this outcome measure, we also conduct Mann Whitney tests for the effects of the 1 to 1 sessions on the sample of 21 participants who opted for them. This tests for an equality (or inequality) on the ordinal ranking within our data of the treatment and control groups. This means, we tested to see if more people shifted rank (lowered their relative position in terms of number of SOV days and frequency category) in the treatment group compared to the control group. For example, if we had 10 people in our sample, 5 in the control group and 5 in the treatment group, and if treatment was randomly assigned, the original rankings could have individuals ranked first, third, fifth, seventh, and ninth in the control group and individuals ranked second, fourth, sixth, eighth, and tenth in the treatment. If the intervention were to be successful, the changes in ranking between individuals in the two groups would be significant.

As can be seen from the table below, our treatments effect on our outcome measure is ambiguous, with some positive and some negative coefficients, although **none achieve statistical significance**. Our Mann Whitney tests are similarly inconclusive, finding effects in the desired direction (a reduction in SOV usage) but neither a significant fall in the frequency category ($p=0.255$) or the number of SOV days ($p=0.899$).

Table 1: Main Results of PCP Trial (OLS)

	(1)	(2)	(3)	(4)
	Frequency Category		Days Using SOV	
	(1 to 1)	(ITT)	(1 to 1)	(ITT)
1 to 1	0.745		-0.218	
	(0.887)		(0.567)	
Treatment		-0.024		0.010
		(0.140)		(0.092)
Constant	0.800	1.367***	0.400	0.469***
	(0.642)	(0.119)	(0.411)	(0.078)
<i>N</i>	21	1094	21	1094

The figure below illustrates the trial design, sample sizes, and response rates



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