

Encouraging Environmentally Friendly Behaviour with Insights from Behavioural Economics

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ENVIRONMENTAL PROTECTION AGENCY

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- Office of Environmental Enforcement
- Office of Evidence and Assessment
- Office of Radiation Protection and Environmental Monitoring
- Office of Communications and Corporate Services

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by

EnvEcon

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This report is based on research carried out/data from September 2017 to August 2019. More recent data may have become available since the research was completed.

The EPA Research Programme addresses the need for research in Ireland to inform policymakers and other stakeholders on a range of questions in relation to environmental protection. These reports are intended as contributions to the necessary debate on the protection of the environment.

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Executive Summary

The Irish government has committed to ambitious climate change targets in its 2019 Climate Action Plan. The plan states, for example, the aim to add 500,000 public transport and active travel journeys daily by 2035 (p. 87). It also calls for 600,000 heat pumps to be installed by 2030, 400,000 of which are to be retrofitted into the existing stock (p. 74). In addition, it suggests that implementing the goals set out in the plan will reach far into our daily lives, so support and acceptance from Irish citizens are indispensable (p. 8). In order to achieve these targets, infrastructure investments are essential. However, infrastructure investments will reach maximum effectiveness only if combined with large-scale behavioural changes. As such, there is a need for strategies to encourage environmentally friendly behaviours in all sectors, including transport, residential heating and behaviour in everyday life.

Relying on insights from the behavioural sciences (behavioural economics and psychology), this report aims to support environmental policymaking in Ireland with the goal of encouraging environmentally friendly behaviour. The report is structured in five parts and each part can be read independently of each other, depending on the reader's interests. The unifying theme across all parts is the application of insights from the behavioural sciences to environmental policymaking.

The first part develops a method to measure environmental behaviour in everyday life. It presents a measurement instrument (the Day Reconstruction Method or DRM) that researchers and policymakers can use to obtain data from people's everyday lives. As subsequent parts of this report will illustrate, the DRM can be used to inform behavioural environmental policymaking.

The second part focuses on the transport sector. It presents a review of behavioural barriers to "smarter travel", defined as less car use. It suggests a number of ways to overcome these behavioural barriers and to encourage smarter travel. It highlights, for example, that making smarter travel "easy" and "attractive" is a key strategy for achieving behavioural change in the transport sector. In order to identify what makes a trip

easy and attractive, this part presents a novel DRM study on travel satisfaction with over 4000 participants. A key result from this study is that active travel is significantly more satisfying than motorised travel and that this is explained to a large part by the shorter time that people spend travelling when travelling actively. A number of policy recommendations are also made, related to, for example, reducing trip duration and peak spreading of commutes. The second part suggests that the DRM is used to evaluate the planned bus network redesign known as "BusConnects Dublin".

The third part deals with the residential sector and analyses household decisions to invest in heat pump retrofits. Highlighting the "hassle factor", this part argues that it is often burdensome to change one's heating system, as there are many administrative steps to be taken. It is suggested that these administrative burdens are particularly detrimental when people have the tendency to postpone spending effort on unpleasant tasks, i.e. when people have a tendency to procrastinate. Using Irish building energy rating data, it is shown that procrastination over the hassle related to heat pump retrofits can reduce the number of households that will make the retrofit. It also shows that ignoring the tendency to procrastinate leads policymakers to overestimate the effectiveness of financial grants and that re-allocating some grant money to reducing administrative burden can be cost-effective.

The fourth part deals with measuring and gaining a better understanding of pro-environmental behaviour in everyday life. A novel DRM study is presented in which participants indicated how many pro-environmental behaviours they had engaged in on the day prior to taking part in the study. The results show that some demographic variables (age, gender, education) and a psychological variable (green identity) predict how frequently people act pro-environmentally in their everyday lives. Moreover, reciprocity and altruism predict pro-environmental behaviour but other economic preference measures (time and risk preferences) do not.

The final part deals with the ethics of using behaviourally informed policies that aim to change

behaviour. It suggests that policymakers should use the FORGOOD ethics framework before implementing behavioural policies as a guide to think about potential ethical problems. FORGOOD suggests

considering seven core ethical dimensions when designing and implementing behavioural policies: fairness, openness, respect, goals, opinions, other options and delegation.

1 Development of the Day Reconstruction Method As a Tool to Inform Policymaking

1.1 Introduction

Many policies seek to change the decisions that people make in their everyday lives. For example, policies try to make people eat healthier, exercise more, drive more safely, use less fossil fuel, recycle their rubbish, and so on. In order to evaluate these policy interventions, subsequent behavioural changes need to be measured (e.g. changes in travel patterns or reductions in energy use). However, the measurement of changed outcomes contributes little to the understanding, refinement and application of effective policy interventions on different scales, at different times and in different contexts because observing “what works” does not explain “why it works” (Grüne-Yanoff, 2015; Deaton and Cartwright, 2017). Designing and deploying better policies requires an understanding of causal and coincidental mechanisms. To understand the mechanisms with which policies influence everyday behaviour, data from everyday life are needed.

This part of the report suggests using naturalistic monitoring techniques, in particular the Day Reconstruction Method (DRM), to obtain these everyday data. The aim of this part is to facilitate the use of the DRM in business and policy contexts to complement surveys, observational data, laboratory experiments and randomised controlled trials (RCTs). To achieve this aim, the six most important steps that need to be taken when conducting a DRM study are summarised.

1.2 Naturalistic Monitoring

Naturalistic monitoring describes the observation of people’s behaviours and experiences “in the wild” and captures situation-specific thoughts, feelings and behaviours as they arise in daily life (Shiffman *et al.*, 2008). A common application of naturalistic monitoring is to identify the everyday activities during which people are most and least happy (Kahneman *et al.*, 2004; Bryson and MacKerron, 2017). Naturalistic monitoring has also been enthusiastically implemented

in psychological research on health, sedentary behaviour and nutrition.

To illustrate the type of information that can be obtained from DRM studies, Figures 1.1 and 1.2 present some results on tiredness from a DRM study that we conducted with a nationally representative sample of 955 Irish participants.

Naturalistic monitoring can also be used to measure decisions and the situation-specific variables that influence these decisions (Delaney and Lades,

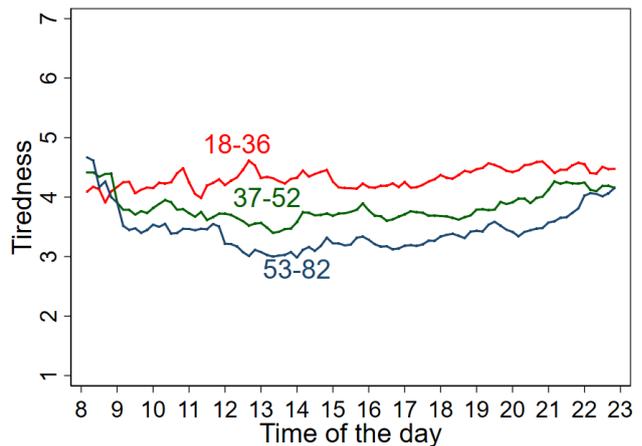


Figure 1.1. Tiredness over the course of a day by age ($n=955$).

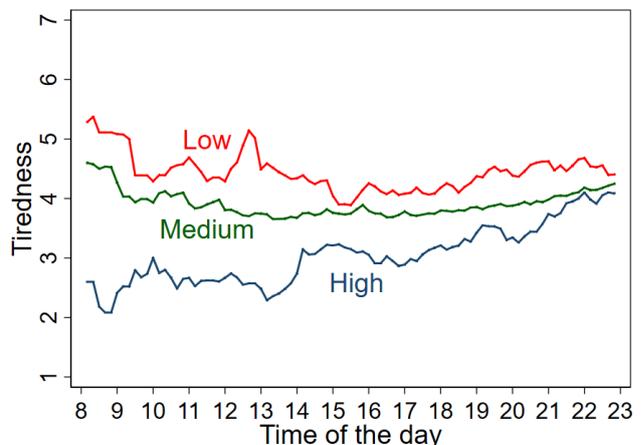


Figure 1.2. Tiredness over the course of a day by trait self-control ($n=955$).

2017; Lades *et al.*, 2019). This can help us to better understand how decisions are influenced by situational context factors that can be modified by the policy.

1.3 The Day Reconstruction Method

The DRM is a naturalistic monitoring tool that allows the gathering of data from everyday life. The key benefits of the DRM, which set it apart from alternative approaches, are that it allows us to measure experiences, behaviours and choice architecture in naturalistic, everyday contexts and furthermore that it can be used in large, representative samples because it is cost-effective. It is thus a method that can help to quantify the extent to which policies change our behaviour in the real world. The key disadvantages of DRM research are that the data are self-reported and recovered from memory.

The DRM studies are organised in at least two phases. In the first phase, participants reconstruct their previous day (“yesterday”) in a diary. In this diary, participants divide their day into “episodes” as if each episode was a scene in a movie. Participants give each episode a name, such as “driving to work” or “having lunch”, and are asked to reflect on what they did and how they felt during each episode. This diary is essential as it minimises memory biases. For example, it is difficult to give an accurate answer to the question, “How did you feel yesterday at 3.30 pm?”. However, after having completed a diary of yesterday, responding to the same question is much easier and answers are more accurate. In the second phase of the DRM study, participants complete a structured survey in which they are asked follow-up questions about each episode. These follow-up questions can deal with any themes that the researchers wish to assess.

1.4 Six Steps When Conducting a Day Reconstruction Method Study

In this chapter, we present the six most important steps that need to be taken when developing a DRM study, as illustrated in Figure 1.3.

1.4.1 Step 1: making sure that the DRM is the right method

The first step when considering a DRM study is to make sure that the DRM is a valid tool for the research question. There are cases when naturalistic monitoring is not the best option to answer a research question. As an example, naturalistic monitoring is not the best method to analyse why people prefer a certain car/mortgage/pension fund over another. These big, one-off decisions do not happen very frequently and are not characteristic of daily life, and the associated deliberation processes can be better understood using laboratory experiments and surveys. However, naturalistic monitoring is a very good choice when investigating behaviours such as smoking, eating, taking the car rather than the bus and watching another episode of one’s favourite television show. Such high-frequency decisions are often made on a daily basis, intuitively and with little effort or deliberation.

1.4.2 Step 2: defining the relevant sample and timeframe

As in any research, sample selection is important. Researchers have to define whether they need a convenience sample, a nationally representative sample or a specific sub-sample of the population. In order to identify the appropriate sample size, it is often a good idea to look at previous similar research and to conduct a power analysis to identify the

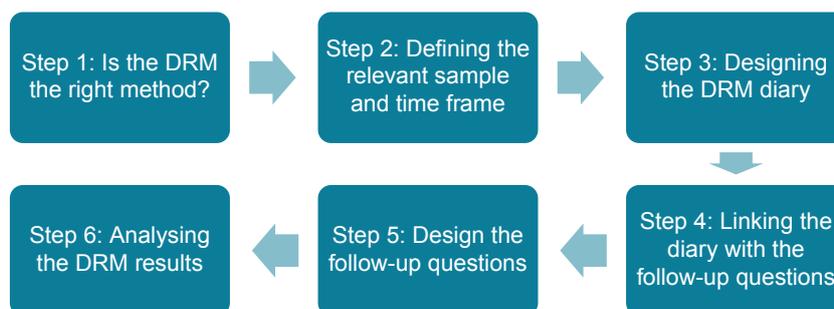


Figure 1.3. The six most important steps to be taken when developing a DRM study.

minimum sample size needed to reject the research hypothesis. Additionally, researchers need to make sure that the behaviour of interest actually happened the day before. If relevant behaviours are relatively infrequent, even more care has to be taken to select the right study days and pre-screening surveys are often needed. It is also possible to conduct event reconstruction studies to analyse events that happened in the recent past (and maybe more than 1 day before).

1.4.3 Step 3: designing the DRM diary

The key aim of the diary is to maximise the extent to which participants re-live their previous day. This process guides respondents to recall yesterday's experiences, behaviours and decisions and encourages them to respond with their actual experiences in mind. It is important to allow participants some time to complete the diary to facilitate a successful re-living of the experiences yesterday. The diary can be administered in various ways, including on paper, online in a web browser and on a mobile phone. The optimal DRM diary asks participants to reconstruct their full day. However, writing a diary for the full day can take a significant amount of time and effort. As reducing participant burden is often a good idea to minimise attrition and maximise sample size, some studies benefit from shorter diaries. It is possible, for example, to ask respondents to recall only yesterday morning, afternoon or evening or to ask participants to recall only a minimum of five episodes, starting at a random point in the day. In most DRM diaries, participants are asked to partition their days individually into various episodes. However, it is also possible to pre-define certain time intervals, for example 60-minute intervals, and ask participants follow-up questions regarding each of these intervals.

1.4.4 Step 4: linking the diary with the follow-up questions

A key challenge in DRM research is to make sure that participants use their diary when answering the follow-up questions. Only if the diary and the follow-up questions are linked in a meaningful way will the re-instantiation of the day before affect the answers that participants give. If both the diary and the follow-up questions are answered on pieces of

paper, researchers can ask participants to refer to the pieces of paper participants used when completing the diary. A similar system can be used when the diary is completed on paper and the follow-up questions are answered online. We recommend this procedure, as the answers do not need to be transcribed before analysing the data. It can be helpful to ask participants to answer an episode-specific question (e.g. "Give this episode a name") at the top of the page that contains the follow-up questions to make sure that participants think about this specific episode when responding. It is possible to ask follow-up questions for all episodes described in the diary or for only a subset of these episodes. The researcher can randomly select some episodes, pick episodes from specific points in time or even ask respondents to choose the most important episode from the day before.

1.4.5 Step 5: designing the follow-up questions

Key to every DRM study is the design of the follow-up questions to ask in the second phase of the study. While the same rules that are relevant in any kind of survey research apply, there are some considerations relating to the design of questions that are specific to naturalistic monitoring research. Perhaps the most important rule when designing questions for DRM studies is to keep the questions as short as possible. As participants answer the same question multiple times, long questions can become burdensome and annoying to answer. It is also a good idea to use dynamic questions that go into more detail, but only if a condition is triggered by a previous question. Care should be taken to design questions that ask for the time of day, as this is an important variable in the analysis of DRM data (e.g. make sure that participants give a clear indication whether they are describing an episode taking place at 9 am or an episode taking place at 9 pm). Many survey questionnaires used in the behavioural and social sciences to measure stable interindividual differences can be transformed into questions that are meaningful in the context of everyday life to measure aspects of life that can change from one situation to the next.

1.4.6 Step 6: analysing the DRM results

In typical DRM studies, individuals provide multiple measures of the same variable at different points in

time. Having data with repeated observations nested within individuals allows us to structure the data in at least three ways: (1) one row per individual, (2) one row per episode or (3) one row per time unit. Different research questions can be answered with different data structures. Most statistical programmes have commands that make it straightforward to reshape the data from one structure to another. When the data are structured at the individual level so that each row represents one individual, researchers can analyse means and variances of the repeatedly measured variables for each individual. When the data are structured at the episode level, researchers can investigate how context variables measured at each episode correlate with experiences, behaviours and decisions. For policy and business, this type of analysis is particularly valuable because some of the context variables are amendable by policy. When the data are structured at the time level, researchers can measure the time courses of individual experiences.

The analysis of temporal dynamics lends itself to creating interesting graphs with time on the horizontal axis and other variables of interest on the vertical axis. Whenever data from the same individual appear in more than one row, multilevel models to analyse the data are appropriate; we recommend consulting textbooks that are available on these types of analyses (Bolger and Laurenceau, 2013).

1.5 More Information

For researchers and policymakers who are interested in designing a DRM study, the project team has developed a six-step guide to the DRM, as presented above. The guide is available as EnvEcon (2020a).

For academics more interested in how the DRM can inform behavioural public policymaking by providing detailed information about everyday decisions and the choice architecture in which these decisions are made, see Lades *et al.* (2019).

2 Encouraging Smarter Travel

2.1 Introduction

The Irish government has committed to ambitious modal shift targets in its 2019 Climate Action Plan (DCCA, 2019). The plan states the ambition to add 500,000 public transport and active travel journeys daily by 2035. In order to achieve this aim, infrastructure investments are essential. However, infrastructure investments alone are not enough. They need to be complemented by behavioural change and large-scale mode shifts. As such, there is a need for strategies to encourage a culture of walking and cycling to complement infrastructure investments in order to reduce people's reliance on the car.

This part of the report provides a perspective on modal shift strategies from the behavioural science literature. Effectively managing transport behaviour and transport services are perennial challenges. The key question covered here is, "How can transport policies encourage smarter travel?" "Smarter travel" describes environmentally friendly and sustainable alternatives to driving alone in the car. Depending on the context, smarter travel means walking, cycling, public transport use or car-sharing. Smarter travel choices can be divided into long-term choices (e.g. about where to live and work and what car to buy) and short-term choices (e.g. about which travel mode to use when multiple options are available) (Garcia-Sierra *et al.*, 2015). This part of the report focuses on the latter.

There are many reasons why smarter travel should be promoted. In particular, the benefits of walking and cycling include:

- *Environmental benefits.* Ireland's growing transport sector is an important contributor to climate change and greenhouse gas emissions. In 2017, the transport sector contributed almost 20% to the overall emissions in Ireland (in 1990 this was just under 10%). Most of these emissions come from private car journeys, as car transport is by far the most popular travel mode in Ireland. For example, 61.4% of workers use the car to get to work, whereas only 3% of workers cycle to work and just over 9% walk (Central Statistics Office, 2017).
- *Economic benefits.* Dublin is one of the most congested cities in the world. A recent study comparing over 200 cities worldwide shows that only in Bogota and Rome do commuters lose more time in congestion.¹ Moreover, Ireland faces penalties from the European Union if emissions are not significantly reduced.
- *Health benefits.* Active travel reduces the risk of high blood sugar, cardiovascular diseases and obesity (Hoehner *et al.*, 2012).
- *Psychological benefits.* A large number of studies on travel satisfaction suggest that active travellers are significantly more satisfied with their trips than travellers using motorised modes (Friman *et al.*, 2018a). Higher travel satisfaction associated with the use of active travel modes can spill over to higher life satisfaction (Friman *et al.*, 2017).

Of course, in many situations active travel is impossible. Hence, non-active smarter travel such as public transport and car-sharing must not be neglected (Friman *et al.*, 2018b). Moreover, there are many situations in which driving is the only option, for example when living in rural areas without public transport and cycling infrastructure. This part of the report focuses on those situations where smarter travel is possible in principle, but where people, for a multitude of reasons, decide to travel by car instead of by alternative modes.

In the past, many policymakers aimed to encourage smarter travel with a particular view of human nature in mind: humans were understood to be rational decision-makers who engage in cost-benefit analyses and maximise their well-being. These rational individuals were assumed to be very responsive to incentives such as subsidies or fines. Hence, many of today's transport policies rely on modifying the incentive structure of travel. However, the behavioural science literature suggests that there are many behavioural barriers to smarter travel (as reviewed in section 2.2) and also suggests a number of policies to change behaviour (as reviewed in section 2.3).

¹ The report can be found at <http://inrix.com/scorecard/> (accessed 17 February 2020).

2.2 Behavioural Barriers to Smarter Travel

The behavioural science literature has identified many behavioural barriers to normative behaviours such as smarter travel (Kahneman, 2011; Dhimi, 2016). As an organising structure, we can differentiate between three different types of behavioural barriers (awareness, decision, and from decision to action). These types relate to three different steps in the decision-making process that can lead to a change in travel behaviour from the car towards smarter travel choices:

- **Awareness.** Travellers have to be aware that they are in a position to make a decision. If they do not view their travel mode as a choice and view their car use as the only alternative, they will stick to the car. Behavioural factors can prevent travellers from perceiving that they have a choice about how to travel.
- **Decision.** Once travellers have decided to make a decision about whether or not to change their travel, they engage in, for example, a cost–benefit analysis. Behavioural factors can lead to biased evaluations of costs and benefits when considering a behavioural change. When perceived costs are higher than real costs and perceived benefits are lower than real benefits, people are more likely to keep on driving.

- **From decision to action.** Once travellers have decided to change their travel behaviour and to travel smart more frequently, they have to translate that decision into action. Behavioural factors can lead to intention–behaviour gaps, with the result that travellers stick to travelling by car despite their intentions to travel sustainably.

Figure 2.1 summarises some of the most important barriers to smarter travel, organised by the three steps presented previously. Tables 2.1–2.3 provide more details on each of the barriers.

2.3 Encourage Smarter Travel with Behavioural Insights

2.3.1 Making smarter travel easy, attractive, social and timely

Based on insights about bounded rationality, a large and growing behavioural science literature suggests that policymakers can change people’s behaviour using interventions that do not rely on changing incentives. These policies are often called “nudges” (Thaler and Sunstein, 2008; Sanders *et al.*, 2018), and they may be used to effectively complement traditional transport policies. An often-employed strategy of nudging is based on the EAST framework (Behavioural Insights Team, 2014), which suggests encouraging behaviours by making them easy,

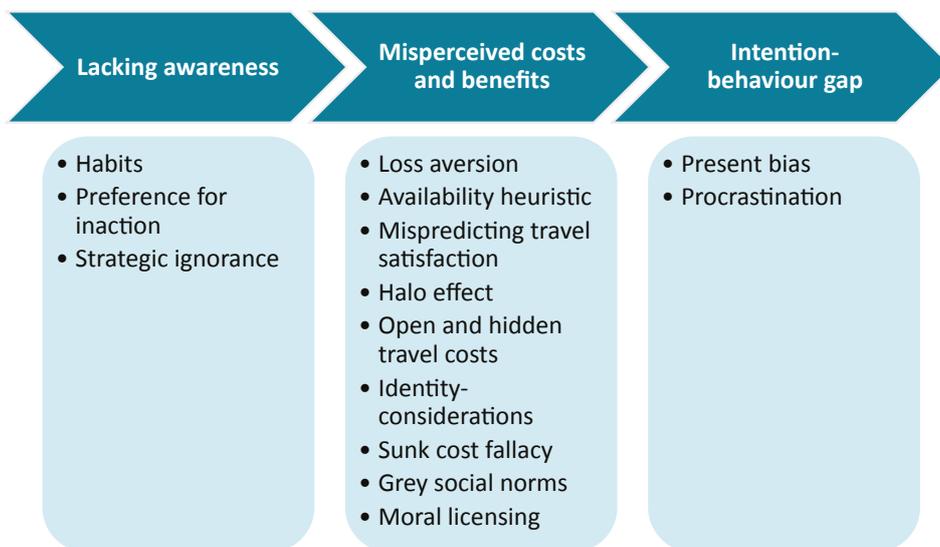


Figure 2.1. Behavioural barriers to smarter travel.

Table 2.1. Behavioural barriers to being aware of the option to travel smarter

Reason for lacking awareness	Description
Habits: "No question – I always take the car"	Once people have established the habit of making a certain journey by car, it is very difficult to change this behaviour because people no longer make an active decision about how to travel.
Preference for inaction: "I'd rather not make a decision"	Reorganising one's life to change travel habits can be complex and people generally have a tendency to avoid making complex decisions. Sticking to the known travel modes is the simplest choice that needs the least amount of mental energy.
Strategic ignorance: "I can't travel sustainably (I think)"	Establishing that one's travel choices are harmful to the environment can lead to negative emotions in individuals with pro-environmental self-images. These individuals might try to avoid making active travel choices by telling themselves that there is no option but driving. This choice avoidance can shield against negative emotions associated with environmentally harmful choices.

Table 2.2. Behavioural barriers to a rational cost–benefit analysis

Misperceived costs and benefits	Description
Loss aversion: "The car is just much more convenient"	People often use their "typical" travel mode as the reference point to evaluate alternative modes, and the car is the default travel mode for many people in Ireland. Switching to a sustainable travel mode can feel like a loss in terms of convenience, freedom and safety. Since losses loom larger than gains, people are less likely to move away from driving.
The availability heuristic: "That one time when it was pouring ..."	To evaluate how probable it is that an event will occur, people refer to the ease by which an instance of this event comes to mind. When an instance is easily retrieved from memory or imagination, people are more likely to expect the event to happen. Unpleasant active trips are particularly memorable (more so than unpleasant car trips). Hence, people overvalue the chances that an active trip will be unpleasant.
Mispredicting travel satisfaction: "Taking the bus will be a horrible experience"	People predict car journeys to be more pleasurable than they actually are and bus journeys to be less pleasurable than they actually are. Hence, people are less likely to use the relatively sustainable bus for their trips.
The halo effect: "My car is great – everything about it is great"	People who are generally positively inclined towards car use evaluate incoming information in favour of the car. For example, a story about somebody having a bad experience with public transport is seen as strong confirmation (rather than one new data point) of one's belief of the car's advantage.
Open and hidden travel costs: "The bus is so expensive"	The costs related to driving are relatively hidden, as they are mainly fixed costs paid only at specific points in time when purchasing cars, when filling the car with petrol or when paying insurance. To the contrary, the costs of public transport are very attention grabbing, as people typically have to pay each time they travel. Consequentially, the costs of driving are often underestimated and the costs of using public transport overestimated, and the psychological "pain of paying" is higher for public transport use than for car use.
Identity considerations: "I drive, therefore I am"	The ways we view ourselves, our identities and self-images are sources of well-being. In many countries, including Ireland, the car is an important determinant of our self-image. Once people view themselves as "drivers" as opposed to "walkers" or "public transport users", they will even drive short distances that may be quicker on foot.
Sunk cost fallacy: "If I do not drive enough, the car's purchase was not worth it"	People often feel that they have to make sure that past payments were "worth it". As such, they overemphasise the fact that they have paid a lot of money for a new car. As a result, people use their cars even for trips that could be made cheaper and more efficiently by smarter travel modes.
Grey social norms: "Everybody drives"	People often use the behaviour of others as a reference in order to guide their own behaviour. Social norms can be descriptive ("How do other people who are like me commonly behave?") or injunctive ("What do relevant people approve or disapprove of?"). If people realise that all their peers tend to use the car for most trips and consider driving to be the appropriate mode of transport (which it often is in the case of Ireland), people are more likely to drive as well.
Moral licensing: "I bought a reusable coffee cup, so I can drive"	Behaving in pro-environmental ways in one domain (e.g. taking a reusable shopping bag to the supermarket) can increase the environmental impact in another domain because people believe that their pro-environmental behaviour has given them a licence to be less environmentally friendly in another domain. People might buy a reusable coffee cup to avoid throwing away plastic cups when drinking coffee in order to keep up their self-image of being environmentally friendly. However, the same individuals might drive to the supermarket using a big car rather than a smaller car or using public transport.

Table 2.3. Behavioural barriers to a translation from intentions to behaviour

Reason for intention behaviour gaps	Description
Present bias “I’ll cycle tomorrow, not today”	People do not always stick to the plans they have made before. This is called the intention–behaviour gap. One reason for this gap is present bias, which is the tendency to overvalue the present and undervalue the future. Present-biased individuals undervalue the hassle costs related to cycling to work tomorrow but overvalue the hassle costs related to cycling to work today. As a result, they plan to travel sustainably but might not do so.
Procrastination: “I’ll change my behaviour tomorrow”	It might not be a straightforward task to change one’s behaviour in favour of smarter travel. Complications can include finding people to car share with, buying a bike that is fast and safe enough to be used on the road, and completing the paperwork needed to avail oneself of cycle subsidies. People often postpone making difficult decisions, as they do not like to spend cognitive energy. As a result, they might procrastinate arranging their everyday lives in line with smarter travel and stick to driving for prolonged periods.

attractive, social and timely. Making behaviour easy tends to refer to the removal of behavioural barriers. Making behaviour attractive and social tends to add additional psychological benefits to the relevant behaviour. Making behaviour timely highlights that interventions need to be timed well to have maximal effect. Figure 2.2 summarises some of the most important ways to make smarter travel easy, attractive, social and timely and Tables 2.4–2.7 provide more details.

2.3.2 *Make car trips difficult, unattractive, unsocial and untimely*

An alternative to making smarter travel easy, attractive, social and timely is to do the opposite: making car use as difficult as possible. Reversing the EAST framework leads to the DUUIU framework, as presented in Figure 2.3. It suggests that driving should be made difficult, unattractive, unsocial and untimely. However, encouraging a behaviour such as smarter travel is politically easier than discouraging a behaviour such as driving. Hence, these policies will be met with some political adversary (often for good reasons) and therefore should be considered with caution. We do not go into detail here, but rather we mention potential options as food for thought.

2.4 **Informing Transport Policies with Travel Satisfaction Data**

Section 2.3 suggested that making smarter travel easier and more attractive is a sensible way to encourage smarter travel. However, how can

policymakers increase the ease and attractiveness of smarter travel? One way to answer this question is to rely on travel satisfaction data gathered in surveys that use methods such as the DRM. This section presents some key results and policy implications from a travel satisfaction survey conducted among more than 4000 participants in November 2018.

2.4.1 *The 2018 UCD Commuting Survey*

This section draws on data from the November 2018 University College Dublin (UCD) Commuting Survey. It was carried out by the UCD Estates Service Team. The 2018 version of the survey was the first to include questions about participants’ most recent commute to the campus. The analyses below use the responses from 4134 participants who, in their most recent commute to the campus, travelled primarily in a motorised mode by bus, train or tram or in a non-motorised mode on foot or by bicycle to the main campus of UCD, Belfield, Dublin. The survey included many questions on travel in general and the most recent commute in particular. However, the most important question for present purposes asked participants to indicate how satisfied they were in their most recent commute to the campus. Travel satisfaction was measured using nine questions that asked participants to rank their most recent commute to the campus along the dimensions described in Table 2.8. Each question could be answered on a scale from –3 to +3. A higher score implied higher travel satisfaction. The average of these nine items can be interpreted as an overall travel satisfaction rating.

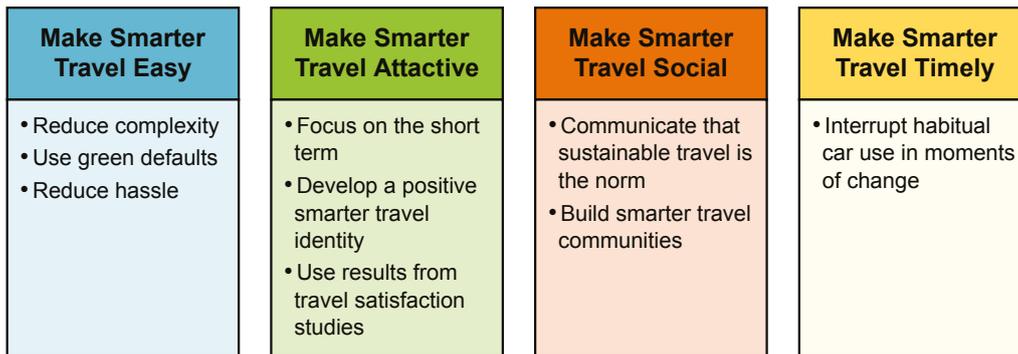


Figure 2.2. Making smarter travel easy, attractive, social and timely.

Table 2.4. Making smarter travel easy

Make smarter travel easy	Examples
Reduce the complexity of the decision to travel smarter	<p>Changing one's travel behaviour can be a complex decision. Simplifying this choice can help overcome the inertia related to making a decision and also to translate intentions into behaviours. There are a few ways of reducing the complexity of the decision to travel smarter:</p> <ul style="list-style-type: none"> • Provide maps that show the best ways to travel actively or with public transport in order to remove the uncertainty and raise awareness of smarter travel as an option.
Set smarter travel as the default	<p>Defaults can have strong effects on behaviour in many areas of life from pension savings – over donation contributions – to choices of health insurances. In the transport sector, setting transport defaults to the smarter travel option can change behaviour as well:</p> <ul style="list-style-type: none"> • Make smarter travel the default when communicating with the public, employees or colleagues. For example, when sending emails to new employees (or students in university contexts) communicate walking, cycling and carpooling as the standard and driving as the deviation from this standard. • When offering parking permits, set “no permit” or “carpool permit” as the default. People might choose these options more often because they view the default option as an implicit recommendation. This might help to establish a new norm about smarter travel.
Reduce hassle	<ul style="list-style-type: none"> • Encourage the use of smartphone applications that show real-time bus departures to reduce the stress associated with waiting times, and provide apps that simplify door-to-door travel planning.

Table 2.5. Making smarter travel attractive

Make smarter travel attractive	Examples
Focus on the short term	<p>Many people focus more on the present than on the future. Hence, focusing on immediate costs and benefits is more effective than focusing on future outcomes:</p> <ul style="list-style-type: none"> • Highlighting short-term benefits of sustainable transport (e.g. fresh air, time to think, steps made and money saved) rather than long-term benefits (e.g. long-term health benefits and environmental consequences). • Improving the short-term experience of sustainable travel by, for example, reducing the perceived effort costs of walking and cycling and increasing the positive feelings associated with these travel modes. • Generating short-term rewards such as “active travel points” for smarter travel to provide immediate feedback.
Develop a positive smarter travel identity	<ul style="list-style-type: none"> • People who view themselves as active individuals are more likely to travel by bike or on foot when having the choice. Self-images of being a cyclist or walker (rather than a car driver) can influence the decision to use smarter travel options. • Ask relevant personalities from the media or popular culture who are smarter travellers to engage in campaigns, presenting themselves as role models.
Use results from travel satisfaction studies	<ul style="list-style-type: none"> • Active travel modes (walking and cycling) are associated with higher travel satisfaction than driving and public transport use. • Communicate the findings of high travel satisfaction ratings for active travel in appealing graphs.

Table 2.6. Making smarter travel social

Make smarter travel social	Examples
Communicate that smarter travel is the norm	<p>People often behave in line with descriptive and injunctive social norms:</p> <ul style="list-style-type: none"> • If a large number of people travel smarter, communicate this descriptive norm. Use messages such as “the majority walks or cycles to work”. • If only a few people walk or cycle, but the number of smart travellers is increasing, communicate this trend. Use messages such as “in the last year, the number of employees who walk or cycle to work has increased by 200%”. • If only a few people walk or cycle and there is no increasing trend over time, communicate the injunctive norm stressing that walking and cycling is the socially approved behaviour. • When communicating the smarter travel norm, make the reference group as specific as possible using available observables such as neighbourhood, postal code and employer.
Build smarter travel communities	<ul style="list-style-type: none"> • People are often looking for communities in order to exchange information and experiences. Communicating with like-minded people can strengthen the pre-built preferences and information sharing can lead to higher use of cycling to work. • Build cycle clubs in workplaces, schools and universities where people can talk to each other and create a community. • Encourage information-sharing about cycling and cycling clubs in universities, schools and workplaces in online blogs, magazines and the like.

Table 2.7. Making smarter travel timely

Make smarter travel timely	Examples
Interrupt habitual car use in moments of change	<ul style="list-style-type: none"> • Interventions to change habitual travel behaviour work best when they disrupt environmental factors that automatically cue car use. These interventions are best timed when people are undergoing changes in their lives (e.g. just after having moved, having changed occupation and having had their first child) because these are the moments when habits are most vulnerable to change. • Focus interventions on those times when people’s habits are not yet fully established. For example, intervene when students first arrive on campus, when people change their jobs and when people move house. • Short messages via email or mail at the right point in time can be much more effective than ill-timed messages.

Make Driving Difficult	Make Driving Unattractive	Make Driving Unsocial	Make Driving Untimely
<ul style="list-style-type: none"> • Add barriers to car use where possible • Make it difficult to park • Add paperwork burdens for car-related applications • Make people pay parking fees every time they park 	<ul style="list-style-type: none"> • Make all costs of driving more obvious • Design apps that calculate the true cost for every car journey • Make real time fuel consumption very obvious to reduce the joy of driving fast 	<ul style="list-style-type: none"> • Show that many people dislike driving • Highlight that driving-induced air pollution can harm vulnerable individuals (e.g. children) 	<ul style="list-style-type: none"> • Communicate time lost in traffic

Figure 2.3. Making driving difficult, unattractive, unsocial and untimely.

Table 2.8. Satisfaction with travel scale

Negative	-3	-2	-1	0	1	2	3	Positive
Bored	○	○	○	○	○	○	○	Enthusiastic
Fed up	○	○	○	○	○	○	○	Engaged
Tired	○	○	○	○	○	○	○	Alert
Stressed	○	○	○	○	○	○	○	Calm
Worried	○	○	○	○	○	○	○	Confident
Hurried	○	○	○	○	○	○	○	Relaxed
Worst I can think of	○	○	○	○	○	○	○	Best I can think of
Low standard	○	○	○	○	○	○	○	High standard
Did not work well	○	○	○	○	○	○	○	Worked well

2.4.2 Travel satisfaction is low in Dublin

Key message

The average travel satisfaction was 0.165 on the scale from -3 (very low travel satisfaction) to +3 (very high travel satisfaction). Compared with other studies using the same travel satisfaction measure, an average of 0.165 is low. For example, a study from Stockholm, Göteborg and Malmö finds an average travel satisfaction rating of 0.75, a study from Ghent finds an average travel satisfaction rating of 1.23 and a study from Stockholm, Göteborg and Karlstad finds an average travel satisfaction rating of 0.87 (Friman *et al.*, 2013, 2017; De Vos *et al.*, 2015).

Policy relevance

The relatively low travel satisfaction rating in this study indicates that the transport infrastructure might be worse in Dublin than in other European cities. This suggests that there is potential for investments in services (such as high-quality bus routes) and infrastructure (such as safe and well-lit cycling and walking paths) to increase travel satisfaction.

Note

The comparison of travel satisfaction ratings across different studies is not perfect. Although all studies use the same nine-item measure of travel satisfaction, different studies might implement the same measure in slightly different ways, which reduces comparability across studies. We suggest that a large, international study comparing travel satisfaction across multiple

cities would be beneficial by providing more robust data on comparisons across cities.

2.4.3 Active trips are most satisfying

Key message

Commuters are most satisfied when they travel actively by bike or when they walk. Commuters are least satisfied when using public transport. These patterns are illustrated in Figure 2.4. These differences across travel modes are in line with the literature on travel satisfaction (Friman *et al.*, 2018a).

Policy relevance

Communication campaigns can make use of these findings by informing travellers about the relatively high travel satisfaction associated with walking and cycling. Such information provision might convince people on the margin to try out active travel rather than stick to their car-based habits. Presenting graphs on

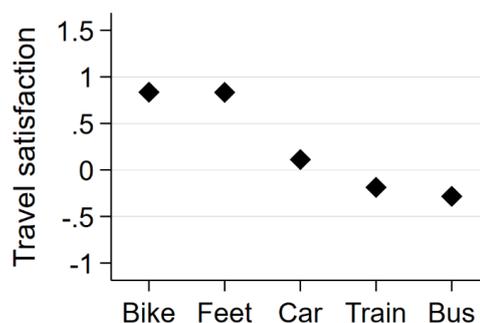


Figure 2.4. Average travel satisfaction by mode of travel.

mode-specific travel satisfaction at the right points in time might convince more people to join smarter travel initiatives such as the National Transport Authority of Ireland's (NTA) Smarter Travel Cycle Challenge and the Smarter Travel Campus initiative.²

Note

Since the differences in travel satisfaction across travel modes might not be causal, more research on this topic is warranted. It might be the case that people who are particularly satisfied with themselves, their lives and the way they travel decide to commute actively and hence indicate higher travel satisfaction. Moreover, there might be other, unobserved variables that influence both the choice of travel mode and travel satisfaction. If these factors explain differences in travel satisfaction across travel modes, switching from the car or public transport to commuting actively would not necessarily lead to an increase in travel satisfaction. We suggest that future research should implement causal research designs to test whether or not it is indeed active travel that causally increases travel satisfaction compared with motorised travel.

2.4.4 Long trips are much less satisfying than short trips

Key message

The data from the commuting survey suggest that differences in the duration of the trip is the main factor

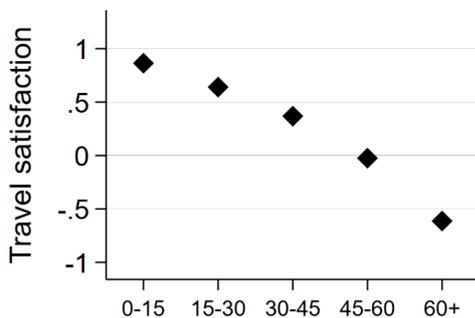


Figure 2.5. Travel satisfaction by duration of the trip in minutes.

that is responsible for differences in travel satisfaction. Commutes are relatively short when people cycle or walk to campus and relatively long when people primarily rely on public transport. Moreover, travel duration is a strong predictor of trip satisfaction as shown in Figure 2.5. For example, the predicted travel satisfaction for trips lasting less than 15 minutes is 0.865 and the predicted travel satisfaction for trips lasting more than an hour is -0.614 on the scale from -3 to +3.

We can statistically control for the differences in travel duration and calculate the predicted travel satisfaction that people would have indicated *if* all trips had taken the same amount of time. Figure 2.6 illustrates the importance of trip duration for explaining differences in travel satisfaction across travel modes. The black diamonds show the mean values of travel satisfaction for each mode just as in Figure 2.4. The vertical difference between the first diamond (bike) and the last diamond (bus) is 1.12 points on the scale from -3 to +3. The blue circles present the predicted travel satisfaction ratings by travel mode controlled for the duration of the trip, i.e. the values that people had indicated if all trips had been of the same duration. The vertical difference between the travel satisfaction rating when cycling and when taking the bus is reduced to 0.52. This reduction of the differences in travel satisfaction across travel modes indicates that differences in travel duration explain a large part of the differences in travel satisfaction.

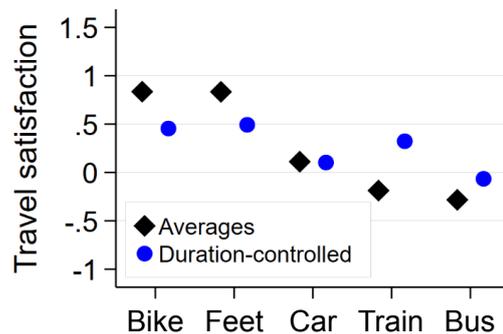


Figure 2.6. Predicted travel satisfaction by travel mode with and without controlling for the duration of the trip.

² More information about the NTA's Smarter Travel Cycle Challenge can be found online at <https://www.smartertravelworkplaces.ie/cycle-challenge-ie/> (accessed 17 February 2020) and more information about the NTA's Smarter Travel Campus initiative can be found online at <https://www.smartertravelworkplaces.ie/smarter-travel-campus/> (accessed 17 February 2020).

Policy relevance

The data show that the main advantage of active travel is its short duration and the main disadvantage of using public transport (especially train journeys) is its long duration. This suggests that policies that reduce trip duration can have a strong and positive influence on travel satisfaction. Long-term strategies can seek to reduce commuting distances through, for example, higher density planning.³ However, this is not an option in the short to medium term. Reducing distance is not the only way to reduce the trip duration. For example, the NTA is proposing to redesign the Dublin bus network over the coming years. One of their stated aims is to make bus journeys faster, more predictable and more reliable.⁴ Where these investments and actions can shorten trips, in particular, relative to the private car, there should be a further stimulus for modal shift to active and mass transit modes via increased travel satisfaction in public transport.

The findings also suggest that it may be useful to establish a general ambition for the reduction of trip journey times within a reasonable radius to less than

45 minutes. The suggestion of aiming to reduce inner-city commutes to a maximum duration of 45 minutes is based on a robust drop in travel satisfaction after this mark.⁵

2.4.5 Low travel satisfaction when commuting in rush hour

Key message

There is a rush hour effect on travel satisfaction as illustrated in the left panel of Figure 2.7. When people commute by car or public transport during rush hour (i.e. between 7 am and 9 am), they are less satisfied with their commute than when starting the commute later in the morning (e.g. at 10 am). There is no rush hour effect on active travel. The shaded areas in Figure 2.7 represent a measure of precision (a 95% confidence interval). The rush hour effect is entirely explained by travel duration. When we statistically control for the duration, i.e. when we consider a hypothetical situation in which all trips take the same amount of time, travel satisfaction ratings are

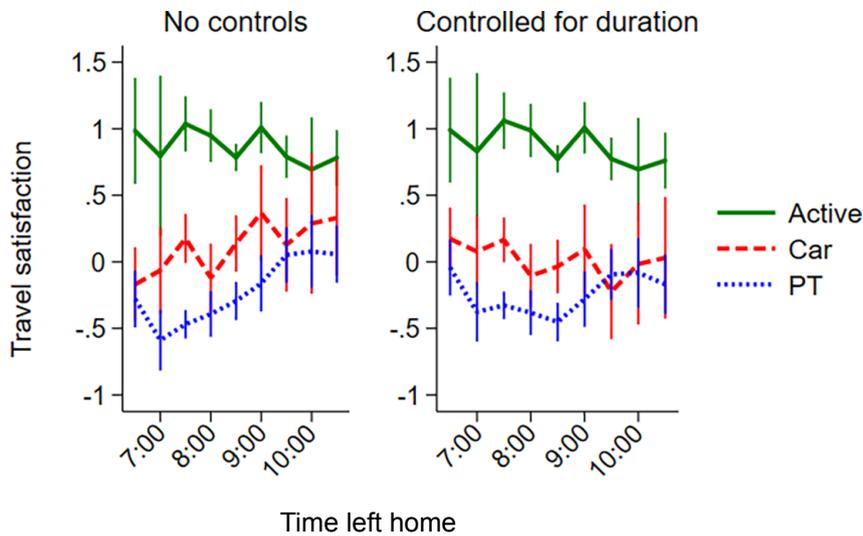


Figure 2.7. Predicted travel satisfaction by the time of starting the trip and by travel mode with and without controlling for the duration of the trip.

3 See, for example, the compact development concept in the National Planning Framework as well as details of linked national infrastructure investment plans (<http://npf.ie/project-ireland-2040-national-planning-framework/> and <http://npf.ie/wp-content/uploads/NSO-Feb18.pdf>; both accessed 17 February 2020).

4 https://busconnects.ie/media/1184/bus-connects-cbc-route-maps-web_14.pdf (accessed 17 February 2020).

5 We acknowledge that future work can set more refined travel time bands to gain additional insight into associated travel satisfaction threshold points.

independent of when people start their commutes. This is illustrated by the almost horizontal red and blue lines in the right panel of Figure 2.7.

Policy relevance

The finding that the rush hour effect on travel satisfaction is entirely explained by the trip duration suggests an ambitious short-term initiative to increase travel satisfaction. We recommend considering the introduction of a newly regulated schedule that ensures that classes and most meetings do not commence before 10 am. Anticipated effects of shifting more than 30,000 staff and students to a deferred starting hour would include:

- reduced number of commuters during the peak travel times in the morning and hence reduced journey times for commuters to the campus;
- reduced road congestion in the mornings and hence eased pressure on the morning peak public transport and travel infrastructure;
- potentially increased safety for cyclists and pedestrians travelling outside the busiest period and hence greater levels of non-motorised and mass transit mode choices.

Note

There are, of course, recognisable challenges that could range from motorists continuing to travel early to secure parking spaces and the campus population sticking to their own personal scheduling of commitments and activities to issues relating to university timetabling. However, complementary parking strategies could be developed and university staff and students are likely to represent some of the most flexible of all morning commuters. University populations are adults and they are thus capable of independent travel – something which is often not the case for primary school pupils. We recommend tendering a detailed report on the positive and negative aspects of this policy that includes the implications for transport in Dublin of such an initiative.

2.4.6 Subjective evaluations of the trip

Key messages

Study participants indicated the extent to which they felt that their commutes were safe, clean, congested/overcrowded, strenuous and convenient on a scale from 0 (not at all) to 6 (very much). Figure 2.8 presents the distributions of these five subjective characteristics

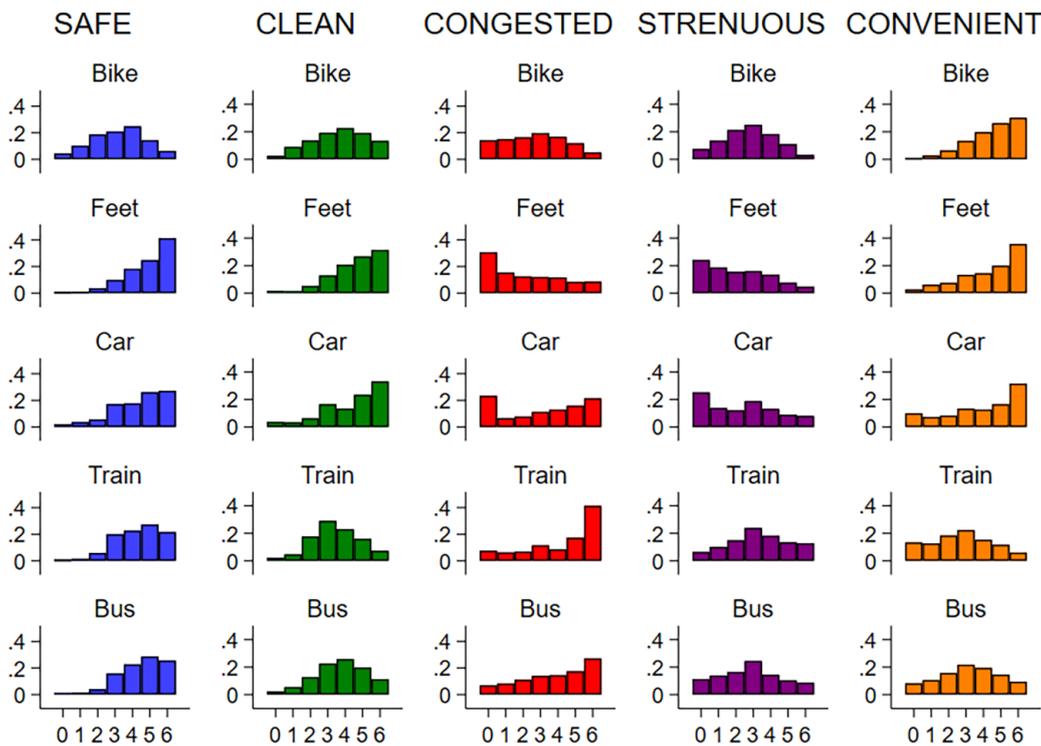


Figure 2.8. Distributions of subjective trip evaluations by travel mode.

separated by travel mode. In terms of safety, walking and cycling are perceived as the most and least safe travel mode, respectively, with means of 4.97 and 3.21, respectively. It is important to note that only commutes to the campus were evaluated and walking might be perceived as less safe in commutes from the campus in the dark hours of the day. The train is perceived as the least clean mode ($M=3.41$) and walking as the cleanest way to get to the campus ($M=4.57$). In terms of congestion/overcrowding, walking is the best mode of transport ($M=2.21$) and the train the worst ($M=4.26$). Walking is the least strenuous way to get to the campus ($M=2.15$) and the train the most strenuous ($M=3.31$). Finally, the train is least convenient ($M=2.68$) and cycling is most convenient ($M=4.53$).

Policy relevance

It is a sensible transport policy goal to make travel safe, clean, uncongested, non-strenuous and convenient. The findings presented in Figure 2.8 suggest that policies that aim to improve travel along these dimensions should be travel mode specific. In terms of safety, our data suggest that most work needs to be done regarding cycling trips. The data support the idea that cycling is not safe in Dublin. Informal inquiries on the campus about reasons not to cycle suggest that the lack of safe cycling infrastructure is among the most important reasons for not cycling even when living close enough to the campus. The commuting survey data and these inquiries support calls for infrastructure investments for safe cycle infrastructure.

Note

The data suggest that cycling is perceived as the least safe travel option. However, only commuters who chose to cycle to the campus provided data on their most recent cycling trip in this study. Those who consider cycling as particularly unsafe and who hence do not cycle to campus have not ranked cycling according to how safe it is. We recommend conducting future research with a focus on cycling and cyclists' feelings on safety. This research should gather information on the precise routes that cyclists use for their commutes, as this would allow correlating the cycling infrastructure with perceptions of safety and to identify the routes that are perceived as least and most

safe. Specifically, this research should measure factors that policies can influence. Moreover, we recommend querying all commuters about the reasons why they do not cycle to the campus and to focus the analysis on the subset of commuters who could, in principle, use a bicycle to get to the campus.

2.4.7 Parking difficulties reduce travel satisfaction

Key message

The data show to what extent those study participants who regularly take the car to campus tend to have difficulties finding a parking spot. Figure 2.9 shows that travel satisfaction ratings differ according to the answers to this question. For example, participants who only rarely have parking difficulties on campus indicate an average travel satisfaction of 0.66 (on the scale from -3 to +3). However, people who experience parking difficulties five times per week indicate an average travel satisfaction of -0.36.

Policy relevance

The strong negative effect of parking difficulties on travel satisfaction reinforces the importance of parking policy and strategy with regard to encouraging modal shift and influencing private car journeys to campus. While the immediate response may be to consider the provision of additional parking spaces, the lower relative travel satisfaction of car journeys where parking is scarce or strategically priced also represents an opportunity to stimulate additional transfers to non-motorised or mass transit modes of travel to campus. For example, research has distinguished between

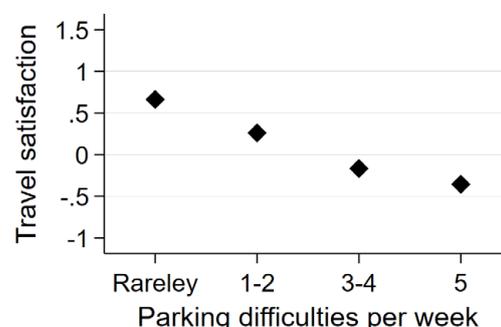


Figure 2.9. Travel satisfaction by parking difficulty for a sub-sample of 1381 participants who drive regularly to campus.

short-run “pro-bike” policies (e.g. making cycling safer and more convenient) and long-run “anti-auto” policies (e.g. reducing the convenience of commuting by car) (Noland and Kunreuther, 1995). Here, we have bracketed the number of issues that arise with anti-auto policies.

2.4.8 Geographical differences in travel satisfaction

Participants also indicated the origin point of their trip using a list of regions that could be accessed from a drop-down menu. Respondents started their trips from 259 different locations, with 221 (5.35%) starting from the campus itself. We mapped all of

these locations to the nearest local election area (LEA) and Figure 2.10 shows the average travel satisfaction rating for each area. The numbers in each LEA in this figure indicate the number of participants who started their trip from the respective area. The colour coding in the same figure indicates the average travel satisfaction rating for each LEA, using a five-point colour-coded classification from dark red (indicating lower levels of travel satisfaction) to green (indicating higher levels of travel satisfaction). The map suggests that the distance to UCD is an important geographical determinant of travel satisfaction. Moreover, there seems to be a north/south divide, with commutes that start in LEAs north of the river Liffey being less satisfying than commutes that start south of the river.

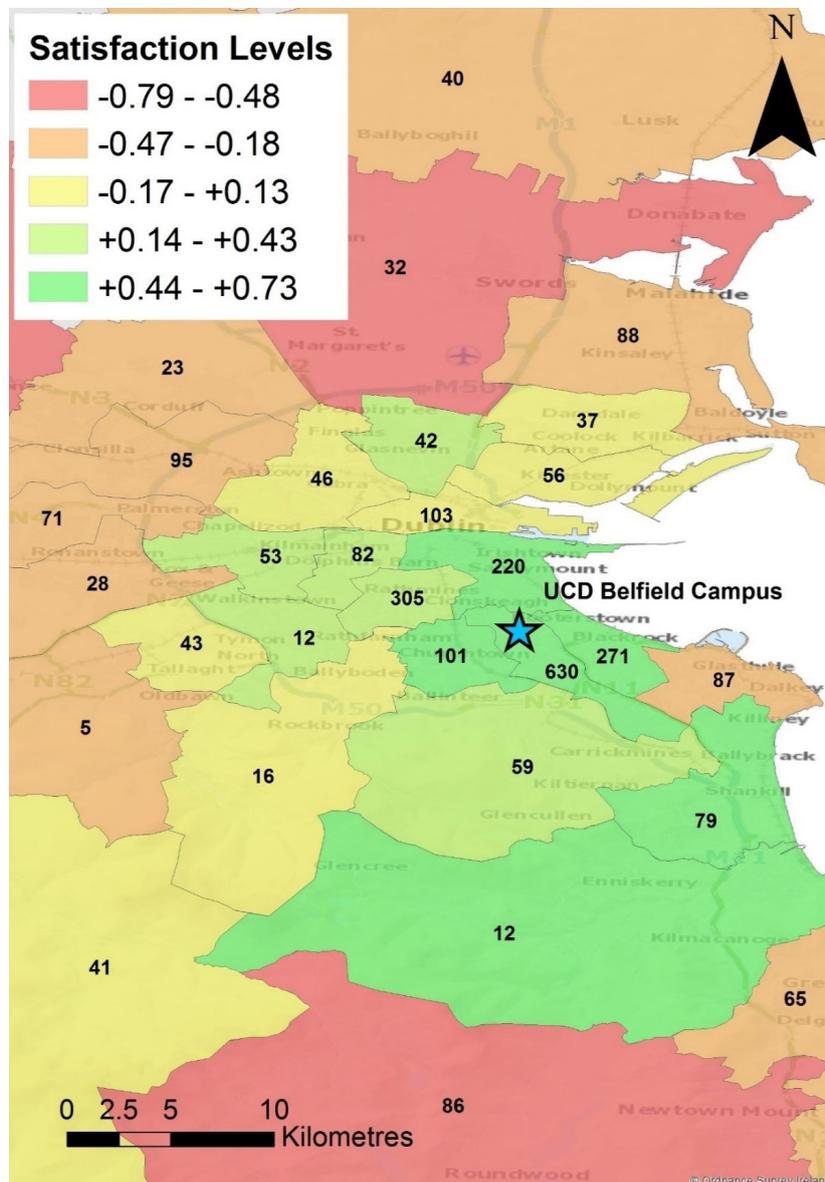


Figure 2.10. Travel satisfaction by area in which the trip started.

Note

Geospatial analyses of satisfaction with the commutes to UCD have the potential to provide important input for transport policies. The current data, however, are not specific enough to conduct more detailed geospatial analyses. We suggest that future studies on trip satisfaction aim to gather data on the origin as well as on the route taken during the commute. Moreover, future research should correlate the geospatial information with external datasets on, for example, transport accessibility, frequency of accidents, congestion and air quality.

2.5 Conclusion

The application of insights from behavioural economics to behavioural change in the transport sector is still in its infancy and only a few behavioural change interventions as suggested above have been tested in the field. While the concepts presented in this part of the report are based on the behavioural science literature, it is possible that they do not apply in the context of transport decisions and will not be effective in bringing about smarter travel choices. As such, there is a strong need to rigorously test the ideas presented here in the relevant contexts before starting

to design new policies at scale. The transport sector in Ireland offers various opportunities for such tests, preferably as part of RCTs. In these RCTs, different individuals are confronted with different vehicles of communication and a random process decides whether a given individual is confronted with one policy or the other. For example, email communications can be changed slightly by including different behaviourally informed messages. By comparing the response rates to these emails, the most effective email design can be identified. Similarly, a large-scale study should be conducted which compares travel satisfaction ratings before and after the bus network redesign in Dublin in order to identify the causal effect that this redesign has on travel satisfaction. For more information about RCTs, see the “Test, Learn, Adapt” report by the UK Behavioural Insights Team (Haynes *et al.*, 2012).

2.6 More Information

More information on behavioural barriers and behavioural change strategies related to smarter travel is summarised in EnvEcon (2020b).

For more information on the travel satisfaction data from the UCD commuting survey, see EnvEcon (2020c) and Lades *et al.* (2020a).

3 Encouraging Heat Pump Retrofits

3.1 Introduction

Fuelled by concerns about climate change, the desire for secure, efficient energy provision and international obligations to reduce emissions, the demand for clean and efficient heating technologies to replace fossil fuels is increasing. Studies show that the residential sector has substantial potential for actions (Sugiyama, 2012; Nejat *et al.*, 2015; Pablo-Romero *et al.*, 2017) and research from Ireland shows that oil and solid fuel use in the residential sector remains a substantial source of both carbon emissions and air pollutants (Clinch and Healy, 2000; Kelly *et al.*, 2016). There are many positive effects associated with the use of efficient electric heating systems in the residential sector, including improved comfort and health, savings to the household, reduced winter morbidity, reduced national emissions and associated progress on national climate and air targets. As such, the Irish Climate Action Plan (2019) has established a clear ambition for a transformative shift in energy performance and heating systems for Irish homes by 2030 (DCCA, 2019). Specifically, it calls for 600,000 heat pumps to be installed by 2030. This ambitious goal includes 200,000 installations in new build homes, with a further 400,000 retrofitted into the existing stock.

In order to encourage heat pump retrofits, many governments worldwide provide subsidies for households that decide to invest in heat pumps. The Irish government provides a grant of up to €3500 via the Sustainable Energy Authority of Ireland (SEAI) to subsidise heat pump retrofits. However, the uptake of this offer is surprisingly low and certainly too low by a margin to achieve the national targets. It is clear that the system must be streamlined to ensure greater numbers of households initiate and follow-through on heat pump retrofits.

This part of the report relies on insights from behavioural economics to suggest policies that have the potential to efficiently encourage households to replace their heating systems with heat pumps. This part of the report first identifies procrastination over

the hassle associated with heat pump retrofits as a key reason for the low uptake of government grants. In a second step, this part suggests that policies that reduce the hassle associated with heat pump retrofits are likely to be more efficient than providing financial grants for retrofit investments alone. As such, we suggest that these hassle-removal policies should complement financial support policies in order to increase citizens' uptake of grants and investments in heat pump retrofits at scale.

3.2 The Economics of Heat Pump Retrofits

Should people invest in heat pump retrofits? The stated aim in the 2019 Climate Action Plan to facilitate 400,000 heat pump retrofits until 2030 suggests so. However, it depends on a number of economic factors whether or not a heat pump retrofit makes sense for a given household. Households need to consider both benefits and costs of heat pump retrofits and some of these benefits and costs are stated below.

Benefits of heat pump retrofits include:

- improved comfort and health;
- reduced winter morbidity;
- reduced national emissions;
- associated progress on national climate and air targets;
- subsidies by the government; and
- savings to the household.

The costs of and economic barriers to heat pump retrofits include:

- too high initial costs of the heat pump and lacking access to low-cost financing;
- incentive problems where renters (and not landlords) pay the electricity bills;
- private households not benefiting as much from reduced emissions as society;
- low planning horizons of renters; and
- energy poverty.

Households would generally be expected to decide whether or not to invest in a heat pump retrofit by weighting the costs and benefits of the retrofit, i.e. by making a simple form of a cost–benefit analysis. They consider, for example, how long they will stay in the same home, how the investment changes the property value, how much the investment costs initially, what money they have available and the savings the investments will provide over time.

The low demand for heat pump retrofits would suggest that many households do not view the heat pump retrofits as economically beneficial. However, research from Ireland suggests that changing the system from oil and solid fuel-based heating to a heat pump system is economically beneficial for many Irish households (Kelly *et al.*, 2016). This puzzling lack of uptake of efficient technologies despite their economic and environmental advantages has a name in the literature: the energy efficiency gap. The literature suggests a number of explanations for the energy efficiency gap. One of these explanations focuses on “transaction costs”, more colloquially known as “hassle”.

3.3 The Hassle Associated with Heat Pump Retrofits

3.3.1 Transaction costs

Retrofitting one’s home with a heat pump is not a trivial task and the hassle associated with heat pump retrofits can be an important barrier. Below we describe the (often non-monetary and unmeasured) transaction costs that households face when considering heat pump retrofits (Kiss, 2016; Allcott and Greenstone, 2017; de Vries *et al.*, 2019):

- The difficulty of obtaining reliable information. This includes sourcing trustworthy and reliable information on the options available, the most appropriate course of action and the process.
- The difficulty of comprehending the information. The challenge of understanding the technical, detailed and often complex information about energy efficiency and operation of heat pump technologies in the home.
- The difficulty of getting the home assessed. Heat pump grants are subject to certain preconditions

that require an in-house assessment. The assessors need to be paid by the applicants irrespective of the outcome and there are no guarantees at the outset that the home will be classed as “heat pump ready” and therefore grant eligible.

- The difficulty of finding reliable contractors. At a time of considerable housing construction and renovation activity, it can be very difficult to find contractors who are willing and able to retrofit a home with a new heat pump system. Where multiple retrofits actions are planned, it can be an added hassle to co-ordinate the multiple contractors.
- The disruption in the home. Changing a heating system or undertaking related works to upgrade the insulation of your home can be disruptive given the time required, the access that you need to give to builders and the associated activities.
- The paperwork related to applications for subsidies or loans. It can be a major hassle to apply for grants, as it is sometimes not straightforward to identify where and how to apply, and often applications contain multiple steps with much potential for frustration.

3.3.2 Sludge

It will not be possible (or even preferable) to eliminate all transaction costs totally. Many of the tasks listed previously serve important functions. However, in some cases, the hassle related to these tasks is unnecessarily high. Nobel Prize-winning economist Richard Thaler and renowned lawyer Cass Sunstein have begun to call these unnecessary frictions “sludge” (by analogy with the term “nudge” that they popularised) (Thaler, 2018). Sludge can be understood as an “excessively high administrative burden”, as “too much hassle” or as “unnecessary transaction costs” (Herd and Moynihan, 2019). Sludge is a word for excessive or unjustified frictions that make it more difficult for people to get what they want or to do as they wish. In our context, it makes sense to think of sludge as unnecessarily high transaction costs associated with heat pump retrofits. As we will show in section 3.5, sludge can be particularly costly when people have a tendency to procrastinate.

3.4 Procrastination

“Never put off till tomorrow what may be done the day after tomorrow just as well.” (Mark Twain, 1870)

3.4.1 The phenomenon

For many, the quote by Mark Twain describes a familiar behaviour. Procrastination is a common problem among large segments of the population and can be a major behavioural barrier. Procrastinators plan to send emails, go to the gym in the evening and call the builders – but they never get around to doing these things. Instead, they postpone and postpone and ultimately may never get around to doing what they had planned, even though they recognise that these are things that they should do. While there are several “behavioural barriers” to heat pump retrofit that can explain why households do not make economically beneficial investments,⁶ here we focus on procrastination.

3.4.2 The explanation

A common explanation for procrastination is present bias. People who are present biased consider everything that happens in the present as being more important than anything that happens in the future (irrespective of when things happen in the future). For example, present-biased people overvalue the hassle costs of engaging in administrative tasks immediately and simultaneously undervalue the hassle costs of engaging in the same tasks on another day in the future. As a result, they are tempted to put off the administrative tasks until the future. Sometimes, such procrastination can last forever.

Endless procrastination of paperwork is particularly probable when people are unaware of their present bias. People unaware of their present bias do not believe that they will be tempted to put off the paperwork again in the future and hence expect that they will do the paperwork at the next possible occasion. They believe that not doing the paperwork today is not very costly, as they will do it tomorrow

and are thus happy (and probable) to postpone the tasks again and again and again (O’Donoghue and Rabin, 1999).

As we will illustrate in section 3.5, the combination of procrastination and even small hassles associated with heat pump retrofits can have massive behavioural effects.

3.5 Procrastinating on the Hassle Associated with Heat Pump Retrofits: An Illustration

In order to illustrate how the tendency to procrastinate combined with the presence of transaction costs that may be unnecessarily high can lead to a reduced number of heat pump retrofits, we can think of the heat pump retrofit investment as a two-step decision process.

3.5.1 Step 1: is the heat pump retrofit economically beneficial?

In step 1, households ask themselves: “Is it economically beneficial for us to invest in the heat pump retrofit?” As discussed previously, households will probably use some kind of a cost–benefit analysis to answer this question. Let us make some more assumptions to better illustrate this decision:

- A given household has completed the cost–benefit analysis and has calculated that it can save €1000 from the heat pump retrofit if making the relevant transactions today.
- The household explicitly considers the transaction costs associated with the heat pump retrofit and values these transaction costs at €50.
- Household members are present biased at a rate of 50%. They value everything that happens in the present at 100% and everything that happens in the future at 50%.

Based on these assumptions, the household calculates the benefit of completing the paperwork *today*. It compares today’s transaction costs of €50 (valued at 100%) with the future benefits of €1000

6 Other behavioural barriers to heat pump retrofits include the intention–behaviour gap (people have difficulties translating their intentions into action), the status quo bias (people prefer sticking with what they have rather than changing to new things) and social norms (people like to behave in the way that others behave as well).

(valued at 50%) and decides that the investment is beneficial because

$$-\text{€}50 + 0.5 \cdot (\text{€}1000) = \text{€}450 \quad (3.1)$$

is larger than zero.⁷

3.5.2 Step 2: when is the best time to make the transactions associated with the heat pump retrofit?

In step 2, households decide *when* to make the transactions. We assume that households simply think about making the transaction either today or tomorrow. Let us make two final assumptions:

- The household members do not believe that they will be present biased again tomorrow.
- The investment provides daily savings of €10 until a fixed point in time. Hence, completing the paperwork tomorrow rather than today will lead to net savings of only €990 instead of the €1000 that can be saved if the paperwork is completed today.

Based on these assumptions, household members can calculate the benefits of making the transactions tomorrow and compare this with the benefits of making the transaction today. They compare the costs of €50 (valued at 50% because they arise only in the future) with the benefits of €990 (also valued at 50%) and again decide that the investment is beneficial for them because

$$0.5 \cdot (-\text{€}50) + 0.5 \cdot (\text{€}990) = \text{€}470 \quad (3.2)$$

is positive. However, comparing the benefits of the heat pump retrofit they get from making the transactions today (€450) with the benefits from making the transactions tomorrow (€470) shows that household members are tempted to postpone the paperwork until tomorrow. They will procrastinate for 1 day.

3.5.3 The repetition of “step 2”

What happens tomorrow? A similar process will ensue and the household members will again

compare the utility from making the transactions today $[-\text{€}50 + 0.5 \cdot (\text{€}990) = \text{€}445]$ with the utility from making the transactions the day after tomorrow $[0.5 \cdot (-\text{€}50) + 0.5 \cdot (\text{€}980) = \text{€}465]$ This will again lead them to prefer to make the transactions the next day rather than immediately.

If household members do not learn about these patterns, they will procrastinate until the investment is not economically beneficial anymore and will thus never make the transactions and hence never invest in the heat pump retrofit. Economically, this can be an extremely unwise decision triggered by the minor inconvenience of transaction costs that the household members value at only €50.

3.6 How Many Households Will Make the Heat Pump Retrofit? Simulation Results

The case presented in section 3.5 is a simplified approach to illustrate the effects of procrastination over transaction costs on the decision to make a heat pump retrofit or not. To quantify the relevance of procrastination over transaction costs for the Irish residential heat pump retrofit market, we have developed a choice model and calibrated this model using Building Energy Rating (BER) data from the SEAI. We then used this model to simulate the estimated share of eligible households that we expect should invest in heat pumps with and without taking procrastination into account. For this exercise, we focus only on one specific type of heat pump, namely the air source heat pump (ASHP).⁸

Of note is that the proportion of households that we expect should invest in heat pumps is strongly dependent on the assumption made about the household’s planning horizon. If households expect to move out of their home in just a year or two and disregard any changes in the property value following the retrofit, households will probably not invest in new technology that pays off only in the long term. Since the time horizon is important, we present the results of the simulations in graphs that show the association

⁷ This is a very stylised description that makes a lot of simplifying implicit assumptions, for example money translates linearly into utility, all discounting is captured in present bias, there are no markets, and so on.

⁸ For this exercise, we focus on homes that have many of the “good” characteristics of candidates who should consider investing in ASHPs. Hence, we focus on 314,027 homes that are not apartments (installing ASHPs in an apartment is difficult), do not already have energy-efficient heating systems, currently heat mainly with oil or solid fuel and are not outliers. More details on these calculations are available from the academic manuscript by Lades *et al.* (2020b).

between the proportion of households that we expect should invest in an ASHP (on the vertical axis) and the time horizon (on the horizontal axis).

3.6.1 *Is it economically beneficial for me to invest in a heat pump retrofit?*

First, we calculated the proportion of households for which investing in an ASHP retrofit is economically beneficial. The line in Figure 3.1 increases from the bottom left towards the top right because the retrofits become economically beneficial for more households when the planning horizon increases. For example, if all households expected to benefit from the investment for 10 years, we calculate that for just over 40% of the eligible households investing in the ASHP is economically beneficial.

3.6.2 *The anticipated effect of financial grants*

We then calculated the proportion of households for which investing in an ASHP retrofit is economically beneficial when they can avail themselves of a government grant. In order to illustrate the potential of these grants, we used four different values. The line corresponding to the €3500 grant is colour coded in green because that is the grant actually provided by the SEAI.⁹ Figure 3.2 shows that grants can be quite effective in increasing the number of households for

which ASHP retrofits are economically beneficial. For example, for households that expect to benefit from the heat pump retrofit for another 10 years, a €3500 grant increases the proportion of households benefiting from the retrofit from just over 40% to over 80%.

3.6.3 *The anticipated effect of grants when people procrastinate*

Next, we introduce the assumption that all households are present biased (with a present bias factor of 0.95) and that transaction costs are notionally fixed at an illustrative value of €50. Comparing Figure 3.3 with Figure 3.2 illustrates the effect of present bias. Figure 3.3 shows that the behaviour of the ~40% who benefit most from the retrofit is not changed by present bias. These households make sufficiently high savings that procrastination does not matter. However, present bias matters for households whose annual savings are lower and who need longer planning horizons to make the investment worthwhile. For example, without a grant, the proportion of households the model predicts to make the retrofit investment never grows above 51% even for long planning horizons.

Figure 3.3 also shows that for households with relatively low annual savings grants are not effective. For example, for households who expect to benefit from the heat pump retrofit for another 10 years, a €3500 grant increases the proportion of households

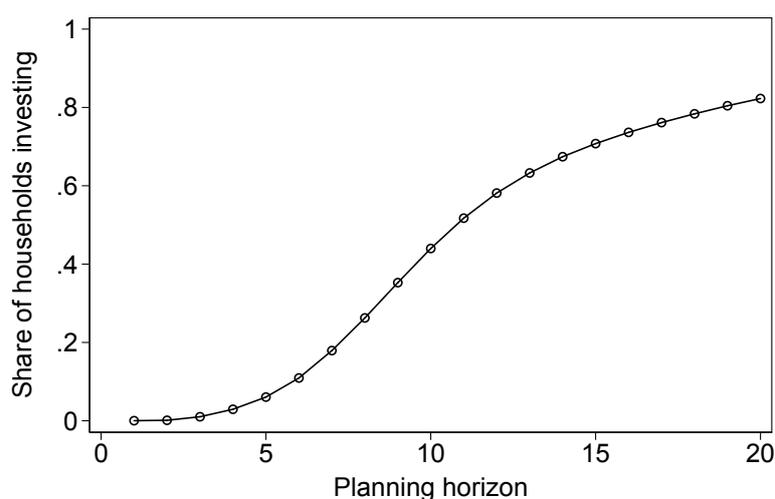


Figure 3.1. Proportion of households for whom investing in an ASHP is economically beneficial by planning horizon.

⁹ We disregard interest rates and the financial market in the model. The grant would obviously reduce borrowing requirements for those without the capital to hand.

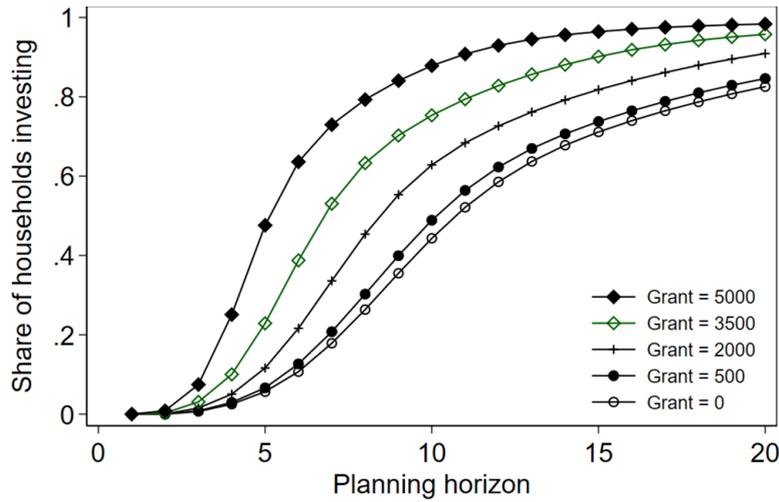


Figure 3.2. Proportion of households for which investing in an ASHP is economically beneficial by planning horizon for different grants.

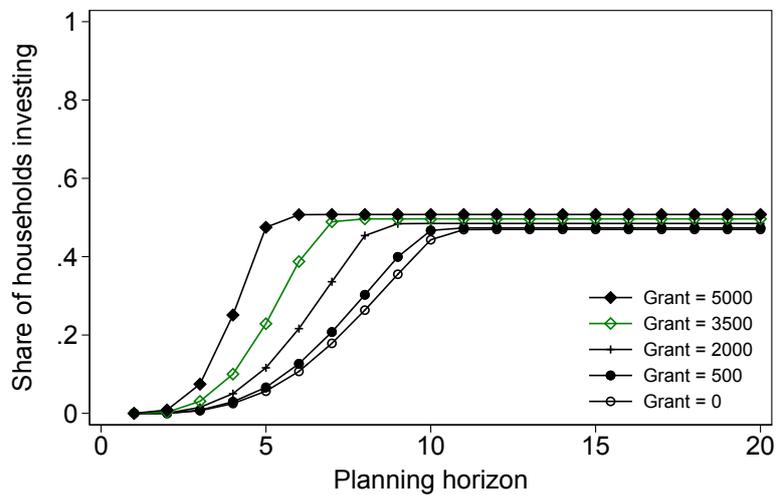


Figure 3.3. Proportion of present-biased households for which investing in an ASHP is economically beneficial and which also invest in the ASHP by planning horizon for different grants.

who make the investment only from just above 40% to 43%. These simulations show that financial grants are not an effective policy if the low uptake of ASHPs is due to procrastination rather than as a result of financial cost–benefit considerations.

3.6.4 The effect of “behaviourally modified” grants

One policy option would be to reduce the amount of the grant and instead use that money to reduce transaction costs. Figure 3.4 presents the results of a simulation in which we compare two grant designs. The first is the €3500 financial grant from Figure 3.4 which the SEAI currently offers. The second grant provides only €2000 but uses the remaining money to

reduce the transaction costs to €35. Figure 3.4 shows that moving money from a financial incentive towards a reduction in transaction costs can be more effective than the financial grant alone. This “behavioural” grant helps people overcome procrastination and is thus more effective if procrastination is the main reason for not investing in energy-efficient technology. For example, for households who expect to benefit from the heat pump retrofit for another 10 years, the €3500 grant increases the proportion of households who make the retrofit to 43%, but the financial grant of €2000, which also reduces the transaction costs to €35, increases the proportion of households that make the retrofit to about 60%. In practice, we do not know whether the low uptake of heat pumps is more because of cost–benefit considerations or on

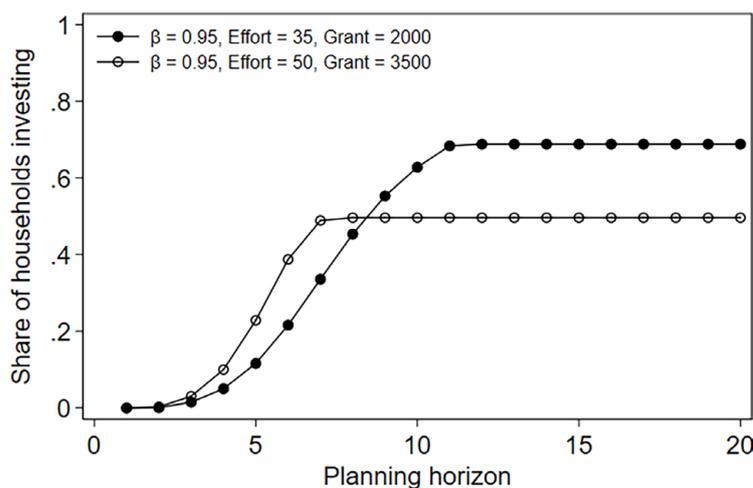


Figure 3.4. Comparison of the effectiveness of two different grants for present-biased households.

account of procrastination, and future research needs to identify the importance of both. Future research needs to test this and it is certainly sensible to trial an alternative approach in pursuit of the ambitious goal of retrofitting heat pumps into 400,000 homes by 2030.

3.6.5 Summary of the simulation results

- Result 1: even low transaction costs (hassle) can have a massive effect on whether households make heat pump retrofits or not.
- Result 2: the effectiveness of financial grants is severely limited when household members procrastinate over the hassle associated with heat pump retrofits.
- Result 3: reducing transaction costs may be a more effective policy than relying on capital grant supports alone.

3.7 Five Actions to Encourage Heat Pump Retrofits in Ireland

3.7.1 Identify unnecessary administrative burdens in sludge audits

Transaction costs can have massive effects on whether households invest in heat pump retrofits or not, so reducing transaction costs is essential to encourage heat pump retrofits at a larger scale. Some transaction costs are impossible to avoid but we must work to identify those that are avoidable. So-called sludge audits produce clarity about the magnitude of avoidable transaction costs (Sunstein, 2019) and we encourage regular sludge audits that include a lookback at existing burdens and assess

the effectiveness and cost-effectiveness of sludge reduction policies.

3.7.2 Consider re-allocating money from the grant to sludge-reducing policies

Re-allocating some money from the financial grant to measures that reduce transaction costs can increase the effectiveness of government policy to encourage heat pump retrofits. However, more research is needed. Whether public resources are better spent on reducing transaction costs rather than on handing out larger financial grants needs to be tested in the field, applying rigorous cost-benefit analyses.

3.7.3 Raise awareness of procrastination and offer commitment devices

Making people aware of their tendency to procrastinate on important activities such as the arrangement of energy-efficiency investments via, for example, information campaigns. Raising awareness of procrastination will increase the demand for commitment devices that help household members overcome their inertia by committing to arranging the retrofits on another day in the future. Authorities should look into ways to supply such commitment devices, for example by making appointments in the future.

3.7.4 Increase (perceived) planning horizons

Policymakers need to consider and identify the planning horizons of households. If household members do not plan to stay in their home for at least several years, they will not invest in energy-efficient

technology. Accordingly, policies that serve to increase household members' planning horizon, for example by encouraging a culture with more stable housing tenure, will establish a better investment environment for heat pump retrofits. It should also be communicated to homeowners that the investments into heat pump retrofits will increase the home's value and thus may be economically beneficial even with lower planning horizons.

3.7.5 *Include transaction costs and behavioural factors in models explaining the demand for heat pump retrofits*

Ignoring transaction costs and present bias can lead governments to overestimate the effectiveness of

financial grants. Policy designs need to be evaluated using models that include well-established behavioural aspects in order to more accurately estimate the effectiveness of incentives. Governments who ignore the existence of transaction costs and people's tendency to procrastinate will be too optimistic about the effectiveness of financial grants and this will work against successful attainment of nationally defined ambitions for 400,000 heat pump retrofits in Ireland by 2030.

3.8 More Information

For more information and further details, see EnvEcon (2020d) and Lades *et al.* (2020b).

4 Measuring and Encouraging Pro-environmental Behaviour in Everyday Life

4.1 Introduction

Individual behaviour is one of the main factors contributing to increasing environmental damages and the resulting challenges we face today (Steg and Vlek, 2009), and it is unlikely that global warming can be limited to 1.5°C above pre-industrial levels without behavioural change (IPCC, 2018). Plastic in the ocean, global warming, air pollution and other environmental challenges have all been linked to people’s behaviours such as littering, air temperature regulation and transport choices.

Governments worldwide have begun to call for behavioural change and are considering insights from the behavioural sciences in order to design policies that change people’s environmentally relevant decisions. Many of these policies focus on encouraging “pro-environmental behaviours” (or PEBs; Box 4.1). In order to design these policies effectively, it is essential to have a detailed understanding of the decision-making processes that lead to PEBs in the relevant contexts.

4.1.1 Low- and high-frequency decisions

We can distinguish between two fundamentally different types of decisions, both with potentially enormous environmental impacts. On the one hand, *low-frequency decisions* are typically made with

a lot of deliberation and thought. They are usually important one-off decisions that are made once a month, once a year or even once a lifetime. Examples are the decisions to insulate the attic, buy a more environmentally friendly car or change energy provider. On the other hand, *high-frequency decisions* are made on a daily basis, often intuitively with little or no deliberation. Examples include the decisions to eat or smoke a little more, to take the car rather than the bus to go grocery shopping or to watch another episode of one’s favourite TV show (see Figure 4.1).

Depending on whether the aim is to influence low-frequency or high-frequency decisions, the appropriate policies are very different. Since high-frequency decisions typically involve less deliberation and reflection than low-frequency decisions, behavioural policies such as nudges are probably most effective in changing high-frequency decisions.

The common measurement tools in the social and the behavioural sciences, i.e. experiments and surveys, are particularly good tools to investigate low-frequency decisions. However, to investigate high-frequency decisions that are made repeatedly in everyday life, other methodologies are needed. The need for these tools to measure everyday decisions is particularly pressing in the context of the current environmental challenges because everyday behaviours have a large impact on the environment.

Box 4.1. Definition of PEBs

What are PEBs?

Pro-environmental behaviours can be defined in various ways. We understand a PEB to be a behaviour that consciously seeks to minimise the negative impact of one’s actions on the natural and built world (Kollmuss and Agyeman, 2002). PEBs are often assigned to different clusters, such as water saving, energy conservation, recycling, transport and nutrition (Blankenberg and Alhusen, 2018).

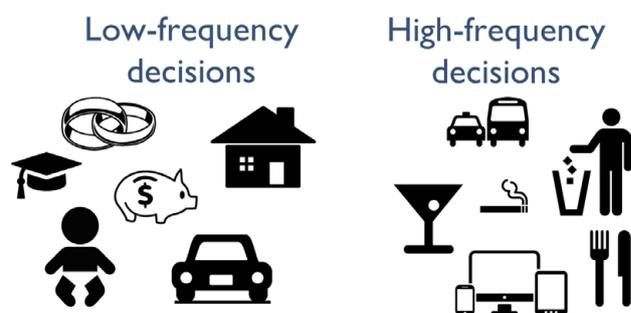


Figure 4.1. Low-frequency and high-frequency decisions.

4.1.2 Key aims of this part of the report

- To present a method (the DRM) that allows to efficiently measure PEB in everyday life.
- To present key results from a study on everyday PEBs and their determinants.
- To develop recommendations for future research and policymaking in the context of everyday PEB.

4.2 The Study

In order to illustrate the benefits of measuring PEBs for policymaking, we present some key results from a study we conducted in summer 2019. The study was conducted on Prolific Academic (<https://www.prolific.ac/>) with 354 participants (63.5% of participants were female and the average age was 37). It measured PEBs in general and also the behaviours conducted on 1 day of the participants' lives (yesterday) as described in the following section. Additionally, we measured individual-specific preference parameters (time preferences, risk preferences and social preferences), psychological measures (green identity and trait self-control) and demographics (such as age, gender, marital status and income). We conducted the study on 7 days in a row with about 50 participants on each day to have information for every day of the week.

4.3 Measuring Pro-environmental Behaviour

4.3.1 Pro-environmental behaviours in general

There are various ways to measure PEBs. Most studies ask participants how frequently they enact in a list of behaviours *in general* (Whitmarsh and O'Neill, 2010; Bissing-Olson *et al.*, 2016; Blankenberg and Alhusen, 2018; Melo *et al.*, 2018; Schmitt *et al.*, 2018). These lists vary in terms of the behaviours included and range from short lists with only a handful of behaviours to long and detailed lists with more than 40 behaviours.

Following the existing literature, in our study we measured general PEBs asking two different types of questions. First, we asked participants to indicate the last time they undertook seven actions with "Never", "5 or more years ago", "1-4 years ago" and "In the last year" as answer possibilities. Second, we asked participants to indicate how often they undertake 22 actions with "Never", "Occasionally", "Often" and

"Very often" as answer possibilities. Figures 4.2 and 4.3 show the items we used and also present the answers participants gave.

Figure 4.2 shows, for example, that buying light-emitting diode (LED) light bulbs is by far the most common investment in environmentally friendly products. On the other hand, almost nobody has ever installed a renewable energy system. Figure 4.3 shows, for example, that recycling, using reusable bags when shopping and saving electricity in the home are very common behaviours. However, other behaviours, such as carpooling, participating in environmental activities and avoiding or reducing meat consumption, are rather uncommon.

4.3.2 Pro-environmental behaviours in everyday life

The data presented in section 4.3.1 come from self-reported measures of the frequency of engaging in the respective PEBs. Next, we use the DRM to get a more fine-grained measure of PEBs in everyday life. We argue that the DRM provides more accurate measures of frequency because (1) participants are asked to

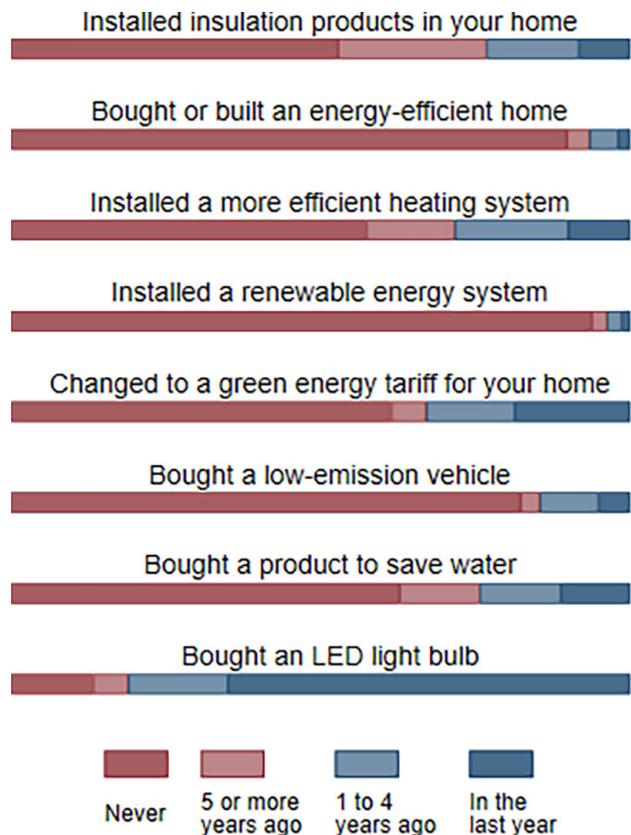


Figure 4.2. How often do you engage in these actions?

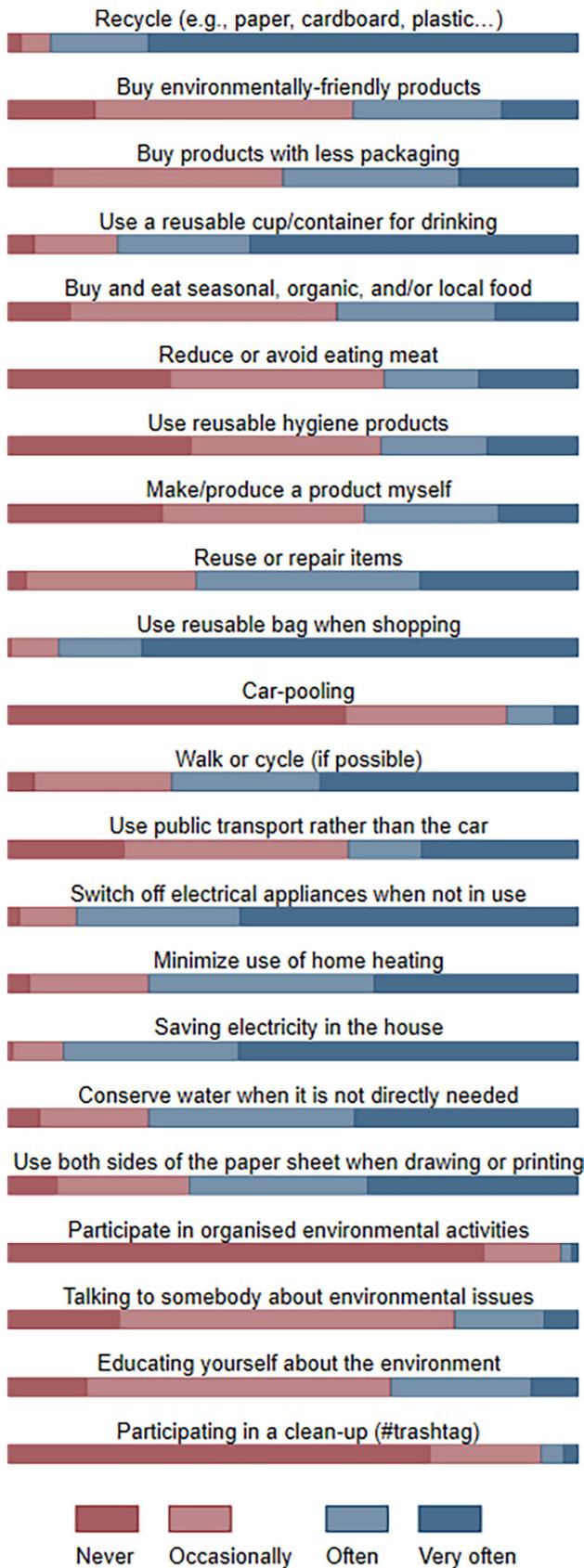


Figure 4.3. When was the last time you undertook this action?

remember what they did on the previous day rather than over a longer time period and (2) averaging over the sample allows the actual number of behaviours (rather than categories of self-reported frequencies, such as never, occasionally and often) to be measured.

It is less common to measure everyday PEBs. One study asked participants to complete a survey three times per day (in the late morning, the afternoon and the evening) on their mobile phones for 5 consecutive days. Participants indicated whether or not they had engaged in five PEBs since the last time they had answered the questions (Baumgartner *et al.*, 2019). The focus on only five PEBs was on account of the rather high burden put on participants in these smartphone studies.

An alternative approach (which we recommend) is to use the DRM to measure PEBs that participants had engaged in on the day previous to the study (Kahneman *et al.*, 2004). The DRM is a powerful measurement technique to elicit information on people’s inner and outer lives as they go through their days. It is a survey technique that is based on a reconstruction process in which study participants relive their day “yesterday” as if they were writing in their diary. After having relived their day, participants were asked to respond to follow-up questions about environmental behaviours on the next screen. To help them recall what had happened the day before, participants see their answers from the previous screen again as illustrated in Figure 4.4.

A number of limitations of the DRM approach should be kept in mind: the data are based on self-reports about what participants did yesterday. Such self-reports might be influenced by biases such as memory bias and social desirability bias. Future work should test different ways to minimise memory biases and use objective data on PEBs, such as meter readings of electricity, peer ratings and observations by trained persons. Moreover, we will present correlations and these should not be interpreted causally. Future research should embed the diary methodology in causal study designs. Finally, the sample is not nationally representative and future work should put particular emphasis on the sample composition.

In our study, we asked participants to separate their day (yesterday) into morning, afternoon and evening.

More details about Yesterday Morning

Now, we would like to ask you some specific questions about Yesterday morning. To help your memory, below is what you answered about yesterday morning:

<p>What you did yesterday morning: Woke up, got ready, drove to work, worked, had a coffee, had a meeting.</p>
<p>How you felt yesterday morning: Tired at first. Otherwise happy.</p>

Figure 4.4. Example of memory aid in the DRM.

For each part of the day, we asked them to tell us whether or not they had engaged in a list of 20 PEBs. The answer options for the participants were as follows (Bissing-Olson *et al.*, 2016):

- “yes” if they engaged in the behaviour;
- “no, but I could have” if it was possible to engage in the behaviour, but they did not;
- “not applicable or can’t recall” if none of the above fitted.

Figure 4.5 presents all the behaviours we used. The list was informed by recent papers on PEBs and was adapted to the daily context (Whitmarsh and O’Neill, 2010; Bissing-Olson *et al.*, 2016; Blankenberg and Alhusen, 2018; Schmitt *et al.*, 2018). Figure 4.5 also shows how often the individual behaviours were enacted (in dark blue) and when they were not enacted although enactment was possible (in light blue).

4.4 Determinants of Pro-environmental Behaviour

Research has identified a broad range of determinants that can predict which people behave more pro-environmentally than others. For example, environmental psychologists suggest that factors such as green identity (Akerlof and Kranton, 2000; Whitmarsh and O’Neill, 2010; Binder and Blankenberg, 2017), social norms (Farrow *et al.*, 2017), sense of control (Gifford and Nilsson, 2014) and personality traits (Milfont and Sibley, 2012) predict whether or not and how frequently people behave pro-environmentally. Our study contributes to this literature by testing whether or not economic preference measures predict PEBs and by focusing on everyday PEBs.

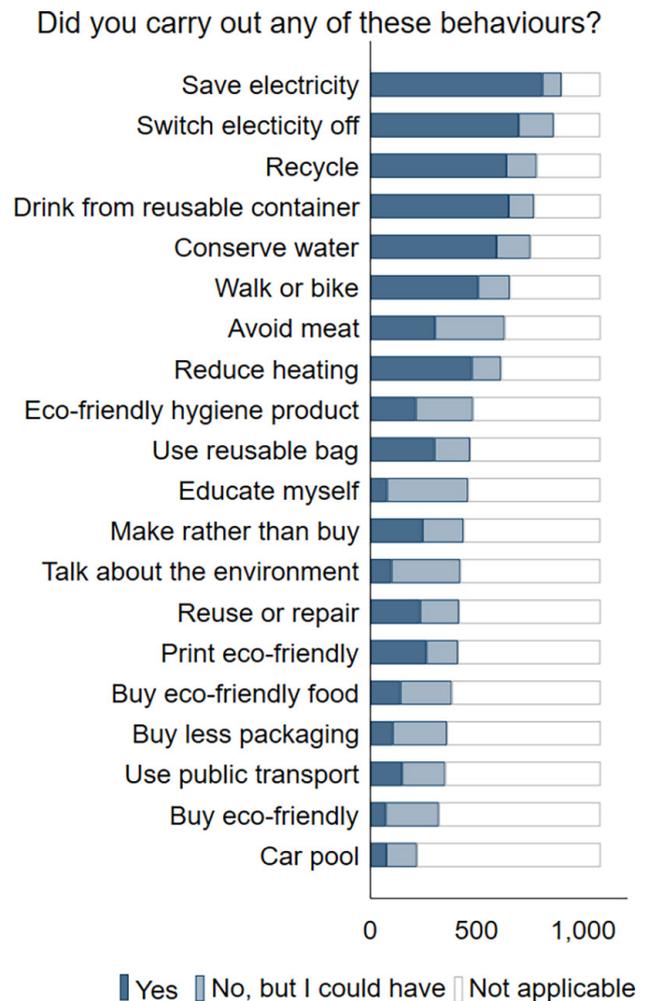


Figure 4.5. PEBs enacted yesterday.

4.4.1 Calculating pro-environmental behaviour indexes

In order to identify the determinants of PEBs both on the general level and in everyday life, we calculated two indexes. First, we created a general PEB index by giving the values 1, 2, 3 and 4 to the four answer options in all questions about general PEBs and

then averaging over all questions for each individual one. Figure 4.6 shows the distribution of this general PEB index. Second, we summed up all PEBs each individual had conducted yesterday. As shown in Figure 4.7, there is substantial heterogeneity in this number across individuals.

We can correlate these measures with other individual-specific variables we observed in the study to test whether or not we can predict who acts in pro-environmental ways more than others.

4.4.2 Demographics

First, we tested for gender differences in PEBs. Figure 4.8 shows that females enacted in more PEBs the day before the study. On average, females enacted

19.2 PEBs and males enacted 16.9 PEBs during the previous day. Figure 4.9 shows that females also score higher (2.43 on average) than males (2.30 on average) on the general PEB index. T-tests indicate that both differences are statistically significant at the 0.05 confidence level.

We also found a small, but significant, age effect when looking at everyday PEBs. Older participants engaged in fewer PEBs than younger individuals, as indicated in Figure 4.10. The correlation coefficient was -0.12 and is significant. There was no significant association between age and the general PEB index, as shown in Figure 4.11.

To illustrate the effect of education, we distinguished between participants with and without a college

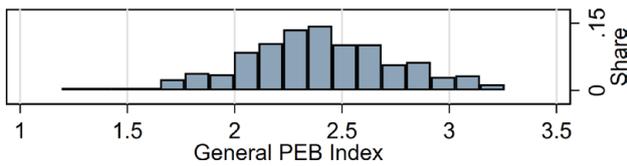


Figure 4.6. General PEB index.

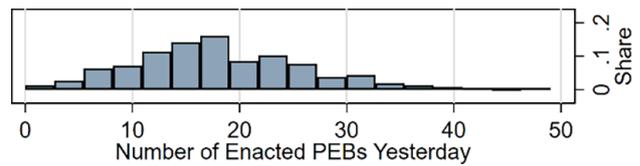


Figure 4.7. Number of PEBs enacted yesterday.

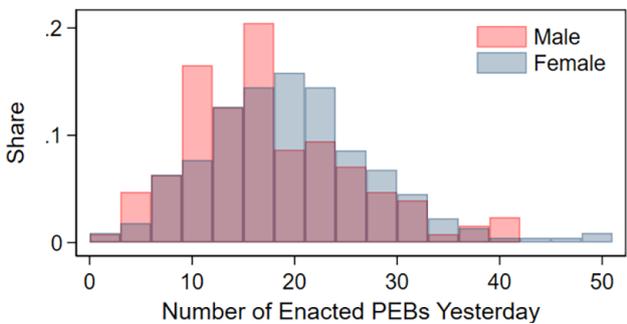


Figure 4.8. Number of PEBs enacted yesterday by gender.

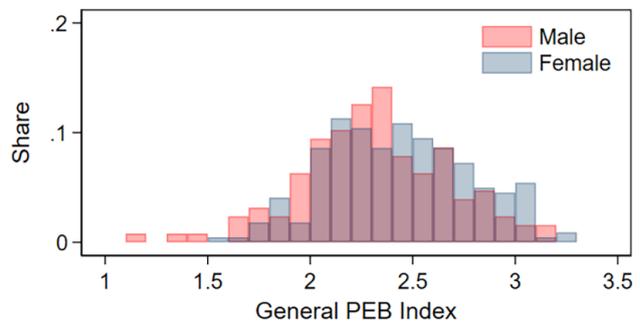


Figure 4.9. General PEB index for females and males.

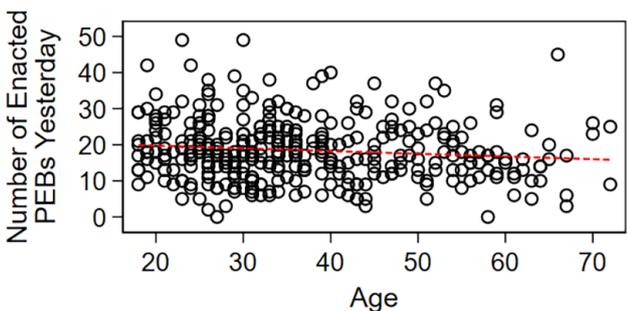


Figure 4.10. Number of PEBs enacted yesterday by age.

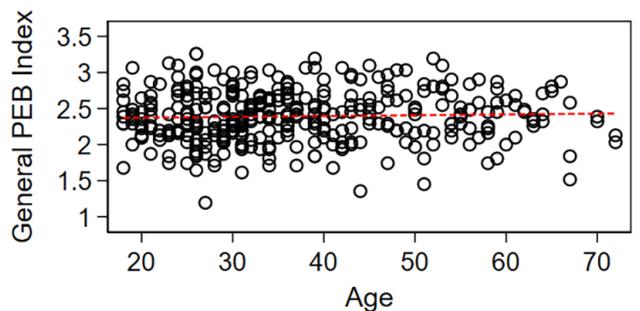


Figure 4.11. General PEB index by age.

degree. As Figure 4.12 shows, participants with a college degree enacted in more PEBs (19.2 on average) than participants without a college degree (16.6 on average). We observed the same pattern for the association between having a college degree and the general PEB index, with average values of 2.43 and 2.29 for participants with and without a college degree, respectively (see Figure 4.13). These differences are statistically significant.

4.4.3 Psychological variables

In terms of psychological variables, we focused on green identity and trait self-control. Having a green identity can act as a motivator to enact PEBs and hence both variables should be positively correlated (Akerlof and Kranton, 2000; Binder and Blankenberg,

2017). Having high levels of self-control should help overcome intention behaviour gaps where people with high self-control are better able to translate their environmental attitudes into behaviour (Daly *et al.*, 2014; Kotabe and Hofmann, 2015; Lades and Hofmann, 2019). This should be the case for high-frequency behaviours which conflict between an impulsive choice and long-term goals. Hence, the association between these two variables should also be positive.

Figure 4.14 shows that participants with a greener identity enacted significantly more PEBs yesterday compared with individuals with less green identity. The correlation coefficient is 0.24. Figure 4.15 shows that the correlation between green identity and general PEBs is even stronger, with a correlation coefficient of 0.56.

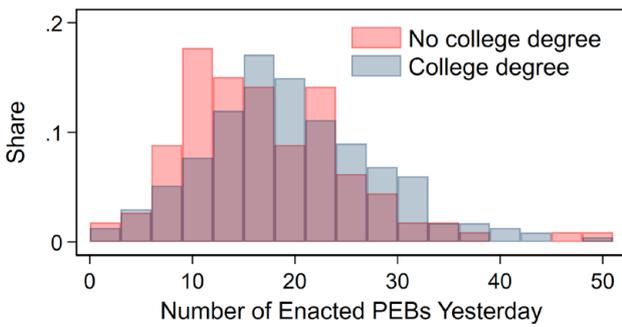


Figure 4.12. Number of PEBs enacted yesterday by a college degree.

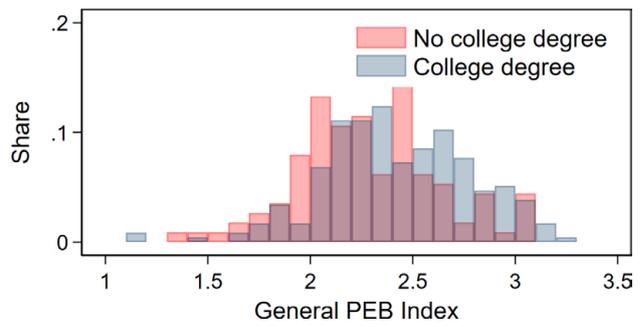


Figure 4.13. General PEB index by a college degree.

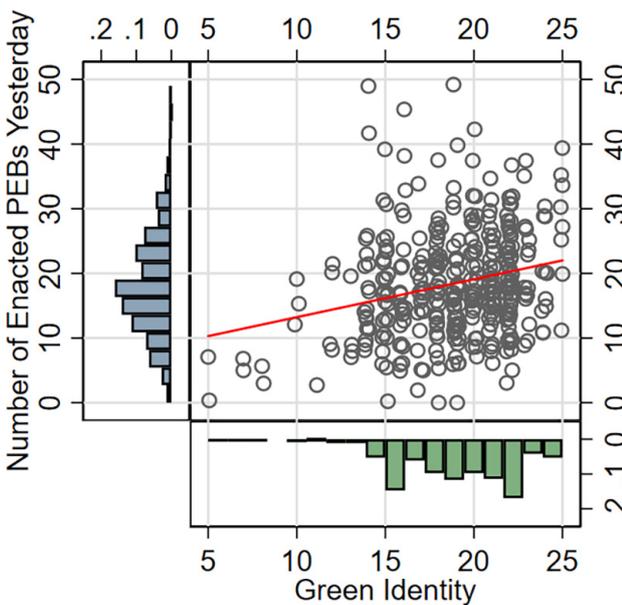


Figure 4.14. Number of PEBs enacted yesterday by green identity.

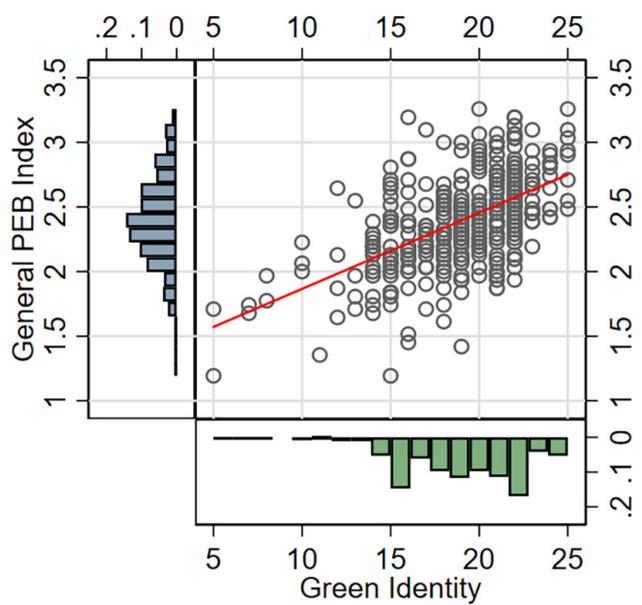


Figure 4.15. General PEB index by green identity.

Figures 4.16 and 4.17 show the associations between trait self-control and PEBs yesterday and in general, respectively. The correlation coefficients are positive in both cases but only the association between trait self-control and the general PEB index is statistically significant with a correlation coefficient of 0.21.

associations with the number of PEBs enacted yesterday with correlation coefficients of 0.12 and 0.18, respectively. The associations with the general PEB index are significant for positive reciprocity with a correlation coefficient of 0.22 and for altruism with a correlation coefficient of 0.31.

4.4.4 Economic preferences

A large and growing literature in economics investigates individual differences in economic preferences focusing on risk, time and social preferences (Falk *et al.*, 2018). These economic preference measures have been shown to explain variation in behaviour across the different domains including health, credit debt and pension savings. PEBs can also be linked theoretically to time preferences (they typically are costly now with benefits only in the future), risk preferences (their effects on the environment are uncertain) and social preferences (PEB is often viewed as an act of altruism). So far, there has not been a systematic investigation of the associations between these preference measures and PEBs.

Figures 4.18 and 4.19 show the associations between seven economics preference measures and PEBs yesterday and in general, respectively. Negative reciprocity and altruism show significantly positive

4.5 Policy Relevance

4.5.1 Summary of the findings

This study showed that:

- It is possible to measure PEBs in everyday life in a cost-effective way using the DRM.
- There are substantial differences across PEBs in terms of whether or not people have the opportunity to engage in them and/or whether or not people actually engage in them.
- Pro-environmental behaviour in everyday life can be predicted by being female, being relatively young, having a college degree, having a green identity and having preferences for negative reciprocity and altruism.
- The correlations between individual-specific variables and general pro-environmental tendencies tend to be higher than the associations with PEBs in everyday life.

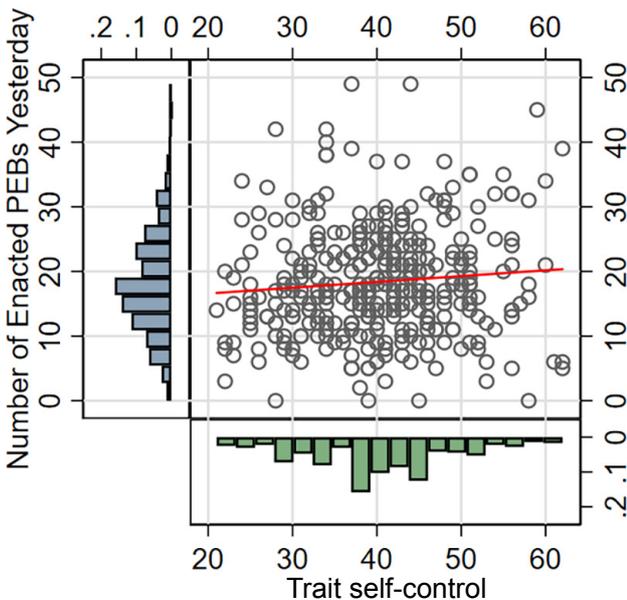


Figure 4.16. Number of PEBs enacted yesterday by trait self-control.

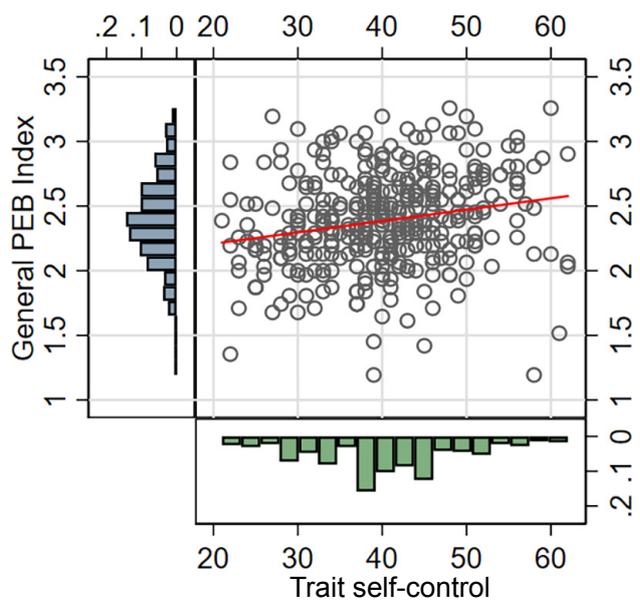


Figure 4.17. General PEB index by trait self-control.

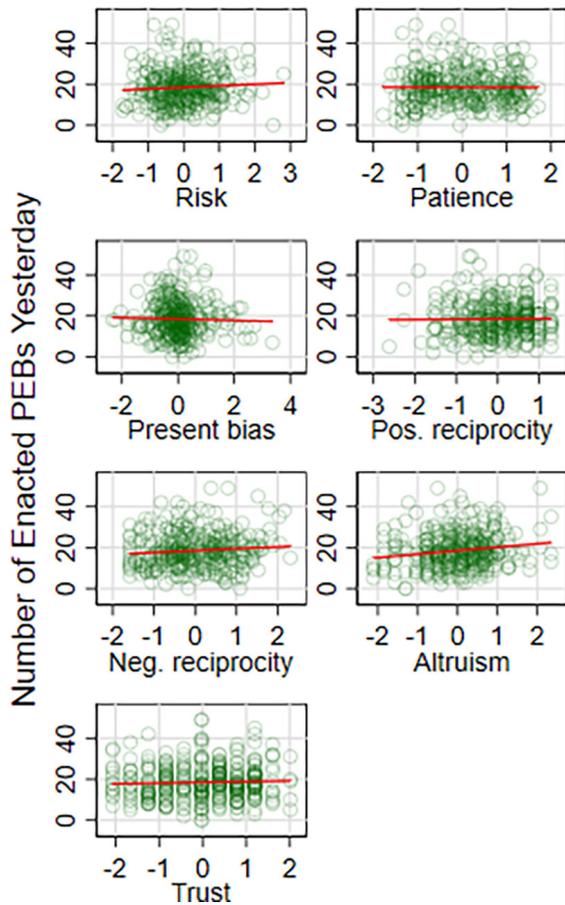


Figure 4.18. Number of PEBs enacted yesterday by economic preference measures (standardised).

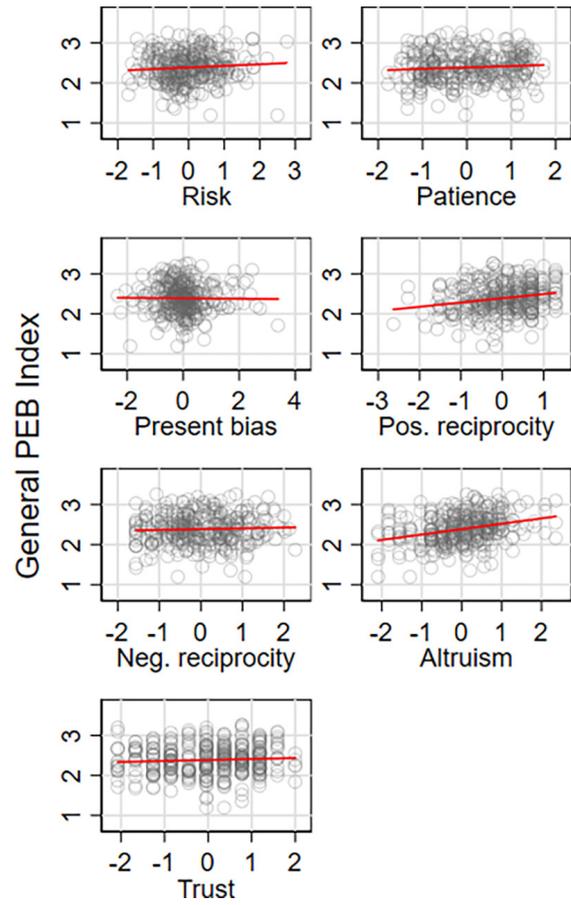


Figure 4.19. General PEB index by economic preference measures (standardised).

4.5.2 Potential for behavioural change interventions

Behavioural change interventions (rather than harder interventions and infrastructure development) are most likely to be successful when the opportunity to act pro-environmentally is already present, but where, for various reasons, individuals are not motivated to act pro-environmentally. The DRM study we present here allows us to measure the domains of PEBs in which behavioural interventions are likely to be most successful. The light blue bars in Figure 4.20 represent these cases where participants did not act pro-environmentally although the opportunity for PEB was present and hence where the potential for behavioural change interventions is the greatest. Figure 4.20 presents the 20 PEBs reordered according to the potential for behavioural change using behavioural change interventions.

4.5.3 Changing the person versus changing the context in which decisions are made

Some behavioural change interventions aim to change the person (e.g. by changing knowledge, attitudes and preferences). However, it is often hard to change attitudes and deep individual preference structure. It might be easier to activate certain aspects of our lives, such as environmental identities and attitudes. For example, information campaigns can highlight green identities or the importance of altruism and our data suggest that such campaigns have the potential to change everyday PEB. Our study suggests that interventions that aim to increase self-control and time and risk preferences are likely to be less effective.

Other behavioural interventions aim to change the context in which people make pro-environmental decisions. For example, making double-sided printing the default or simplifying the forms that need to be

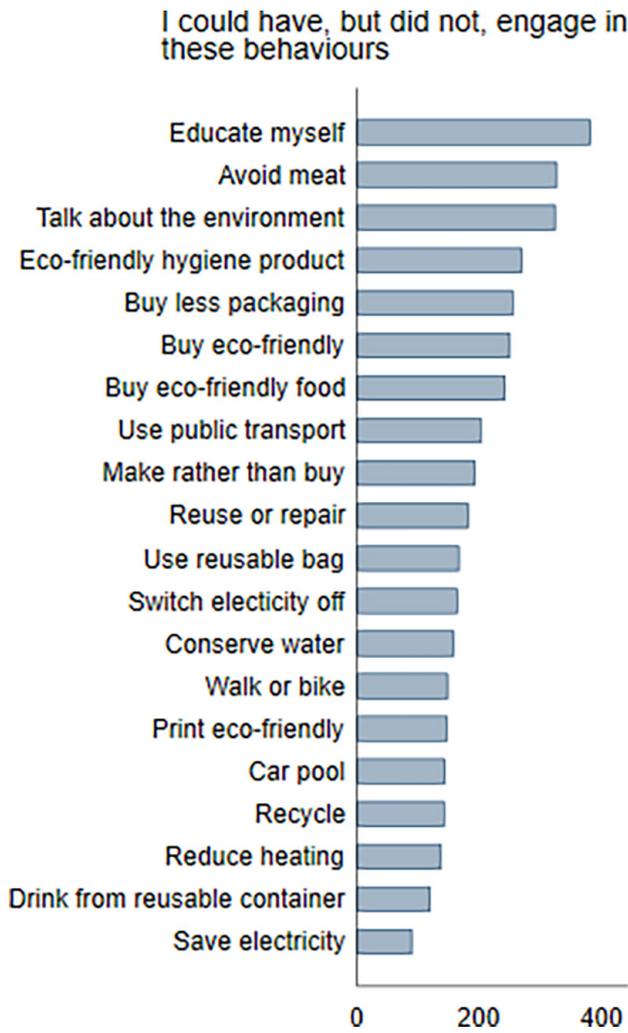


Figure 4.20. Most potential for behavioural change interventions.

completed for energy-efficiency investments can lead to PEB. We recommend that future studies on everyday PEBs focus on these situational factors that might influence PEBs and are amenable to change by policies.

4.5.4 Focus on specific pro-environmental behaviours

Most environmental policies focus on specific behaviours, such as energy use, travel and recycling. Hence, we suggest that more studies should investigate specific everyday environmental behaviours. For example, we conducted a study on disposable coffee/tea cup consumption in response to policy attempts to tackle the throw-away culture and thoughts about the “latte levy”. This study also suggests that having a green identity is associated with a lower number of disposable cups used. The same study also showed that even when the hot drinks are consumed in the same place where they are also bought over 40% of these hot drinks are consumed in a disposable cup. We suggest that more, behaviour-specific studies like this will help to identify potential for behavioural change regarding everyday PEBs.

4.6 More Information

More details about this study are available from EnvEcon (2020e).

5 Encouraging Ethical Uses of Behavioural Insights

5.1 Introduction

Policies that aim to change behaviour rely more and more on insights from the behavioural sciences. Governments and other agents have begun to use behavioural insights to “nudge” people to make better choices as judged by themselves without reducing their freedom of choice (Thaler and Sunstein, 2008). Nudging has been used to, for example, encourage people to pay their taxes on time, save more for retirement and eat healthier food. Nudges do not provide new information, nor do they change economic incentives or take away choice options. To the contrary, they rely on findings from the psychological and behavioural sciences about how people’s choices are influenced by the contexts in which decisions are made. Nudges change the decision-making context, or the *choice architecture*, to influence how people behave.

With the major uptake of nudging in many governments worldwide, a literature about the ethics of nudging has emerged (Rebonato, 2012; Bubb and Pildes, 2014; Sunstein, 2016). Sometimes in heated debates, ethical considerations are discussed that might make a nudge ethically acceptable or not. However, this debate is usually abstract and not easily accessible for nudge practitioners who actually use the insights in the real world to change behaviours. As a result, a systematic assessment of the ethics of nudging is often missing in practice.

In lack of ethical guidelines, nudge practitioners are sometimes asked to “nudge for good”. For example, whenever Richard Thaler, one of the authors of the book *Nudge*, is asked to autograph a copy of the book,

he signs with “Nudge for Good”, which is meant as a plea rather than an expectation (Thaler, 2015). In a recent editorial, he added that we should “nudge, not sludge” and avoid nudging for evil, mucking things up or making wise decision-making and prosocial activities more difficult (Thaler, 2018). However, the meaning of the phrase “nudge for good” may still not be obvious to all practitioners. The assessment of the ethics of a specific nudge thus often relies on the moral intuition of the practitioner. Many nudgers aim to nudge for good, but it is not straightforward for usually busy practitioners to identify and answer potentially complex ethical questions about whether a given nudge is ethically acceptable or not.

This is in stark contrast to how easy it has become to design effective nudge interventions relying on behavioural science frameworks such as MINDSPACE and EAST, popularised by the UK Behavioural Insights Team (Dolan *et al.*, 2010; Behavioural Insights Team, 2014). These frameworks represent memorable mnemonics in which each letter refers to a behavioural science insight that nudgers can (and do) readily apply in their contexts. For example, the *M* in MINDSPACE refers to the importance of the *messenger* and the *E* in EAST reminds nudgers to make the wanted behaviour as *easy* as possible to engage in.

There is a need to make it easier for nudge practitioners to think about the ethical acceptability of their attempts to change behaviour. Hence, Lades and Delaney (2020) suggest using FORGOOD – an ethics framework that synthesises the debate on the ethics of nudging in a new easy and memorable mnemonic. Table 5.1 provides a summary of this framework

Table 5.1. The FORGOOD ethics framework

Key dimension	Summary questions
Fairness	Does the behavioural policy have undesired redistributive effects?
Openness	Is the behavioural policy open or hidden and manipulative?
Respect	Does the policy respect people’s autonomy, dignity and freedom of choice to go their own way?
Goals	Does the behavioural policy improve welfare for those being nudged and for society as a whole?
Opinions	Do “enough” people accept the means and the ends of the behavioural policy?
Options	Do more effective policies exist and are they warranted? Do less intrusive policies with similar effectiveness exist?
Delegation	Do the policymakers have the right and ability to use the power delegated to them?

with the key dimensions in the first column and short summary questions relevant for each dimension in the second column. The framework's ultimate aim is to reduce the potential for misuse of behavioural science in applied policy settings. FORGOOD is a tool that suggests considering seven core ethical dimensions when designing and implementing behavioural policies: fairness, openness, respect, goals, opinions, other options and delegation.

5.2 The FORGOOD Ethics Framework

5.2.1 Fairness

Ethical nudges aim to help people to make better decisions. However, when decision improvements occur unevenly, concerns about fairness and justice can emerge. Since people have different preferences and different resources available to them, a given nudge might benefit some but fail to benefit others. For example, from a fairness perspective, a nudge that helps underprivileged segments of the population to avoid unnecessary fees might be given priority over a nudge that helps affluent individuals invest more effectively. To nudge for good, nudge practitioners should consider the heterogeneous effects of a nudge on different segments of the population.

5.2.2 Openness

Most traditional economic policies (such as bans, mandates, taxes and information campaigns) are highly visible and can easily be scrutinised and assessed by the public, for example through voting mechanisms. While most of the currently used behavioural policies are also transparent, nudges have the potential to be difficult to observe and thus to be manipulative. To assess the openness of a behavioural policy, nudge practitioners can ask two questions (Bovens, 2009). First, does the public have the chance to scrutinise the policy? Public announcements about the policy, its goal, rationale and methodology in official statements and press briefings provide an opportunity for the public to scrutinise and criticise the policy. Second, how easy is it for watchful individuals to identify that a behavioural policy is in place? To answer this second question, knowledge about the mechanism through which the policy influences

decisions is essential. Considering the extent to which a nudge is overt or covert can help policymakers avoid being manipulative. Only in cases where individuals indicate that they actively want the policy to be hidden should policymakers consider non-transparent interventions.

5.2.3 Respect

To be ethically acceptable, a behavioural policy needs to respect people and in particular their autonomy, their dignity and their freedom of choice (Rebonato, 2012). Respecting autonomy means that nudges do not treat adults as if they were children whose capacities for making good decisions are not being taken seriously. Nudges that respect autonomy also ensure that people's capacity to deliberate and determine what to choose (their agency) and their sense of self and self-chosen goals (their self-constitution) are not negatively affected (Vugts *et al.*, 2018). Respecting dignity means that nudges do not stigmatise those being confronted with the nudge, as would be the case when pictures of obese people are presented on the packaging of unhealthy food products. Respecting dignity also means that policymakers acknowledge that behavioural insights do not suggest that people are stupid. To the contrary, even the most intelligent individuals can benefit from nudges, as the world we live in today is hard to navigate (Dubner and Thaler, 2018). Respect for freedom of choice is the core of the definition of nudges and nudged individuals are always able to go their own way (Thaler and Sunstein, 2008). However, some nudges are easier to resist than others (Saghai, 2013; Bubb and Pildes, 2014). For example, default settings that determine what happens if individuals do nothing might lead busy and boundedly rational individuals to believe that they do not have a choice. These individuals' freedom of choice is reduced to the extent that they are not aware of the choice opportunity. Hence, even if freedom of choice is present in theory, it may not be straightforward to obtain in practice. These issues of respect for autonomy, dignity and freedom of choice are more relevant when considering Type 1 nudges (which work via the automatic decision-making in System 1) rather than Type 2 nudges (which appeal to deliberative thought and cognitive deliberation in System 2) (Kahneman, 2011).

5.2.4 Goals

When designing nudges, policymakers need to be clear about the goals of the policies. Many nudges aim to improve the lives of the nudgees “as judged by themselves”. Unfortunately, obtaining information about what people judge to be a good life is not always easy, as it can be difficult (some argue impossible) for an outside observer to identify the goals of those being nudged (Sugden, 2017). An awareness of this difficulty and the fact that nudgers might lack information and make miscalculations themselves can help nudgers to design policies more carefully and ethically. Other nudges are designed to reduce externalities (e.g. nudges to encourage PEB), to benefit common goods (e.g. nudges to encourage people to donate to charities) or to benefit other important societal values (e.g. promoting equality). Even if these nudges do not make people better off, as judged by themselves, they can be ethically acceptable. However, there are nudges that are not ethically acceptable because they aim to maximise the nudgers’ profits at the expense of those being nudged. Thaler and Sunstein call the latter “sludges” (Thaler, 2018; Sunstein, 2019). To differentiate nudging from sludging, nudge practitioners need to have a good idea about what their goals are and they have to establish that these goals improve, rather than reduce, welfare.

5.2.5 Opinions

Different people have different opinions about the ethical acceptability of nudges. Hence, it might be impossible to design a nudge that everybody agrees with. Nudgers should consider how much disagreement is bearable (and in line with fairness considerations). Acceptability of nudges can be concerned with both the ends (what is the goal of the nudge?) and the means (what methods does the nudge use?) of the policy (Clavien, 2018). A strong justification for the nudge is present when nudgers and a large majority of the nudgees agree about both the ends and the means of the policy. In order to identify public opinions about nudging, surveys can be designed that ask people whether or not they like nudges and whether or not they like to be nudged. Previous results from such surveys suggest that there is generally majority support for nudging, but the results also show that public opinions differ across different types of nudges (Sunstein, 2016).

5.2.6 Other options

While nudges are very topical in policy circles these days, it is important to acknowledge that they are merely one of several policy options (Loewenstein and Chater, 2017). At times, policymakers might be best advised to rely on hard interventions, such as bans, mandates and incentives, in order to change behaviour effectively. An ethical argument can be made against nudging if it diverts attention and political will away from stronger political tools. For example, nudging alone will probably not solve some of the most pressing problems, including climate change, unemployment and low mental health. Considering alternatives to nudging, including the alternative to do nothing and let markets and spontaneous orders define the choice architecture, can be essential to evaluate whether a nudge is ethical or not.

5.2.7 Delegation

Policymakers should consider whether or not they have the right and the ability to nudge. The right to nudge does not come from anywhere but is delegated to the policymakers. They need to ask themselves whether or not this delegation is legitimate and whether or not it resulted from a fair process. Acceptable delegation includes delegation by law, by professional function and by public concertation. Unacceptable delegation can be present when the power of changing the choice architecture was given to the nudgers by groups with strong interests. Policymakers need to reflect on their own role in the nudging process and put special focus on potential conflicts of interests in this reflection. When reflecting on power, policymakers should also consider whether or not they are competent enough to complete the delegated tasks efficiently.

5.3 Conclusion

FORGOOD summarises seven key dimensions of the debate on the ethics of nudging. Of course, one can think of other important ethical dimensions. However, some of these are relevant for any type of policy influence, not only nudging. More complex frameworks would be able to capture more ethical aspects (e.g. whether or not the nudge encourages learning). However, more complexity would also make

the framework less memorable and less likely to be adopted on a voluntary basis by choice architects.

We encourage applied researchers in this area to use FORGOOD as a starting point to think systematically about the ethics of nudging and to develop their own, case-specific ethics frameworks for behavioural policymaking. These could develop into checklists with sets of injunctions from which policymakers would

find actionable guidance. For now, however, we view FORGOOD itself as a nudge to “nudge for good”.

5.4 More Information

More details about the FORGOOD ethics framework are available from EnvEcon (2020f) and Lades and Delaney (2020).

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Abbreviations

ASHP	Air source heat pump
DRM	Day Reconstruction Method
DUUU	Difficult, unattractive, unsocial and untimely (framework)
EAST	Easy, attractive, social and timely (framework)
LEA	Local election area
NTA	National Transport Authority of Ireland
PEB	Pro-environmental behaviour
RCT	Randomised controlled trial
SEAI	Sustainable Energy Authority of Ireland
UCD	University College Dublin

AN GHNÍOMHAIREACHT UM CHAOMHNÚ COMHSHAOIL

Tá an Gníomhaireacht um Chaomhnú Comhshaoil (GCC) freagrach as an gcomhshaoil a chaomhnú agus a fheabhsú mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaoil a chosaint ó éifeachtaí díobhálacha na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

Rialú: Déanaimid córais éifeachtacha rialaithe agus comhlionta comhshaoil a chur i bhfeidhm chun torthaí maithe comhshaoil a sholáthar agus chun díriú orthu siúd nach gcloíonn leis na córais sin.

Eolas: Soláthraimid sonraí, faisnéis agus measúnú comhshaoil atá ar ardchaighdeán, spríodhíre agus tráthúil chun bonn eolais a chur faoin gcinnteoireacht ar gach leibhéal.

Tacaíocht: Bimid ag saothrú i gcomhar le grúpaí eile chun tacú le comhshaoil atá glan, táirgiúil agus cosanta go maith, agus le hiompar a chuirfidh le comhshaoil inbhuanaithe.

Ár bhFreagrachtaí

Ceadúnú

Déanaimid na gníomhaíochtaí seo a leanas a rialú ionas nach ndéanann siad dochar do shláinte an phobail ná don chomhshaoil:

- saoráidí dramhaíola (*m.sh. láithreáin líonta talún, loisceoirí, stáisiúin aistriúcháin dramhaíola*);
- gníomhaíochtaí tionsclaíocha ar scála mór (*m.sh. déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta*);
- an diantalmhaíocht (*m.sh. muca, éanlaith*);
- úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe (*OGM*);
- foinsí radaíochta ianúcháin (*m.sh. trealamh x-gha agus radaiteiripe, foinsí tionsclaíocha*);
- áiseanna móra stórála peitрил;
- scardadh dramhuisece;
- gníomhaíochtaí dumpála ar farraige.

Forfheidhmiú Náisiúnta i leith Cúrsaí Comhshaoil

- Clár náisiúnta iniúchtaí agus cigireachtaí a dhéanamh gach bliain ar shaoráidí a bhfuil ceadúnas ón nGníomhaireacht acu.
- Maoirseacht a dhéanamh ar fhreagrachtaí cosanta comhshaoil na n-údarás áitiúil.
- Caighdeán an uisce óil, arna sholáthar ag soláthraithe uisce phoiblí, a mhaoirsiú.
- Obair le húdarás áitiúla agus le gníomhaireachtaí eile chun dul i ngleic le coireanna comhshaoil trí chomhordú a dhéanamh ar líonra forfheidhmiúcháin náisiúnta, trí dhírú ar chiontóirí, agus trí mhaoirsiú a dhéanamh ar leasúchán.
- Cur i bhfeidhm rialachán ar nós na Rialachán um Dhramhthrealamh Leictreach agus Leictreonach (DTLL), um Shrian ar Shubstaintí Guaiseacha agus na Rialachán um rialú ar shubstaintí a ídionn an ciseal ózóin.
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaoil.

Bainistíocht Uisce

- Monatóireacht agus tuairisciú a dhéanamh ar cháilíocht aibhneacha, lochanna, uisce idirchriosacha agus cósta na hÉireann, agus screamhuisecí; leibhéil uisce agus sruthanna aibhneacha a thomhas.
- Comhordú náisiúnta agus maoirsiú a dhéanamh ar an gCreat-Treoir Uisce.
- Monatóireacht agus tuairisciú a dhéanamh ar Cháilíocht an Uisce Snámha.

Monatóireacht, Anailís agus Tuairisciú ar an gComhshaoil

- Monatóireacht a dhéanamh ar cháilíocht an aeir agus Treoir an AE maidir le hAer Glan don Eoraip (CAFÉ) a chur chun feidhme.
- Tuairisciú neamhspleách le cabhrú le cinnteoireacht an rialtais náisiúnta agus na n-údarás áitiúil (*m.sh. tuairisciú tréimhsiúil ar staid Chomhshaoil na hÉireann agus Tuarascálacha ar Tháscairí*).

Rialú Astaíochtaí na nGás Ceaptha Teasa in Éirinn

- Fardail agus réamh-mheastacháin na hÉireann maidir le gáis ceaptha teasa a ullmhú.
- An Treoir maidir le Trádáil Astaíochtaí a chur chun feidhme i gcomhar breis agus 100 de na táirgeoirí dé-ocsaíde carbóin is mó in Éirinn.

Taighde agus Forbairt Comhshaoil

- Taighde comhshaoil a chistiú chun brúnna a shainnaint, bonn eolais a chur faoi bheartais, agus réitigh a sholáthar i réimsí na haeráide, an uisce agus na hinbhuanaitheachta.

Measúnacht Straitéiseach Timpeallachta

- Measúnacht a dhéanamh ar thionchar pleananna agus clár beartaithe ar an gcomhshaoil in Éirinn (*m.sh. mórfheananna forbartha*).

Cosaint Raideolaíoch

- Monatóireacht a dhéanamh ar leibhéil radaíochta, measúnacht a dhéanamh ar nochtadh mhuintir na hÉireann don radaíocht ianúcháin.
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as tairmí núicléacha.
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta.
- Sainseirbhísí cosanta ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

Treoir, Faisnéis Inrochtana agus Oideachas

- Comhairle agus treoir a chur ar fáil d'earnáil na tionsclaíochta agus don phobal maidir le hábhair a bhaineann le caomhnú an chomhshaoil agus leis an gcosaint raideolaíoch.
- Faisnéis thráthúil ar an gcomhshaoil ar a bhfuil fáil éasca a chur ar fáil chun rannpháirtíocht an phobail a spreagadh sa chinnteoireacht i ndáil leis an gcomhshaoil (*m.sh. Timpeall an Tí, léarscáileanna radóin*).
- Comhairle a chur ar fáil don Rialtas maidir le hábhair a bhaineann leis an tsábháilteacht raideolaíoch agus le cúrsaí práinnfhreagartha.
- Plean Náisiúnta Bainistíochta Dramhaíola Guaisí a fhorbairt chun dramhaíl ghuaiseach a chosaint agus a bhainistiú.

Múscaill Feasachta agus Athrú Iompraíochta

- Feasacht chomhshaoil níos fearr a ghiniúint agus dul i bhfeidhm ar athrú iompraíochta dearfach trí thacú le gnóthais, le pobail agus le teaghlaigh a bheith níos éifeachtúla ar acmhainní.
- Tástáil le haghaidh radóin a chur chun cinn i dtithe agus in ionaid oibre, agus gníomhartha leasúcháin a spreagadh nuair is gá.

Bainistíocht agus struchtúr na Gníomhaireachta um Chaomhnú Comhshaoil

Tá an ghníomhaíocht á bainistiú ag Bord Iáinimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóirí. Déantar an obair ar fud cúig cinn d'Oifigí:

- An Oifig um Inmharthanacht Comhshaoil
- An Oifig Forfheidhmithe i leith cúrsaí Comhshaoil
- An Oifig um Fianaise is Measúnú
- Oifig um Chosaint Radaíochta agus Monatóireachta Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag comhaltáí air agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair inní agus le comhairle a chur ar an mBord.

Encouraging Environmentally Friendly Behaviour with Insights from Behavioural Economics



Authors:

Leonhard K. Lades, J. Andrew Kelly and J. Peter Clinch

Identifying Pressures

The 2019 Climate Action Plan sets out ambitious targets for Ireland in sectors including transport (e.g. to add 500,000 public transport and active travel journeys daily by 2035), residential heating (e.g. to install 600,000 heat pumps by 2030) and waste (e.g. to recycle 70% of packaging waste by 2030). In order to achieve these targets, infrastructure investments are essential. However, infrastructure investments are not enough. The investments must be paired with broad behavioural change. It has become increasingly clear that ignoring the human element reduces the effectiveness of infrastructure investments because of “last mile problems”. There is therefore a pressing need for strategies that encourage environmentally friendly behaviours in all sectors, including transport, residential heating and simple everyday life. These strategies need to be both effective and ethical.

Informing Policy

This report draws on insights from the behavioural sciences (mainly behavioural economics and psychology) to support environmental policymaking in Ireland with the goal of encouraging environmentally friendly behaviour across several sectors. The report is divided into five parts that present a methodological guide for behavioural analysis, an appraisal of barriers to smarter travel, design strategies for residential retrofit grant schemes, factors affecting pro-environmental behaviour and a framework for ethical behavioural policymaking. The unifying theme across all parts is the application of insights from the behavioural sciences to environmental policymaking.

Developing Solutions

Day reconstruction method – A survey technique that allows the gathering of data from people’s everyday lives. The report delivers a six-step guide to assist policymakers in designing day reconstruction studies.

Transport sector – The report analyses the determinants of travel satisfaction and identifies behavioural barriers to “smarter travel”. Recommendations are provided on ways to overcome these barriers.

Residential sector – The report analyses decisions to invest in heat pump retrofits and highlights the “hassle factor” as a major behavioural barrier. The research demonstrates how reducing hassle can be more effective than increasing grants.

Pro-environmental behaviour – The report presents novel day reconstruction method data on everyday pro-environmental behaviours. The report delivers policy design support by highlighting how certain characteristics are linked to more pro-environmental behaviour than others (e.g. in terms of demographics, green identity and altruism).

Ethics of behaviourally informed policymaking – Although behavioural science can offer considerable value to policymaking, ethical boundaries must be defined. The report delivers this through the FORGOOD framework, which highlights seven ethical dimensions: fairness, openness, respect, goals, opinions, options and delegation.