



NEXT STEPS:

TACKLING PLASTIC LITTER

A Nudging Strategy for Reducing Consumption
of Single-Use Disposable Cups



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About the Report

This report was produced by PBM Sweden AB, and commissioned by the Swedish Environmental Protection Agency (EPA).

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Foreword

Mismanaged plastics are a growing environmental challenge of global concern. Large quantities accumulate in our oceans, threatening our marine ecosystems, as well as in our air, soil and freshwater. To overcome one aspect of the plastics problem – plastic litter – and mitigate environmental pollution of land and sea, there is a need for further action and cooperation, both nationally, within the EU and globally.

The habit of grabbing a coffee or other beverage on-the-go has grown significantly over the past decades, and this has led to a substantial increase in the consumption of single-use disposable cups. Plastic cups and lids are among the top 10 items collected on the beaches globally.

In this report nudging is explored as a complement to traditional policies to reduce the use of single use plastics, such as regulation, economic incentives and information campaigns. Behavioural insights are used to develop different options to nudge consumer preferences from single-use cups to more sustainable alternatives. Based on careful reviews and analysis of previous nudging projects, three green nudges are proposed to catalyze this shift. Once the COVID-19 pandemic is largely behind us, we hope to be able to test the effectiveness of these nudges in real life by introducing pilot projects at coffee shops in several countries.

The project is part of the ongoing cooperation on behavioural insights for policy-making within the UN One Planet network multistakeholder programme on Sustainable Lifestyles and Education. The nudging project was kicked off in Stockholm in February 2020 with a workshop on the practice of behavioural economics as an environmental policy instrument.

Since 2018 the Swedish Government has assigned the Swedish Environmental Protection Agency to strengthen national and international cooperation for the circular and sustainable use of plastics. This project is one of the projects funded under this initiative to date.

As members of the UN One Planet network and other roles, we foresee further cooperation and sharing of knowledge and experiences to accelerate the shift to sustainable consumption and production, according to the goals of Agenda 2030. By working together, we can make a global change and protect our ecosystems.

Swedish Environmental Protection Agency
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BACKGROUND

Governments worldwide are prioritising the issues of plastic waste and plastic pollution, as awareness of the environmental impact grows. Single-use, take-out coffee cups are a significant part of the disposable plastics challenge.

A nudging response, informed by behavioural science, could help to tackle the problem, and lead the way for other policy interventions.

Governments around the world are prioritizing plastic pollution as an environmental urgency and are increasingly investigating potential policy tools that could address the leakage of plastics into the environment. Environmental scientists have also recognized plastic pollution as a major threat to global ecosystems (Bläsing & Amelung, 2018; Horton et al., 2017; Rockström et al., 2009b, 2009a). Littering with plastic products and challenges in the management of plastic waste are important contributors to the problem. Recent reports for the European Commission (Addamo et al., 2017) and for the Swedish Environmental Protection Agency (Nordin et al., 2019) suggest that take-away coffee cups contribute significantly. The habit of grabbing a coffee on-the-go has grown significantly over the past decades, and the mixed paper/plastic single-use disposable cups that have become the standard, and the plastic lids that often come with them, are among the most abundant items of litter found on beaches, in parks, and in water bodies in Europe and many other parts of the world. Even when these items reach the waste management system, the recycling and composting infrastructure and technology lacks the efficiency and volume to sustain the present level of single-use cup consumption. As mixed paper/plastic cups and plastic lids gradually disintegrate in the natural environment or in landfills, plastic particles seep into soil and water, eventually contaminating the oceans and accumulating in animals.

Analysis of the environmental impacts of single-use cups is a matter for natural scientists. The focus here is on the human behaviours that contribute to the problem, and how they can be deliberately altered to mitigate the environmental impacts of single-use cups. This calls for psychological analyses and methods.

Consumers tend to be aware of plastic pollution as an environmental problem, but they often fail to grasp the extent and severity of the problem.

Many businesses have engaged with strategic efforts to change consumer behaviours regarding disposable containers, with limited success. As with many other sustainability threats, consumers tend to be aware of plastic pollution as an environmental problem, but they often fail to grasp the extent and severity of the problem, or translate this awareness into more sustainable behaviours (e.g. Chang & Chou, 2018; Hartley et al., 2015; Pahl & Wyles, 2017). In order to bridge the gap between awareness and sustainable behaviour change, scholars have advised that policymakers consult expertise in the behavioural sciences to explore new potential strategies to reduce plastic litter and pollution (e.g., Hartley et al., 2015; Heidbreder et al., 2019; Moss, n.d.; Pahl & Wyles, 2017). Nudging is one tool that is increasingly applied to address challenges related to sustainability and the environment (i.e. green nudges; see Byerly et al., 2018; Carlsson et al., 2019; Thaler & Sunstein, 2009). Unlike traditional policy tools, nudging builds on people's existing ways of thinking and making decisions, to direct specific behaviours in predictable ways.

The Purposes of the Report

Because the literature is still young regarding how green nudges can be applied to plastic consumption, and to single-use cups in particular, it is important to examine how nudging could complement existing policies in this area. This report looks

at whether nudging can be used as a complement to traditional policy tools to influence the user-level behaviours that contribute to plastic litter and pollution from single-use cups. The report focuses on interventions aimed at changing behaviours at the user level, which we take to encompass individual consumption and disposal behaviours.

The report proposes a nudging strategy and implementation guidelines that can be adapted and used by national and local governments.

The report is aimed at policymakers and higher-level stakeholders. It draws on existing knowledge and experiences to suggest green nudges to reduce consumption and pollution, particularly relating to single-use plastics. The report proposes a nudging strategy and implementation guidelines that can be adapted and used by national and local governments, where a large-scale project to test the nudges will begin once cafés and other coffee-serving settings are open, post-COVID. The proposed strategy can also be used by other EU countries, and globally. It provides a foundation for the application of behavioural science in policymaking more broadly, as well as specific direction in how nudging can be applied to reducing pollution from single-use cups.

The report is based on a review and analysis of relevant academic literature and reports. The academic review and analysis is complemented by input from interviews that were held with eight representatives from major market stakeholder organizations in Sweden, comprising product managers, sustainability managers, individual business owners, location managers and franchise workers. These representatives remain anonymous and their input is only included briefly where relevant. However, their input provided our team with insights into the specific conditions and considerations that are important for businesses if they are to engage collaboratively with policymakers and researchers around the proposed strategies.

The report is divided into five sections, which reflect the process formulated by the Swedish Environmental Protection Agency to guide the development of behaviourally informed policies (see Gravert & Carlsson, 2019):

Section 1: A behaviourally informed way of understanding the problem(s) behind plastic litter and pollution from single-use cups

Section 2: A systematic examination of relevant behaviours

Section 3: A proposal for an intervention strategy grounded in the nudging approach

Section 4: An implementation and evaluation strategy that will allow for gradual tuning of the intervention strategy and crucial knowledge gains

Section 5: A framework for bringing the intervention strategy to scale in diverse settings and countries and to other product categories

Throughout the report, we draw on relevant scientific literature and documented experience from relevant previous efforts. We also indicate how nudging interventions could be expected to interact with and complement other, more traditional policy instruments, including public information campaigns, economic policy instruments, and regulation. The report can therefore support policymakers in considering how behaviourally informed interventions can be applied to enable and support traditional policies in promoting sustainable transitions.

Glossary

Bounded rationality The idea that choices are rarely completely rational because people have limited information, cognitive processing capability, and time to evaluate options.

Choice architecture The structure through which choices are made, such as how and in what order and with what attending information different options are introduced.

Effectiveness trial A controlled field experiment designed to determine the degree to which an intervention produces the desired effects when it is applied in complex, real-life settings where support and control are typically less than optimal. Effectiveness trials do not allow for the same level of control as efficacy trials but provide realistic estimates of the effects and costs that an intervention can be expected to have when implemented as policy.

Efficacy trial A rigorously controlled field experiment designed to determine the degree to which an intervention produces the desired effects when it is applied as intended within a supportive and controlled context. They are 'real-world' trials, but the contexts and settings are tightly controlled. Efficacy trials allow for relatively high control and conclusion validity but are often resource intensive in terms of the expertise and person-hours invested by the research team and the demands incurred on participating individuals and organizations.

Feasibility study A study designed to determine if an intervention is appropriate for further testing in efficacy and effectiveness trials. Feasibility studies address issues such as whether and how an intervention can be implemented, sustained, and evaluated in practice, and what modifications should be made before further investments are made.

Mediating variable An intermediary process through which an independent variable (e.g., a nudge) produces an effect on an outcome. Analyses of mediation effects serve to reveal how – by which processes – an intervention produces effects. In psychology, mediating variables are often processes of perception, cognition, or emotional reaction that are triggered by an intervention in the environment and that in turn lead to a change in behaviour.

Moderating variable A contextual or person-level factor that interacts with an independent variable (e.g., a nudge) to affect the direction or strength of its effects on an outcome. Analyses of moderation effects can reveal when, where, and for whom interventions are more or less effective.

Nudging Non-forcing interventions in a choice architecture which aim to change behaviour in a specific way.

EXECUTIVE SUMMARY



We look in depth at one specific type of plastic pollution – the single-use, disposable coffee cup – to see how altering behaviours can help the environment.

We describe three specific ‘nudges’, informed by behavioural science, that can be implemented at scale by policy makers to help move consumers away from disposable cups and towards more sustainable options.

The Why and the What

The environmental problem (Background)

Today, governments around the world are prioritizing plastic litter and pollution as an environmental urgency and are increasingly investigating potential policy tools that could effectively address the problem. Take-away coffee cups are one important contributor to plastic pollution as the habit of grabbing a coffee on-the-go has increased significantly in many parts of the world.

The behavioural problem (Section 1.1)

Although policymakers, businesses and consumers are aware of and concerned by plastic litter and pollution, this does not necessarily translate to sustainable behaviours and actions. It is often when behavioral problems cannot be solved with traditional environmental policy that we look to green nudging or green behavioural science for solutions. Behavioural science can support policymakers in identifying and developing strategies that can complement traditional environmental policy instruments by acknowledging the idiosyncrasies of human judgement and decision making.

Nudging for change (Section 1.3)

Nudging is an emerging policy instrument derived from behavioural science that is increasingly being applied to address challenges related to sustainability and the environment. The 'green nudging' approach involves making strategic changes to the context in which individual decisions are made – the 'choice architecture' – to promote more sustainable choices.

The objective (Purpose of the Report)

This report examines whether and how nudging can be applied as a complement to traditional policy instruments to reduce user-level behaviours that contribute to plastic litter and pollution from single-use cups.

What we did

Drawing on scientific literature, documented experiences and stakeholder interviews, this report describes:

- a process for determining when nudging is feasible;
- a systematic examination of behaviours that are relevant;
- three green nudges that could likely reduce the consumption of single-use cups;
- a strategy for implementation and evaluation of those nudges; and
- a strategy for bringing these ideas to scale.

What it's for (Key Conclusions for Policy Making)

The report is aimed at policymakers in Sweden, the EU and around the world. It is intended to inspire and guide policy development around the problems associated with single-use cups and behaviourally informed policy more generally.



Insights from the Literature

What nudging contributes to the policy toolbox (Sections [1.3](#), [1.4](#) and [3.1](#))

Human behaviour is central to the causes, consequences and solutions related to plastic litter and pollution. To better understand human judgement and decision making, policymakers are increasingly consulting behavioural sciences.

The public information campaign has been a go-to strategy in addressing sustainability issues, but they are often costly, difficult to evaluate, and their effects are weak or unpredictable. Even if they are successful in informing their audience, neither improved knowledge nor attitude change are enough to change behaviour on their own.

Comprising relatively easily implemented and ‘soft’ ways of influencing behaviour, nudging is feasible in a wide range of situations and generally acceptable to most people, compared with regulation and economic policy instruments.

Nudging takes place in the actual setting in which a behaviour occurs, and influences choices at a closer range than traditional policy instruments. It can therefore change *specific* behaviours in *measurable* ways.

When to nudge (Section [1.5](#))

Nudging can be considered as a first step towards change in emerging policy areas, or as a way to enable other policy instruments to work more efficiently.

Nudging is appropriate when individuals’ attitudes and intentions are aligned with the performance of a given desired behaviour, but they fail to act in accordance with these due to situational or psychological constraints.

Nudging Strategy

The report suggests that nudging is a promising tool to reduce consumption of single-use disposable coffee cups.

Whether nudging is practicable hinges on the formation of a collaborative and mutually rewarding long-term alliance with key market stakeholders.

A triple-nudge strategy (Section 3.3)

As mentioned above (What we did), there are two important stages that must be undertaken *before* any nudging strategy is put into practice. First, there needs to be a process for determining when nudging is feasible; and second, a systematic examination of the relevant behaviours.

With those stages addressed, this report proposes three nudging interventions to reduce the user-level consumption of single-use disposable coffee cups:

- **Nudge 1: A soft new default for coffee ordered over the counter** implies that single-use disposable cups will no longer be the default option.
- **Nudge 2: Bring your own cup for convenient self-service** facilitates the replacement of single-use cups by making personal reusable cups the quicker and more convenient way of getting coffee in self-service locations.
- **Nudge 3: Refillable cups** augments reusability with the psychologically, environmentally and economically more impactful and attractive property of refillability. It elevates reusable cups to markers of identity and status and provides a way for coffee chains to build long-term customer relations by tying coffee subscription plans to branded cups. At the same time, it ensures that reusable cups get reused enough times to compensate for the environmental impacts of their production.

Expected effects (Section 3.3)

The three nudges can be used individually but are expected to produce the greatest benefits if used in combination. On the whole, they are expected to interact favourably with traditional policy instruments and to have manageable side-effects.

Considered as a package, the nudging strategy is expected to produce moderate reductions (i.e. a statistical effect size above $d \geq 0.5$; see Box 1: Statistical effect sizes) in the ratio of single-use take-away cups to total coffee sales over the months following implementation and strong effects over a year or more.

Implementation and Evaluation Strategy

The necessary conditions (Sections [4.2.1.](#) and [4.2.2.](#))

The scale of implementation must be fairly large in order for the nudging strategy to produce desirable effects, in terms of the geographical area and the number of business locations where the nudges are implemented. As a rule, a major city and its surrounding commuter belt would be the minimum scale for implementation.

Implementation is a collaborative effort between policymakers, market stakeholders and experts in behavioural science. Participating individuals and organizations from each of these groups will need to be open-minded and flexible throughout the implementation and evaluation process.

An ongoing series of workshops involving policymakers, market stakeholders and experts in behavioural science and other disciplines should be initiated as a first step towards implementation. These workshops should become the central arena for collaboration throughout the evaluation and upscaling phases.

A gold standard process for implementation and evaluation (Sections [4.2.2.](#), [4.2.3.](#) and [4.2.4.](#))

The nudges should be implemented and evaluated in a three-step process:

- **A feasibility study** set in a national socioeconomic and cultural hub region and conducted with a collaborative, mixed-methods approach.
- **An efficacy trial** conducted as a field experiment in a cluster-randomized controlled trial. Additional geographical regions implement the nudges or serve as waiting controls. Individual business locations are the basic unit of analysis, and the main findings are based on sales records from these locations.
- **An effectiveness trial** in which all relevant businesses in selected regions are mandated to implement the nudges or serve as control sites. More long-term trends of change in sales records and other indexes are tracked.

See [Box 2](#) on page 70 for further explanation of feasibility, efficacy and effectiveness studies.

Bringing these Ideas to Scale

Spread the approach (rather than the nudges) to create change in other areas ([Section 5.1](#))

The approach of nudging, implementation and evaluation may be viable in many countries and for several types of single-use items – not just take-away coffee cups.

Nudges are context dependent, so the systematic examination of target behaviours and implementation strategy must be revised for new contexts and new challenges. This report can serve as a guide for conducting the necessary analyses and adaptations to begin implementation.

Collaboration with local stakeholders and behavioural science experts through all stages of the process will be needed to determine how the proposed strategies can be fitted to diverse conditions and needs.

Use and build international networks ([Section 5.2](#))

The workshop series should be the hub of efforts to bring these ideas to scale. Interested policymakers and market stakeholders should be included.

Market stakeholders are not only targets of dissemination but key participants in communication around the nudges: through their international chains and networks, through their marketing efforts, and by the examples they set.

Nudging projects should consider publishing in academic journals as part of the initiative.

Key Conclusions for Policy Making

- Policymakers should consider nudging as part of their approach to reducing plastic litter and pollution from single-use cups and some similar products. Nudges can be applied in a single step or as one component in a wider strategy.
- Policymakers should aim to design nudges that effectively contribute to policy. To this end it is necessary to:
 - Identify when nudges can target environmental problems better than other policy instruments, based on analysis of behaviours that contribute to environmental problems.
 - Carefully investigate the feasibility of nudges.
 - Understand how nudges can be scaled to relevant policy levels.
- Policymakers should work to form, maintain, and develop collaborative alliances with market stakeholders and experts in behavioural science. Such alliances are the foundations of a successful nudging strategy.
- Policymakers should use this report as a guide rather than a template. The proposed nudges are feasible but the strategies for ongoing collaboration, evaluation and adaptation to local conditions and changing needs are the greatest strengths of the proposed approach.
- Policymakers should continue to develop their understanding of behavioural science and its key importance for effective policy making. Sustainability is, first and foremost, a matter of human behaviour.

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SECTION 1

Understanding the Problem

Section summary

This section shows why plastic litter and pollution from single-use disposable cups should be approached as a behavioural problem. It identifies the different levels on which psychological processes become relevant as potential targets for interventions to mitigate this behavioural problem. It then introduces the nudging approach to behaviour change and relates it to traditional policy instruments. It outlines the unique advantages of nudging and shows how this approach fits within a multicomponent policy toolbox.

Key points

- 1** As with sustainability challenges more broadly, plastic litter and pollution from single-use cups is fundamentally a behavioural issue.
- 2** Some important shortcomings of traditional policy instruments stem from misguided or unconsidered notions of why people act as they do.
- 3** Nudging is increasingly accepted and used in policy contexts as a standalone approach or as a complement to traditional policy instruments.

1.1. What a Psychological Perspective Contributes

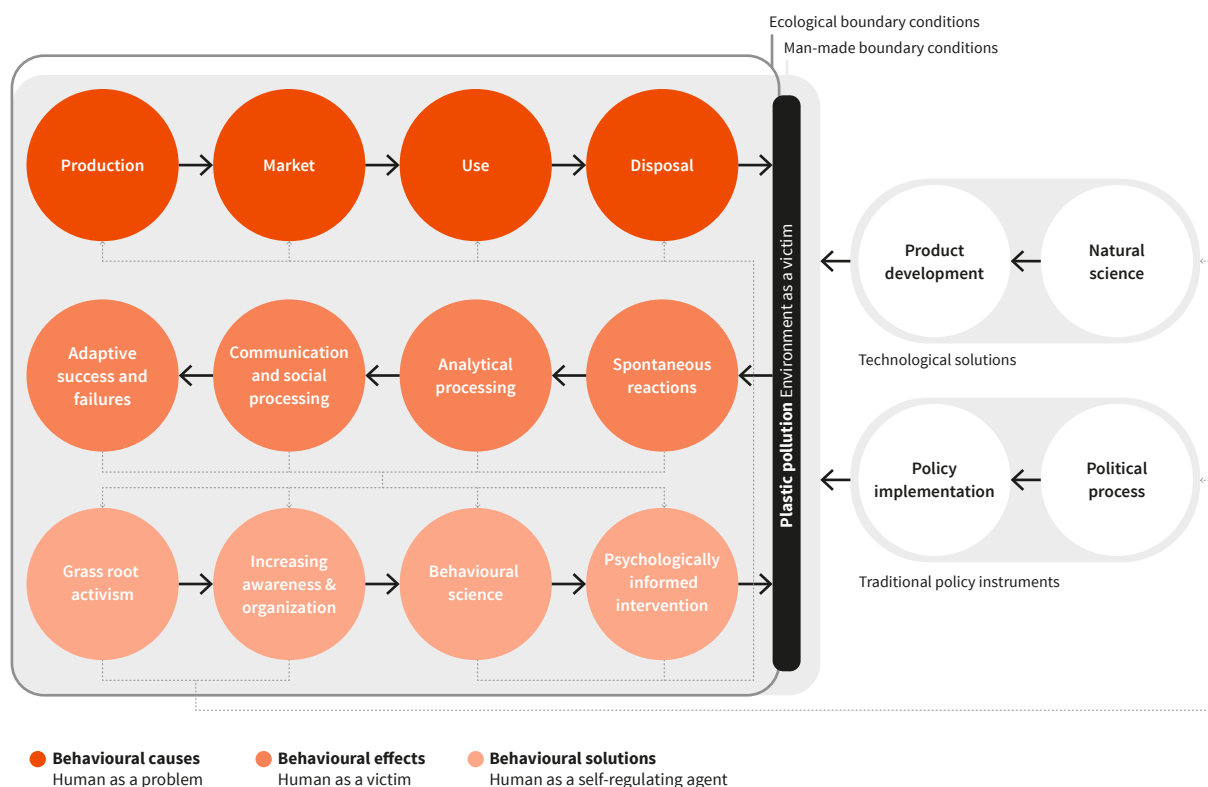
The possibilities and problems associated with plastic are all fundamentally linked to human behaviour (Heidbreder et al., 2019; Pahl & Wyles, 2017; Van Den Bergh et al., 2000; Van der Linden et al., 2015). Humans invent and produce plastic materials, design and make plastic products, sell and buy them, use and dispose of them, and handle the resulting waste and litter. The behavioural aspects of plastic litter and pollution do not end there: humans also experience, react psychologically and physically, appraise and form memories and beliefs about, rationalize and communicate about, and adapt or succumb to plastic litter and pollution. Furthermore, humans engage in grassroots activism and organize and raise awareness around, theorize and study with scientific methods, and develop new ways of addressing the problems of plastic litter and pollution. Even political processes and policy implementation are essentially behaviours, although they are more often discussed in terms of the man-made boundary conditions (e.g. legal, economic, technical) within which plastic litter and pollution occurs.

Humans invent and produce plastic materials, design and make plastic products, sell and buy them, use and dispose of them, and handle the resulting waste and litter.

Figure 1 shows how human behaviours can be construed as causes of the problem of plastic litter and pollution, as effects of increased awareness of the problem, and – not least – as self-regulating actions that can mitigate the problem. It outlines the multiple levels on which we can observe and potentially intervene in behavioural aspects of the problem. It also shows how the behavioural aspects are layered, and how they interact within *man-made boundary conditions* (e.g. regulations, economic conditions, limitations of infrastructure and available technology). These processes can help to influence behavioural patterns to keep levels of plastic litter and pollution within *ecological boundary conditions* (e.g. tolerance levels, anticipated tipping points). Behavioural approaches work within all existing boundary conditions, assuming that the factors that influence the chain of causes, effects and solutions can be strategically targeted to change relevant behaviours in a predictable way.

In contrast, Figure 1 shows technological solutions and traditional policy instruments as approaching the problem from the outside. Technological solutions (e.g. new materials for compostable or recyclable cups, in this case) see the problem as deriving from the products themselves rather than from the behaviours that surround them. Traditional policy instruments (e.g. regulation, economic policy instruments) address the problem by altering the man-made boundary conditions to constrain behavioural options, in order to fit them within the ecological boundary conditions. Dotted arrows represent forces that interact across the different ‘levels’. Solid arrows show the presumed impact of the processes on plastic litter and pollution.

Figure 1: The behavioural aspects of plastic litter and pollution – causes, effects and solutions



When viewed in this way, as a multi-layered and interconnected range of behaviours rather than as a matter of either poor material or product design or failing regulation of a market, the scope of possible areas and methods for intervention widens considerably. In contrast, traditional policy measures as well as technical solutions tend to take an outside-in or top-down approach that largely neglects the behavioural aspects of the problem. Traditional policy instruments, particularly economic policy instruments and regulation, target the man-made boundary conditions of the behavioural patterns (e.g. banning or taxing certain behaviours without first considering why people act a certain way), to better match the ecological boundary conditions. Technical solutions instead consider how physical products can be made to pollute less without considering the human factors that lead to pollution.

The human-centred analysis makes clear that presumed lack of knowledge or motivation among individual consumers are not the only, and not necessarily among the most important, issues to be addressed in attempts to alter behaviour. With a behavioural viewpoint, insights from multiple branches of psychology can inform efforts to initiate or invigorate processes of change at various levels, beyond the effects of mere information and aside from strictly regulatory or economic measures and technical advances.

1.2. Behaviourally Informed Policy

Urban people in modern societies already tend to prioritize environmental issues highly and express values and attitudes that more or less support sustainable transitions (De Groot & Steg, 2007; European Commission, 2008; Milfont & Duckitt, 2010; Schultz & Zelezny, 1999; Whitburn et al., 2019) and to value products and experiences more highly when they perceive them as natural and environmentally sustainable (Haga et al., 2016; Joye et al., 2010; Sörqvist et al., 2015). In fact, appealing to green values has in recent times developed into a central business strategy for many companies (Bartlett, 2011; Munshi & Kurian, 2005; Pearson & Henryks, 2008).

Unsustainable patterns of consumption and waste persist.

Yet, unsustainable patterns of consumption and waste persist. A recent report by the Swedish non-profit organization Håll Sverige Rent (2019) shows that this pattern is relevant also for the use of single-use cups: a large majority of the target population of young Swedes report having environmental concerns about single-use cups and other fast-food containers, but only a minority report actively limiting single-use consumption and less than 10 per cent state that they regularly bring a reusable cup. Traditionally, such attitude-behaviour gaps have been interpreted as resulting from failure to fully grasp or accept due responsibility for the environmental impacts of day-to-day choices. However, interventions based on that traditional interpretation are not always feasible or effective.

Traditional policy instruments rely on authority (including regulation); persuasion; or adjustments of prices in the market as the tools of government (Bell et al., 2010; Howlett, 2018; Mols et al., 2015). In many policy areas, sustainable behaviour change has been partially achieved through 'hard' measures such as regulation. In some cases, however, regulation may be politically or ethically unfeasible (Carlsson et al., 2019; Etienne, 2010, 2011; Howlett, 2018). For example, mixed paper/plastic single-use cups will not be banned under EU directive 2019/904 (EU, 2019; on the reduction of the impact of certain plastic products on the environment). Instead, the EU has opted for measures to raise awareness, implement compulsory markings, and other 'soft' measures to reduce their consumption. In general terms, modification of the pricing structure (e.g. through Pigouvian taxes) is a market-oriented strategy that can be effective but that, like regulation, can be politically or practically challenging to implement. It can also be unpopular and is not necessarily sufficient.

In many policy areas, sustainable behaviour change has been partially achieved through 'hard' measures such as regulation. In some cases, however, regulation may be politically or ethically unfeasible.

Outside of the realm of legislation and taxation, the traditional go-to approach to reducing harmful behaviours has relied on information and persuasion campaigns (Bell et al., 2010; Howlett, 2009b; Owens, 2000; Weiss & Tschirhart, 1994). However, information-based campaigns aimed at individual-level behaviour change are costly and their effects weak or unpredictable (Abrahamse et al., 2005; Ferraro & Miranda, 2013; Henry & Gordon, 2003; Mols et al., 2015; Moss, n.d.; Snyder et al., 2004; Snyder & Hamilton, 2002). They also tend to be very difficult to evaluate (Coffman, 2002; Grilli & Curtis, 2021; Shadish & Cook, 2009). As has been shown in other policy areas, long-term communication and relationship-building efforts directed at higher-level

Mere communication of knowledge or arguments regarding behavioural choices is inefficient in promoting behaviour change on the user level.

stakeholders can sometimes produce reliable effects, given that strategic choices tend to be relatively considered (cf. e.g. Hysing & Olsson, 2005).

When it comes to the day-to-day behaviours of individual users, however, a recent review of perceptions, behaviours and interventions in the area of plastic use and waste (Heidbreder et al., 2019) shows that problem awareness does not have a direct causal relationship with behaviour. This is unsurprising and mirrors findings in other policy areas: researchers in psychology and related fields have long recognized that mere communication of knowledge or arguments regarding behavioural choices is inefficient in promoting behaviour change on the user level (Abrahamse et al., 2005; Carlsson et al., 2019; Costanzo et al., 1986; Dennis et al., 1990; Gardner & Stern, 1996; Ölander & Thøgersen, 2014; Thaler & Sunstein, 2009). In fact, the conventional wisdom that more or better knowledge makes for better individual-level decisions has been described as “deeply misguided” (Mildenberger et al., 2013). Even when campaigns successfully promote a change in attitude – e.g. by playing on social norms or evoking an emotional reaction – the achieved change in self-reported attitude is typically not in itself sufficient to substantively and lastingly change behaviour patterns (Blamey, 1998; Klöckner, 2013; Schwartz & Howard, 1981; Steg & De Groot, 2010).

Even when there is a strong intention to act sustainably, even relatively minor contextual constraints can restrain sustainable behaviour.

In an effort to synthesize prominent psychological theories on the processes that drive behaviour change in sustainable transitions, Klöckner (2013) reanalyzed data from 56 different studies. He showed that three factors have independent and direct effects on behaviour in a given situation: habits (how people usually act), intentions (how determined people are to act in a specific way), and contextual constraints (how situational factors make some behaviours easier or more attractive than others). In contrast, many factors that are commonly invoked in public discourse around sustainable transitions (e.g. knowledge, values, attitudes, and personal and social norms) only have indirect effects on behaviour (also see Blamey, 1998; Schwartz & Howard, 1981; Steg & De Groot, 2010). This implies that they only influence behaviour if they become activated in the given situation. And, even when there is a strong intention to act sustainably, even relatively minor contextual constraints can restrain sustainable behaviour. Similarly, the review by Heidbreder et al. (2019) concludes that multiple contextual and psychological factors in the consumption situation can override awareness and attitudes around plastic consumption and pollution. This can hamper sustainable behaviour even among people who want to act sustainably and who have ample knowledge regarding more sustainable options.

So, what are these contextual constraints? Researchers in multiple branches of psychology have come to a similar conclusion: the central problem is that the positive consequences of sustainable options tend to be distant in time and space and impersonal, while sustainable options often incur minor but immediate and personal negative consequences for the individual (e.g. Ajzen, 1991; Gärling et al., 2002; Kahneman, 2003; Kahneman et al., 1993; Nyborg et al., 2016; Ostrom, 2000; Sörqvist & Langeborg, 2019; Thaler & Sunstein, 2009; Van Lange & Joireman, 2008). These negative consequences may take the form of added physical or psychological effort, inconvenience, threats to one’s social role, time demand, monetary costs, and so on. For that reason, behaviour change efforts should focus on making the

desired behaviour option the easier choice, and on mitigating the obstacles (cf. e.g. Byerly et al., 2018; Sheeran, 2002; Steg & Vlek, 2009; Thøgersen, 2005). These are the factors that nudging interventions target. [Section 2](#) of this report outlines some of the real-world contextual constraints that can affect the consumption and disposal of single-use cups.

1.3. Principles Behind Nudging

Founded in modern psychological knowledge and scientific methods, nudging interventions are proving useful in addressing a variety of different problems. Nudging refers to non-forcing interventions in a choice architecture with the aim to change behaviour in a specific way (Byerly et al., 2018; Sunstein & Reisch, 2014; Thaler & Sunstein, 2009). Nudges are non-forcing because they do not prohibit any choice but merely shift the balance between the factors that guide choices: the so-called choice architecture. A choice architecture is the structure in which choices are made, such as how and in what order and with what attending information different options are introduced. The physical layout of a shop and the arrangement of products and information within it is a choice architecture, and so is a restaurant menu, the user interface of a web page, and a survey form. In fact, it has long been recognized that all behaviour is shaped by the arrangement and salience of different objects in the surrounding space (Lewin, 1951; Saegert & Winkel, 1990; Wicker, 1984).

Nudging interventions are often relatively inexpensive, with costs shared between relevant government entities, market stakeholders, and sometimes also users.

The variety of different types of interventions that can be considered as nudging tend to share the properties of being relatively easily implemented strategies to enhance the access to, attention to, and attractiveness of a given behavioural option – goals that are also reflected in different ways in traditional approaches to behaviour change. However, nudging interventions are not purely communicational, and they typically exclude changes to regulatory or economic aspects of the choice. Typically situated in the actual behaviour setting of concern, they influence choices at closer range than most public information campaigns. Being relatively soft in nature, they are also expected to be feasible in a wide range of situations and acceptable for most people, compared with regulation and economic policy instruments (Schubert, 2017; Thaler & Sunstein, 2009). Nudging interventions are often relatively inexpensive, with costs shared between relevant government entities, market stakeholders, and sometimes also users.

1.3.1. Theoretical underpinnings

Nudging builds on the observation that peoples' behaviour is only partly led by rational considerations and that it is also influenced by situational factors and psychological biases: so-called bounded rationality (Kahneman, 2003; also see Gigerenzer, 2015; Simon, 1972; Thaler & Sunstein, 2009). 'Dual-process' theories of this kind presume that much of human day-to-day behaviour is determined by fast and automatic cognitive processes that bypass conscious and rational thought (Evans, 1984, 2008; Kahneman, 2003a). For instance, the force of habit can bypass decision-making processes and allow behaviour to proceed relatively unconsidered;

and people often tend to accept a default option rather than rationally weigh the pros and cons of all options before making a choice (Dinner et al., 2011; McKenzie et al., 2006; Szaszi et al., 2018; Van Gestel et al., 2020). Even when a person stops to consider the options, incomplete access to, or insufficient capacity to process, all relevant information about available choices and possible outcomes can lead them to undervalue or overvalue certain factors. For instance, people are prone to consider past investments of money, effort, or other resources in current decisions even though they are rationally irrelevant (e.g. the sunk cost fallacy; see Arkes & Blumer, 1985; Roth et al., 2015; Thaler, 1985). In addition, more immediate expected outcomes tend to dominate over distant outcomes even when they are objectively less important (Caney, 2009; Oliver, 2015; Thaler & Sunstein, 2009).

Public information campaigns are founded in similar ideas about how incomplete access to or understanding of information can lead people to make poor choices, or how certain outcomes can have a greater influence on behaviour if they are made more salient through an emotional message or a convincing argument (Grilli & Curtis, 2021; Owens, 2000; Weiss & Tschirhart, 1994). However, information campaigns typically target these processes at a greater distance to the actual choice situation (e.g. expecting a television advert seen in the evening at home to affect consumption behaviours during next day's commute to work).

Making environmentally sustainable choices is often more cumbersome, expensive, or risky for a person than going with the more familiar and trusted standard option.

Many early nudges were intended to help people behave more rationally (in the classical economic sense) by minimizing risks and maximizing opportunities for themselves (Carlsson et al., 2019; Schubert, 2017). These classic nudging approaches are suited to situations where the objective is to reduce negative consequences for the individual ('internalities'), as for instance with choices that affect a person's own health or finances (cf. Camerer & Loewenstein, 2003). More recently, the nudging toolbox has expanded to also address negative *impersonal* consequences ('externalities'), such as environmental consequences. In contrast to personal consequences, when the problematic outcome to be addressed is external and impersonal, the classical economic model does not suffice because the desired behaviours are often not 'rational' in terms of personal loss or gain. In fact, making environmentally sustainable choices (e.g. buying an electric car rather than one run by fossil fuel) is often more cumbersome, expensive, or risky for a person than going with the more familiar and trusted standard option. The benefits of the sustainable choice are also frequently intangible (e.g. reduced emissions of invisible greenhouse gases), incomplete (e.g. very slight dampening of the progression of global warming), dispersed across many people (e.g. benefiting others at least as much as oneself), and distant in time or space (e.g. lower risk of future extreme weather events in distant parts of the world).

Building on a similar line of reasoning, economic policy instruments have been founded in the idea that free markets sometimes fail to influence behaviour efficiently because people fail to consider or correctly value impersonal consequences such as environmental impacts and other impersonal outcomes. By pricing in the environmental cost that the behaviour causes, that cost becomes internalized in the product. Because impersonal consequences are reflected in the price, the theory goes, they carry greater weight in considerations founded in rational self-interest (Fleischer, 2015; Johansson, 1997).

In contrast to economic policy instruments, however, so-called green nudges that address impersonal consequences typically do not aim to compensate for bounded rationality but instead build on (or take advantage of) peoples' biased reasoning in order to reduce negative environmental outcomes such as pollution. Extending the seminal definition of a nudge (Thaler & Sunstein, 2009), Carlsson et al. (2019) describe a green nudge as "a change in any aspect of the choice architecture that is intended to alter people's behaviour in a predictable way *and result in a reduction of a negative external effect without forbidding any options or significantly changing the economic incentives*" (italics added). Concrete examples of how this has been achieved in green nudging interventions are given next.

1.3.2. Illustrative examples of green nudges

'Pure' green nudges are those that build on people's bounded rationality to help them make choices that may not be in their immediate personal best interest in the classical economic sense of incurring the lowest cost or offering the highest value, but that will mitigate negative impersonal consequences in terms of environmental impacts. For instance, choosing a somewhat more costly 'fair trade' coffee product over an equally good but cheaper, less sustainable option. On the surface it might seem that these green nudges are about moral or social choices, but research shows that people are more influenced by *the situation in which they're making the decision* – the choice architecture of information and feedback.

Research shows that people are more influenced by *the situation in which they're making the decision*.

Example interventions include the 'green default', where the choice architecture is arranged so that a less environmentally damaging option (e.g. 'green electricity') is the default. People must actively opt out in order to choose a less environmentally desirable option (Ebeling & Lotz, 2015). Green default interventions are thought to be most effective in 1) rare and complex choices where some people are inclined to limit effort or worry by accepting a perceived recommended option, but also in 2) frequent and relatively inconsequential choices where a person would have little to lose from going with the default (Sunstein & Reisch, 2014). However, they may be less effective with experienced users who tend towards their own pre-established preference (Löfgren et al., 2012; also see Carlsson et al., 2019).

Other green nudges aim to enhance the salience or the psychological impact of a greener option in a choice situation. For instance, restaurants have increased sales of vegetarian dishes relative to dishes based on animal products by placing a vegetarian option at the top of the menu (e.g. Kurz, 2018). This is not a green default per se, although it can be seen as a way to present the vegetarian option as a standard or recommended choice. More importantly, it creates a psychological benchmark against which the following non-vegetarian dishes might compare as less ethical or less healthy options.

Another nudging approach is more suitable for frequently recurring or ongoing behaviours such as electricity or hot water use where it can be difficult to appreciate how the total consumption is affected by choices in the moment. This difficulty can be overcome by providing immediate feedback. Visual and emotionally evocative ways of providing feedback seem to enhance the effects. For instance, a display in the shower featuring a polar bear on an ice sheet that shrinks for each minute

that the water runs seems to be fairly reliable and effective at reducing hot water consumption (Tiefenbeck et al., 2018).

In addition to these relatively pure changes in the choice architecture, other nudging interventions instead target social and moral processes: ‘moral’ green nudges.

Moral green nudges draw more explicitly on the moral values associated with different options, to reinforce the impact in the choice situation of some of the otherwise intangible personal or social benefits of behaving pro-environmentally (Carlsson et al., 2019; Schubert, 2017). For instance, reuse of towels in hotels has been increased by providing normative prompts suggesting that most hotel guests reuse their towels (Goldstein et al., 2008; Schultz et al., 2008). Presumably, the prospect of proving oneself (even if only to oneself and possibly to cleaning staff) to be less moral than most peers by not reusing a towel will incur negative feelings (e.g. shame). Similarly, providing recurring feedback on household energy consumption compared with that of neighbours has reduced energy consumption (Costa & Kahn, 2013), at least in populations that already hold favourable attitudes towards sustainable transitions and therefore may be sensitive to motivations to compete for a position among the most environmentally friendly households. Furthermore, providing information about how much others have contributed to charity has been shown to influence how much people will give (Shang & Croson, 2009). Researchers believe that this kind of information sets a benchmark for expected behaviour and possibly also triggers competitive motivations to do better (or at least not much worse) than peers. Other examples of moral green nudges include highlighting the social status value associated with pro-environmental behaviour (Griskevicius et al., 2010), for instance by marking environmentally friendly products with conspicuous labels and pricing them higher than more damaging options. It is thought that many people will see value in the opportunity to show off publicly that they are able and willing to pay a larger sum for the sake of the greater good. The transition to electric vehicles (EVs) is one high-profile example. EVs are prohibitively expensive for many consumers, so early adopters tend to be wealthier or higher-status individuals. In turn, the environmental benefits that accompany EVs are accentuated and the new behaviour (i.e. driving an EV) becomes something desirable to be emulated.

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In the empirical nudging literature, researchers have not consistently adhered to the original definition of nudging, and reviewers do not fully agree on which interventions fall in the nudging category. For instance, Grilli and Curtis (2021) classify the normative prompts suggesting that most hotel guests reuse their towels (see above) as an “education and awareness” intervention rather than a nudge while Carlsson et al. (2019) consider them to be moral green nudges. Nielsen et al. (2017) classify a broad range of information-based and norming interventions under the nudging umbrella. Mols et al. (2015) propose that social norming processes are central in these and many other successful ‘nudging’ campaigns. Nyborg et al. (2016) similarly argue that nudging and other policy tools work partly by conveying changed expectations about how people should behave. Going beyond definitional issues, however, nudging interventions are in practice often integrated with, or set against a background of, traditional policy instruments.

1.4. Comparing Nudging to Traditional Policy Instruments

Before considering how nudging can complement the traditional policy toolbox, it is necessary to identify points of overlap and points of contrast by comparing nudging to traditional policy instruments. We do this here in terms of some central issues: the degree to which different instruments constrain freedom of choice, raise other ethical issues, and the principles of how they are intended and applied to address problems.

1.4.1. Preservation of choice and other sources of controversy

Any effort to change behaviour necessarily interferes to some degree with the existing behavioural patterns of relevant groups and individuals, and policy efforts are frequently subject to debate regarding the form and degree of interference that they seek or achieve (see Hausman & Welch, 2010; Howlett, 2009a; Schneider & Ingram, 1990; Schubert, 2017). This section summarizes some of the ethical issues that policymakers must consider in choosing between policy instruments.

Nudging interventions do not constrain freedom of choice in an absolute sense, but rather target a choice situation in a behaviourally informed way in order to increase the likelihood that people will behave in a way that serves a greater good for themselves, for humanity, or for the environment. But because nudging involves a deliberate intervention in choice architecture, there is lively, and ongoing, academic debate around the ethics of nudging. (See, for example, Hausman & Welch, 2010; Thaler & Sunstein, 2009; Gigerenzer, 2015; Barton & Grüne-Yanoff, 2015; Hausman & Welch, 2010; Mols et al., 2015; Rebonato, 2014; Schubert, 2017; McCrudden and King, 2015.)

Because nudging involves a deliberate intervention in choice architecture, there is lively, and ongoing, academic debate around the ethics of nudging.

In response to these debates, scholars and policy organs have begun to develop ethical guidelines for the use of nudging interventions in sustainable transitions. The OECD (2019) advise policymakers to follow research ethical principles to the degree that they are relevant in a given application of nudging, and to consider consulting a dedicated ethical committee or institutional ethical review board in preparatory, implementation, and evaluation stages of nudging projects. Schubert (2017) concludes that in order to ensure ethicality in nudging, interventions should 1) be transparent, in the sense that the people who are targeted should, at least in principle and if they applied themselves to it, be able to understand that they are being nudged; and 2) be effective and durable in addressing an important and broadly relevant problem. In Schubert's view, this ensures that nudging interventions are not manipulative and that the interference that they introduce is of benefit to humanity.

Public information campaigns have been subject to long-running debates around two central issues: 1) whether they can actually be effective for any other purposes than to persuade people that government is taking action on a problem; and

2) if they *are* effective, whether government action to manipulate public opinion and move people to action on politically or otherwise sensitive current issues is compatible with democratic ideals (see e.g. Owens, 2000; Weiss & Tschirhart, 1994). On the second point, if information campaigns are considered as ‘government by persuasion’ they leave policymakers open to criticism regarding manipulation or propaganda (Mols et al., 2015; Weiss & Tschirhart, 1994). Even when reactions to information campaigns are overwhelmingly positive, one might consider governmental intervention to deliberately and lastingly modify cognitive and emotional processes within individuals to be more intrusive than mere changes to a specific choice architecture.

Economic policy instruments such as Pigouvian taxes (i.e. taxes imposed on anyone who produces externalities; Landes, 2013) may be seen as more explicit and transparent – hence less ‘manipulative’ – than nudging and persuasion (Howlett, 2018; Schneider & Ingram, 1990; Weiss & Tschirhart, 1994). Like nudging and public information campaigns, and unlike regulation, economic policy instruments can also be considered as relatively non-intrusive policy instruments because they do not formally prohibit any option. However, by altering the affordability of certain options economic interventions can have negative consequences for marginalized sections of society. For instance, a fuel-tax increase intended to encourage people to use cars less, if not accompanied by other effective transport options, will effectively be an unavoidable economic penalty. The ethicality as well as the effectiveness of economic policy instruments can thus depend on the degree to which other behavioural determinants than rational self-interest determine a given behaviour – an often-debated theme.

Because regulation is a political matter, it is often beset with delays, trade-offs and backlashes – both in formulation and implementation.

A related issue comes from the research showing that economic policy instruments tend to erode peoples’ ‘intrinsic motivation’, making sustainable behaviour more dependent on cost and/or reward than it was before an economic measure was put in place. Economic policy instruments therefore only work as long as they are in place (as illustrated for instance in several studies on travel mode choices; e.g. Gravert & Olsson Collentine, 2019; Kearney & De Young, 1996; Thøgersen, 2009), and they are often attended by a backlash when they are removed. Removing an economic (dis)incentive will, thus, not only signal that it is now acceptable to choose the environmentally damaging option again, but it will also remove the imposed and now psychologically dominant reason for behaving pro-environmentally.

Regulation as an approach to sustainable behaviour change has over several decades grown in prominence and refinement globally and, not least, in the EU (Gunningham, 2009; Vogel, 2003). It relies on authority and the capability to monitor and enforce compliance. When authority is gained through a democratic process, one could assume that regulation imposed by that authority tends to be perceived as legitimate. Perceived legitimacy is, however, not a given (cf. Howlett, 2018; McCrudden & King, 2015). There are many instances in which elected representatives and other officials have failed to tread the fine lines between bold action and overreach on the one hand, or light-touch regulation and accusations of ‘window-dressing’ on the other (Zimmerman, 2004; Boin et al., 2009; Matten, 2003). And because regulation is a political matter, it is often beset with delays, trade-offs and backlashes – both in formulation and implementation (Duruigbo, 2000; Gunningham, 2009; Howlett, 2018; Toshkov, 2008; Etienne, 2010, 2011).



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1.4.2. Comparison of basic characteristics of nudging interventions against traditional policy instruments

Carefully crafted public information campaigns have their place in transitions towards more sustainable behaviour (Moss, n.d.; Owens, 2000; Weiss & Tschirhart, 1994). A review of policy measures intended for changing sustainability-related behaviours (as pertaining to a broad range of different sustainability problems) concludes that public information campaigns still seem to be the default option for many policymakers (Grilli & Curtis, 2021). Regulation and economic policy instruments are also time-tested and sometimes effective measures to influence behaviour. More recently, nudging has emerged as an alternative and a complement to these more traditional approaches.

By definition and design, nudging interventions build on scientifically founded analyses of target behaviours and are shaped to draw on established psychological principles and previous experience in promoting alternative behaviours. They differ from traditional policy instruments in that they have often proved to be relatively cost efficient. Against the background of the principal considerations outlined in the preceding sections, nudging interventions and the traditional policy instruments also tend to differ in how the basic problem to be addressed is formulated, the processes through which interventions are decided and designed, and how interventions are implemented and maintained. They further differ along the important dimension of the degree to which they preserve or constrain personal freedom of choice, which could serve as one source of guidance as to the order in which the different measures could be considered. To enhance comparability of these characteristics between the different policy instruments, we summarize them side-by-side in [Table 1](#).

Table 1: Formal characteristics of typical nudging and traditional policy instruments.

Increasing constraints on personal freedom of choice →				
	Nudging interventions	Public information campaigns	Economic policy instruments	Regulation
Preservation of choice	Non-forcing. Manipulates contextual factors (e.g. access to, attention to, and attractiveness of options).	Non-forcing. Manipulates intraindividual factors (e.g. knowledge, emotional responses, motivations).	Forcing for some. Manipulates relative and absolute affordability of options.	Forcing. Prohibits options under threat of penalty.
Problem framing	People make unsustainable choices because the context in which choices are made unduly favours unsustainable options over sustainable ones.	People make unsustainable choices because they lack knowledge of, emotional attachment to, or motivation to consider the full environmental impacts of these choices.	People make unsustainable choices because market forces do not price options according to their full environmental impacts.	People make unsustainable choices because of a variety of personal, social, economic, and contextual reasons that are largely inaccessible to direct government action.
Decision process	Collaborative between government, NGO, market representative groups, etc.	Political (often considered as default option).	Political, economic, (legal).	Political, legal, (economic).
Design process	Collaboration between policymakers, stakeholders, psychologists and other behaviour experts.	Collaboration between policymakers, technical experts, communications experts.	Collaboration between policymakers and (behavioural) economists.	Collaboration between policymakers and legal experts.
Implementation process	Typically small-scale start with iterative evaluation, adjustment and upscaling.	Typically planned-ahead, one-shot campaign.	Typically planned-ahead. To some extent adjustable.	Typically planned-ahead. To limited extent adjustable.
Maintenance	Typically tested in time-limited trials intended to inform further collaboration around long-term policy.	Typically time-limited. Sometimes extended and to some extent evolving.	Sometimes tested in time-limited trials or campaigns. Sometimes intended as long-term but subject to political and economic sways.	Typically intended as long-term policy. To some extent subject to political and economic sways.

1.5. How Nudging Complements the Traditional Policy Toolbox

Whether or not a nudging intervention can be implemented – and whether it will be successful – depends on its fit within a broader policy context. However, nudging can also be considered as a *first step* towards change in emerging policy areas, or as a way to enable other policy instruments to work as efficiently as possible. Zehaie (2020) outlines four main ways that nudging can complement traditional policy instruments.

1.5.1. Enabling other policy instruments

Emotional attachments and identity-forming processes continue to dominate in the choice situation.

Whether used as a first or standalone step or in the context of other policy efforts towards a sustainable transition, nudging (and related psychologically informed instruments) are first and foremost means of alleviating contextual constraints and promoting contextual support for desired behaviours. As described in [Section 1.3](#), contextual factors will determine whether a person's values, attitude and knowledge translate into a given behaviour – and whether that behaviour can be influenced. If it is inconvenient or otherwise psychologically or socially unattractive to act sustainably in a given situation, few will do so even if they understand and care for the consequences of their actions. Also economic policy instruments will only have limited effects if the contextual conditions make alternative behaviours unappealing for other than economic reasons. Nudging interventions can thus be seen as *enabling interventions* that can set the conditions for people to act in accordance with sustainable inclinations that are already in place. And nudges lay the necessary foundations for people to change their behaviour in response to a campaign effort aimed at conveying new knowledge or shifting values and attitudes, or in response to price changes.

1.5.2. Addressing irrational behaviours

Behaviours that are strongly influenced by seemingly irrational motivations may be difficult to address with traditional policy instruments. Examples abound, for instance in research on motivations for car use (e.g. Mokhtarian & Salomon, 2001; Salomon & Mokhtarian, 1998; Steg, 2005; Steg et al., 2001), where some segments of drivers are virtually immune to information and economic policy instruments aimed to steer them towards more sustainable transportation options because environmental and economic considerations are not central factors in their choice to drive. Instead, emotional attachments and identity-forming processes continue to dominate in the choice situation. The force of habit is another, often very strong determinant of choice that can keep a seemingly irrational pattern of behaviour going through shifts in knowledge and values as well as in economics (Gravert & Olsson Collentine, 2019; Thøgersen, 2012).

One reason that it is difficult to change established habits through rational arguments or economic policy instruments is that many habitual behaviours are conditioned not so much on the actual choice situation but on the preparatory stages of the new or ‘target’ behaviour (Bamberg et al., 2003; Verplanken et al., 1994). For example, a habitual driver will be unlikely to suddenly choose the bus one morning unless they already prepared for it well in advance by locating a suitable bus stop, figuring out how to obtain a ticket, and setting their morning alarm to match the bus schedule – regardless of whether a new road tax has been imposed on cars. Similarly, people will be unlikely to get their take-away coffee in a reusable cup – even if a single-use cup suddenly costs much more than usual – unless they have prepared in advance by buying a reusable cup, washing it and remembering to bring it as they rush off to work. In the actual choice situation, a person arriving without a reusable cup may act perfectly rationally by choosing a single-use cup even if it does not come free, because buying a new reusable cup on site will likely cost substantially more. Other examples of irrational behaviours that are difficult to influence by rational means include choices that are made under emotional stress, time-pressure, crowding, or fatigue (all of which are common in work commutes; Evans et al., 2002; Evans & Wener, 2006); choices that are made under intoxication or peer pressure; and choices that are made while engaged in a separate task (e.g. talking on the phone, working, wayfinding) (see e.g. Hockey, 1997; Kahneman, 1973; Kaplan & Berman, 2010; Lavie, 2010; Melnyk et al., 2011; Milgram, 1970; Morris et al., 2015; Nyborg et al., 2016).

1.5.3. Filling policy gaps

Where traditional policy instruments have not produced the desired results, nudging interventions can be considered as complementary measures.

It is rare for any single policy measure to work on its own (Howlett, 2018). Knowledge alone is not normally effective (e.g. Costanzo et al., 1986; Ölander & Thøgersen, 2014), and economic policy instruments do not always fully translate impersonal consequences to personal costs (Camerer & Loewenstein, 2003; Fleischer, 2015; Johansson, 1997; Van Den Bergh et al., 2000). Even regulation will often require additional measures to secure a satisfactory compliance rate (Etienne, 2010, 2011; Howlett, 2018). Where traditional policy instruments have not produced the desired results, nudging interventions can be considered as complementary measures. For instance, an added tax on fossil energy could help steer consumer choices towards renewable alternatives to some degree, as an expression of environmental concern or for economic reasons. However, many may be happy to bear the economic costs of staying with their old plan simply to save the effort of looking into alternatives or the uncertainty of change. Others may fail to grasp how a seemingly small increase in the cost of fossil energy will affect their personal finances in the long term. In addition, many will switch to the renewable alternative and then feel better about leaving the lights on, possibly even increasing their environmental footprint (Klöckner et al., 2013; Truelove et al., 2014). To overcome such problems and increase the impact of traditional policy measures, nudging interventions can be employed to:

- break habits (e.g. by forcing a choice);
- make a desired alternative appear more appealing or reliable (e.g. by setting a new default or reordering the choice architecture);

- to draw attention to and simplify processing of otherwise easily overlooked information (e.g. by providing accessible, personalized information on long-term costs); and
- to introduce psychologically impactful information into the actual choice situation (e.g. real-time feedback on consumption, social comparisons against peers; see Abrahamse et al., 2005; Costa & Kahn, 2013; Ferraro & Miranda, 2013; Tiefenbeck et al., 2013).



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1.5.4. Nudging government action

The public sector is a significant part of many countries' economies. It is also uniquely amenable to direct influence from the policy level and is often less sensitive than private sector businesses to temporary shifts in profit margins and other financial considerations. The public sector can therefore be a useful tool for policymakers who wish to lead the way or make an example in sustainable transitions. One approach is to target internal processes within public sector organizations through behaviourally informed interventions, for instance by implementing nudges to reduce the consumption of single-use cups in the lunch restaurants or cafés in different government facilities. Another approach would be to target central functions in procurement with nudges to guide the purchase behaviours of government bodies towards more sustainable options. A third approach, which also helps to set a clear public example, is to implement nudges in government-run businesses that cater to the public. For instance, nudges targeting single-use cups could be implemented in the publicly owned transportation system by only renting space to businesses that commit to specific sustainable practices.

Through its economic force and conspicuousness, government action can influence behaviour change by pushing the economy in a desired direction, drawing attention and setting examples, testing out new business models that private companies could then emulate, and getting people used to the idea that alternatives to the conventional mode of service are viable and potentially attractive.

SECTION 2

A Systematic Examination of Relevant Behaviours

Section summary

This section summarizes the process of identifying a suitable level for intervention to reduce the behaviours that lead to pollution from single-use cups, the psychologically relevant factors that govern those behaviours, and the arenas where nudges could be implemented to influence those behaviours in a desirable direction.

Key points

- 1** On the level of user behaviours, measures to shift coffee consumption patterns towards more sustainable types of containers are most likely to be practicable and effective.
- 2** There are valid reasons that people choose single-use disposable cups today (related to hygiene, convenience, consumer culture and lingering doubts and misconceptions), that must all be overcome to shift consumption to more sustainable containers.
- 3** There are possibilities to nudge relevant behaviours in over-the-counter service locations, self-service locations and in the preparatory situations that determine whether someone brings a reusable cup or not. Each of these strategic domains offers different constraints.

2.1. Identifying a Suitable Level for Intervention

Nudging interventions stem from a scientific approach to behaviour change and rely on analyses of the behaviours to be targeted, their contextual determinants, and how change can be assessed.

The review by Grilli and Curtis (2021) shows that traditional behaviour change efforts are typically launched after no or very limited analysis of what the actual target behaviours are (also see Howlett, 2018). Many of them also fail to document the implementation process – thus effectively precluding replication and obstructing cumulative knowledge gains – and lack a plan for systematic evaluation of outcomes (Coffman, 2002; Grilli & Curtis, 2021; Howlett, 2018; Moss, n.d.). In contrast, nudging interventions stem from a scientific approach to behaviour change and rely on analyses of the behaviours to be targeted, their contextual determinants, and how change can be assessed. In this case, the task (set out in the [Background](#) section) is to propose interventions *at the user level*. We are not concerned here with influencing producers or sellers of single-use cups, or those who deal with the litter and waste they create (although we do recognize that interventions on these levels are worth considering). Interventions that target the behaviour of people who run or work for businesses that rely on single-use disposable cups is only considered indirectly (as will become evident in [Section 3](#)), as means towards the implementation of the proposed interventions. Our discussion is limited to the factors that influence consumer-level behaviours surrounding the purchase, utilization and disposal of cups.

In order to reduce plastic litter and pollution from single-use cups through interventions at the user-level, there are several types of measure to consider:

- measures aimed at reducing coffee consumption generally ([Section 2.1.1.](#));
- measures aimed at reducing littering with single-use cups ([Section 2.1.2.](#));
- measures aimed at user behaviours that have implications for the management of litter and waste from single-use cups ([Section 2.1.3.](#)); or
- measures aimed at shifting coffee consumption patterns towards more sustainable types of containers ([Section 2.1.4.](#)).

2.1.1. Measures to reduce coffee consumption generally

If successful, a general reduction in coffee consumption would likely cut plastic litter and pollution from single-use disposable coffee cups and also bring other environmental benefits: freeing land and water resources that are presently occupied by coffee production as well as reducing overall emissions from the global coffee trade network (Consumers International, 2005; Tucker, 2017). However, we see this as politically unfeasible because of the impact it would have on the economies of coffee-producing countries, and on private companies involved in the coffee trade. It would also interfere with deeply rooted cultural practices around coffee (Morris, 2013; Tucker, 2017). And, if the aim is to reduce plastic litter and pollution specifically (rather than, say, the total consumption of natural

resources or CO₂ emissions), then efforts to discourage coffee consumption generally would be a blunt tool.

2.1.2. Measures to reduce littering with single-use cups

Measures to reduce littering are not only feasible, they are already being employed. If these efforts were scaled up, it is likely that other forms of litter would also be reduced as a secondary benefit (e.g. by improving the availability of appropriate waste bins or improving schemes to encourage appropriate disposal). It is also likely that such measures could help to limit the leakage of plastic into soils and water. However, given that major investments in appropriate waste disposal and litter prevention are already being made in many parts of the world, the gains from further investment in these places would be small. Meaningful reductions in littering would only be expected in places that lack suitable waste disposal facilities. We therefore consider that improving access and functionality of waste bins are matters of praxis and technology rather than general policy, although psychological insights could be used to augment such efforts.

Allowing people to use single-use cups with a clearer conscience or even a sense of doing good for the environment by placing them in a recycling bin rather than a general waste bin can help them to justify continued or even increased use of such cups.

Furthermore, littering is only one of the problems associated with mixed paper/plastic single-use cups. Reducing littering does nothing to address the negative environmental impacts from their production and transport, nor the fact that they are not efficiently degradable or recyclable. Even where cups are available that *are* more easily recycled, and/or measures are taken to increase recycling, these can have important drawbacks. Allowing people to use single-use cups with a clearer conscience or even a sense of doing good for the environment by placing them in a recycling bin rather than a general waste bin can help them to justify continued or even increased use of such cups (e.g. through well-known psychological processes such as rebound effects and moral licensing that cause negative spillover, see Klöckner et al., 2013; Mazar & Zhong, 2010; Tiefenbeck et al., 2013; Truelove et al., 2014). Such measures may also disincentivize companies that use disposable cups from revising their environmentally problematic business strategies.

For these reasons, encouraging a transition to recyclable single-use cups would not mitigate the total environmental impact of coffee cups. It risks locking coffee consumption more firmly into take-away single-use patterns, which have unavoidable negative consequences. On the more authoritative side, most measures to improve monitoring and punishment of littering would fall outside of the scope of nudges.

2.1.3. Measures aimed at user behaviours that have implications for the management of litter and waste from single-use cups

These measures can include anything from deposit systems for single-use cups to organized beach cleans. Such interventions would rely in large part on policy that falls outside of the scope of nudges. As with measures aimed at reducing littering,

these may be effective to a limited extent but they would also come with some risk of triggering undesired psychological processes (e.g. rebound effects and moral licensing) that could help sustain high levels of single-use cup consumption and it is likely that they would disincentivize companies that use disposable cups from revising their environmentally problematic business strategies.

2.1.4. Measures to shift coffee consumption patterns towards more sustainable types of containers

These measures would stimulate sustainable transitions in the personal habits of coffee consumers as well as strategic development in the businesses that currently use single-use cups. If they are effective, they would also address the same problems as interventions 2 and 3 (Sections 2.1.2. and 2.1.3.) above, i.e. they would reduce littering – and the amount of these materials in the environment – and improve user behaviours around consumption and disposal.

Whatever happens to overall levels of coffee consumption, other materials will need to replace the current mixed paper/plastic. Transitions to other types of single-use cups could be one avenue; however, one for technical rather than behavioural solutions. Transformation of business strategies away from single-use cups and towards reusable alternatives is the more feasible target for nudging interventions. Although such transformations also in part hinge on technical matters (e.g. resource demands in production, transportation and eventual waste management of reusable coffee cups), behavioural aspects of this transformation will influence whether reusable cups will actually incur lower total resource demands: a transition to reusable cups will only reduce the total environmental impact compared to disposable cups if the reusable cups are actually being reused enough times. It is therefore imperative that nudging approaches to such a transformation consider ways of ensuring a suitable rate of reuse. It is also important to note that interventions that shift coffee consumption patterns towards more sustainable types of containers, unlike measures aimed at reducing coffee consumption generally, would not threaten the global coffee business and it would allow coffee culture to persist, although in somewhat modified form. In fact, any negative spillover of rebound effects or moral licensing would probably lead to a slight increase in coffee consumption, albeit in reusable cups.

Transformation of business strategies away from single-use cups and towards reusable alternatives is the more feasible target for nudging interventions.

We conclude that, in order to make a meaningful, efficient impact on plastic litter and pollution, without threatening the coffee business or coffee culture, the suitable target should be (4) to develop measures that help shift coffee consumption patterns towards more sustainable types of containers. Specifically, nudging interventions could be used to transform coffee consumption patterns to increase the proportion of coffee consumed in reusable containers relative to single-use cups. In order to do that, we must first understand the factors that currently motivate people to get their coffee in single-use cups.

2.2. Reasons for Using Disposable Cups

Fisher (2008) describes how the practice of using disposable drinking cups developed in the United States through the twentieth century, motivated by three main factors:

- growing concerns for hygiene and disease prevention;
- the convenience of a receptacle that does not require any care; and
- the growth of consumer culture including the possibility to signal or gain social status through consumption behaviours.

To this list we could add that people still seem to have lingering doubts and misconceptions around the environmental impacts of disposable cups. Each of these factors would need to be considered in efforts to modify people's choices towards increasing use of reusable cups. Each of them can also be considered from both a business perspective and consumer perspective.

2.2.1. Hygiene

Cleaning and caring for reusable cups could also become the responsibility of the coffee shop or food service business.

The issue of hygiene could be considered in terms of objectively measurable contamination such as microbial growth, but also has important subjective components that reflect cultural and psychological notions of (un)cleanliness (e.g. Nemeroff & Rozin, 2009). Even minor signs of previous use or lack of cleanliness in food-related consumer products are associated with the relatively forceful emotional reaction of disgust, which is closely linked to avoidance behaviours (e.g. Numata & Managi, 2012; Walsh et al., 2017). Disgust reactions are also highly prone to generalization (through classical conditioning), i.e. people carry their negative reaction to one stimulus across to others; this could have major negative impacts on brand trust and brand loyalty (cf. Desmet & Hekkert, 2009; Lassoued & Hobbs, 2015). Some research suggests that fast food tends to be perceived as very hygienic and that the disposability of fast-food items allows people to waste the product at early signs of spoiling (e.g. change in temperature, texture, taste), making foods sold in disposable packaging particularly appealing to people who are sensitive to experiencing disgust (e.g. Egolf et al., 2018).

Most cafés and restaurants already clean and care for the ceramic cups used for in-house service. Therefore, cleaning and caring for reusable cups could also become the responsibility of the coffee shop or food service business. However, some food service businesses have limited amenities for washing and storing dishes (Fisher, 2008). Investment in appropriate dish-washing facilities, and the running costs incurred with their staffing, maintenance, electricity and water consumption, may be deterring. For kiosks, food trucks and other small settings, on-site dish-washing facilities may be entirely unfeasible. Even with adequate facilities, some studies have reported that reusable restaurant utensils have substantively higher incidence of microbial contamination (e.g. *E. coli*), and associated risk of spreading

Reusable cup hygiene can also be considered as the responsibility of the consumer, as is already the case with personal travel mugs that people carry around.

diseases, than disposable alternatives (Felix et al., 1990; Kupchik & Katz, 1977). Furthermore, consumers tend to be more sensitive to hygiene concerns and other food safety risks that they perceive as stemming from previous users (Nemeroff & Rozin, 2009) or from the handling of a product in the production and sales chain than they are to risks incurred with their own handling of the product (Frewer et al., 2005; Grunert, 2005). Therefore, businesses that fail to fully convince customers of the pristine state and hygiene of reusable food containers run the risk of severely damaging trust in their brand (Desmet & Hekkert, 2009; Lassoued & Hobbs, 2015). Quality labels *that are highly trusted* are one possible route to convincing consumers that hygiene standards are being upheld – and these labelling standards may be more reassuring than assertions of cleanliness given by individual businesses (Grunert, 2005; Tonkin et al., 2016; Wardy et al., 2015).

Reusable cup hygiene can also be considered as the responsibility of the consumer, as is already the case with personal travel mugs that people carry around. Personal travel mugs allow users to avert perceived or actual risks of contamination of the container by previous users or service staff, and they could give users a sense of control over the level of hygiene (Frewer et al., 2005; Grunert, 2005; Nemeroff & Rozin, 2009). However, they may have considerable drawbacks in terms of actual risks: a substantial proportion of reusable cups and bottles in use show microbial contamination (e.g., Miko et al., 2013; Oliphant et al., 2002). They may also have drawbacks outside of the actual consumption situation in terms of psychological aspects of hygiene and disgust as well as convenience, because they require prolonged storage and handling of the soiled container (Egolf et al., 2018; Ertz et al., 2017).

Our stakeholder interviews indicate that concerns connected to disease prevention in the ongoing COVID-19 pandemic have led several businesses to ban the practice of filling a personal travel mug.

Our stakeholder interviews, conducted in the early summer of 2020, indicate that concerns connected to disease prevention in the ongoing COVID-19 pandemic have led several businesses to ban the practice of filling a personal travel mug. While this could be a temporary change, increased awareness of hygiene, and the disease prevention advantages of single-use cups, could persist after the current pandemic has ended.

2.2.2. Convenience

From the business owners' perspective, the use of disposables has been described as a consequence of the transition towards 'prosumption capitalism' (Ritzer & Jurgenson, 2010) in which the labour and other aspects of value production surrounding a product are increasingly left to the users themselves (rather than the producers): businesses can save labour and handling costs by limiting their level of service, letting customers pay for and fill a cup themselves from a coffee dispenser. After the purchase, customers will continue to provide essential services for the business as they carry around a branded cup. However, for consumers to accept responsibility for these aspects of the service, businesses have sought to minimize the added cost incurred in terms of effort and monetary expense (cf. McCollough, 2007). Containers have therefore typically come 'free' with the purchase of a beverage, at least from the consumers' viewpoint, and been easily disposable. Much of the true cost of disposable cups is instead absorbed by the public sector that manages the resulting waste, litter and environmental degradation (Fisher,

2008; Nordin et al., 2019; Ziada, 2009); and by the environment itself through the added load of natural resource consumption and the pollution caused in production, transport and by planned waste management (e.g. landfill, incineration) as well as unmanaged waste (e.g. microplastics leaking into marine ecosystems) (e.g. Addamo et al., 2017; Koelmans et al., 2019). While these negative impersonal consequences can be substantial, business owners may hesitate to abandon disposable cups and return to a more costly mode of service, or to charge for them and risk losing customers and marketing services.

Economic models also suggest that rising incomes will tend not only to increase the rate of consumption in a general sense but will also shift consumption patterns towards disposable products.

From a consumer perspective, disposable cups offer the convenience of obtaining, transporting, consuming and disposing of a drink 'on the go', without much added time or effort dealing with the receptacle itself (Alsop et al., 2004; Fisher, 2008; Niimi & Lynch, 2017). In contrast, reusable cups have the disadvantages of requiring a fairly advanced level of preparation involving steps that can be traced back to the day before it will be needed or even longer, in order to have it in the correct location (e.g. home rather than at work), clean after last use, and sufficiently well-placed in the home to be reliably remembered and packed in the morning. During the day, it requires a level of care in storage (e.g. to avoid leftover coffee leakage in a bag) and developed routines for handling and remembering the cup throughout the daily activity cycle which for many involves transportation between multiple sites. The versatility of reusable mugs is an open question. On one hand, they allow the user to fill up with any beverage from any setting, on the go, without worrying about disposal or waste. On the other, users may feel the need to wash the cup between uses throughout the day, especially if they want to use it for different beverages. They may even keep different cups for different beverages. The need to store and wash a personal reusable mug thus increases the burden of effort and inconvenience associated with usage.

While the added load of caring for a reusable drinking cup (e.g. washing) may seem minor, it can be prohibitive for many; particularly for busy urban sub-populations. Strict prioritization of limited personal resources such as time, attention and empathy (for the environment as well as for humans) is a hallmark of urban living (Hartig & Kahn, 2016; Kaplan, 1995; Milgram, 1970). Economic models also suggest that rising incomes will tend not only to increase the rate of consumption in a general sense (i.e. cutting across product categories) but will also shift consumption patterns towards disposable products (McCollough, 2007). This shift presumably reflects the increasing opportunity cost that is associated with any time spent in caring for a reusable product—time that could be spent in more pleasant or lucrative activities instead.

2.2.3. Consumer culture

Morris (2013) describes the current global trend in coffee consumption as a mixing of Italian coffee culture with American speciality coffee shop culture and Internet-age urban mobility patterns. Seeing prolific global growth since the 1990s, coffee shop chains have partly replaced the older national coffee cultures in Europe and throughout the world, at least in the out-of-home coffee market. A wide and growing range of different espresso-based coffee drinks allows consumers to build and project sophistication and individuality and motivates them to pay generously

for the product. The speciality coffee shops contribute to the sense of sophistication by training and dressing employees as baristas who make and personalize coffees to order, and by providing a comfortable, sociable ‘third place’ setting, away from work or home (see Oldenburg & Brissett, 1982). With the Wi-Fi era, speciality coffee shops also took on the role of workspace for professionals on the go and even for startup companies looking to cut overhead costs, where comfort and Internet access could be rented for the price of a latte.

Much of the sales also centre around morning hours when people get coffee to-go, presumably to consume during a commute to work.

Brands generally, and coffee shop brands not least, have become central not only in framing urban life but also in shaping it (Bookman, 2014; Dobers & Strannegård, 2005). Coffee shop chains invest in and recreate neighbourhoods, and they seek to reconceive the role of customers within their stores – as co-creators rather than mere receivers of marketing campaigns or consumers of products. Coffee shops and coffee consumption thus become essential aspects of the lived experience of a city. In recent years coffee shop chains have been described as part of a larger-scale commodification or ‘McDonaldization’ of the public space, representing an impersonal, fast-food approach not only to café culture but to city life more broadly (Bookman, 2014; Dobers & Strannegård, 2005; Morris, 2013). This approach has led to increased competition from independent artisan coffee shops.

Our stakeholder interviews suggest that, at least in convenience stores and gas and service stations, consumption patterns do not fully match the picture painted by Bookman (2014), Morris (2013) and others, as outlined above. Much of the coffee sales actually seem to reflect part of the older northern European coffee culture in the form of drip coffee (also see Statoil, 2010) – often seen as a lower-status drink. Much of the sales also centre around morning hours when people get coffee to-go, presumably to consume during a commute to work. These consumption patterns may reflect a more habitual and possibly more utilitarian consumption pattern than the leisurely consumption of more elaborate or continental forms of coffee described in the preceding paragraphs. One might speculate that these more leisurely consumption patterns are shaped by motives to project sophistication and individuality by associating oneself with a particular taste or brand. With luxury products, a higher price and more conspicuous brand markings will likely increase the appeal of a more environmentally friendly option (Griskevicius et al., 2010; Sörqvist et al., 2015). In contrast, non-luxury consumption is more susceptible to modification via shame (Amatulli et al., 2019). For commuters, more conspicuous markings that clearly show an environmentally damaging choice has been made would be likely to reduce their appeal.

For commuters, more conspicuous markings that clearly show an environmentally damaging choice has been made would be likely to reduce their appeal.

2.2.4. Doubts and misconceptions

For several years there was some debate over whether transitioning from single-use to reusable cups would reduce environmental damage (see e.g. Duda & Shaw, 1997; Hocking, 1994). The scientific consensus now is that reusable cups tend to be better for the environment in most contexts, although there are several important caveats around their production, use, cleaning/care and end-of-life (for more on cups and other disposable products see, for example, Addamo et al., 2017; Kershaw, 2015; Koelmans et al., 2019; Nordin et al., 2019). Leaving these important technical and environmental considerations for natural scientists, the focus here lies on

Being used to recycling other paper products, many people may also be under the misconception that 'paper cups' are recyclable.

Many people may also believe that recycling compensates for the environmental impact of a product.

psychological aspects of how doubts and misconceptions surrounding single-use cups may hamper efforts to reduce their use.

Colloquially known as 'paper cups', mixed paper/plastic single-use cups may not be easily recognizable as a potential environmental threat. Furthermore, these cups were introduced as more environmentally friendly alternatives to polystyrene and other types of fully plastic disposable cups (Duda & Shaw, 1997; Hocking, 1994; Jung et al., 2011;). Being used to recycling other paper products, many people may also be under the misconception that 'paper cups' are recyclable. Having been targeted with campaigns on the importance of recycling and likely feeling good about their recycling habits, many people may also believe that recycling compensates for the environmental impact of a product. Even with recyclable products, however, recycling normally far from compensates for the environmental costs of production and transport (Jung et al., 2011; Nordin et al., 2019). Furthermore, the mixed paper/plastic material of the cups means that they can often not, with sufficient efficiency, be separated and recycled as would be appropriate for each constituent material (Nordin et al., 2019). Instead, the mixed paper/plastic single-use cups that people assiduously put in the recycling bin must be sorted out in the waste management process and often go to landfill or incineration (cf. Jung et al., 2011; Ziada, 2009). In an additional recent development, degradable versions of mixed paper/plastic single-use cups have been introduced. According to data from Statistics Sweden (as reported in Nordin et al., 2019), having the belief that an item is degradable is among the top self-reported reasons for intentional littering. Cups that could be presumed to be degradable could therefore incur a risk of increased littering. Through psychological processes such as negative spillover and moral licensing (Klöckner et al., 2013; Mazar & Zhong, 2010; Tiefenbeck et al., 2013; Truelove et al., 2014), gaining a sense of doing good for the environment by getting coffee in a recyclable or degradable cup can also sustain or increase consumption patterns (Kershaw, 2015; also see e.g., Jung et al., 2011; Ziada, 2009). And to complete the case against degradable cups, they are often degradable under specific conditions that normally require industrial-grade facilities and professional handling (Kershaw, 2015; Nordin et al., 2019). Few countries and regions have such facilities. When placed in general waste or paper recycling bins, as most of them probably are by well-intentioned consumers, these cups get redirected to landfill or incineration. Simply left in the environment (due to intentional or unintentional littering or failures in the waste management process), so-called degradable plastics are often not reliably degradable over at least several years; it is uncertain how long they can persist (Napper & Thompson, 2019).

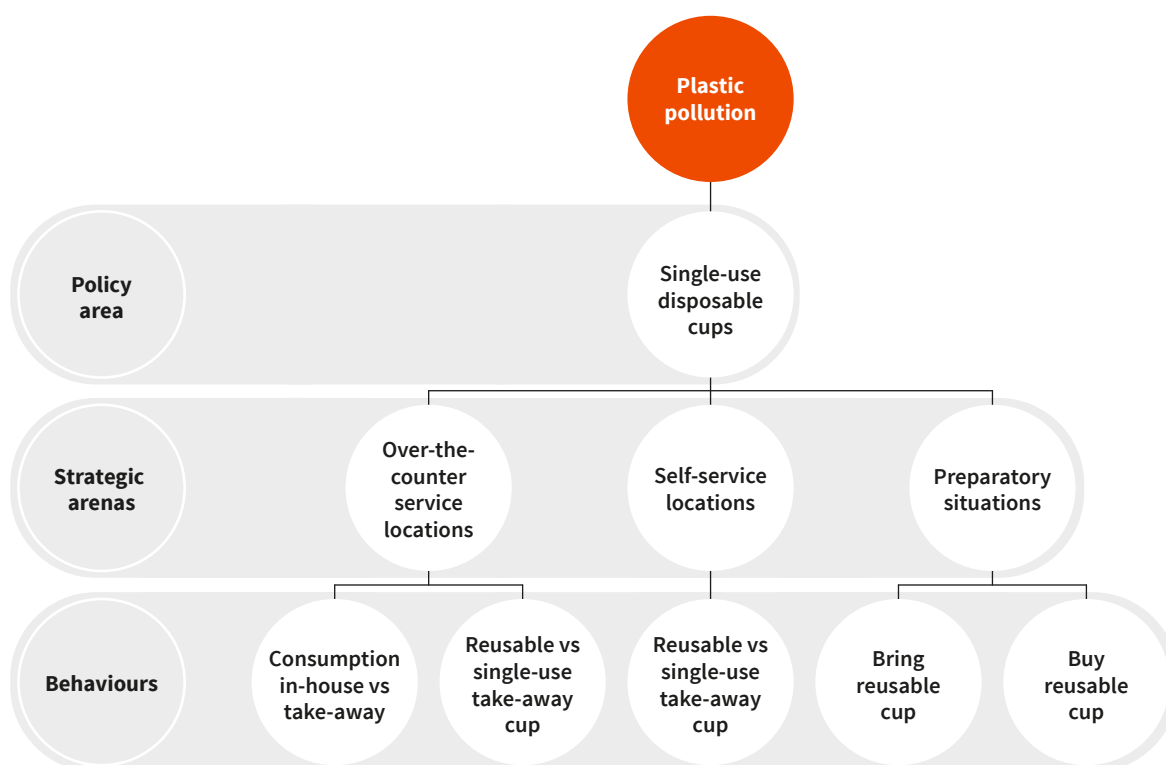
Beside sources of doubt and misconceptions around the sustainability of the cups themselves, efforts to reduce their use could also be met by more or less unfounded scepticism. Controversies surrounding recent efforts to abolish different single-use items (e.g. plastic bags; Hallberg et al., 2018) may also extend to disposable cups. The perceptions among some subgroups of the population – that a drive against disposables might be premature given lingering doubts about their environmental merits relative to different alternatives; that it constitutes a symbolic or politically exploitative attempt to persuade people that they are acting on environmental issues; or that it is a case of greenwashing through which coffee chains seek to improve their image – could seriously compromise the efficacy of such efforts

(cf. Bartlett, 2011; Munshi & Kurian, 2005; Pearson & Henryks, 2008). Furthermore, it could damage the brands and businesses of companies that take a leading role in these efforts.

2.3. Behaviours to Address

Behaviours relating to single-use disposable coffee cups occur in multiple arenas and involve both conscious and unconscious decisions. They are not limited to rational considerations in a specific purchase situation but involve preparatory behaviours (or a lack thereof) away from the purchase setting, and habit forming processes that play out over time and which are interwoven with the complex activity cycles and social practices that structure day-to-day life. To pinpoint which arenas and behaviours might allow for effective interventions to decrease consumption of single-use cups, the BASIC Toolkit that was developed by the Organization for Economic Co-operation and Development (OECD, 2019) includes a stepped approach to behavioural reduction. Using this approach, the challenge can be summarized as in [Figure 2](#).

Figure 2: Behavioural reduction process for single-use disposable coffee cup consumption



Source: Adapted from the OECD BASIC Toolkit (OECD, 2019).

The behavioural reduction identifies three strategic domains: 1) over-the-counter service locations; 2) self-service locations; and 3) the preparatory situations that largely determine whether a consumer has access to and brings a reusable cup to service locations. The two service domains are distributed across convenience stores that mainly cater to public transport commuters; gas and service stations

that mainly cater to people travelling by car; and coffee shops, cafés and restaurants that cater both to habitual consumers, who buy coffee during their commute or at work breaks, and to urban leisure consumers, who get coffee spontaneously as a luxury. Our stakeholder interviews included sustainability officers at three large business chains representing the three strategic domains in the Swedish context: 7-Eleven (convenience store), Circle K (gas and service station), and Wayne's Coffee (coffee shop). While each of these categories of businesses can allow for in-house consumption of coffee to some extent, they vary markedly in the degree to which they rely on and encourage it.

Our stakeholder interviews identified two main categories of on-the-go coffee consumption. The bulk of take-away sales happen close to public transport stations – examples of the habitual and time-sensitive consumption which may be characteristic of commuting populations. The other category of on-the-go coffee consumption is centred around major pedestrian streets, parks and other hubs of urban leisure activities, and is characteristic of the leisurely behaviour patterns of predominantly younger, urban populations.

The stakeholder interviews also showed that, in most convenience stores and gas and service stations, the single-use cup is clearly the default. While take-away coffee is a relatively small proportion of sales in coffee shops, it comprises the bulk of sales in the convenience stores and gas and service stations. These settings often have limited and rudimentary provisions for consuming the coffee in-house, and do not normally offer ceramic cups for in-house consumption. For many of them, investment in the washing and service facilities that would be needed to provide



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ceramic cup service would probably be prohibitive. However, many of them allow customers to have coffee served in a personal travel mug (barring the current restrictions due to the COVID-19 pandemic). Some of them also sell reusable cups for an added fee. The alternatives that are available to replace single-use cup consumption in convenience stores and gas and service stations are therefore 1) to increase the use of personal travel mugs, or 2) to increase the attractiveness of buying and reusing a reusable cup.

Like convenience stores and gas and service stations, many coffee shops see customers buying coffee in single-use cups but then stay to drink their coffee in-house.

Like convenience stores and gas and service stations, many coffee shops see customers buying coffee in single-use cups but then stay to drink their coffee in-house. Many coffee shops also sell branded reusable cups. In contrast to convenience stores and gas and service stations, however, coffee shops rely mostly on serving coffee in a ceramic cup for in-house consumption. However, the coffee shop context does not normally set any strong default for either single-use cups or reusable cups. While the choice to grab a coffee in a coffee shop is often a spontaneous one, once customers enter a coffee shop, many of them probably have a clear plan to either stay or get coffee to-go. Most coffee shop chains in Sweden have not implemented anything in the choice environment to nudge customers into a more sustainable plan, such as staying to enjoy their coffee in-house in a ceramic cup. The fact that many consumers hold an explicit preference for sustainable options in general and in coffee consumption specifically, but still predominantly buy coffee in single-use cups, suggests that the behavioural patterns surrounding on-the-go coffee are likely to be influenced by the choice environment. Interventions in the choice environment could therefore feasibly change these behavioural patterns, especially if the preferred choice is aligned with consumers' intentions to act pro-environmentally.

Any intervention aimed at reducing single-use cup consumption must be easy to implement, highly acceptable to customers and in-store staff, and general enough to work in a wide range of different locations.

Our stakeholder interviews also showed highly positive attitudes among business owners and operators towards interventions aimed at decreasing consumption of single-use cups, although with the caveat that interventions must not negatively affect profits. Several convenience store chains in Sweden have already initiated attempts to increase the use of reusable cups. Among the gas and service station chains, several are increasing their investment in the 'in-store experience', transitioning towards making sales of food and beverages their main source of revenue. Thus, initiatives to increase to-stay behaviours are already being adopted by these chains. Regardless of these positive strategic moves from retailers, however, any intervention aimed at reducing single-use cup consumption must be easy to implement, highly acceptable to customers and in-store staff, and general enough to work in a wide range of different locations. Taking these aspects into regard will increase the likelihood that implementation as well as outcomes will be successful and can work as a proof of concept, feasible for upscaling.

SECTION 3

Intervention Strategy

Section summary

This section outlines relevant strengths and weaknesses of nudging compared with traditional policy instruments, applies these arguments specifically to the problem of user-level behaviours that contribute to plastic litter and pollution with single-use disposable cups, and describes our proposal for a nudging strategy that would likely be both practicable and effective. Three nudging interventions are proposed: 1. A soft new default for coffee ordered over the counter; 2. Bring your own cup for convenient self-service; and 3. Refillable cups. For each nudge, we discuss how it could reinforce the effects of the other nudges. We also discuss how the strategy could work together – in sequence or in parallel – with traditional policy instruments.

Key points

- 1** Nudging is suitable for addressing plastic litter and pollution from single-use cups, and in doing so it provides specific advantages compared with traditional policy instruments in this policy area.
- 2** The three proposed nudges each address psychologically relevant factors identified in [Section 2](#) and are expected to mutually reinforce each other to produce meaningful reductions in single-use cup consumption.
- 3** The nudging strategy is expected to interact mostly favourably with traditional policy instruments and to have manageable side-effects.

3.1. Strengths and Weaknesses of Nudging and Traditional Policy Instruments

In [Section 1](#), we summarized the characteristics of nudging and of more traditional policy instruments, and how those characteristics make them suitable for different situations and different problems. We also discussed some ethical considerations related to the form and degree of interference with personal freedom of choice that attend the different approaches to behaviour change. On the assumption that each of the policy instruments could be found to be acceptable and reasonable to use in principle, (i.e. the seriousness of the problem allows for a degree of interference with personal freedom), the choice between them comes down to matters of a more practical nature: nudging and the several traditional policy instruments have specific strengths and weaknesses that should be considered. [Table 2](#) summarizes these strengths and weaknesses side-by-side to enhance comparability of their practical aspects. We also break out economic incentives and economic disincentives as distinct categories, because they differ in several practical ways. For each practical issue and policy instrument, we also propose questions that policymakers may find useful in evaluating the instruments with regard to a given sustainability problem.



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Table 2: Strengths and weaknesses of typical nudging and traditional policy instruments, and guiding questions for decision makers

Strong Moderate Weak Negative moderate Negative weak

	Increasing constraints on personal freedom of choice →				
	Nudging interventions	Public information campaigns	Economic incentives	Economic disincentives	Regulation
Ease of implementation	Voluntary and collaborative implementation.	Often complex to implement.	Often substantive political, economic and bureaucratic obstacles.		
Guiding questions	Feasible to achieve collaborative alliance with relevant actors?	Manageable to achieve sufficient scope and reach?	– Feasible to achieve political alliance? – Feasible to overcome formal obstacles?		
Acceptability	Typically only minor negative reactions from users to non-forcing interventions.	Sometimes induce undesired reactions in some subpopulations (e.g. fear, hopelessness, resistance).	May be unpopular and controversial in some ideologically opposed populations.	Often unpopular and controversial in multiple populations.	
Guiding questions	Acceptable type and degree of behaviour change for users?	Can message framing be acceptable enough without compromising its strength?	Acceptable with some politically motivated opposition?	Acceptable with substantive political and popular opposition?	
Specificity	Planned, stepped site- or time-specific implementation with intact control conditions.	Normally national or international in scope. Limited customization towards selected subpopulations through communication strategy choices.	Normally national in scope. Targets all.	Normally national in scope. Targets all but affects some more than others.	Normally national in scope. Targets all relevant actors.
Guiding questions	Possible to identify and tailor to broad enough arenas to be both manageable and efficient?	Available knowledge and means to identify and tailor to relevant subpopulations?	Affordable to effectively incentivize large enough population segments?	Acceptable that the financially strong are less affected?	Acceptable to prohibit and punish all possible instances of behaviour?
Adaptability and scalability	Quick to implement and adapt. Inherently experimental with built-in plan for evaluation and iterative adaptation and upscaling.	Once planned, often left to run its course. With the quicker format of social media-based campaigns, sometimes more room for adaptation along the way based on user feedback or panel studies. High risk of contagion between different iterations or waves of campaign efforts.	Can be gradually adjusted in a planned or iterative process. However, versatility sometimes constrained by political, economic and bureaucratic obstacles and risk reigniting controversies around the policy.		Normally slow to plan and implement and slow to adjust. Versatility often constrained by political, economic and bureaucratic obstacles and risk reigniting controversies around the policy.
Guiding questions	Available institutional support and expertise to develop, evaluate and adapt?	Possible to know from the start what will work?	– Feasible plan and process for adaptation? – Can continuing debate be managed?		– Acceptable with slow pace of adaptation? – Can continuing debate be managed?

	Nudging interventions	Public information campaigns	Economic incentives	Economic disincentives	Regulation
Affordability	Often some added cost for initial investments by authorities and companies.	Investment in production and dissemination of media content.	Often substantive added cost for government and loss of business for some companies.	Sometimes increase tax revenue for government, though at added cost for consumers. Often loss of business for some companies.	Often costly transition for government and companies and continuous cost for monitoring and sanctioning system.
Guiding questions	Feasible to engage stakeholders to invest in new strategies?	Worth it for weak or unpredictable effects?	Economically and politically justified?	Acceptable to transfer costs to companies and consumers?	<ul style="list-style-type: none"> – Acceptable transitional cost? – Worth expected long-running monitoring costs?
Expected effects during intervention	Expert-run nudging interventions tend to achieve small-to-moderate behavioural effects in targeted areas. They often evolve and inform further interventions.	Often weak or unpredictable effects due to high population-level variability in habits, message exposure and receptivity; and constancy of contextual factors in choice situation.	Smaller economic incentives are generally weak, and large incentives often unfeasible.	Even smaller economic disincentives can achieve small-to-moderate behavioural effects due to loss aversion.	Often very effective compared to non-forcing measures, at least when applied to production- or market-level behaviour rather than user behaviour only.
Guiding questions	Sufficient given seriousness of problem?				
Expected effects if or when discontinued	Intended for long-running and evolving use. If discontinued, expect partial return, though lasting adjustments of business models and habit formation can sustain part of achieved effects.	Temporary in nature. Knowledge gains and attitude change may sustain part of any achieved effect. Chronic contextual factors will tend to draw behaviour back to baseline levels.	Some risk of some backlash through dampening of intrinsic motivation.	High risk of some backlash through dampening of intrinsic motivation and norm-setting.	
Guiding questions	Acceptable with partial return if/when collaborative effort terminates?	Acceptable with weak or uncertain long-term effects?	Acceptable with possible backlash with political or economic sways?	Acceptable with probable backlash with political or economic sways?	Acceptable with probable backlash with political sways?
Expected knowledge gains	Experimental approach with direct observation of behavioural outcomes. This allows for causal inference through site- or actor-level experimental contrasts for evaluation with within- or between-group control conditions. Easy to implement tag-on survey or interview methods directly on site to identify moderating and mediating variables.	Evaluation often limited to blunt measures of population-level trends and lack control conditions for causal inference. Difficult to control population- or individual-level exposure for between-group comparisons, and low signal-to-noise contrast for evaluation. Often allow monitoring of exposure by tracking media use and social media interaction patterns. Tag-on survey or interview methods can tap attitudinal outcomes.	Evaluation often limited to blunt measures of population-level trends in purchase patterns etc. However, stepped implementation and gradual adjustment of (dis)incentive levels can sometimes allow for causal inference. Tag-on survey or interview methods can tap attitudinal outcomes. Weak: Evaluation often limited to blunt measures of population-level trends in purchase patterns etc. and lack control conditions for causal inference. Added richness of information possibly available through monitoring registers and legal records. Tag-on survey or interview methods often difficult to implement with lawbreakers.	Evaluation often limited to blunt measures of population-level trends in purchase patterns etc. and lack control conditions for causal inference. Added richness of information possibly available through monitoring registers and legal records. Tag-on survey or interview methods often difficult to implement with lawbreakers.	
Guiding questions	Can next steps be efficiently guided by this type and quality of data?				

3.2. Is Nudging Suitable to Address Plastic litter and Pollution From Single-Use Disposable Cups?

Reading [Table 2](#) from left to right – i.e. considering instruments that interfere less with personal freedom of choice before those that impose more constraints – we first consider whether a nudging approach would be feasible in a given situation, before considering how nudges should be designed and how they might interact with traditional policy instruments.

3.2.1. Is nudging feasible in this situation and with this problem?

Here, we use the guiding questions from [Table 2](#) to answer the overarching question of the feasibility of nudging interventions in the policy area of single-use disposable cups:

Is it feasible to achieve a collaborative alliance with relevant actors?

The answer to this question is crucial, and it is really something to be explored in practice through open-minded conversations between relevant authorities, stakeholders and experts in psychologically informed policy and implementation. However, our stakeholder interviews (see [Section 2](#)) do suggest that several of the major actors are positive about participating in efforts to improve the sustainability of their businesses and are already engaged with certain relevant processes. Imperatives are that any nudging intervention must be easy to implement, highly acceptable to customers and in-store staff, and general enough to work in a wide range of different locations.

We also see potential to augment the open-minded conversations with elements of the traditional policy instruments. Relevant NGOs and spokespeople for environmental issues could be engaged to step up their communication efforts towards the companies in question and to the general public about the need to reduce plastic litter and pollution from single-use cups. Alongside this, relevant national and EU-level authorities could inform retailers, manufacturers and other companies that a ban will be considered shortly if collaborative change efforts are unsuccessful. And while these communications efforts are going on, economic disincentives are already being prepared (SOU 2020:48). This process would motivate collaborative efforts and provide an opportunity to implement nudging interventions alongside economic disincentives, when businesses and consumers will need to modify their behaviour in relation to single-use cups anyway.

We consider it feasible that a collaborative alliance with relevant actors could be achieved.

Will nudging interventions impose an acceptable type and degree of behaviour change for users?

The different interventions that could be considered would nudge users to update their habits arounds coffee consumption, motivated by their spontaneous psychological responses to the new choice architecture and without forcing them to do so. While some might experience some predictable initial confusion or frustration in direct response to the changed context, and a small subpopulation might react more explicitly negatively on ideological grounds to the sustainability initiative, we expect that nudging interventions in this context and product category would be acceptable for a vast majority of users. If nudges were complemented by well-considered, on-site communication efforts by the involved companies to clarify the valid reasons for the changes, that could likely improve acceptability even further.

We conclude that nudging interventions would impose an acceptable type and degree of behaviour change for users.

Is it possible to identify, and tailor interventions to, broad enough arenas to be both manageable and efficient?

Our systematic approach to examining the involved behaviours (see [Section 2](#)) has identified relevant arenas for intervention: commuting, coffee shops and convenience stores. Take-away coffee consumption is determined by different contextual factors in each of these arenas, and we see potential to develop suitable nudging interventions for each arena. In collaboration with companies and other stakeholders, such interventions should be manageable. Taken together, reasonably successful implementation and iterative tailoring in each of the arenas would reach a large part of the total take-away coffee market and so have good potential to achieve substantive overall reduction in plastic litter and pollution from single-use cups.

We conclude that we can identify, and tailor interventions to, several broad arenas in a way that would be manageable and likely to be efficient.

Is there available institutional support and expertise to develop, evaluate and adapt the intervention?

Institutional support should be made available through the commissioning agency and from a steering committee of representatives from a range of relevant national and international organizations. Members of the reference group also contribute with expertise in policy matters, economics and other fields. In Sweden, and many other countries, the expertise to develop, evaluate and adapt nudging interventions for large-scale implementation already exists – in consulting firms and freelance practitioners, for example. An international network of collaborators would need to be established in order to support eventual upscaling to a European level. It is expected that the reference group would have international reach, and an existing collegial network of researchers and practitioners in psychology, making international upscaling feasible.

We conclude that the institutional support as well as the needed expertise is available.

Is it feasible that we could engage the relevant stakeholders to invest in the new strategies?

We consider that the EU is already committed to implementing soft measures to reduce the use of single-use disposables and that Swedish authorities are engaged with the issue as well. Companies will need to move on this issue too, sooner or later, and our stakeholder interviews reveal that they are already considering their options. Moving early relative to other companies could be attended by benefits as well as risks (e.g. losing some sales during the transitional period). Engaging multiple major companies simultaneously would likely reduce the sense of risk for each company. Furthermore, green business strategies and corporate social responsibility have grown to prominent and pervasive movements in many market segments and countries. With the support of the forthcoming economic interventions and strategic communication efforts, we are hopeful that companies will engage to make the needed investments in transitioning to new business strategies around take-away coffee.

Stakeholder engagement is at least feasible, though this is an answer to explore in practice.

Are the expected effects during the intervention sufficient given the seriousness of the problem?

Well-planned and executed nudging interventions tend to have small to moderate effects (in statistical terms, approximately 0.2 to 0.5 standard deviations of difference between intervention groups vs control conditions). For real-life comparison, the average effect size in research on psychological interventions (e.g. psychotherapy) is about 0.4 and in medical treatment studies 0.05–0.2. Given that we do not yet have data on baseline levels of relevant aspects of the use of single-use cups, it is impossible to translate these effect sizes to an estimate of the expected reduction in plastic litter and pollution from such cups. We can, however, in more general terms say that the achieved effect is likely to be meaningful. For more on statistical measures of effectiveness, see [Box 1: Statistical effect sizes](#).

We conclude that the potential effects during the intervention would be meaningful but pending the initiation of data collection, no numerical estimates can be made.

Is the intervention still acceptable if we expect a partial return towards baseline values if or when the collaborative effort terminates?

Depending on which specific nudges are implemented and the degree to which the nudges are accepted and stimulate lasting adjustments of business strategies, the issue of partial return might be more or less relevant. With nudges that, for instance, change the order of food options on a restaurant menu, one would expect effects to largely dissipate with a return to the normal menu as only the relatively weak pathway through the establishment of new and enduring tastes and habits among customers would sustain the intervention effects: any new choice that occurs after removal of the

intervention would presumably be nudged towards the usual default option. However, with interventions that are more likely to remain in the choice setting even after termination of the active phase of a nudging project, or with interventions that nudge people and business owners towards committing to new business strategies, the effects are more likely to last with only slight return effects. We consider that this case offers opportunities to leave long-lasting marks on the ways that coffee is sold and consumed.

We conclude that return towards baseline values after the collaborative effort terminates is likely to be a relatively small problem in this project.

Can next steps be efficiently guided by this type and quality of data?

The possibility to draw causal conclusions is rare in social sciences and policy studies, in part because the achievement of knowledge gains is rarely among the top priorities in the design and implementation of large-scale interventions (e.g. Moss, n.d.; Shadish & Cook, 2009; Steg & Vlek, 2009). With a field experimental approach to both intervention and evaluation, it will be possible to determine whether the nudges caused any change in the relevant outcomes. Furthermore, easily implemented tag-on strategies (such as pairing the nudges with financial incentives, exploring what effects time of day or week might have, as well as pairing with moral nudges) can allow researchers to see more clearly how different variables affect results and uncover the processes through which the nudges are effective (see Hayes, 2017; van Kleef & van Trijp, 2018). Such knowledge is eagerly awaited in policy generally as well as in nudging research (Grüne-Yanoff, 2016; Szaszi et al., 2018). Furthermore, smaller-scale tag-on studies using survey or interview methods can add richness of detail and qualitative material that could provoke new questions or inspire new ideas. We are convinced that policy innovations can be guided by the knowledge gains that could be achieved with this project. The project could also be a major step in advancing the academic literature on nudging for sustainable transitions.

The data that could be obtained would be able to guide next steps in developing policy instruments for the future.

3.2.2. Is nudging suitable relative to traditional policy instruments in this situation and with this problem?

We see only one practical characteristic on which nudging is relatively weak compared to another policy instrument: regulation to ban single-use cups would likely, and unsurprisingly, produce a stronger and more immediate effect on their use. As it currently stands, however, single-use cups will not be banned within the work to implement European Union directive 2019/904 on the reduction of the impact of certain plastic products on the environment (EU, 2019). Instead, the EU has, for now, opted to push for measures to reduce their use. In response, preparations are underway to implement multiple relevant policy instruments,

including compulsory marking of single-use plastic products, a possible ban on branding and commercial messages on single-use cups, and economic disincentives in the form of an added cost for consumers on purchase of a beverage in a single-use cup (SOU, 2020:48). This report is another preparatory step in response to directive 2019/904.

We conclude that it is appropriate to consider nudging in this situation and with this problem. We also judge each of the other proposed initiatives (labelling, branding and disincentives) as reasonably viable from a psychological perspective. Of note, for a Pigouvian tax on single-use cups to be effective, it should come with the condition that the added cost is applied to the cup itself, which should be sold as a separate product, rather than bundled with the price of a cup of coffee. Furthermore, we recognize that our proposed nudging intervention must be considered and adapted to work as part of a larger, multi-component effort to tackle the problem of plastic litter and pollution from single-use products, though the nudging intervention should be workable as a standalone option as well. In outlining our nudges and their proposed impacts, we also consider how they could be expected to interact with the other policy instruments.



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3.3. Three Nudges

Based on the reasoning outlined in [Section 2](#), concerning the different factors that presently, inadvertently, are nudging much of coffee consumption towards take-away in single-use cups, we have developed three different nudging interventions.

Nudge 1: A soft new default for coffee ordered over the counter.

It ensures that customers face an actual choice situation when they get coffee.

Nudge 2: Bring your own cup for convenient self-service.

This builds on the same mode of implementation as [Nudge 1](#), but it works differently in locations that offer self-service. In these locations, [Nudge 2](#) replaces single-use cups with personal reusable cups as the quickest and most convenient way of getting coffee, which will affect the habitual and time-sensitive behaviour patterns of many on-the-go consumers.

Nudge 3: Refillable cups

This nudge takes a different approach to the problem: it does not directly target the reduction of single-use cups but rather aims to facilitate the transition towards alternative ways of buying take-away coffee, and is intended to support companies in developing – and getting customers committed to – a viable alternative business model for take-away coffee.

The three nudges are intended to work together as complementary and mutually supportive interventions, and we also indicate how they can be expected to interact with other policy instruments that might also be in use. While the nudges are expected to be most effective if used in combination, each nudge could also be considered as a standalone intervention. We describe each nudge in turn below.

3.3.1. Nudge 1: A soft new default for coffee ordered over the counter

In any effort to influence customers to select more sustainable cups, it is necessary to give customers an *actual choice*. The practice of presenting customers with a choice will contribute to raising awareness and stimulating thoughts not only about alternatives to single-use cups, but also about consumption habits and the on-the-go lifestyle more generally. In order to accomplish that, take-away cups must be treated as an item or product of their own – not just a container that coffee comes in. With [Nudge 1](#), single-use cups will no longer be the default option in any

of the relevant contexts. However, the form that this nudge should take will have to differ between locations where coffee is ordered over the counter but that allow for in-house consumption in ceramic cups (generally traditional cafés, restaurants and speciality coffee shops) and locations where coffee is ordered over the counter and that do not allow for in-house consumption (convenience stores, gas and service stations, and kiosks and food trucks).

For many locations where in-house service with ceramic cups is not a feasible option, nudging people to bring or buy a personal reusable cup might be the only viable option.

What the new default should be must be left up to business owners. It might be reasonable to assume that service in a ceramic cup for in-house consumption would be a suitable new default in many locations where in-house service and the needed facilities for washing and handling dishes are already in place; that is, for most speciality coffee shops, traditional cafés and restaurants. However, leaving the new default optional will ensure that the nudge is perceived as respectful and acceptable by a larger proportion of business owners, and will allow the nudge to be tailored to the specific business model, customer base and facilities in different locations. For many locations where in-house service with ceramic cups is not a feasible option (e.g. some convenience stores and gas and service stations, many kiosks and food trucks), nudging people to bring or buy a personal reusable cup might be the only viable option. This could be rather challenging, but [Nudge 2](#) is designed to facilitate that transition for some of these locations and [Nudge 3](#) proposes a way to further increase the effects.

Implementation

- Single-use cups can only be obtained over the counter, on request (i.e. not at self-service stations, through vending machines, etc.).
- Locations that sell coffee over the counter should allow refilling of personal reusable cups and offer service or self-service facilities for rinsing reusable cups before refilling.
- An order of take-away coffee is met with the question “Do you also need a cup for that?”, which opens the opportunity to present different available products (i.e. both reusable and single-use alternatives).
- In presenting different alternative products for take-away coffee, the first to be presented (which in visual displays corresponds to the top or left-most item) should be a reusable product.



Box 1: Statistical effect sizes

In psychological research, a small effect is conventionally defined as a difference between two mean values (e.g. the mean ratio of single-use take-away sales to total coffee sales in locations that have implemented the nudges vs the mean of control locations) of 0.2 standard deviations, denoted here as d (as per Cohen, 1988). A small effect is comparable to a correlation between the variables (e.g. nudging implementation and ratio of single-use take-away to total coffee sales) of $r = .10$. Moderate and strong effects are conventionally defined as differences of 0.5 standard deviations (or $r = .24$) and 0.8 standard deviations (or $r = .37$), respectively.

The magnitude of the expected effects of the nudges, as indicated for each nudge in the following sections, is estimated based on the presumed psychological impact of each nudge. They should thus be considered as hypotheses regarding the magnitudes of the effects.

Expected effects

- Up to small statistical effects ($d \leq 0.2$) on the ratio of single-use take-away to total coffee sales over the first few months following implementation.
- Up to small statistical effects ($d \leq 0.2$) on the purchase and use of reusable cups.
- Elevates and makes explicit that the single-use cup is a choice that customers make, thereby raising awareness and stimulating thoughts about consumption habits, general lifestyle and alternatives.
- Stimulates some businesses to develop their in-house customer experience, and their communications, to favour more qualitative and slow coffee culture over a business model based around an on-the-go lifestyle. Potential to promote espresso and coffee bar culture (over mugs of drip coffee) to facilitate short stays and increase customer turnover.
- Stimulates businesses to develop their offer around reusable cups for take-away.

Expected interplay with other policy measures

- Should work very well together with an economic disincentive that forces a price on single-use cups, which would help to elevate single-use cups to a product in their own right, and draw additional attention to the choice situation and available alternatives.
- Should work well together with compulsory marking of single-use plastic products, and/or a ban on branding and marketing messages on single-use cups, which would help to draw attention to the negative environmental impacts of single-use cups and help further in making reusable cups a comparatively more attractive option.

Possible extensions

- Although the background to this report specifies that single-use cups are the target, the single-use disposable lids could well be included in this intervention: when a single-use cup is requested it would as default be provided without a lid, and lids thus require an additional explicit request from customers.
- A move to ban branding and commercial messages on single-use cups could further reduce their appeal, to some extent for customers but mainly and much more forcefully for businesses. They would then be motivated to develop their offer of branded reusable cups that would allow them to maintain their visual presence in the urban environment.
- A similar strategy (of banning commercial messaging on single-use materials) should be feasible also for fast-food restaurants and regular restaurants that offer take-away foods.

Ethical considerations

- Introduces a minor inconvenience for all consumers and service staff.
- Presents only minor inconvenience for businesses.
- **Summary:** While expected effects are only small over the first few months following implementation, minor interference in choice architecture seems warranted and proportional given the importance of making single-use cups a *choice* rather than a default and thus setting the stage for the more effective nudges 2 and 3.

3.3.2. Nudge 2: Bring your own cup for convenient self-service

Single-use cups are the default and most convenient way of enjoying self-service benefits.

Many convenience stores and gas and service stations, and some speciality coffee shops, traditional cafés, and restaurants, offer self-service coffee from a manual coffee dispenser or coffee machine. In some locations with high customer load at peak hours (e.g. locations that cater to commuters near transit hubs), the self-service offer even includes payment by card at the coffee dispensing point. Self-service solutions are likely to be on the increase: they require minimal staff attendance and they can save commuters precious minutes of waiting to order and/or pay at the counter. However, single-use cups are the default and most convenient way of enjoying such self-service benefits. To facilitate transition away from single-use cups, this level of convenience should instead be saved for those who bring a reusable cup and, more importantly, utilized to motivate transitions to reusable cups. Just as in Nudge 1 (A soft new default for coffee ordered over the counter), the transition hinges on the change to treating single-use cups as items or products of their own. In Nudge 2, this is reinforced by the fact that single-use cups will be obtained separately from the coffee itself.

Implementation

- Single-use cups can only be obtained over the counter, on request (i.e. not at the self-service station, through a vending machine, etc.). Consequently, customers who do not bring a reusable cup will have to wait in line (at least in peak hours when time-sensitive commuters get their coffee).
- Locations that offer self-service dispensation of coffee should allow refilling of personal reusable cups and offer adjacent and convenient self-service facilities for rinsing reusable cups before refilling.
- Payment for the coffee can proceed as usual, at the counter or in self-service terminals. Depending on how the payment and self-service systems are set up in a particular store, some customers may need to queue once or twice (to collect a single-use cup, then to pay after obtaining the coffee), or not at all (if they bring a reusable cup and choose self-service payment). Increasing the availability of payment at self-service terminals would substantively enhance the nudge by further enhancing the contrast in convenience.

Expected effects

- Up to moderate statistical effects ($d \leq 0.5$) on the ratio of single-use take-away to total coffee sales.
- Up to moderate statistical effects ($d \leq 0.5$) on purchase and use of reusable cups.
- Stimulates businesses to develop their self-service offer, which particularly could attract regular commuting customers.
- Stimulates businesses to develop their offers around reusable cups for take-away.

Expected interplay with other policy measures

- Should work very well together with an economic disincentive that forces a price on single-use cups. This would also motivate business-owners to make them available over the counter only, and motivate customers to use reusable cups.
- Should work well together with compulsory marking or labelling of single-use plastic products, and/or a ban on branding and marketing messages on single-use cups. Both of these measures would help to draw attention to the negative environmental impacts of single-use cups and help make reusable cups a more attractive option.

Possible extensions

- As with Nudge 1 (A soft new default for coffee ordered over the counter), the single-use disposable lids could well be included in this intervention: when a single-use cup is requested it would as default be provided without a lid, and lids thus require an additional explicit request from customers.

- As with Nudge 1, banning branding and commercial messages on single-use cups could further motivate businesses to develop their offer of branded reusable cups.
- Could potentially be translated to other contexts in which food is offered through self-service and that currently rely on single-use disposable containers, such as some salad bars in convenience stores and supermarkets.

Ethical considerations

- Introduces some considerable interference in choice architecture for selected groups of consumers and service staff.
- Presents some inconvenience for businesses.
- For consumers, viable alternatives (i.e. different types of reusable cups) are already available for advance purchase or in the relevant locations in response to the intervention. Inconvenience for consumers could be further mitigated by giving warning well in advance through information at relevant sites and/or public announcements, without compromising expected effects.
- For staff and businesses, inconvenience should diminish as the intervention becomes more effective – i.e. as customers adapt to the changes. Initial inconvenience is partly compensated by increased sales of reusable cups.
- **Summary:** Expected effects are moderate; consumers can adapt; staff inconvenience is transient; and businesses enjoy partly compensatory benefits: we consider the nudge to be ethically acceptable.

3.3.3. Nudge 3: Refillable cups

For those who do not value environmentalism highly, appeals to such values can even deter behaviour change.

Reusability is, in some ways, an unattractive property: it is associated with added responsibility and inconvenience for consumers, and the only real motivation for using reusable cups is, at present, pro-environmental altruism. Pro-environmental altruism is a valued principle for many people, but it is not in itself a strong force for motivating otherwise inconvenient behaviours (e.g. Klöckner, 2013; Moss, n.d.). For those who do not value environmentalism highly, appeals to such values can even deter behaviour change.

With Nudge 3, the concept of reusability is replaced with the psychologically much more appealing and positively motivating prospect of *refillability*. Unlike reusability, *refillability* is directly relevant to the actual motivations for entering the given context – for getting your coffee. Refillability also extends the concept of reusability from a technical or environmental matter to a psychologically relevant one. In order to be an attractive alternative, reusable cups should come with many refills so that people will be happy to reuse them. This is what makes refillability attractive for customers, but what makes it important is the way that it joins the two otherwise largely opposing forces of user motives and environmental needs in a new and business-smart way.

Even more important than the development of viable business models for reusable cups, however, is that the reusable cups get reused enough times to actually cut the overall environmental impact of coffee cups.

In order to secure a sustainable collaborative alliance with business owners around these nudging interventions, and to reap the benefits of their enthusiasm and specific expertise in implementing them, the interventions must not entail significant drawbacks for businesses. One possible drawback would be simply forcing retailers to prioritize relatively unpopular products – many businesses have offered reusable bamboo cups and insulated mugs for years, with only modest success. Engaging with transitions is risky in itself, particularly for early movers. Nudge 3 provides a way to compensate those risks with more appealing prospects that could greatly benefit the effort to move away from single-use cups. At the same time, and no less importantly, Nudge 3 offers a way to ensure that the transition away from single-use cups really does cut the total environmental impact of coffee cups.

Even more important than the development of viable business models for reusable cups, however, is that the reusable cups get reused enough times to actually cut the overall environmental impact of coffee cups. If people start buying bamboo cups instead of paper cups but handling them similarly and throwing them away after one or a few uses, the environmental impact will only increase. Even worse if people start buying new insulated mugs every few weeks. This is a real risk because reusable cups can become disgusting or break, they can easily be forgotten at home or at work, and a drive by business owners to transition to reusable cups could lead them to sell reusable cups cheaply.

With the novelty value of take-away coffee long gone; with single-use cups attracting more and more negative associations through different campaign efforts and the general awakening of people to the environmental impacts of cheap, low-quality products; and with the continuing move towards a green, qualitative, slow, artisan approach to modern urban living (which has been reflected in coffee beverages for many years already, but not so much in coffee cups); the era of single-use cups is probably coming to an end for more than environmental reasons. Still, they have had great advantages in terms of hygiene, convenience, and as carriers of culture and identity. In order to be commercially viable and dominate the take-away market, we consider that reusable cups must provide all of these advantages as well. But reusability offers additional advantages for the take-away business.

Like single-use cups, reusable cups should come with coffee; but unlike single-use cups, reusable cups should come with coffee again and again.

Rather than pricing reusable cups low in futile or counterproductive attempts to compete with free or very cheap single-use cups, reusable cups should be relatively costly and come with psychologically attractive benefits. Like single-use cups, reusable cups should come with coffee; but unlike single-use cups, reusable cups should come with coffee again and again. Importantly, they should come with enough refills to make a substantive cutback on the environmental impacts of a person's coffee consumption relative to single-use cups, and to make refillable cups sustainable in a life-cycle perspective.

The major perk for business is that companies that sell products that come with refills and other psychologically relevant benefits tie customers to them, establishing a long-term commitment that single-use cups never could; single-use consumption is fleeting and unattached by definition. Many businesses that cater to commuters have already tried ways of enhancing customer loyalty in coffee consumption, for instance through 'get the 10th cup free' schemes. These have

With refillable cups, refillability should lie in the cup itself, and the refills should come free once you have bought your cup, as in a pre-paid coffee subscription attached to the cup.

At the end of their life, reusable cups could be returned to the coffee chain for reuse or recycling in exchange for a discounted price on the next cup.

considerable drawbacks in that the little stamp card has no natural connection to the act of getting coffee and is therefore often lost or forgotten. Furthermore, the motivating force that it provides is weak: incentives are generally not strong drivers of behaviour change, and the prospect of not having to pay for coffee on the tenth purchase is too distant to meaningfully influence the choice of what chain a person will choose for their next cup. In contrast, with refillable cups, refillability should lie in the cup itself, and the refills should come free once you have bought your cup, as in a pre-paid coffee subscription attached to the cup. For instance, a reusable cup could include ten “free” refills. The usage could either be tracked using a low-tech solution such as a marking on the cup, or it could come in a more high-tech version using RFID (radio frequency identification) technology: unique scannable tags which could be embedded into the cup, making it simple to track or “recharge” the refills. Commuters are used to buying into a continuing service through their travel cards and other subscription services and most of them could probably bear the initial cost. The economic obstacles to committing to the refill service could probably be further mitigated by letting the cups work as a cash card, where after the first purchase of the cup itself and the initial number of refills you reload it with a sum of your choice.

The price per cup of coffee would probably not be the main selling point for the initial buy-in to the refill service. Many would find the primary appeal to be the ‘VIP’ status of exclusive access to self-service coffee at any location in a wide network of branch coffee outlets. In and out without even paying for it, and off to work – that has immense psychological value for commuters. There seems to exist a real possibility that employers could take interest in offering refillable cups with a coffee subscription plan as a benefit for employees, instead of providing a coffee machine in the office. Personalization and a sense of luxury could also enhance the appeal, to some extent for commuters but most prominently for leisure consumers who might be more strongly attracted to cups that let them signal personal identity by associating with particular coffee shop brands and/or cup characteristics (i.e. in terms of materials, functions or design). And at the same time as the sunk cost of a coffee subscription plan that comes with the cup lets businesses turn take-away consumers into faithful customers, the investment and personal identity markers will prevent the customers from disposing of the cup prematurely. At the end of their life, reusable cups could be returned to the coffee chain for reuse or recycling in exchange for a discounted price on the next cup.

From the consumer perspective, perceived hygiene issues might prohibit some subpopulations from transitioning to a refillable cup program. Businesses would likely do well to consider developing services that could mitigate hygiene concerns beyond the mere availability of self-service rinsing possibilities adjacent to self-service dispensers.

Implementation

- The concept of refillability replaces reusability in communication and marketing.
- Refillable cups are sold at a price at which they can be refilled enough times to compensate for their life-cycle environmental impact.

- Businesses develop their own multi-tier VIP service programmes for refillable cup owners.
- Self-service refills are central to the offer.

Expected effects

- Acceptability of reusable cups is strongly enhanced as they take over most of the advantages for customers that single-use cups used to provide and give additional advantages as well.
- The appeal of single-use cups declines significantly.
- Up to moderate statistical effects ($d \leq 0.5$) on the ratio of single-use take-away to total coffee sales over the first few months following implementation.
- Refillable cups become status symbols that drive demand for reusable cups.
- Coffee chains build profitable long-term relationships with their customers.
- Independent coffee shops (i.e. non-chain locations) could be motivated to form alliances around refill plans.
- Coffee chains are stimulated to develop enhanced rinsing/washing applications or services that further elevate the attractiveness of reusable cups by mitigating lingering hygiene concerns.
- Up to strong eventual statistical effects ($d \leq 0.8$) on the ratio of single-use take-away to total coffee sales.

Expected interplay with other policy measures

- Should not be substantively affected by an economic disincentive that forces a price on single-use cups. If any small effect, it would probably be to the disadvantage of refillable cups as they would compete in the same product category as single-use cups.
- Should work well together with compulsory marking of single-use plastic products, which could help to draw attention to the negative environmental impacts as well as the negative social status value of single-use cups.
- Should be negatively impacted by a ban on single-use cups, as that would obliterate the relatively clear contrast between low-status single-use and high-status refillable cups. The new contrast in this scenario would be between 'standard' reusable cups and 'higher-status' cups tied to refill schemes. These would retain all the practical benefits of the nudge, but lose some of their relative status.

Possible extensions

- In time, cheaper and simpler alternatives to top-tier luxury refillable cups could be introduced to also accommodate customers with low incomes or low drive for status symbols. These, too, will be sold with refills that compensate

for the environmental impact of their production but will come at a lower price given that fewer refills will be needed.

- Systems that coffee chains develop for managing reusable/refillable cups could be adopted and adapted to other food and beverage businesses.

Ethical considerations

- Introduces new attractive options but no immediate inconvenience or absolute degradation of attractiveness of existing options.
- Some users may see the idea of paying up-front as problematic, even inequitable, especially given the rise in pay-in-advance and subscription models for goods and services, which may be unaffordable to some (e.g. entertainment and streaming; travel; digital storage).
- Utilizing social status hierarchies in intervention (i.e. marketing refillable cups as relatively costly status symbols) could be seen as endorsement of existing social inequalities. However, not an uncommon marketing strategy and no absolute exclusion of any subpopulation.
- Established chain businesses could be better equipped to implement and attract customers to the nudge than small, independent businesses, and could thus reinforce their relative market advantage. However, the bulk of single-use cups are currently sold in chain stores, so they are a key target for this nudge; and independent coffee shops could potentially form alliances to benefit jointly. Also, by mandating that businesses accept refilling of personal reusable cups (see [Nudges 1](#) and [2](#)) chain-bought cups will also be refillable at all other coffee dispensing locations (at prices and conditions set by that business).
- **Summary:** new offer to consumers and retains availability of old options; uses but does not enforce existing social hierarchies; and tailored to the chain stores that contribute more to the problem: we consider that expected strong eventual effects justify the intervention.

By mandating that businesses accept refilling of personal reusable cups chain-bought cups will also be refillable at all other coffee dispensing locations.

SECTION 4

Implementation and Evaluation Strategy

Section summary

This section defines the relevant research questions and the outcomes that are of interest for evaluating and guiding the incremental implementation of the nudges. Any strategy must recognize that these nudges must be implemented at scale (i.e. in a first step, a major city and the surrounding commuter belt) to have a chance of producing the desired effects, and of overcoming other issues and constraints. We propose a 'gold standard' three-step implementation and evaluation process: 1) a feasibility study set in a national socioeconomic and cultural hub region and conducted with a collaborative, mixed-methods approach; 2) an efficacy trial conducted as a field experiment in a cluster-randomized controlled trial, in which additional geographical regions implement the nudges or serve as waiting controls; and 3) an effectiveness trial in which all relevant businesses in selected geographical regions are mandated to implement the nudges or serve as control sites. The evaluation process is further explained in the text.

Key points

- 1** Forming a collaborative long-term alliance between policymakers, prominent market stakeholders, and experts in behavioural science will be essential in implementing and evaluating the nudges.
- 2** A workshop series that runs through the entire project will be the hub for flexible and open-minded collaboration around the nudges. The workshop series will continue to provide benefits in the eventual upscaling phase.
- 3** Sales records from collaborating business locations will be the main outcome, complemented by an action research approach that will dominate in the feasibility study and smaller-scale tag-on studies using naturalistic observation, survey, and interview methods to identify when, where, and for whom the nudges are effective and by which processes they produce effects.

4.1. What We Need to Know

Nudging interventions are designed with evaluation and development in mind, to guide further progress. Evaluation of outcomes is, thus, not only a way to confirm whether the intervention worked as intended, but more importantly a means towards understanding why it worked and what the next step should be in a continuing drive towards sustainable transitions.

It is customary in intervention research in behaviour and health sciences that evaluation and implementation progress through three stages, where each new step builds on the former (Bowen et al., 2009; Flay et al., 2005; OECD, 2019; van Kleef & van Trijp, 2018). First, an intervention should be shown to be **feasible**; that is, practicable to use, acceptable to target groups, accords with ethical standards, and likely to produce desired outcomes. Feasibility studies provide the important benefits of relatively small-scale testing and identification of possible drawbacks or opportunities for improvement before more resource intensive and otherwise risky larger-scale tests. Second, an intervention should be shown to be **efficacious**; that is, capable of delivering the desired outcomes with sufficient strength and reliability. This step requires investment in larger-scale implementation under high levels of control. Third, an intervention should be shown to be **effective**; that is, capable of delivering satisfactory outcomes in more complex and less controlled real-life contexts. This entails a further increase in the scale of implementation and evaluation.

Each step thus safeguards against premature assumptions regarding the suitability of the intervention for widespread upscaling, allows researchers and practitioners to catch and mitigate any unforeseen drawbacks or risks, and ensures that a misguided intervention strategy can be aborted as early as possible.



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Box 2: Feasibility, efficacy, and effectiveness

Research on psychological interventions often proceeds through three steps:

- 1 A feasibility study** is a study designed to determine if an intervention is appropriate for further testing in efficacy and effectiveness trials. Feasibility studies address issues such as whether and how an intervention can be implemented, sustained and evaluated in practice, and what modifications should be made before further investments are made.
- 2 An efficacy trial** is a rigorously controlled field experiment designed to determine the degree to which an intervention produces the desired effects when it is applied as intended within a supportive and controlled context. Efficacy trials allow for relatively high control and conclusion validity but are often resource intensive in terms of the expertise and person-hours invested by the research team and the demands incurred on participating individuals and organizations.
- 3 An effectiveness trial** is a controlled field experiment designed to determine the degree to which an intervention produces the desired effects when it is applied in complex, real-life settings where support and control are typically less than optimal. Effectiveness trials do not allow for the same level of control as efficacy trials but provide realistic estimates of the effects and costs that an intervention can be expected to have when fully implemented as policy.

4.1.1. What are the relevant measures of success?

These nudges have been developed for their environmental effects – primarily reduced plastic litter and pollution. However, environmental effects should not be the primary measures against which they are evaluated, for several reasons:

Environmental effects are noisy

A wide variety of different factors, many of which are difficult to measure let alone control, separately and interactively contribute to producing a given environmental outcome. Even a relatively uncomplicated environmental measure such as the number of single-use disposable cups that can be found in parks and on beaches must be assumed to vary not only with single-use cup consumption but also with the multitude of known and unknown factors that can influence use and disposal patterns, waste management and cleaning operations, and other related behaviours. These factors may include, for instance, cultural trends and attitude shifts as well as various forces of nature such as variations in climate and weather, among others. Much of the variation in the composition of litter will therefore be due to processes other than the proposed nudges, and any effect that is in fact caused by the nudges will be very difficult to confirm statistically and attribute causally to the interventions. For a more complex outcome, like plastic litter and pollution in

oceans, the number of different factors that contribute to increases or decreases will be further multiplied.

Environmental effects are slow

Assuming that the proposed nudges will have some environmental effects, as we have good reason to expect, those effects are likely to appear with some time lag. Plastic litter items are known to degrade slowly and to disperse gradually in the environment. The slow pace of change means that environmental measures will always be tainted by consumption patterns that preceded the nudges – especially environmental measures taken months or years later. Furthermore, environmental measures are often slow to obtain, making it difficult to observe variations that occur quickly, or with even moderate frequency. For instance, it is not feasible to conduct beach cleans with litter counts on a daily, weekly, or even monthly basis. We need outcome measures that can match the temporal patterns in the expected behavioural effects of the interventions.

Environmental effects are distant

Environmental outcomes are generally quite far removed in space and time from the locations and occasions where the targeted behaviours take place. As the preceding paragraphs explain, that distance allows other factors to intervene with the causal chain and modify the effects of the nudges in various ways. The time lag between cause and effect also makes it difficult if not impossible to establish whether and to what degree observed variation in environmental status is due to the nudges. The spatial dispersion of environmental outcomes also introduces another problem: that observed effects cannot be reliably tied to a particular intervention site. To allow an experimental approach to evaluation and tuning of the nudges, the nudges must be implemented in some sites first while other sites serve as control conditions while they await implementation. Comparisons between the intervention sites and control sites form the basis of valid conclusions about whether and to what degree the nudges are effective. Environmental measures do not allow for such precision.

The points above show that, even though the nudges are expected to have spatially and temporally distant positive environmental effects, environmental measures will not allow for outcomes to be validly attributed to the nudges as causes, nor for reliable estimation of the magnitude of those effects.

What should we be evaluating?

Nudges are designed to change behaviours, so behaviours are the relevant outcome. To measure the primary outcome – shifting consumption patterns away from single-use disposable coffee cups – we need to know what kind of cups people are choosing.

From an implementation standpoint, another important realm of outcomes is how the nudges are applied and how they work for the collaborating stakeholders. Only when the nudges are applied as appropriate for each type of business and

Environmental outcomes are generally quite far removed in space and time from the locations and occasions where the targeted behaviours take place.

location can they be expected to produce the anticipated effects. It is also essential to consider and evaluate how the nudges can be suitably tailored to the specific conditions that characterize each unique business and site so that they will be viable as long-term strategies to be implemented and iteratively adjusted within a positive collaborative effort.

A third realm of outcomes concerns the identification of contextual and individual-level factors that influence the effects of the nudges. Tag-on studies can be employed to add a nuanced and practical understanding of moderating factors (i.e. where, when and for whom the nudges are effective) and mediating processes (i.e. by which psychological processes the nudges cause effects) (see Hayes, 2017; van Kleef & van Trijp, 2018).

All of these outcomes and study design elements will be detailed further below in this section. First, however, we consider which specific questions should be addressed by the evaluation strategy.

4.1.2. A preliminary set of questions to evaluate the nudges

Feasibility

The first step in the evaluation of the proposed nudges is to determine whether and how they can be made to work in practice. This step involves two research questions:

Question 1. Are the proposed nudges feasible to implement in practice?

The first research question concerns whether and how well the proposed nudges can be implemented in practice in the collaborating businesses. It is essential to ensure that the nudges can be integrated within the technical and procedural conditions of the businesses involved, and for all parties to collaborate with market stakeholders in developing a working implementation strategy. There could well be room for adaptations to improve their acceptability or adaptability to suit different types of businesses or locations. Some of these issues could be spotted and handled early on through careful evaluations in the initial steps of the project.

Question 2. Is continued collaboration around the nudges viable from a business standpoint for the collaborating market stakeholders?

In addition to establishing how the nudges can be implemented in practice, a central concern is whether continued collaboration with market stakeholders is viable from a business perspective. Unlike policies that are applied top-down, nudges need voluntary commitment and economic concerns are central for the businesses involved. For instance, a pronounced and prolonged decline in total coffee sales could deter further collaboration.



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Efficacy

When the first two research questions have been answered and any necessary adjustments have been made to the nudges or the implementation strategies, the project must evaluate how well the nudges can perform in reducing the consumption of single-use cups. This step involves two research questions:

Question 3. Are the proposed nudges efficacious in reducing single-use cup consumption?

The third research question concerns the efficacy of the proposed nudges. Efficacy, in the context of behavioural science, relates to the degree to which a given intervention has desired effects when it is applied as intended within a supportive and controlled context (Flay et al., 2005; Hunsley & Lee, 2007; OECD, 2019; van Kleef & van Trijp, 2018). The scale and scope of the proposed interventions and the mechanisms through which they are thought to work do not allow for perfectly controlled implementation in a laboratory setting or research clinic. However, this stage of the project is expected to allow for close collaboration with central market stakeholders in Sweden, and so provide suitable conditions for an efficacy evaluation. Given the field approach to efficacy evaluation, other relevant policies that are or will be implemented in parallel with the nudges must be considered in terms of how the different policies interact to produce effects.

Question 4. What adaptations of the nudges could further enhance their effects?

In addition to determining how well the nudges work, it is essential at this stage to identify any factors that may constrain the potential effects of the nudges. That is, given that the nudges can be implemented as intended, could they be adjusted in any way to more strongly influence consumer choices in the desired direction(s), without compromising their acceptability and the freedom of choice of the consumers? Perhaps some types of businesses or some locations could achieve stronger effects if the nudges were more tailored to their specific conditions or to the customer base that they cater to, or if the nudges were augmented with other interventions in the behaviour setting.

Effectiveness

Upon having confirmed in the feasibility study and efficacy trial that the nudges are both practically implementable and capable of delivering the desired effects, and after gaining knowledge about how the intervention can be tuned to work well for both businesses and for policy goals, the third step involves implementation and evaluation of the nudges as actual policy. There are two questions to be investigated:

Question 5. Are the proposed nudges effective in reducing single-use cup consumption?

Effectiveness, in the context of behavioural science, relates to the degree to which a given intervention has desired effects when it is applied in complex, real-life settings where support and control are typically less than optimal (Flay et al., 2005; Hunsley & Lee, 2007; OECD, 2019; van Kleef & van Trijp, 2018). Continually developing the understanding of how the nudges work when implemented as actual policy is essential in the continued process of adjustment and upscaling to other policy contexts. The gradual upscaling of the approach to other regions, market stakeholders, and eventually countries will allow for continual knowledge gains regarding their effectiveness. It will also allow for estimation of interaction effects between the nudges and other policy instruments that are or will be implemented in parallel with the nudges in the different contexts.

Question 6. When should the nudging strategy be reconsidered?

Finally, an important question is *when* the nudges will have reached their full effects, and whether those effects are sufficient or not. It is likely that the nudges will produce an initial reaction directly on implementation (e.g. within the first few months), followed by a gradual positive effect of continued exposure over time (i.e. potentially progressing over a year or more). The gradual effect of continued exposure is likely to account for a large part of the total effect of the nudges, although we expect the pace of change to slowly reduce and level off. Continued collection and analysis of data will help create projections of this trend, which can inform decisions regarding at which point in time any additional effects of the nudges can be expected to be inconsequential. This statistical approach to determining when the nudging strategy should be reconsidered will complement other considerations in the effort to reduce single-use cup consumption (e.g. new insights in environmental science, technical or political developments).

Furthermore, it could potentially prove to be the case that the nudges can eventually be abandoned while retaining part of the achieved change in consumption patterns. Once people have created habits around consuming coffee in-house or getting coffee on-the-go in a reusable cup on most occasions, and when businesses have built robust strategies around refillable reusable cups, it may no longer have a meaningful impact to keep the nudges in place as policy. Such changes in habits and business strategies may also set the stage – politically and economically – for further measures: for instance, banning or greatly raising the prices of single-use cups.

4.2. Design of the Evaluation Strategy

4.2.1. Initial considerations

Randomized control field experiments are the gold standard for evaluating behaviour change interventions in general, and nudging interventions specifically.

Because nudging interventions are situated in the relevant context of specific, targeted behaviours, their effects can be evaluated at close range and with high control over the intervention (i.e. who is exposed to nudges and who is not). This sets nudging interventions apart from traditional policy instruments where presumed causes and effects are far removed and where exposure to the intervention (e.g. an information campaign) is difficult or impossible to control. Nudging interventions therefore lend themselves to evaluation using experimental methods applied in field settings (OECD, 2019; van Kleef & van Trijp, 2018; cf. Shadish et al., 2002; Shadish & Cook, 2009). Although they are rare in policy studies, randomized control field experiments are the gold standard for evaluating behaviour change interventions in general, and nudging interventions specifically. In this case, three complicating factors must be considered in developing the experimental approach:

- 1 The nudges hinge on relatively large-scale implementation to be effective, particularly Nudges 2 (Convenient self-service if you bring your own cup) and 3 (Refillable cups) that aim to replace single-use cups with refillable reusable cups: if only a few locations within a given geographical area implement these nudges, the convenience and other attributes of getting a refillable reusable cup will be fatally compromised.
- 2 With Nudge 3 (Refillable cups), certain segments of the population must be targeted first in order to create a momentum driven by a cultural and socioeconomic avant-garde. This partly constrains possibilities for random assignment to the intervention.
- 3 Individuals self-select not only their consumption choices, but they also self-select (i.e. cannot be randomly assigned to) the locations to which they go for coffee, and the cities and countries they live in.

To further complicate the field experiments, incremental implementation and gradual upscaling require that an initial feasibility study is followed by a well-supported and controlled proof-of-concept in an efficacy trial, which can then be followed by a modified and somewhat relaxed implementation in an effectiveness trial as the nudges are disseminated and applied in additional contexts (e.g. regions, countries). The **feasibility study** will require particularly close collaboration characterized by flexibility and goodwill from policymakers, stakeholders and researchers to jointly identify, try, and develop ways of fitting the proposed nudges to the different local contexts in question. The **efficacy trial** will require a higher level of experimental control and carefully planned and executed measurements and analyses of the multiple relevant outcomes and potential moderating factors and mediating processes that will help explain where, when, for whom, and by which processes the nudges produce effects (see Hayes, 2017; van Kleef & van Trijp, 2018).

However, the field approach will inevitably constrain the level of experimental control. For instance, some contamination between conditions is unavoidable, given that some people will travel or move between locations. Also, practical as well as political constraints may delimit the time frame for the experiment: for instance, it may not be possible to allow the control locations (those without any intervention) to go on waiting until all potential effects of the nudges have been accounted for. While these problems cannot be fully averted, they can be mitigated by also obtaining comparable data from several other countries that await implementation and using these as non-randomized control conditions.

In the **effectiveness trial**, further implementation and upscaling will require less experimental rigour but will also need to be well planned and carefully monitored to produce the knowledge gains that are needed to understand how the nudges interact with and can be adapted to different policy contexts and other national and regional differences.

The smallest unit where the nudges can be usefully applied and tracked over time is the business location.

It is also important to consider that a large-scale intervention of this kind will necessarily involve **nested variables** (see Donner & Klar, 2004; Eldridge & Kerry, 2012). For instance, individual consumption behaviours occur in specific business locations that in turn are nested within cities, regions and countries. Nesting means that different individual consumption behaviours that occur in the same business location tend to be somewhat more similar than consumption behaviours that occur in diverse locations, or that people who live in the same city tend to share certain relevant characteristics and habits to a somewhat higher degree than people who live in different cities. Such dependencies between data points matter because they preclude some standard statistical approaches to evaluation, and they can weaken statistical analyses unless they are properly handled from the outset.

The evaluation must also track and compare trajectories of **change over time**. Although individual behaviours are the main outcomes of concern for these nudges, individuals will not be appropriate units of analysis: they cannot be randomly assigned to receive (or not receive) nudges and they cannot be tracked over time to observe changes in their consumption behaviours. Instead, the smallest unit where the nudges can be usefully applied and tracked over time is the business location. That is, the unit of analysis should be the individual coffee shops, cafés and restaurants, convenience stores and gas and service stations, kiosks and food trucks.

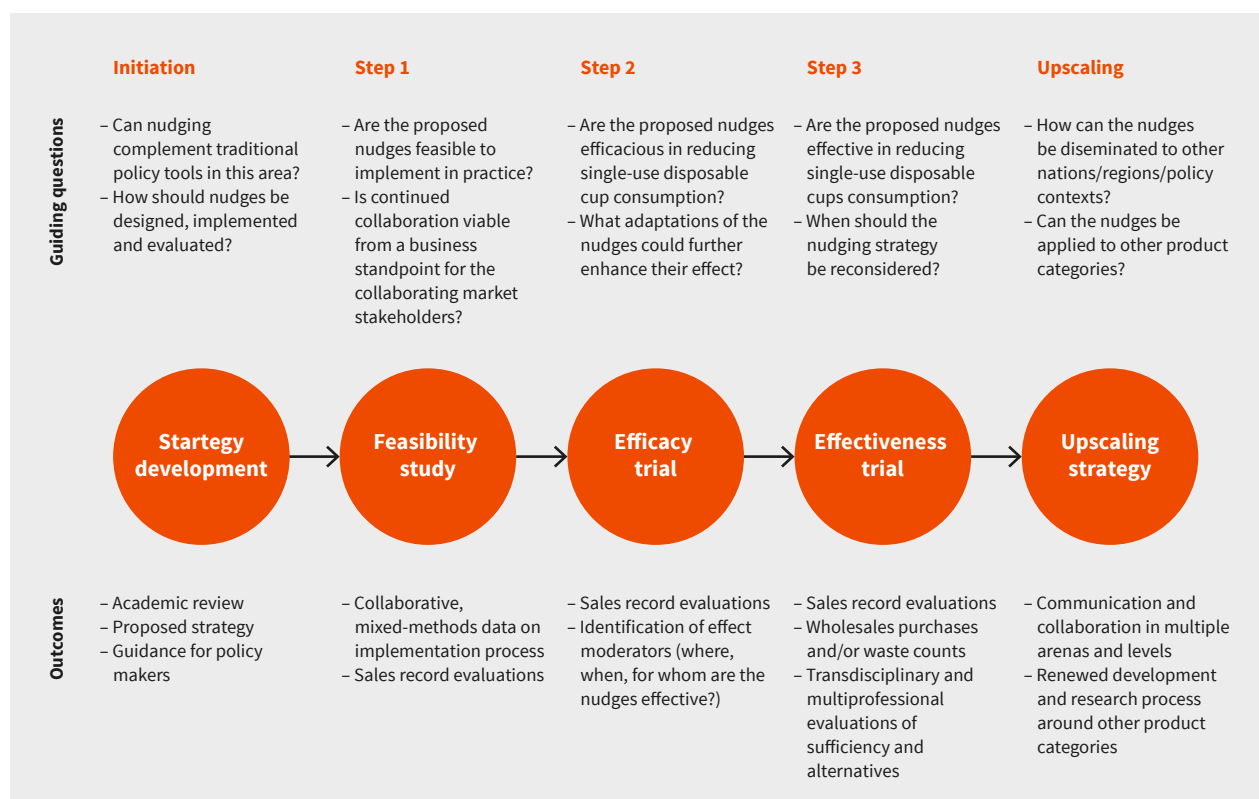
Large-scale implementation is key to getting the proposed nudges to work as intended.

As for the assignment of units to conditions, however, recall that the business locations are nested within cities, regions and countries. Also recall that large-scale implementation is key to getting the proposed nudges to work as intended, so for instance having some locations in the same city implement both Nudge 2 (Convenient self-service if you bring your own cup) and Nudge 3 (Refillable cups) and others no nudges at all will severely dampen the potential attractiveness and utility of a reusable cup. In order to provide the benefits of enhanced and expedient coffee service for the commuters who are the main target group of Nudge 2, even the city level might be too small to cover the many who make frequent intercity commutes. At least for the Swedish context, which we hope will be the testbed for the feasibility study and efficacy trial, we consider that the country's 21 regions will be the most suitable units to work with. This will ensure that individuals who consume most of

their coffee within a given region will be continuously exposed to the nudges and will be able to reap the full benefits of the nudges.

The following sections (4.2.2. to 4.2.4.) describe the proposed evaluation strategy, which is also summarized in [Figure 3](#). Figure 3 also shows how the evaluation strategy follows on from the initial move to determine whether and how nudging can be feasible in addressing this problem (which has resulted in this report) and how the evaluation strategy transitions into the upscaling strategy (see [Section 5](#)).

Figure 3: Summary of the proposed Implementation and Evaluation Strategy.



4.2.2. The feasibility study

The feasibility study aims to determine whether and how the nudges can be made to work in practice, by providing answers to two questions of investigation:

Question 1. Are the proposed nudges feasible to implement in practice?

Question 2. Is continued collaboration around the nudges viable from a business standpoint for the collaborating market stakeholders?

The feasibility study hinges on careful and collaborative exchange with higher-level representatives but most importantly with local managers and staff around the implementation of the nudges, and flexibility on the part of researchers and policymakers. The central goal is for all parties to gain positive and useful experiences of using the approach, so an open mind is required by all involved to find and try ways of operationalizing the principles of the nudges in the physical,

procedural and organizational structures of the local businesses. While the three nudges probably need to be implemented jointly and fully integrated with the day-to-day running of a coffee business, the exact shape of the nudges may need to be tailored to the unique conditions on each site. In fact, the nudges may well be more effective in reducing single-use cup consumption if they are adapted to local conditions and if business owners, managers and staff can gain a sense of ownership over the new strategy.

Selecting a site

The feasibility of the nudges could, in principle, be evaluated in any relevant place. As we explained in [Section 4.2.1. \(Initial considerations\)](#), however, the effects and economic viability of [Nudge 3 \(Refillable cups\)](#) hinge on the social momentum that would result from first targeting socially and culturally high-status subpopulations. This cannot be guaranteed with simple random allocation of the nudges. We reason that nudges implemented in larger cities will be more likely to create such momentum than nudges implemented in smaller cities. In countries that have one particular city or region that is culturally dominant, we consider that the nudges must necessarily be implemented first in those cities or regions in order to create the needed momentum. In the Swedish case, for example, the Stockholm region would be the most suitable location for the feasibility study.

Evaluating the relevant outcomes

The data gathered from responses to [Question 1 \(Are the proposed nudges feasible to implement in practice?\)](#) will be useful in a number of ways but they will say little about the issues that businesses, managers and staff struggle with and the experiences that they are gaining in working with the nudges. These aspects are probably better tapped through a series of workshops that invite representatives from all relevant levels to share experiences and, together with researchers and policymakers, develop suggestions that could facilitate the implementation and strength of the nudges. These workshops should be initiated well in advance of the planned date for initial implementation, and proceed through the implementation *at least*. The workshops should run until a point of stabilization has been reached (i.e. the ways in which the nudges are implemented in various contexts) and of saturation (the issues and experiences raised in the workshops are common and recurring). The workshops should also involve a strategy for communicating the process and its outcomes to all relevant businesses and their managers and staff. Continuing the workshop series throughout the project and into the upscaling phase will provide additional benefits (see [Section 5.2.1](#)).

The process of answering [Question 2 \(Is continued collaboration around the nudges viable from a business standpoint for the collaborating market stakeholders?\)](#) will involve collecting data around the sales of coffee and different types of cups. As with the experiences and adaptations that will result from the workshops, this too will lay the foundations for continued work to implement and evaluate the nudges in the subsequent steps.

We expect that the collaborative alliance with stakeholders will provide access to reliable data that are easy to obtain and process, in the form of sales records.

The nudges may well be more effective in reducing single-use cup consumption if they are adapted to local conditions and if business owners, managers and staff can gain a sense of ownership over the new strategy.

In order to work as the foundation for a testbed implementation of the nudges that can provide the needed knowledge gains to inform later steps in the project, as well as eventual upscaling, the data will also have to be collected and analysed centrally to give answers of more general relevance.

When single-use cups become products in their own right, they will be registered as purchases – just as branded reusable cups are and as the coffee itself is. Sales records reflecting the number of single-use cups purchased have a strong and reliable logical relationship with the more important but distant environmental impacts that can result from single-use cups. However, these concerns will be more central in the subsequent steps. In the feasibility study, the most central issue will be whether the total coffee sales stay within boundaries that are acceptable for the businesses or if they go down to a degree that could threaten the collaborative effort.

Each collaborating business will keep a close eye on their own sales records through this process. However, in order to work as the foundation for a testbed implementation of the nudges that can provide the needed knowledge gains to inform later steps in the project, as well as eventual upscaling, the data will also have to be collected and analysed centrally to give answers of more general relevance. Historical sales records will therefore be obtained from the collaborating businesses and current data will be obtained through their ongoing sales records, during the period while the nudges are implemented and adjusted. The dependent variable of concern is total coffee sales.

For between-groups comparisons, comparable data should be obtained from a number of randomly selected other Swedish regions. The selection of regions to be included in the control condition should be integrated with the preparations for the efficacy trial, which is outlined in detail below, so that all regions that are intended for inclusion in the implementation or waiting control conditions in the eventual efficacy trial will serve as control regions in the feasibility study. This will provide control for larger-scale trends in coffee consumption that will be needed to determine the degree to which the nudges, specifically, may influence coffee sales. It will also help to ensure that collaboration is initiated with relevant parties in other regions of the country.

4.2.3. The efficacy trial

The efficacy trial aims to determine whether and to what degree the nudges are capable of producing the desired reductions in single-use cup consumption, answering two questions of investigation:

Question 3. Are the proposed nudges efficacious in reducing single-use cup consumption?

Question 4. What adaptations of the nudges could further enhance their effects?

The efficacy trial requires a high degree of support and control in the implementation of the nudges and a well-prepared way of obtaining valid and reliable data from all involved locations. The processes that comprise the feasibility study, described in Section 4.2.2. above – building a collaborative alliance with businesses, facilitating their integration of the nudges and creating the routines needed to work with them in practice, as well as establishing a system for collecting sales records – will help enormously with this.

Advance exclusion is a much preferred over the alternative, which would be to exclude them after random assignment or even after implementation and thus compromise the internal validity of the research design.

It will be essential to engage statistical expertise from the outset of the project.

Selecting sites

Following successful completion of the feasibility study in Stockholm, the remaining 20 Swedish regions will be considered for inclusion in the efficacy trial. The gold standard design for an efficacy trial is the randomized control experiment. However, an efficacy trial does not demand that all possible regions are included in the randomization, if there are objective reasons to exclude some in advance. For instance, business representatives, researchers or policymakers may see a region as inappropriate because it could compromise the implementation of the nudges or dampen their potential effects. Advance exclusion is a much preferred over the alternative, which would be to exclude them after random assignment or even after implementation and thus compromise the internal validity of the research design. It is, however, important that more than half of the 20 regions are included in the randomization. This does not, however, mean that half of the regions in the country will have to implement the nudges in this step.

The regions that are deemed eligible for inclusion in the efficacy trial are to be randomly assigned to having their individual business locations implement the nudges early or to awaiting later implementation. Although the feasibility study will by this point have shown that the nudges are viable from practical and business perspectives, we propose that 50/50 randomization may be unnecessarily costly at this stage, given that the level of support and control over the implementation must be high while the efficacy of the nudges will not yet be known. If not too many regions are excluded in advance from randomization, a reasonable alternative could be to allocate 20/80; that is, 1 out of every 5 (or 4 out of the total 20 regions) to early implementation and the remaining regions to either a waiting control condition or to random exclusion. Considering that geographical, sociodemographic and cultural conditions vary considerably across the country, we propose that the regions could be ordered by latitude and then subjected to random assignment in blocks of five. If data can easily be obtained from the natural accumulation of relevant records in the targeted businesses, data from locations in the regions that implement the nudges early could be compared against data from a comparable number of locations drawn at random from the larger pool of data from all of the control regions. Alternatively, if collection or handling of data from the control conditions is expected to be more demanding, the initial randomization could allocate regions 20/20/60 to early intervention, waiting control, and random exclusion from the trial, respectively. The fact that relatively few regions (or, in formal terms, 'clusters') are assigned to conditions will negatively affect statistical power but should not be a grave concern in this case because the intraclass correlations can be expected to be fairly low (i.e. it is unlikely that locations will be very similar) and the number of individual locations within these regions or clusters, which will be the units of analysis, will be fairly large (see Donner & Klar, 2004; Eldridge & Kerry, 2012). However, it will be essential to engage statistical expertise from the outset of the project.

A problem for the internal validity of the trial is that contamination between the conditions is likely to occur to some degree because people hear about the nudges, experience them during travel, or move between regions during the experiment. Contamination can be expected to be higher in border areas where some people regularly travel to a neighbouring region for work or leisure, but given the present rate of travel and spread of information it is likely to affect the whole

country to some degree. The effects of such contamination will be difficult to determine statistically. For that reason, we propose that when the experimental implementation in Sweden is initiated, data collection according to a relatively relaxed sampling schedule and from a selected number of locations should commence in at least a few other European countries that are not planning any policy changes surrounding single-use cups at the time but that hold an interest in following the Swedish approach for consideration in future policy changes. These locations can serve as non-randomized longer-term controls that can be expected to be minimally affected by contamination from the Swedish experiment while being subject to similar larger-scale variations in coffee consumption trends as Sweden. Initiation of such collaboration around data collection with relevant parties in other countries also provides a platform for eventual upscaling of the nudging approach to these countries.

To summarize the scheme for allocating interventions to locations in formal terms, the design includes the randomized between-groups factor Intervention (two levels: Early nudge implementation; Later nudge implementation), with spatially stratified, blocked cluster randomization of locations nested within regions between the two conditions. It also includes non-random assignment to the control condition for a number of locations dispersed across other countries that await possible future policy change around single-use cups.

Evaluating the relevant outcomes

Given that sales records can be used for data, a measure that will be relevant for answering [Question 3 \(Are the proposed nudges efficacious in reducing single-use cup consumption?\)](#) in each of the strategic arenas is the rate of single-use cups sold to the total servings of coffee sold. In locations where the only alternatives are either in-house consumption in a ceramic cup (i.e. many traditional cafés and restaurants) or filling a personal reusable cup that the consumer brings to the site, the use of alternative cups will not produce a registered sale and so the rate of single-use cups sold to the total servings of coffee will be the only main outcome of concern there. However, for locations that offer the purchase of reusable cups, a complementary outcome of strategic interest for businesses will be the rates of reusable cups sold to the total servings of coffee. This rate should be expected to be higher in the transitional phase, when few customers already have a reusable cup but many invest in one, before stabilizing to reflect the periodic replacement of old reusable cups for new ones. From an environmental viewpoint, that stabilized rate should be as low as possible. From a business viewpoint, the strategy proposed in [Nudge 3 \(Refillable cups\)](#) will compensate businesses by allowing them to sell reusable cups at more lucrative prices and greatly enhance customer loyalty through the reusable cup sales that they do make. In order to complement the data obtained in the feasibility study regarding whether the nudges impact the total coffee sales, and to draw conclusions that can be generalized with good confidence, separate analyses of total coffee sales will also be relevant as a supplementary outcome.

Trends in consumption behaviours will be tracked over time to determine not only whether the nudges have effects in the regions where they are implemented early but also how those effects emerge, develop, and eventually stabilize. In order

A problem for the internal validity of the trial is that contamination between the conditions is likely to occur to some degree because people hear about the nudges, experience them during travel, or move between regions during the experiment.

to ensure that valid conclusions can be drawn regarding the trends over time in consumption behaviours as caused by the implementation of the nudges, rather than just regarding the differences that the nudges cause between the conditions (i.e. early vs late implementation), baseline levels of the relevant behaviours must be properly established. With the main outcome variables being drawn from sales records, it will presumably be unproblematic to obtain a long retrospective time-series of data covering the years leading up to implementation. Obtaining these data retrospectively will also be beneficial in that it will avert any risk of measurement reactivity effects on the part of the stakeholders (e.g. adjustment of business strategies or reporting of data in response to knowing that sales are being monitored).

In the retrospective time-series data, the finer the sampling rate or temporal precision, the greater is the statistical power to identify small effects. For instance, a high sampling rate will allow emerging trends of change to be detected and statistically affirmed early on. High power is expected to be quite easy to obtain in this evaluation. Given that sales records can be used as data sources, the temporal precision of the data will potentially be very fine: purchases are stamped by the minute or even by the second. However, that level of precision will not be manageable nor useful. An absolute bound on the temporal precision on which data could be analyzed may therefore be given by technical and economic constraints on data storage and management capabilities rather than on the data source. In determining the trajectories of the general effects of the nudges on consumption behaviours, data summarized by the week would likely suffice in terms of temporal precision. With the week as the basic unit of analysis, multi-level nesting of that data within cyclical patterns across months and years will need to be considered in analyses. Monthly rhythms related to salary payments may exist and be of some interest for gauging the effects of absolute pricing acceptability of the refillable cups of [Nudge 3 \(Refillable cups\)](#), although additional methods would probably be needed to develop a useful understanding of the pricing effects. Seasonal patterns across the year may be of greater interest because they encompass common vacation periods and variation in weather conditions that greatly influence the appeal of behaviours like enjoying coffee outdoors, that are thought to be strongly related to littering in parks or on beaches, for example.

The nested structure of the data in the between-groups and the within-groups design calls for a multi-level modelling approach to data analysis (or a similar approach; see Garson, 2013; Heck et al., 2013; Molenberghs & Verbeke, 2000).

Given that commuters are one important target group, it would, however, be useful to also be able to analyze at least a subset of the data with higher temporal precision. Specifically, data summarized over six-hour time segments would allow for morning purchases (e.g. 04.00–10.00) to be separated from daytime purchases (e.g. 10.00–16.00), evening purchases (e.g. 16.00–22.00) and nighttime purchases (e.g. 22.00–04.00). On the weekdays, the morning segment could then be taken to include mainly the habitual purchases that people make on their way to work or other daily activities, while the other weekday segments probably include a mix of work-break and leisurely consumption. On the weekends and on national holidays, all time segments could be taken to include mostly

Trends in consumption behaviours will be tracked over time to determine not only whether the nudges have effects in the regions where they are implemented early but also how those effects emerge, develop, and eventually stabilize.

The more successful examples could then inform adjustments in the implementation of the nudges in the less successful places.

spontaneous leisurely consumption. Trends in purchase behaviours that are more pronounced in the weekday morning data than in the remainder of the data could therefore be taken as reflecting effects that are specific to commuting subpopulations, and vice versa.

In order to answer Question 4 (What adaptations of the nudges could further enhance their effects?), knowledge of variability in the specific operationalizations of the nudges within different chains, types of locations, or regions could be used in exploratory analyses to investigate if they can account for heterogeneity in the outcome. This would probably be accomplished through moderation analyses where the different between-groups factors could be entered as effect moderators (Hayes, 2017; van Kleef & van Trijp, 2018). The more successful examples could then inform adjustments in the implementation of the nudges in the less successful places. Furthermore, tag-on, smaller-scale survey or interview studies could be used to obtain data on the psychological processes that mediate the effects of the nudges (e.g. aspects of perceived salience, convenience and attractiveness of different service and cup options).

4.2.4. The effectiveness trial

Following the successful completion of the efficacy trial, and the conclusions that the nudges are capable of producing the desired effects on single-use cup consumption, the effectiveness trial will provide practical knowledge of how well the nudges can be expected to perform under conditions of less complete support and control. It will do so by answering two questions of investigation:

Question 5. Are the proposed nudges effective in reducing single-use cup consumption?

Question 6. When should the nudging strategy be reconsidered?

For the effectiveness trial, the continued implementation of the nudges will be guided, tracked and evaluated with somewhat relaxed demands on supporting resources and the degree of control in implementation, and a less intensive data collection scheme. Just as the efficacy trial built on the framework established in the feasibility study, the effectiveness trial will, in turn, build on the framework of the efficacy trial. In the effectiveness trial, a new set of regions will be selected for implementation of the nudges. In these regions, not only the collaborating partner businesses but all relevant businesses will be mandated to implement the nudges. The responsibility for managing and monitoring the implementation will be left to the municipal authorities in the respective regions, and the researchers and national-level policymakers will communicate only with these local authorities rather than directly with the affected businesses.

Selecting sites

Following the controlled implementation in the regions that were randomly selected for early implementation of the nudges in the efficacy trial, the regions that were randomly selected to await implementation will continue to serve as a control condition. A new spatially stratified random sample will be drawn from

among the regions that were randomly excluded from participation in the efficacy trial – perhaps another fifth of the total number of Swedish regions to begin with – where the nudges will be implemented for the effectiveness trial. This will allow for downward comparisons against the control condition but also for upward comparisons against the regions that implemented the nudges with high levels of support and control. The design will thus allow for conventional superiority analyses as well as for non-inferiority analyses (Schumi & Wittes, 2011; Scott, 2009; Snapinn, 2000), so the realistic implementation of the nudges can be situated in relation to the status quo of no intervention as well as in relation to the best-case scenario.

Evaluating the relevant outcomes

The collaborating businesses will continue to provide detailed data on sales of single-use cups and total coffee sales, now also for the regions that implement the nudges in the effectiveness trial. These data can be used to track the effects of the nudges and provide a partial answer to Question 5 (Are the proposed nudges effective in reducing single-use cup consumption?). However, the collaborating businesses may be more successful in implementing the nudges because they have gained experience through their participation in the feasibility and efficacy trials. Because the nudges will now be implemented in all relevant businesses, it may not be feasible that all will have the necessary technical equipment and skills – or the goodwill – to contribute data through automatically generated sales records. At this scale and dispersion of implementation, observation methods would also be unfeasible as means of obtaining generalizable estimates of patterns in purchase behaviours.

The collaborating businesses may be more successful in implementing the nudges because they have gained experience through their participation in the feasibility and efficacy trials.

We consider that records of wholesale purchases of single-use cups may be a more useful source of data at this stage. This will probably require that, in addition to the mandate to implement the nudges, an additional new mandate is put in place, to the effect that the relevant businesses must provide information on wholesale purchases of single-use cups. It would also only render relatively unrefined figures of how many single-use cups had become available for purchase by consumers. Given that such wholesale purchases may be quite infrequent for many businesses, they would also need to be summarized over relatively large time units (e.g. per month or per quarter).

Alternatively, municipal waste management facilities could be engaged to conduct regular weighing of the single-use cups that they receive, which would likely need to be based on random sampling and manual sorting of general waste and paper waste. Besides being cumbersome, sampling and weighing waste would have the disadvantage that the unit of analysis becomes elevated to municipalities rather than individual businesses, which would reduce the statistical power in evaluations of the effects of the nudges. Furthermore, neither wholesale purchases nor sampling and weighing of waste could directly be related to the total number of coffee drinks purchased.

These problems can probably be handled fairly well through statistical methods. Collaborating businesses will continue to provide detailed data on single-use cup sales in the control regions, (the regions that implemented the nudges in the efficacy trial), as well as in the regions that implement the nudges in the effectiveness trial.

If the control regions and the regions that implemented the nudges in the efficacy trial would also provide data on the unrefined measures (i.e. wholesale purchases or garbage weighing), that should make it possible to estimate the relationship between the unrefined measures and the actual sales of single-use cups, and so to calculate lower and upper bounds for the actual total sales of single-use cups in the regions that implement the nudges in the effectiveness trial. The strategy can thus approximate an answer to the question of the degree to which the nudges have desired effects when they are implemented as policy, as per Question 5 (Are the proposed nudges effective in reducing single-use cup consumption?).

The ultimate judgement of when the nudges should be reconsidered must, however, also be informed by other than psychological and statistical expertise.

Upon having determined the effects of the nudges when implemented as policy, the time comes for tackling Question 6 (When should the nudging strategy be reconsidered?). It involves the difficult task of determining under what conditions the nudging strategy may be worthwhile and sufficient as a remedy for plastic litter and pollution from single-use cups, and when it should be revisited. For a statistical approach to the problem, continued monitoring of sales records and the other data in the regions where the nudges have been implemented will allow for estimation of the time point where effects level off and stabilize, and so of the eventual endpoint of what these nudges can achieve. It will also allow for detection of any unexpected longer-term drawbacks such as possible rebound effects or other backlash. Continued collaborative exchange with the collaborating businesses will also allow for detection of any unexpected negative consequences in terms of negative spillover or negative reactivity on the part of customers or staff, but also of opportunities for further adjustments or extensions of the nudges. The ultimate judgement of when the nudges should be reconsidered must, however, also be informed by other than psychological and statistical expertise. Researchers in economics must be engaged to evaluate the cost effectiveness of the strategy, researchers in environmental science must be engaged to determine whether and when more drastic measures must be taken to reduce plastic litter and pollution from single-use cups, and technical experts must be engaged to evaluate the feasibility of emerging technical solutions that could render the nudges unneeded. Importantly, policy experts – together with a multidisciplinary research team – must continue to track and evaluate how the nudges fare together with various other policy instruments and in comparison with alternative policy approaches as the nudges are disseminated and implemented in other countries and policy contexts.

SECTION 5

Bringing these
Ideas to Scale

Section summary

This section outlines an upscaling and communication strategy that builds on the implementation and evaluation strategy proposed in the preceding section. [Section 4](#) already describes initial steps towards large-scale implementation and offers a natural platform for further extensions to other geographical areas and policy contexts as well as to other product categories the use of which may be subject to similar psychological processes. The collaborative upscaling strategy also draws actively on the achieved knowledge gains and on the unique expertise and the collaborative network that the testbed implementation in Sweden will assemble.

Key points

- 1** The described general approach of nudging, implementation, and evaluation may be viable in many countries and for several types of single-use items. This report can serve as a guide for conducting the necessary analyses and adaptations to commence implementation.
- 2** Nudges are context dependent, so the systematic examination of target behaviours and implementation strategy must be revisited and updated for new contexts and strategic arenas, and a local collaborative alliance must be formed.
- 3** The workshop series should be the hub of collaborative upscaling efforts. Market stakeholders are not only targets of dissemination but key participants in communication around the nudges through their international chain networks, through their marketing efforts, and by example.
- 4** Publication of a series of scientific articles in academic journals reflecting the project work can have great impact on several disciplines.

5.1. Extending the Nudges to Other Countries

In principle, we believe other countries will be more likely to achieve success with the nudges (if they follow the Swedish strategy) by revisiting and updating the systematic examination of relevant behaviours (Section 2), consider whether the proposed intervention strategy (Section 3) is likely to work as intended in the new context, and follow the strategy for implementation and evaluation through the three steps proposed in Section 4. Any policy measure must necessarily be adapted to fit a new context. However, because nudging is a series of strategic changes in the behavioural context, such adaptations must not only consider which existing policies are in place that may interact with the nudges in desirable or undesirable ways, but also the complex economic, sociodemographic, and cultural factors, as well as the concrete physical characteristics of the built environment that work together to shape how practices around coffee consumption tend to play out. How the behavioural context is shaped from the outset determines how it must be altered to nudge behaviours in a predictable direction. **It is therefore essential that nudging interventions are not to be disseminated and implemented as prefabricated solutions or policy packages.**

The general intention and approach to nudging people away from single-use disposable cup consumption may well be viable in many countries, following minor adjustments to the local conditions.

We believe that the general intention and approach to nudging people away from single-use disposable cup consumption may well be viable in many countries, following minor adjustments to the local conditions. It may be easy to assume that countries that are considered similar to Sweden in economic and cultural conditions could copy and paste the nudging approach and expect similar outcomes. However, local expertise must necessarily be recruited to study the Swedish example in relation to the specific conditions and practices that characterize the new setting.

Given that collaboration can be established with one or several international chains of businesses, this is expected to lead the way from the proposed testbed implementation in Sweden to implementation in other countries. In fact, a collaborative alliance and a shared positive experience and outcome of working with the nudges together with relevant businesses in Sweden will probably be much more important for the likelihood of successful implementation in other countries than exchange between relevant authorities. As we have said a number of times before in this report, nudges hinge on ground-level cooperation. The support of relevant businesses will ensure that the doors can be unlocked to the process of motivating and grounding the nudges among local managers and staff, shaping the nudges to local conditions and business models, and implementing them in a way that allows them to produce the desired effects.

The proposed nudges should therefore not be seen as a *recipe* for reducing single-use cups. They should instead be seen as a set of well-informed ideas, founded on psychological theories and experience, and on our understanding of the contextual factors that surround take-away coffee consumption in Sweden. Further, the proposed strategy should not be seen as a blueprint for others to follow, even if they eventually turn out to be feasible, efficacious and effective in the Swedish

case. While the psychological principles that guide human decision-making and behaviour may be generally relevant, the way that they play out in a given situation is grounded in the local context of that situation. In addition, different contexts may provide different levels of support and control that determine what is feasible to consider in terms of interventions. This report can probably serve as a guide for how those processes can be conducted in other countries, by highlighting many of the points that will need to be considered.

5.2. Communication

5.2.1. Communication to and through market stakeholders

The forum will be an important channel not only for providing information about the plans, the implementation, and the eventual results but also for channelling crucial feedback from relevant and important parties in these market segments.

The early stages of planning and completion of the feasibility study will involve regular workshops that will facilitate cooperation with relevant stakeholders at all levels in the collaborating businesses, as well as with policymakers at different levels in the involved authorities and expertise from a range of relevant fields. By allowing this workshop series to continue through the implementation and evaluation phases, the workshops will provide a natural forum for communication regarding the achieved effects in the efficacy and effectiveness trials and regarding possibilities and obstacles to upscaling of the nudging approach to other policy areas that involve the same strategic arenas and to other locations and countries. We therefore believe that this forum will be an important channel not only for providing information about the plans, the implementation, and the eventual results but also for channelling crucial feedback from relevant and important parties in these market segments. After the trial implementation is completed, other partners representing market stakeholders and independent businesses who have not collaborated actively in the trial should also be invited to participate and provide their viewpoints regarding the feasibility and needs for adjustments in the nudges to suit their requirements. As was also stated in the preceding paragraphs, this can be an important vehicle for spreading the nudging approach successfully to other regions and countries. Involving the stakeholders will open communication channels within their international chain networks and provide essential credibility in later efforts to engage and elicit commitment from market stakeholders in other countries.

5.2.2. Communication with the public

Through the implementation and evaluation phases, policymakers may consider it appropriate to keep the population informed, in general terms, of what is going on. It is, however, important for the integrity of the evaluation strategy that these communication efforts are kept to neutrally worded information regarding factual issues. We do not want to taint the evaluation strategy by introducing something akin to a public information campaign, which might aim to muster public support for the nudges, for instance, or influence people to adapt to the new policy. Nor

do we want to provide fuel for a possible media debate around the strategy. Such a debate could spark a multitude of different reactive processes in different population segments and potentially invalidate any conclusions regarding what effects the nudges could have had on their own. Only in the final stages of the implementation and evaluation of the nudges should efforts commence to inform the population about the successes and learnings of the project.

5.2.3. Marketing campaigns

The collaborating businesses must, of course, be allowed to communicate around their offer(s) to present and potential customers, if they choose to do so. Demands to limit or skew their marketing efforts may deter collaboration and even prevent the nudges from working as well as they would have done if they were supported by the naturally occurring marketing efforts of the involved companies. In communicating with customers, it would probably be wise to advise companies to keep their marketing efforts focused on their own business and their own efforts, rather than to use their participation in a collaborative effort to evaluate new policy instruments as part of their message. Marketing campaigns by companies, of the sort that might anyway occur to accompany a new strategy or offer, and that are centred around these issues rather than the project to test out nudges as policy, should be unproblematic.

5.2.4. Communication with policymakers

Policymakers at national and international levels will be another important target for communication around the project. Recurring seminars in relevant institutions, or presentations at conferences could be used to retain interest throughout the project and maintain transparency while also ensuring that the group that is involved in the Swedish project will be a natural discussion partner for policymakers who find themselves stimulated to progress nudging as a policy instruments in their own countries.

5.2.5. Communication with scientific communities

The project has the potential to become a milestone in the scientific literature on nudging. Communication with the scientific community will therefore be an important channel for communication of the strategy and the results. The project is designed to answer questions that are not only of practical and specific relevance within the evaluation but also of principal and general relevance for the progression of the theoretical frameworks surrounding nudging and for furthering the evidence base behind nudging as a policy instrument. The data produced by the different steps of the project will provide material for several scientific articles. Provided that the implementation and evaluation strategy holds up as expected, some of these articles could be targeted towards top-tier academic outlets and reach scholars in a wide variety of fields. Others could be targeted to high-ranking journals in psychology and policy research where they could help advance those specific fields in their understanding of nudging as an emerging policy tool. To boost the academic credibility of the project, the project could be preregistered as a controlled trial ahead of the first steps of the implementation and evaluation.

Only in the final stages of the implementation and evaluation of the nudges should efforts commence to inform the population about the successes and learnings of the project.

5.3. Extension to Other Strategic Domains and Products

This report focuses on single-use disposable coffee cups, and includes contextual work that could be of use in other domains: the systematic approach to examining the factors that influence relevant behaviours; the proposed nudges; and the proposed implementation and evaluation strategies. Other strategic domains work differently, and other products will require different strategies. Because we have not conducted structured analyses of these other domains and products, the contents of the following subsections must be taken as tentative and to some extent speculative.

5.3.1. Other beverages

In contrast to coffee consumption, however, fast-food consumption tends to be intrinsically spontaneous so few customers could be expected to bring a reusable cup for the purpose.

Throughout the report we have focused on coffee and coffee cups. We consider that **tea**, in most cases, is handled in the same strategic domains and is surrounded by largely similar concerns and behaviours. It is also typically sold in the same types of single-use cups. With other types of beverages, however, other factors and strategies may need to be considered.

Soda

Soda is provided in a single-use cup as a default in many fast-food restaurants, particularly in larger chains. The proposed Nudge 1 (A soft new default for coffee ordered over the counter) mandates that single-use cups can no longer be the default option for coffee in any of the relevant locations. This aspect of Nudge 1 could probably be applied to soda as well, so that soda ordered for in-house consumption will by default be served in some form of washable glass and soda ordered to-go could only be sold in reusable or recyclable containers such as aluminium cans and PET bottles. That could be an improvement given that aluminium cans and PET bottles are already handled in recycling systems (however, cans and bottles are common litter items as well; Addamo et al., 2017). With Nudge 2 (Convenient self-service if you bring your own cup), locations that sell coffee will be mandated to allow for filling of a reusable cup. This aspect of Nudge 2 could also be viable in the context of fast-food soda. In contrast to coffee consumption, however, fast-food consumption tends to be intrinsically spontaneous so few customers could be expected to bring a reusable cup for the purpose. Those who have a reusable coffee cup would not likely use that cup for soda because of hygiene and taste contamination concerns. These factors would severely constrain the expected effects of mandatory filling of reusable cups.

Juices, smoothies and slushies

Cold fresh beverages such as juices, smoothies and slushies are often sold in single-use disposable clear plastic cups. We consider that these types of fresh

drinks are rarely suited for consumption in reusable cups because the hygiene concerns associated with relatively sticky and highly perishable drinks will be difficult to overcome. Furthermore, people who carry around a reusable cup for coffee would probably not use the same cup for any other beverages due to the actual or perceived mixing or taste contamination between different types of beverages. Even most of those who would be happy to use the same cup for coffee and tea despite experiencing some taste contamination would probably hesitate to drink a refreshing cold beverage that comes with a subtle taste of old coffee. It is also unlikely that people will carry multiple reusable cups intended for different beverages. In addition, juices, smoothies, and slushies are typically purchased spontaneously as determined by needs to regulate hydration or temperature in leisure contexts, where the obstacles to getting people to come prepared with a reusable cup are high. A mandate based on a modified form of Nudge 1 (A soft new default for coffee ordered over the counter), to the effect that such beverages cannot be sold in a single-use cup as a default in locations where in-house service is available, could possibly nudge some customers to stay to consume their drink in a washable glass. As for the other proposed nudges, we conclude that these types of beverages probably require different measures than those suited for reducing single-use disposable coffee cup consumption.

Alcoholic beverages

Beer, wine, and other alcoholic beverages are, in some contexts, served in single-use disposable clear plastic glasses, such as during some festivals and other special events that draw crowds that cannot be accommodated by in-house seating arrangements. In some such contexts, return systems have been implemented where customers pay for a cup with the first purchase and then return that cup for a refill at a reduced price or for a refund. Some such situations also employ pre-purchased tokens that customers can exchange for a beverage at the bar. We consider that Nudge 3 (Refillable cups) could potentially hold some validity in this type of context as an enhancement of the return and token schemes that have been tried. A more substantial and more personal cup that in itself holds the value of multiple refills could merge and enhance the advantages of return and token systems. With alcoholic beverage service during special events, however, the number of refills that are included in the purchase price of the reusable cup can probably not be matched to the number of reuses that would reduce the environmental impact of the cup but rather to the number of drinks that a person planned to consume during the event.

Water fountains

The spread of disease around communal water fountains was the problem that first sparked the introduction of the single-use cup (Fisher, 2008). For public water fountains, the beverage is already free and people are able to refill reusable cups or other containers. For water fountains within offices or shopping malls, we consider that Nudge 2 (Convenient self-service if you bring your own cup) could potentially hold some value. If single-use cups are not available for free, and cannot be obtained by self-service directly by the water fountain, people would have to make a detour to buy a cup over the counter. In offices, probably from a reception desk and in a mall, probably in the nearest café or service centre. Wherever the point of purchase,

Even most of those who would be happy to use the same cup for coffee and tea despite experiencing some taste contamination would probably hesitate to drink a refreshing cold beverage that comes with a subtle taste of old coffee.

single-use cups could not be offered as a default, so staff would present customers with multiple options. That would elevate the use of a single-use cup to an actual choice and potentially nudge some people to buy a reusable cup instead. However, we believe that the types of reusable cups that are attractive and suitable for water may not be the same as those that work well for coffee.

5.3.2. Single-use food containers

As with other types of beverages, most food purchases differ from coffee consumption in various ways that make the proposed nudges unsuitable, without alteration. However, some aspects of the nudges may be worth considering for some foods that tend to be sold in single-use containers.

Fast food

Many fast-food restaurants and some cafés serve food in single-use containers as a default, whether food is served for in-house consumption or take-away. In these locations, [Nudge 1 \(A soft new default for coffee ordered over the counter\)](#) could perhaps be considered as a way of elevating service in single-use containers to a choice. This would, however, probably require major adaptations by the businesses to install dish-washing facilities and manage dishes.

Traditional restaurants

Traditional restaurants that complement their in-house service offer with the option to get food to-go will probably not be suitable for any aspects of the proposed nudges. Getting take-away is already an explicit choice in these locations (as per [Nudge 1 \(A soft new default for coffee ordered over the counter\)](#)) and self-service is not normally an option (as is necessary for [Nudge 2 \(Convenient self-service if you bring your own cup\)](#)). It is unfeasible that people would invest in refillable food containers (as per [Nudge 3 \(Refillable cups\)](#)) that are connected to a specific restaurant because most people prefer a higher degree of variability in their food than in their coffee, so they use different restaurants on different occasions. Furthermore, a personal reusable food container would require more space than a reusable cup and hygiene and convenience concerns would be higher given the often messy nature of the products in question.

Lunch restaurants

In contrast to more traditional restaurants, many lunch restaurants that cater to regular customers working in the same building or nearby could probably develop workable solutions around convenient self-service with a reusable food container (as per [Nudge 2 \(Convenient self-service if you bring your own cup\)](#)). Many customers would be attracted to the opportunity to get food quickly without waiting in line. Some of these places may also find ways to work with refillable food containers (as per [Nudge 3 \(Refillable cups\)](#)) as people who go there regularly could subscribe to pre-paid daily lunches. In this case, the container itself would replace the benefits that pre-paid coupons or ‘get the 10th meal for free’ schemes now provide for the businesses as well as for the customers.

Many customers would be attracted to the opportunity to get food quickly without waiting in line.

Salad bars

The proposed Nudges 1 (A soft new default for coffee ordered over the counter) and 2 (Convenient self-service if you bring your own cup) could work well in salad bars where habitual consumers could be inclined to consider using a reusable container if single-use disposable containers must be obtained separately over the counter. Quick service is important in these locations. Just as with lunch restaurants, locations that cater to returning daily customers could also find ways of implementing refillable food containers (as per Nudge 3 (Refillable cups)) as a way of providing an added level of service for committed customers and at the same time boosting customer loyalty.



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NEXT STEPS

Encouraging people to change their behaviour, in any area of life, is rarely straightforward. However, this report recommends a nudging approach that is clear, consistent and achievable – one that can make a significant difference to disposable cup use.

This final section outlines the basic stages through which these measures can be enacted.

Plastic littering and plastic pollution are, like many other sustainability challenges, caused by human behaviour. However, humans are not only causes of these problems but also victims or concerned bystanders. Furthermore, humans take action to mitigate the problems at the individual level and at higher levels of organization. Psychology and behavioural science hold the tools to analyze and systematically intervene with these processes. As this realization has begun to permeate throughout society, natural scientists, policymakers and market stakeholders are increasingly recognizing and utilizing psychological expertise to enable and enhance their efforts towards sustainable transitions.

The habits of day-to-day life – such as grabbing a coffee on-the-go – are often difficult to change. They are difficult to change for individuals who are concerned about the environmental impacts of their behaviour, and they are difficult to change for policymakers who pursue a more sustainable future for their countries and for the global community. Nudging offers a way of addressing those habits with a high level of precision and without imposing absolute constraints on the freedom of choice. Nudging is a suitable strategy for addressing the problems of plastic littering and plastic pollution with single-use cups. Nudges can be applied in a single step or as one component in a wider strategy.

Policymakers should proceed in investigating nudging as an approach to reducing plastic litter and pollution from single-use cups and some similar products.

Compared to traditional policy instruments that rely on authority, price adjustments or persuasion, nudging differs in multiple ways. Not least, nudging relies on a more collaborative approach to the development and implementation of a behaviour change strategy: the people and organizations that contribute to a problem are also seen as potential contributors to solutions. Bearing in mind that most people in many countries are basically positive towards sustainable transitions, the crux of behaviour change often lies in the seemingly small-scale context of individual choices. In order to change those conditions, market stakeholders must be involved in the design of deliberate interventions that are practicable and economically viable for their particular organizations, business models and locations. Behavioural scientists must also be involved to apply a methodical approach to theoretical analysis and adaptation of previous experience and contribute to an informed behaviour change and evaluation strategy.

Policymakers should work to form, maintain and develop collaborative alliances with market stakeholders and experts in behavioural science. Such alliances are the foundations of a successful nudging strategy.

The collaborative approach is key not only to developing an intervention strategy that is acceptable but also to tuning it to local needs and conditions. This report describes how these conditions have been analyzed for Sweden, and proposes a nudging strategy based on that analysis. However, it should not be taken as a template for reducing the consumption of single-use cups. The particular conditions surrounding their use may well have additional layers that have not

been uncovered here or aspects that may differ considerably across different market segments and across different cultural and policy contexts. The data and experience that will emerge from a testbed project will help to inform other policy areas, and other countries and regions. In each new area where a nudging approach is considered, it should be attended by renewed analyses of the problems to be addressed and of the conditions for introducing the nudging strategy, as well as renewed adaptation and iterative tuning of the nudges.

Policymakers should use this report as a guide rather than a template. The proposed nudges are feasible but the strategies for ongoing collaboration, evaluation and adaptation to local conditions and changing needs are the greatest strengths of the proposed approach.

Nudging is an emerging policy tool that is increasingly accepted and applied in various contexts. Above and beyond nudging as a particular approach to behaviour change, psychology and behavioural science hold a range of tools and methods for analyzing and addressing the behavioural problems that are at the root of many sustainability challenges. Academics and practitioners in these fields can also contribute to broadening the view of sustainability challenges to encompass not only the problems that human behaviours cause but also the ways in which humans react, respond and adapt to environmental degradation and sustainability threats and the ways in which they can become more energized and skilful in addressing them. Sustainability is, first and foremost, a matter of human behaviour.

Policymakers should continue to develop their understanding of behavioural science and its central importance for effective policy-making. Sustainability is, first and foremost, a matter of human behaviour.

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Plastic pollution is having a catastrophic effect on our planet, both on land and at sea. Many governments are attempting to tackle it but traditional policy instruments, like public information campaigns or regulation, are not always effective.

In this report we look in depth at one specific type of plastic pollution – the single-use, disposable coffee cup. We describe three specific 'nudges', informed by behavioural science, that can be implemented at scale by policy makers to help move consumers away from disposable cups and towards more sustainable options.

We examine the research that underpins the nudging approach, as well as the necessary conditions for nudging, the stages of implementation, and how to monitor and evaluate a nudging project. This gives a good outline of why and when a nudging policy might be considered, and how to make it a reality.



One planet
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