LUND UNIVERSITY

Nudging, a tool for sustainable behaviour?

Mont, Oksana; Lehner, Matthias; Heiskanen, Eva

2014

Document Version:
Publisher's PDF, also known as Version of record

Link to publication

Citation for published version (APA):
Mont, O., Lehner, M., & Heiskanen, E. (2014). *Nudging, a tool for sustainable behaviour?* Swedish EPA.

Total number of authors:
3

General rights
Unless other specific re-use rights are stated the following general rights apply:
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.
• Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
• You may not further distribute the material or use it for any profit-making activity or commercial gain
• You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: https://creativecommons.org/licenses/

Take down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

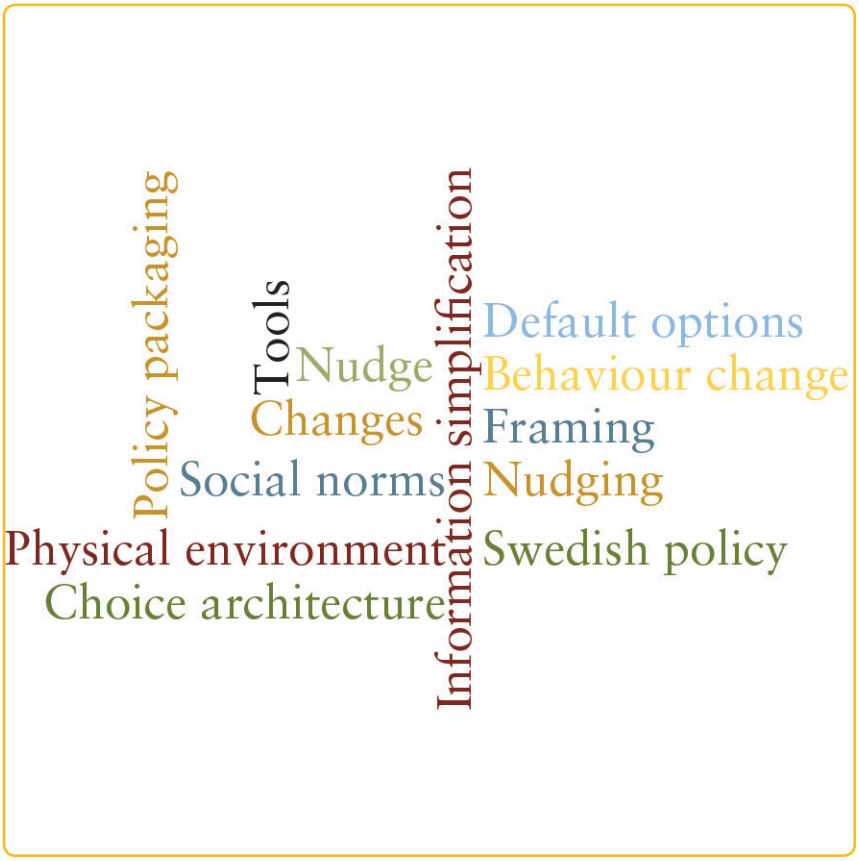
PO Box 117
221 00 Lund
+46 46-222 00 00

Nudging

A tool for sustainable behaviour?

OKSANA MONT, MATTHIAS LEHNER
AND EVA HEISKANEN

REPORT 6643 • DECEMBER 2014



Nudging
A tool for sustainable behaviour?

Oksana Mont, Matthias Lehner and Eva Heiskanen

SWEDISH ENVIRONMENTAL
PROTECTION AGENCY

Order
Phone: + 46 (0)8-505 933 40
Fax: + 46 (0)8-505 933 99
E-mail: natur@cm.se
Address: Arkitektkopia AB, Box 110 93, SE-161 11 Bromma, Sweden
Internet: www.naturvardsverket.se/publikationer

The Swedish Environmental Protection Agency
Phone: + 46 (0)10-698 10 00, Fax: + 46 (0)10-698 10 99
E-mail: registrator@naturvardsverket.se
Address: Naturvårdsverket, SE-106 48 Stockholm, Sweden
Internet: www.naturvardsverket.se

ISBN 978-91-620-6643-7
ISSN 0282-7298

© Naturvårdsverket 2014

Print: Arkitektkopia AB, Bromma 2014
Cover photo: Oksana Mont
Cover illustration: Johan Wihlke

NORDIC ECOLABEL
341 506
Printed Matter

Preface

This study was conducted as part of a government commission which was given to the Swedish Environmental Protection Agency (Swedish EPA) in 2014. The Environmental Protection Agency mandated the International Institute for Industrial Environmental Economics (IIIEE) at Lund University to conduct a research study on nudging. The study has served and will serve as a direct input to further strategic work on sustainable consumption policies.

The aim of the report is to synthesize existing knowledge about the effects achievable with nudging on consumption and the environment, in what areas nudging according to research can have the best effect and how nudging should be applied to give the best effect. The study comprised a literature review and interviews to collect experiences of working with nudging available in some countries.

Professor Oksana Mont has been the Project leader and responsible for analysis and presentation of results. PhD student Matthias Lehner has been responsible for collecting and preliminary screening of literature. Professor Oksana Mont, Professor Eva Heiskanen and Matthias Lehner have analyzed literature and conducted interviews, and are all three authors of the report. Other researchers from the research group on "Sustainable consumption and lifestyles" at the International Institute for Industrial Environmental Economics (IIIEE) have performed particular tasks, e.g. providing expert input on specific approaches for changing consumer behaviour and on policy relevance of behavioural economics.

From the Swedish EPA Elin Forsberg, Project manager of the government commission on measures on sustainable consumption policies, Tove Hammarberg, Senior research officer and Anita Lundström, Senior Policy Adviser, have provided comments to earlier drafts of the report. The latter has finally reviewed and piloted this report for publication.

The views expressed in this report are those of the authors and cannot be cited as representing the views of the Swedish Environmental Protection Agency. The report is also published in Swedish (ISBN 978-91-620-6642-0).

The study has been funded by the Swedish Environmental Agency´s Environmental Research Grant.

Swedish Environmental Protection Agency, December 2014

Contents

PREFACE 3

SUMMARY 7

1 INTRODUCTION 9
1.1 Why are we interested in nudge? 9
1.2 Purpose and RQs 10
1.3 Methods and delimitations 10
1.4 Audience 11

2 CHOICE ARCHITECTURE, NUDGE AND LIBERTARIAN PATERNALISM 12
2.1 Definitions 12
2.2 Why nudge? 14
2.2.1 Two systems of thinking 14
2.2.2 Departures from rational economic model 15
2.3 Where to nudge? 17
2.4 Who nudges? 18
2.5 Philosophy of libertarian paternalism 19

3 NUDGE TOOLKIT 22
3.1 Simplification and framing of information 22
3.2 Changes to physical environment 25
3.3 Changes to the default policy 26
3.4 Use of social norms 27

4 NUDGE: SWOT 29
4.1 Strengths of nudging 29
4.2 Weaknesses of nudging 30
4.3 Opportunities of nudging 31
4.4 Threats of nudging 32

5 NUDGE: HOW THE WORK IS ORGANISED IN VARIOUS COUNTRIES 34
5.1 USA 34
5.2 UK 35
5.3 EU 36
5.4 Denmark 37
5.5 Norway 38

6 NUDGE IN VARIOUS CONSUMPTION-RELEVANT DOMAINS 39
6.1 Energy use in the home 39
6.1.1 Evidence for the effectiveness and efficiency 40
6.1.2 Critical success factors of nudging strategies 44
6.1.3 Lessons learned for devising more successful policies 45

6.2 Food 47
6.2.1 Evidence for the effectiveness and efficiency 48
6.2.2 Critical success factors of nudging strategies 52
6.2.3 Lessons learned for devising more successful policies 53
6.3 Personal transport 54
6.3.1 Evidence for the effectiveness and efficiency 55
6.3.2 Critical success factors 59
6.3.3 Lessons learned for devising more successful policies 60

7 NUDGE AS PRACTICAL APPLICATION 62
7.1 Designing policy interventions with behavioural insights 62
7.2 Nudge in the policy toolkit 66
7.3 Institutionalising nudge in policy context 67

8 CONCLUSIONS 69

9 REFERENCES 72

Summary

Success of strategies for solving problems of climate change, scarce resources and negative environmental impacts increasingly depends on whether changes in individual behaviour can and will supplement the technical solutions available to date.

A relatively new way to influence behavior in a sustainable direction without changing values of people is nudging. Nudging can be used to help people make choices that are better for the environment or their health. The importance of the behaviour change strategies is being recognised in politics and among policy makers in diverse areas – from road safety to diet and physical activity; from pension plans to private economy and from littering to recycling. A renewed perspective on existing policy tools and potential strategies for behaviour change are entering public debate that have implications for behaviour of individuals, but that also raise critical questions about the role of the government in the society and transition to sustainability. Nudge means carefully guiding people behavior in desirable direction without using either carrot or whip. Instead when nudging one arranges the choice situation in a way that makes desirable outcome the easiest or the most attractive option. Knowledge about nudging opens up possibility to suggest new types of policy tools and measure that can contribute to sustainable consumption.

In many countries, public or private knowledge centers are engaged in shaping nudging strategies and policy development. The report provides an international outlook with experiences from the USA, the UK, EU, Norway and Denmark. In the USA, nudging was institutionalised at the Office of Regulatory Affairs which develops and oversees the implementation of government-wide policies and reviews draft regulations in several areas. In the UK, nudge was firmly institutionalised when the Behavioural Insights Team (UK BIT) was established at the UK Cabinet Office in 2010. In February 2014, the team was 'spun out' of government and set up as a social purpose company but is still working primarily for the Cabinet Office. Instead of establishing a governmental unit, Denmark has an active non-profit organisation iNudgeYou outside the government that supports the use of nudges in policy making. Similarly to Denmark, Norway has an independent organisation promoting and supporting the use of nudges, GreeNudge, which has produced a report on the potential for nudging in Norway's climate policy.

The guiding question is whether it is possible to help individuals make better decisions for themselves and society at large by overcoming limitations of human cognitive capacity and behavioural biases? In what way can behavioural sciences help people bridge the gap between good intentions and good deeds? Can learnings from nudge examples be used to shape behaviour in a more sustainable direction?

In order to answer these questions, the report:

- analyses existing academic knowledge on nudging and choice architecture
- investigates lessons about effectiveness and efficiency of applied nudging tools and approaches in consumption domains of energy use in the home, food and mobility
- presents evidence of factors of success of different nudge-based approaches
- outlines the implications of these findings for policy strategies on sustainable consumption

The report shows that lately applications of behavioural sciences and behavioural economics, such as nudge, have been helping policy makers in different countries and sectors to more systematically integrate behavioural insights into policy design and implementation. Some examples of these tools are:

- Use default options in situations with complex information, e.g. pension funds or financial services
- Simplify and frame complex information making key information more salient – energy labelling, displays
- Make changes in the physical environment making preferable options more convenient for people – e.g. change layouts and functions, showing with steps and signs, give remainders and warnings of different kinds to individuals
- Use of social norms – provide information about what others are doing

However, the size of the effects of policy interventions and the actual outcomes of interventions in specific contexts remain hard to measure. Results from one experiment cannot be indiscriminately generalised to a different context or to a wider population. The problem is the complexity of human behaviour and the diversity of factors that influence it.

Despite that, nudging is a useful strategy for inducing changes in context-specific behaviour. Rather than being seen as a silver bullet, the largest promise of nudge is perhaps in helping design other initiatives better and in improving the effectiveness and efficiency of policy tools and the speed of their implementation. Nudge is a cost effective instrument that can enhance other policy tools and that targets behaviours not addressed by other policy instruments because the behaviours are based on automatic, intuitive and non-deliberative thinking.

Nudging promotes a more empirical approach to policy design and evaluation, e.g. through experiments, pilots and random control trials, than the tools usually applied in policy making and ex-ante evaluation. Nudge tools are seen as a complement to the traditional policy instruments rather than as a substitute for laws and regulations and economic tools. Nudging in general and green nudges in particular are interesting tools that can be used alongside other instruments for behaviour change, but more research is needed on their effectiveness and efficiency, as well as on their theoretical underpinnings and practical applications in consumption-relevant domains.

The report is written for policy makers, civil servants and representatives of the public, interested in behaviour change methods and the role of the government in shaping and facilitating the change.

1 Introduction

1.1 Why are we interested in nudge?

There is a growing recognition that supply-side policies (directed at production) need to be complemented by demand side strategies that could help individuals make better decisions for themselves and society at large. Therefore, policy makers are becoming increasingly interested in applications of behavioural sciences in different sectors and types of policy making.

Psychology, sociology, marketing and behavioural economics paint a picture of complex human behaviour that is influenced by a diversity of factors, such as desires and needs, social norms and values, infrastructural and institutional context, and economic and political climate (Mont and Power 2013). There is also a growing practical knowledge on how human behaviour is influenced through everyday practices at home (Shove and Warde 2002), in the shopping context by retailers (Mont 2013) or at the community and city level through commercial advertising and social marketing (McKenzie-Mohr 2011). Increasingly behavioural insights are being used in the design, implementation and evaluation of policy instruments (Heiskanen et al. 2009; Wolff and Schönherr 2011).

Indeed, insights from behavioural sciences help policy makers not only to better understand human behaviour and factors influencing behavioural change, but to also devise more effective and efficient policies for advancing welfare-enhancing and sustainable behaviour. Still, information provision and labelling are the most widely used policy tools targeting individuals. They rely on the rational behaviour model, according to which people are rational utility maximisers with perfect information processing capacity. These assumptions about human nature were questioned by cognitive and social psychologist and even economists already in early 1950s–1960s. It was demonstrated that people have bounded rationality, are subject to behavioural biases and often do not make deliberate choices, but rely on mental shortcuts and habits.

These findings open up possibilities to design policies that recognise and utilise knowledge of human behaviour as it is and not as projected in simplified economic models. However, it has been difficult for psychologists to bring the complexity of human behaviour into the policy making context and even more challenging to translate it into the language of policy recommendations and economic and administrative rationales. A book by behavioural economist Richard Thaler and law scholar Cass Sunstein *Nudge: Improving decisions about health, wealth, and happiness* (2008) has succeeded in popularising some of the findings from behavioural science and their applications in policy making. This spurred a renewed interest in employing behavioural sciences in devising policies that enhance individual and social welfare. The book specifically explores the role of choice architecture and nudges in shaping behaviour in a desired direction.

These tools have been successfully applied by governments, for example in savings accounts (Thaler and Bernartzi 2004) and public health campaigns (Oullier et al. 2010). This gives reason to investigate the merits and limitations of nudging and whether it can be a promising tool for promoting a broad range of pro-environmental and sustainable behaviours.

This report analyses the existing evidence with regard to the role, limitations and the varying degree of success of nudging in fiscal and social policy, as well as environmental and consumer policy. It then describes potential avenues for employing behavioural science in policy making and suggests institutionalisation paths to ensure this. The report also identifies gaps in knowledge that need to be addressed in future research.

1.2 Purpose and RQs

The goal of the study is to improve and increase the knowledge base of Swedish policy makers and public officers on choice architecture and nudging by answering the following questions:

1. What knowledge and practical experiences about nudging exist in general and in the field of consumption and the environment?
2. In which consumption domains and behavioural contexts is nudging most efficient and effective?
3. What are the critical factors of success of nudging strategies?
4. In what way may nudging contribute to devising more successful policies for sustainable consumption?

1.3 Methods and delimitations

This study builds on literature analysis of the existing body of knowledge on nudging approaches in different policy contexts, e.g. financial services, road safety, health, diet, littering and recycling, social policy, and in consumption-relevant domains, e.g. housing, mobility and food, as areas of the highest environmental impact from households. The main focus of this study is on changing the behaviour of individuals, where specific and concrete behavioural choices are targeted. However, considering that many of the individual behaviours take place in physical and social context and are often heavily influenced and shaped by the infrastructure and institutional arrangements, or by what other people are doing, both as individuals and as a group, individual behaviour change is considered within the context in which the behaviour takes place.

The report relies on knowledge from European and North American countries as cultures most closely related to the Swedish context and mentality. The practical experiences with nudging instruments and tools are collected from the UK and the USA, Sweden, Norway and Denmark.

The results of the literature review were discussed with prominent nudge researchers: 1) Prof. Cass Sunstein, USA legal scholar, the author of the book *Nudge: Improving decisions about health, wealth, and happiness*, 2) Dr. Steffen Kallbekken, head of GreeNudge in Oslo, Norway and 3) Associate Professor Pelle Guldborg Hansen at iNudgeyou, Denmark and Roskilde University.

1.4 Audience

The primary target audience for this report is policy makers, governmental representatives and public servants working or intending to work with devising and implementing policies that have direct or indirect implications for behaviour change of individuals. Secondary target groups are other stakeholders, such as non-governmental and civil society organisations and businesses, who are interested in the role of policy in shaping and guiding behaviour change for the benefit of the individual and the societal good. Additionally, the report might be of use for the general public interested in gaining a snapshot picture of nudging.

2 Choice architecture, nudge and libertarian paternalism

2.1 Definitions

Mainstream economics, e.g. neoclassical economics, is based on the assumption of the rational nature of human beings, i.e., the *homo economicus* model of human behaviour. According to this logic, the important incentives people react to are influenced by price and choice. Behavioural sciences, drawing on insights from cognitive[1] and social[2] psychology, stress that besides price and availability of options, behavioural biases and the decision context also influence choices that people make, often routinely. For a long time, the use of findings of behavioural sciences in policy have been rather unsystematic (Shafir 2013). *Behavioural economics* has "managed to bring the fields of applied social and cognitive psychology into policy-making by relating it to economic questions" (Kahneman 2013).

In behavioural sciences, the decision context – the environment in which individuals make choices – is important and is what Sunstein and Thaler (2008) refer to as "*choice architecture*". Altering the social and physical environment or changing the way options are presented to people may increase the chances that a particular option will become more attractive, a preferred or even default choice. In the book "Nudge", the authors use the example of a cafeteria, where different types of foods are placed in different order and this has implications for what food customers choose (Thaler and Sunstein 2008). Thus by changing the layout of the store or the order of the placement of food in a cafeteria, *choice architects* may influence peoples' behaviour. From this perspective, every situation represents some kind of choice architecture, even if it is not explicitly designed that way (Kahneman 2013).

Such aspects of the environment or elements of behaviour architecture have been coined '*nudges*'. They are designed based on insights from cognitive and social psychology and lately behavioural economics. The instruments rely heavily on the idea of choice architecture that may include changes in infrastructure or the environment that guide and enable individuals to make choices almost automatically, where information provided is simplified or where defaults are offered in a way that makes people better off. Thus, nudges do not try to change one's value system or increase information provision; instead they focus on *enabling behaviours* and private decisions that are good for the individuals and often for the society as well.

[1] Cognitive psychology studies mental processes such as language use, memory, attention, problem solving, creativity and thinking.
[2] Social psychology investigates the factors and conditions that influence our behavior in a certain way in the (actual, imagined or implied) presence of others.

The term "*nudge*" was first used in the context of behaviour change by the authors of the book "Nudge", who define it as (Thaler and Sunstein 2008: 8):

"... any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting the fruit at eye level counts as a nudge. Banning junk food does not".

So according to the authors, the primary aim of nudges is to guide people's behaviour towards better choices, as judged by themselves, without restricting the diversity of choices. This definition has been debated in scientific circles as being too broad and imprecise. An alternative definition has been offered by the leading Danish behavioural researcher Hansen (2014: 2):

"A nudge is … any attempt at influencing people's judgment, choice or behavior in a predictable way (1) made possible because of cognitive biases in individual and social decision-making posing barriers for people to perform rationally in their own interest, and (2) working by making use of those biases as an integral part of such attempts".

As people are often unaware of the effects that changes in the environment or different options have on their actions, nudges mostly work on *changing non-deliberative aspects of individuals' actions* (House of Lords 2011). Nudge tools include defaults, working with warnings of various kinds, changing layouts and features of different environments, reminding people about their choices, drawing attention to social norms and using framing in order to change behaviour. Coercive policy instruments such as laws, bans, jail sentences or economic and fiscal measures, e.g. taxes or subsidies, are not nudges according to Sunstein (2014b).

Whether provision of information is a nudge or not is being debated in existing literature. According to Sunstein "provision of information is certainly a nudge, but it may or may not qualify as paternalistic[3]" (Sunstein 2014c: 55). Other researchers exclude openly persuasive interventions – media campaigns and information provision – from the range of tools under the umbrella term of nudge. However, according to them information provision could be a nudge, especially if the goal is not just to provide as much information as possible, but rather to simplify information so as to facilitate benign choices, as for example in case of labelling or simplifying information about financial services (Ölander and Thøgersen 2014). Other researchers argue that information provision per se is not a nudge (Hansen 2014).

Nudges have been used by businesses in their marketing and sales promotion for a long time. Also governments have been nudging people's behaviour change in different areas, perhaps without defining or framing policy instruments as nudges. Now, however, nudges are being explored by governments in a number of countries as a promising policy tool in the policy package for behaviour change management.

---

[3] Paternalism generally refers to a principle that entitles one (a person, organisation or state) to make decisions instead of others for their own good.

2.2 Why nudge?

Human behaviour is complex. Devising policies that entail or imply behavioural change requires solid understanding of how people behave in different situations and contexts. Below some of the insights from behavioural sciences and behavioural economics are outlined that explain how developing policy tools, such as nudges, could help reduce behavioural biases and lead to choices that are better for individuals.

2.2.1 Two systems of thinking

One of the important contributions to understanding human behaviour has been made by a Nobel prize winner Daniel Kahneman (2011) who described two systems of thinking: System 1 – fast (automatic, intuitive) and System 2 – slow (deliberate, conscious). While System 1 guides large parts of our daily routines, which we do almost automatically, e.g. taking a shower or riding a bike, System 2 relies on a much greater deliberate mental effort when we need to make decisions about important choices in life. Thus, System 1 relies on heuristics (rules of thumb), mental shortcuts and biases, and System 2 employs detailed multi-criteria evaluations, e.g. when people buy cars or houses. So what does this have to do with policy?

The majority of existing policy tools for changing behaviour target System 2 that relies on the availability of information and our cognitive capacity to process it and make rational choices. These tools are often guided by the assumption that it is the lack of information or misguided incentives that are the main reasons why people do not act rationally or even according to their own preferences – the so-called attitude-behaviour gap. In order to bridge the gap, policy makers use information provision such as awareness raising campaigns, eco-labelling or other measures. Numerous studies however demonstrate that providing information does not necessarily lead to changes in behaviour: all people are aware of the harmful effects of smoking and yet a substantial share of the population smokes. More than four out of five Nordic citizens are concerned about the environment, yet only about 10–15% state they buy green products on regular basis, while the actual market for green products remains at only 3,6% in Sweden (Ekoweb 2013). Explanations to this gap found in multi-disciplinary literature range from the power of habits and established social norms to the complexity of decision-making process and infrastructural and institutional lock-in effects (Mont and Power 2013).

Behavioural sciences and behavioural economics in particular challenges the assumption of rationality and seeks explanations in the workings of System 1 and System 2. Existence of System 1 means that in order to change behaviour we do not always need to change minds. Secondly, although information is important, it is not sufficient on its own to change behaviour, which is to a large extent automatic, routinised and intuitive and is not affected by the information per se. So what are the specific features of System 1 and System 2?

Table 1 Two systems of human thinking (van Bavel et al. 2013)

System 1 (Fast, intuitive)	System 2 (Slow, reflective)
Regulates automatic behaviour	Regulates reflective behaviour
Thinks fast	Thinks slow
Uncontrolled, unconscious, effortless	Controlled, self-aware and effortful
Relies on stereotypes	Solves problems through calculation and deliberation
Gives immediate responses to frequent and familiar situations	Takes well-thought out decisions
More prone to biases and heuristics	Less prone to biases and heuristics)
Examples: driving a car, brushing teeth	Example: calculating a tip, planning the day

2.2.2 Departures from rational economic model

Different branches of behavioural science, e.g. psychology, sociology and behavioural economics, demonstrate that people do not always behave rationally in the sense that they always maximise their utility. In fact, daily behaviours systematically violate the idea of the "rational" *homo economicus*. Indeed, people often make decisions that are not in their best interest because they procrastinate or lack self-control, because they are greatly influenced by the context in which decisions are made, or because they are overwhelmed by the information and have difficulties to make decisions (Reisch and Gwozdz 2013). Let us have a brief look at some of the "anomalies" of human behaviour that each of us exhibits every day and that can potentially be targeted by nudge tools.

Prospect theory by Kahneman and Tversky (1979) has highlighted *the endowment effect*, according to which if people already possess something they are very reluctant to lose it. This means that it is more important to us to keep or hold on to something than to gain something.[4] For example, loosing SEK 100 causes more pain than receiving SEK 100 causes pleasure (Kahneman and Tversky 1979). Studies show that our "willingness-to-accept" can be up to 20 times higher than the "willingness-to-pay" (Pearce 2002). In the public policy realm this translates into devising policies that emphasise losses and encouraging people to take action to prevent loss from occurring.

Psychological discounting is another trait of our behaviour that means that we place more weight on the short-term rather then the long-term consequences of our decisions, thereby often discounting the future (Frederick and Loewenstein 2002). In terms of consumption, people often overweigh short-term gratification and discount the higher long-term gains that might be achieved if we delay immediate consumption (O'Donoghue and Rabin 1999). For example, people tend to ignore the long-term effects of smoking, poor diet or lack of exercise and are reluctant to save for retirement.

People also have limited computational capacity in decision-making situations especially when calculating probabilities, the so-called "*availability bias*".

[4] The large storage industry in the USA is built on that cognitive bias: due to high fees for storing stuff ($99–195/month) the payment for storing goods exceeds the value of the stored items after 6–8 months. This faulty logic on the part of consumers, makes perfect sense for the industry, which has a collective $20+ billion in annual revenues (SSA 2012).

We tend to worry too much about unlikely events, but underweigh high probabilities, the so-called "*certainty effect*" (Dawnay and Shah 2005). People also tend to overestimate the likelihood of events that we remember well, which can be affected by how recent our memories are or how emotionally charged they are. This effect makes the role of the media, NGOs and other actors that shape the information environment extremely important as they greatly influence the decision context.

People also *desire to maintain status quo* (Samuelson and Zeckhauser 1988). We could be overwhelmed by information, have limited time and resources and thus prefer not to change our behaviour or habits unless we absolutely have to. Information overload is one of the common reasons for people's inaction. A possible solution for policy action is to offer defaults that maximise individual utility and/or social welfare.

Another aspect of human behaviour, recognised by psychologist Festinger (1957) is cognitive consistency, i.e. *people seek consistency between their beliefs and their behaviour*. However, when there is a mismatch between beliefs and behaviour – so-called cognitive dissonance, people often alter their beliefs rather than adjusting the behaviour. To help people be more consistent some authors suggest soliciting commitments from people (Dawnay and Shah 2005), so that they feel more motivated to adopt their behaviour in order to back up their stated beliefs, especially when commitments are made in written or in front of other people.

The above-mentioned traits of human nature focus on the individual level. However, since people are social beings, our behaviour is greatly *affected by what others are doing*. For example, the famous "keeping up with the Joneses" notion highlights the fact that people compare themselves to their peer group. Social influence can be expressed through the idea of relative income, when people are happy with their increased salary until they learn that their colleagues received a higher raise.

There is also a well-known *bandwagon effect* – the tendency to do or believe things because many people do or believe in the same thing (Colman 2003). Social psychologists stress that interpersonal, community and social influences play an important role in shaping individual behaviours. They highlight that people not only compare themselves to others, they also tend to look for social cues of behaviour in new situations or circumstances (Cialdini 2007). Thus, social learning is an important feature of human life, i.e. we learn by observing what others are doing and how (Bandura 1977).

Theories of inter-group bias highlight the importance for people to identify themselves with certain group, expess loyalty and form identity associated with certain social formations, whether it is community-based group, group of colleagues or friends (Tajfel et al. 1971). People who belong to a certain group tend to emulate the behaviour of members of that group. Therefore, policy tools that exploit these inter-group biases and loyalties can encourage peer support and community-based schemes.

2.3 Where to nudge?

So for what behaviours are nudge instruments usually applied? Thaler and Sunstein (2008) suggest that nudges are appropriate when choices have delayed effects, when they are complex or infrequent and thus learning is not possible, when feedback is not available, or when the relation between choice and outcome is ambiguous. On the other hand, they provide many examples from situations where no choice is actually made, and where it is more appropriate to speak of routine or habitual behaviours than active decision making choices. According to Verplanken and Wood (2006) about 45% of our everyday actions are not really choices at all, but habits or routines. For example, people do not usually "choose" to leave the lights on when leaving a room or to accelerate heavily when driving a car. People might not see themselves as "choosing" to over-eat the wrong kinds of food, such as sausages or cookies, either. People often succumb to bad habits in spite of having made an explicit choice to avoid these behaviours, since behaviour is error-prone (Thaler and Sunstein 2008) and not always within our control (Elster 1979/1984). Thus, it is clear that a large portion of our behaviours are not actively reflected upon and this is the primary application area for nudges.

On the basis of this analysis, we suggest that "nudge" interventions are most appropriate in what marketing researchers call "low-involvement" decisions, i.e., ones that involve little conscious deliberation, and also in high-involvement decisions that are complex or unfamiliar (Figure 1). However, it is not self-evident that nudges are likely to work (even in principle) in the case of high-involvement decisions that are perceived to have low complexity. Examples of such decisions where (at least individual, one-off) nudges might not be effective could be the choice of a car brand in the case of people who have high brand loyalty.

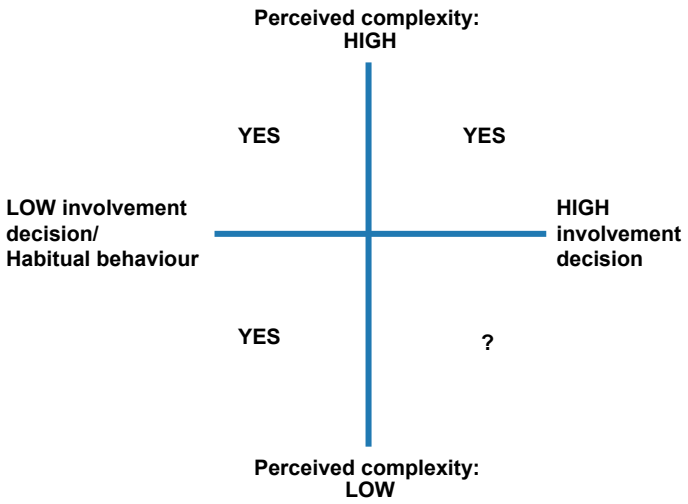


Figure 1 Areas in which nudge is likely to be most effective (indicated with YES)

Attempts to influence values or attitudes are not part of the nudge paradigm. Indeed, nudges can be seen as complementary or even tangential to interventions focusing on attitude or value change. However, there is evidence that suggests that nudges are likely to be more effective if they are perceived of as legitimate (i.e., helping people to do what they ideally would like to do) or when they are so unobtrusive as to be virtually invisible. This is based on research from the USA (Costa and Kahn 2010; Hardisty et al. 2010; Gromet et al. 2013), where politically conservative, anti-environmentalist consumers responded to environmentally oriented labelling nudges differently than politically liberal, more environmentalist consumers. This research suggests that some nudges do not completely "bypass" information processing, but are actually processed at some level. Hence, nudges might encounter less resistance when they are in line with our ideal choices and values; and if they build on these values, they might be more effective. Moreover, Ölander and Thøgersen (2014) argue that many interventions that Thaler and Sunstein (2008) call nudges actually also involve some active information processing. Nudges might thus also form part of a broader package of instruments, where information provision and persuasion might still have a complementary role (Rasul and Hollywood 2012; Ölander and Thøgersen 2014).

2.4 Who nudges?

The term "nudge" usually refers to the the use of nudging as a tool to promote behaviour that is beneficial for individuals or society as a whole, and is applied by policy makers to increase policy effectiveness. Policy makers can use nudging in two ways, 1) to counteract the negative impact of other actors' (e.g. business, media) attempts to subconsciously influence human behaviour and thus reduce behaviour deemed undesirable (e.g. consumption of fatty, salty and sugary food), and 2) to promote certain behaviour and thus increase behaviour deemed desirable (e.g. consumption of healthy food) (Reisch and Oehler 2009).

Businesses have a long tradition of applying diverse strategies similar to nudge for shaping purchasing patterns and levels. Indeed, companies have been pioneers in using insights from research on consumer behaviour, including the latest developments in sensory techniques and neuro-marketing[5], for developing communication strategies in shops, marketing campaigns using different channels outside the in-store environment and shaping buying behaviour through in-store space layout and management. In the words of Vance Packard from the book The Hidden Persuaders (Packard 1957/2007: 11): "… *many of us are being influenced and manipulated—far more than we realize—in the patterns of our everyday lives. Large scale efforts are being made, often*

[5] Neuromarketing is a new field of *marketing* research that studies consumers' *sensorimotor*, *cognitive*, and *affective* response to marketing stimuli.

with impressive success, to channel our unthinking habits, our purchasing decisions, and our thought processes by the use of insights gleaned from psychiatry and the social sciences."

In response to public pressure and consumer attention, companies have shown to be willing and able to use their knowledge about human behaviour to nudge individuals in a desirable direction. More and more companies, for example, are reacting to strong public attention for sustainability and are trying to create and promote markets for environmental and socially sound products (Maniates 2010; Moisander et al. 2010). It must be remembered, though, that while it might seem that marketing and nudging have much in common or that the two strategies are the same thing, there is one vital difference between the two approaches in that while nudge presupposes helping people make choices that are good or beneficial for the people and society, marketing aims to entice people into choices that primarily bring about benefits for businesses (Table 2).

Table 2 Traditional marketing vs. choice architecture and nudge

Traditional marketing	Behavioural economics and nudge approaches
Traditional marketing	Choicearchitecture and nudge
Aims to first of all maximise profits and benefits of businesses	Aims to first of all benefit people/ consumers
Focus on what needs to be sold, not necessarily on the best alternative for consumers	Focus on options that are best for people leaving possibility for people to opt-in or opt-out
Reliace on marketing experts (including behavioural experts) in corporate decision-making	Reliace on behavioural experts in the process of policy planning

This of course does not mean that win-win solutions that benefit both businesses and provide consumer welfare are impossible. Retailers may promote green products, low-fat diets and customised nutritional advice that benefit both their customers and generate profits for the business. It does mean, however, that one must remain careful about business' interest to engage in nudging (maybe even on behalf of the government). Nevertheless, governments can harness the power of private business to nudge certain behaviours through regulatory means or financial incentives. For example, businesses can be required by the government to nudge people's behaviour in certain direction by designing choice architectures in specific ways, e.g. by offering defaults in pension plans or health insurances.

Other actors, e.g. NGOs, may and do apply nudges in order to influence people's behaviour for their own good, e.g. (Duflo et al. 2011).

2.5 Philosophy of libertarian paternalism

The nudge concept builds on the notion of "libertarian paternalism" (Sunstein and Thaler 2003) – a policy approach that preserves freedom of choice (i.e. libertarianism), but encourages the public sector to steer people in directions

that will promote their own welfare (i.e. paternalism). People are allowed to make choices, but the choice architecture is designed to promote the desired behaviour.

So is there a legitimate role for the government in seeking to change people's behaviour? In principle it is accepted in society that a government develops and pursues policies that benefit the society at large and its people. Thus, governments provide conditions in which individuals can maximise their utility, but also shape institutions and infrastructures that enable and make it easy for individuals to realise individual benefits. While some policy interventions are of a more generic nature, such as sustainability or climate change, others aim to assist people in avoiding certain individual problems, such as obesity, alcohol consumption or smoking. Such private matters are of concern for the government since unhealthy lifestyles result in increasing public spending on healthcare services and therefore the government has legitimacy and in fact a responsibility to promote healthy lifestyles. Following similar argument, individual actions, such as driving, may have adverse aggregate impacts on the society and could therefore be targeted by the government.

Libertarian paternalism has been defined as *"…a relatively weak, soft and nonintrusive type of paternalism because choices are not blocked, fenced off, or significantly burdened [...] better governance requires less in the way of government coercion and constraint, and more in the way of freedom to choose. If incentives and nudges replace requirements and bans, government will be both smaller and more modest"* (Thaler and Sunstein 2008: 5 & 14). Successfully deploying the philosophy of 'libertarian paternalism' can be understood as a means to avoid more authoritarian forms of paternalism (Reisch & Oehler 2009).

There is an ongoing discussion regarding the ethics of libertarian paternalism, with specifically two issues being heavily debated: the intrusiveness of governmental rule in people' lives and the transparency of nudge tools undertaken. Nudging as an idea emerged in the USA, a country that historically builds on a profoundly different approach to the freedom to choose vs. protection from bad choices compared to the tradition in many European countries, including Sweden, see (Frerichs 2011). As a consequence, while for the American audience nudging means more paternalism in societal and market liberalism, for Sweden in many cases it may mean more liberalism in state paternalism. This must be kept in mind when one discusses nudging in specific social contexts. It can be assumed, for example, that nudging is promoted as desirable from an American perspective where more stringent interventions in individual choice are politically unacceptable. However, an even better solution might be identified in a regulatory intervention, which – even though impossible to implement in the USA – might be fully possible in Sweden, see (Cronqvist and Thaler 2004).

The transparency of nudge tools is discussed because nudges influence non-deliberative, automatic and intuitive processes of thinking and making choices through mechanisms of which people might not be aware (House

of Lords 2011). Governments may face different levels of public acceptance depending on whether they take a paternalistic approach in terms of the means (policy tools and measures) or the ends (goals of intervention). For example, even if a government is justified in taking measures to address a certain problem (i.e., the ends are accepted), the measures (the means) themselves might not be accepted by the public as ethically justifiable due to the degree of intrusion into everyday life or due to the extent to which the measure is non-transparent or even concealed. There is an opinion that the most intrusive interventions need to be justified most vigorously and be used with utter care as they may limit or edit out choice (House of Lords 2011).

Therefore interventions need to be proportionate to the gravity of the behaviour and its impacts they are trying to change. However there is no solid method for how to weigh the proportionality. The British government for example has focused on interventions that enable and encourage a certain choice rather than restrict it. Indeed, some researchers advocate the government to use nudge when it is used as "facilitator", i.e. making behaviour and choices easier, and much less when it is used as "friction", e.g. making choices or behaviour more difficult or limiting the choices (Calo 2014). They argument this position by the fact that nudging when used by the government lacks the usual safeguards that accompany law making.

Therefore, the issue of transparency of nudge instruments becomes critical. Nudge has been accused of being manipulative and some authors warn against the real risk of the government abusing the power of nudge (Hausman and Welch 2010). It is discussed that it is in the interest of the government to initiate an open societal dialogue in a true democratic manner about the use of nudge instruments for pro-social and other purposes. It is said to be important that nudged consumers know the types of interventions that are being applied and that they are capable of identifying them if they would like to.

3 Nudge toolkit

Nudge is a collective term for different policy tools that policy makers can use in order to influence individuals' behaviour. Table 3 categorises various policy tools, including nudging, based on how they influence the choice of individuals.

Table 3 Policy tools to influence individual behaviour based on (House of Lords 2011)

Regulation of the individual	**Fiscal measures directed at the individual**		**Non-regulatory and non-fiscal measures with relation to the individual**				
Eliminate and restrict choice	*Guide and enable choice*						
	Incentives and information			Nudging			
Laws and regulations	Fiscal incentives	Non-fiscal incentives	Provision of information	Simplification and framing of information	Changes to physical environment	Changes to the default policy	Use of social norms

The most intrusive to individual freedom tools – laws and regulations – are found on the left of the table. Then follow fiscal tools (e.g. taxes, subsidies) that provide economic (dis-)incentives to individuals. The third group of interventions comprise tools that are non-regulatory and non-fiscal. Among those are non-regulatory and non-fiscal incentives, and information provision to enable consumers make informed choices.

Finally come four types of policy instruments that together constitute 'nudging'. Unlike the aforementioned instruments that mostly draw on the neoclassical economics idea of the 'rational man', nudging instruments rely on a more nuanced picture of behaviour offered by such behavioural sciences as cognitive and social psychology and sociology, based on which changes in behavioural architecture and context are made, that influence behaviour. Nudging comprises four types of tools: 1) simplification and framing of information, 2) changes to the physical environment, 3) changes to the default policy, and 4) the use of social norms.

3.1 Simplification and framing of information

Nudging builds on the insight that not only the amount or the accessibility of information provided to people matters,[6] but also how this information is presented. The complexity of information affects greatly the outcomes of decisions people are making. Simplifying information and understanding in which context it is presented (e.g. what comes before and after the information) may drastically change people choices. John et al. (2013: 9) state that "*[n]udge*

[6] Both of which are central to 'economics of information' literature

is about giving information and social cues so as to help people do positive things for themselves and society". Simplification means that information is made more straightforward and presented in a way that fits best to the information processing capabilities and decision-making processes of the individual.[7] Simplification is especially of value in complex products or services, e.g. financial or investment decisions, when people often struggle to make benign choices even in the most simplified of the environments.

The framing of an issue is also important. Framing is the conscious phrasing of information in a way that activates certain values and attitudes of individuals. *"Framing essentially involves selection and salience. To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described"* (Entman 1993). Often, simplification and framing happen simultaneously.

An example for how framing of choice influences both behavior and even experience is reported by Wansink et al. (Wansink et al. 2001). They studied the effect of renaming menu items in a school cafeteria. They called the most popular food items either plainly informative (e.g. 'Zucchini Cookies') or descriptive (e.g. 'Grandma's Zucchini Cookies') and found that descriptive labels increased sales by 27%. They also found that the use of descriptive labels increased post-trial perception of quality and value of the product and that descriptive labels increased customers' intention to return to the cafeteria.

Another typical example of information simplification and framing is food labelling. It often focuses on health and environmental aspects of food and is designed to help make choices to counteract lifestyle-related health problems, e.g. obesity, diabetes, etc. (Rothman et al. 2006). Further changes in food packaging are discussed with one popular suggestion being a 'traffic light system' of information provision intended to frame the consumer decision in line with learned-in reactions to traffic lights (i.e. red is bad, green is good), e.g. (Sacks et al. 2009).

Another example is re-framing of a message that encourages purchase of food products that are close to best-before date to avoid food losses. The largest Swedish food retailer ICA has noticed that consumers interpreted the red price reduction sticker on such food items was associated with low quality and potential health hazard. ICA Maxi Södertälje tested to put instead a green sticker and to change the text from "Lower price" to "Lower price – eat soon. This product is approaching expiration date but is still fresh. Buy it and you will save the environment and money". The retailer judges the outcome as positive and the initiative has spread to other stores within ICA (Chkanikova and Lehner 2014).

[7] For an extensive summary of tools to simplify and customise information see Johnson et al. 2012

The EU's mandatory labelling scheme for electrical appliances can also be seen as an example of information simplification. Introduced in 1995, the EU regulates how the information regarding energy consumption of electrical appliances is to be presented (Ölander and Thøgersen 2014). The label makes considerations about energy efficiency more salient for consumers at the point of purchase.

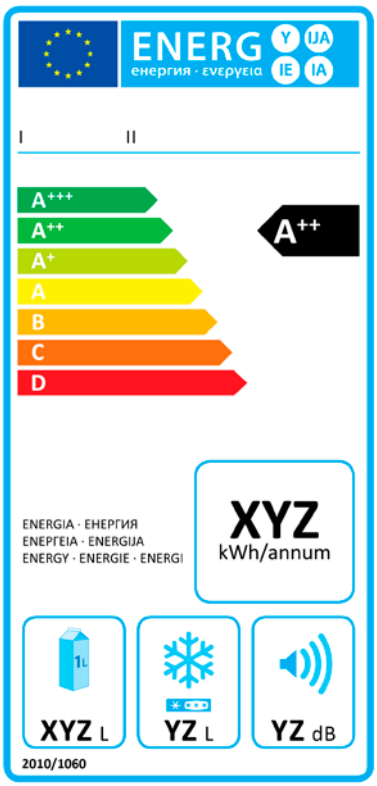


Figure 2 EU Energy label for refrigerator.[8]

Thaler and Sunstein (2008) suggest that labels could be even more useful if they translated energy or fuel use into cost per annum (compare the EU and the U.S. labels below).

Another way to simplify and frame information is through feedback. Thaler and Sunstein (2008) stress that it is often important to provide immediate feedback to people about the mistakes and ways to avoid them in order to make information effective. Timely and effective feedback can enable people to realise implications of their actions. For example, installing an energy use measuring device could provide feedback on how efficient various energy-using devices are. The energy metering device could be equipped with light and sound function to warn people about peak hours or when their electricity consumption is increasing so that they could take measures to reduce it and avoid unnecessary costs. Another good example comes from Malmö's waste management company Sysav that provides monthly newsletter to inhabitants where information is presented about different waste streams from households and on the results of food waste sorting in the previous month, linking the kilograms of collected sorted food waste to the amount of biogas produced from it and to the number of Malmö busses that run on that biogas. This newsletter does more than just providing information: it links the actions of individuals to the common good in the local context that people can relate to; it makes people feel that they belong to the social group of people who are separating food waste; and it highlights the reward to everybody from sorting out food waste as the public busses run on clean fuel and thus environmental pollution in the city is reduced.

[8] Source: http://www.energimyndigheten.se/Global/Hush%c3%a5ll/Energim%c3%a4rkning/Kyl_och_frys.tif

3.2 Changes to physical environment

The physical environment has long been acknowledged to have significant impact on individuals' choices. Especially in low involvement decision-making situations individuals are likely to allow the physical environment to influence their choices, as for example in the retail store where people make daily purchases. For example, Nordfält (2007) describes how consumers are guided through the retail store to increase the total volume or number of items bought or to maximise the procurement of some goods over the others. Have you noticed that milk – one of the most often purchased food products – is situated furtherst away from the entrance, making people to go through the entire store and perhaps pick up items on the way that might not be on their purchasing list. Another way to nudge people into buying certain products is by careful selection of their place on shelves – most sold products are situated at the eye level. Also products that are situated closest to cashier are the ones that are often sold. So if a store places fruits close to cashier then people will buy more fruits than if sweets are placed there and visa versa (Goldberg and Gunasti 2007). Nordfält (2007) also discusses the impact of smell and sound in the retail environment. Both appear to have an impact on the emotional state of human beings, and thereby influence shopping choices.

Numerous studies have also been conducted on the impact of the design of the eating environment, e.g. canteens and restaurants. Thaler and Sunstein (2008) describe the impact of placing meals in different order or of positioning healthy foods at the eye height. Even some environmental factors have impact on the amount and type of food consumed. For example, plate size has continuously increased in recent history (Wansink and Wansink 2010), and has been linked to increasing levels of obesity. It has been shown that reduced plate size in all-you-can-eat environments (Freedman and Brochado 2010) and reduced portion size (Rolls et al. 2002) both reduce total energy intake and food waste. A similar study of reducing plate size from 24 to 21 cm among guests of 90 Nordic Choice Hotels found that, on average, food waste was reduced by 15% (Kallbekken and Sælen 2013).

Figure 3 Reduced plate size led to less food waste. Photo:A-Lundström

Many studies are available on the role of the physical setup of the recycling system for the success of recycling efforts. Specifically the availability of recycling facilities, their attractive design, clear guidance and convenience for users have been identified as success factors (Oskamp et al. 1996; John et al. 2013; Park and Berry 2013).

In a recent study, Pucher and Buehler (2008) try to understand the most significant factors behind an increase in cycling as means of transport in Denmark, Germany and the Netherlands. They conclude that the most important policies to increase the share of cycling in total transport is related to changes to the physical environment. They suggest that the most important policies are the provision of separate cycling facilities along heavily travelled roads and intersections, traffic calming efforts in residential neighborhoods, the provision of sufficient parking space for bikes, the integration of biking with public transport and – more general – urban planning that focuses on density and the prevention of city sprawling.

3.3 Changes to the default policy

People often take the path of least resistence, prefer not to act unless they have to and procrastinate. Therefore they are greatly influenced by defaults, which determine the result in case people take no action. For example, a single-sided print option is unfortunately a default which contributes to much higher volumes of paper than if default would have been double-sided copy. A Swedish study demonstrates that 30% of paper consumption is determined by the default and that by switching the default options paper consumption could be reduced by 15% (Egebark and Ekström 2013).

The importance and effectiveness of the default option is often illustrated by the example of organ donation programs. In countries where the default option is to be enrolled in an organ donation program (i.e. where consent is presumed – the countries on the right in Figure 4), participation is significantly higher than in countries where a person must actively choose to opt into enrolling (i.e. give explicit consent – the countries on the left in the figure below) (Johnson and Goldstein 2003).

Thaler and Sunstein (2008, p. 117) describe the case of pension saving decisions. They claim that across the world individuals fail to sufficiently save for their retirement and to take advantage of various government-supported schemes that are economically beneficial. They therefore suggest to make enrolment of individuals into pension saving plans a default option with the possibility to opt out of it.

Cronqvist and Thaler (2004) studied the design and results of the privatisation of the Swedish pension savings system in which people were encouraged to choose their pension plan. If for some reason they failed to do so, there was a default option defined for them. The experience was that those who did not actively choose the pension plan generally were better off than those who chose. The authors came to the conclusion that often the best outcome for

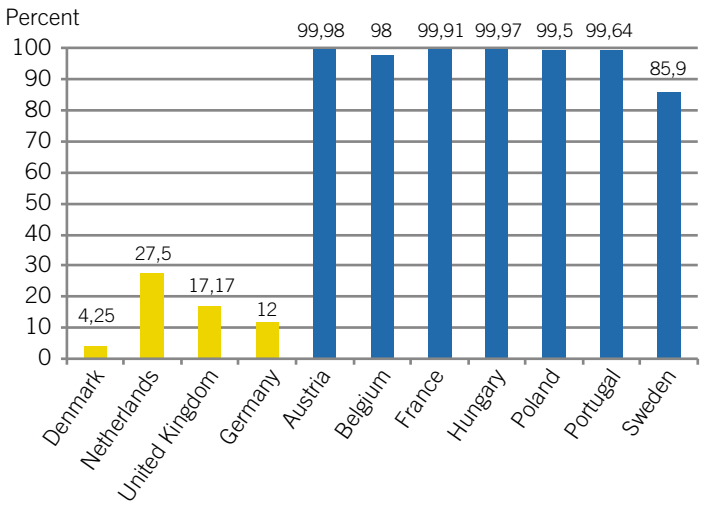


Figure 4 Effective concent rates, by country. Explicit concent (opt-in, gold) and presumed concent (opt-out, blue) (Johnson and Goldstein 2003)

most individuals is offered by a good default option, from which individuals can opt out and choose their own plan. They also recommend that default choices should be very limited and simplified in order for individuals to be able to make an informed decision and to restrict the ability for marketers to influence this choice. This is particularly true for complex choices such as choosing an ideal fund composition for retirement saving as most individuals are inexperienced and relatively illiterate when it comes to financial markets and investment options.

Default options play a great role also in market interactions and marketers often exploit human tendency to accept default options. For example, online shopping is full of defaults that make people subscribe to additional services, purchase products they were not intended to buy or choose automatic prolongation of subscriptions of various kinds, which sometimes results in suboptimal for the individuals outcomes, e.g. financial. Therefore Thaler and Sunstein argue that it makes sense for policy makers not to leave the design of default choices to chance or to actors with private interests, e.g. marketers, but to instead make the design of default choices an active aspect of policy design, see also (John et al. 2013).

Indeed, in the latest Consumer Rights Directive the EU has banned online retailers from using pre-ticked boxes (e.g. for travel insurance in air travel) in their choice and payment process (Lunn 2014).

3.4 Use of social norms

Since humans are social beings, social norms are a strong force that influences human behaviour. Cialdini et al. (1990) talk about two ways in which social norms affect the individual, 1) as injunctive norms, and 2) as descriptive norms. The injunctive norms act upon the individual as a moral implication,

i.e. what ought to be done and what ought not to be done. The descriptive norms refer to the simple observation of how everyone or most others behave (thus the "normal" way to do something), which is replicated by the individual who might be unsure about how best to act in a certain situation.

For the norm to make an impact on behaviour, it has to be salient – visible – for the individual (Cialdini and Goldstein 2004). Cialdini et al. (1990) also showed that when individuals are reminded of a certain norm the chance that they follow this norm increases significantly. Cialdini et al. (1990) explain that individuals often carry several norms for one and the same situation. They derive these different norms from different social/cultural environments they are familiar with, or from different aspects of one's self-identity. In any given choice situation whatever norm is most present in the individual's mind (i.e. most salient), will have the greatest impact on the behavioural outcomes. Salience as a nudge factor can also be connected to framing, the conscious phrasing of information in a way that triggers certain values and attitudes and therefore increases the likelihood that a choice follows one set of norms and not another (see above). An example of the effect of salience on consumption was reported in a study that measured fruit consumption in two schools (Schwartz 2007). In the first school cafeteria employees asked pupils "Would you like fruit or juice to your lunch?", while in the second school no such verbal prompt was provided. The intervention resulted in 70% of the children consuming a fruit at lunch in the first school compared to less than 40% in the control school.

In another study, Goldstein et al. (2008) use the power of descriptive norms to change the reuse rates of towels among hotel guests. They placed the text "the majority of guests reuse their towels" in bathrooms and this produced significantly better reuse results than information solely focused on environmental protection. In another experiment – a real life observation – a utility company in the USA has achieved energy savings between 1.4% and 3.3% by mailing Home Energy Report letters to customers in which they compare the customer's energy use with that of similar neighbours and provide energy conservation tips along the information that they are performing worse, as good as or better than their neighbours (Allcott 2011: 1082).

Social norms play a role also in other areas, e.g. studies found that neighbours' recycling rates influence each other. John et al. (2013) point out that this effect is most explicit in areas with high attachment of the individuals to the neighbourhood, with a strong community spirit and with high peer pressure. John et al. (2013, p. 45) explain: *"most people underestimate the extent of pro-social behaviour among their peers and then use those low estimates as a standard against to judge themselves"*. The study built on this insight and conducted an experiment in which they provided people with feedback about their street's food waste recycling performance compared to other streets in the area and a 'smiley face' or an 'unhappy face' depending on whether their streets' performance was better or worse than average. This intervention produced a 3% increase in food waste recycling compared to a control group.

4 Nudge: SWOT

4.1 Strengths of nudging

The recent surge of interest in nudging is due to several strengths that make it attractive to policy makers.

The most obvious strength of nudging is its compatibility with ideals of the free market. In an age when ideological preference for free markets and the increasing impact of globalisation on nation states limits policy makers' ability to regulate and tax in order to influence individuals' behaviour, nudging is a practical and more acceptable approach for politicians to try to solve pressing social and individual problems, e.g. (Thaler and Sunstein 2008).

Second, insights from psychology and behavioural economics on which nudging builds help policy makers to relate complex policy making processes and goals to individuals' daily decision-making. Unlike in classical economic theory, the understanding of human behaviour at the basis of nudge is derived from empirical evidence rather than abstract theoretical models (Oullier et al. 2010). Nudging requires and enables policy makers to take into account human behaviour in design and implementation of policies.

For the citizen nudging offers two advantages, 1) guidance in difficult decision-making processes, and 2) the possibility to reject choices where they are contrary to the individual's preference or advantage. The first refers to the limited rationality idea of human decision-making. While humans might want to make good decisions for themselves, the cognitive limitations of the human mind often make it difficult for the individual to make an informed choice. The opportunity to rely on nudges designed by a well-meaning party, i.e. democratically legitimised policy makers with one's best interests in mind, therefore might mean a relief to many individuals in certain situations (Iyengar and Lepper 2000). Nudging therefore works particularly well where there are immediate or at least short-term benefits for the individual, which make advantages of nudge evident to the individual. At the same time, for any choice some individuals are better equipped to make decisions than the average citizen or a well-meaning third party and are thus more capable of making decisions that is in their best interest. It is beneficial that in such situations nudging does not impose a choice restriction upon the well-informed individuals as it enables them to choose differently than intended by the choice architect.

The fact that individuals can opt out of the nudge also provides a safety valve for occasions where the 'well-meaning policy maker' makes decisions based on other interests than the individual's (Cooper and Kovacic 2012). This increases the chance for policy makers to positively influence the majority of individuals while leaving a minority with the freedom to choose differently. Nudge can furthermore allow people to test certain behaviour, which could then be followed by changes in people attitudes, and thus it can be a potential "gate opener" for stronger policy making (i.e. the introduction of fiscal and regulatory policies; see Figure 10 – Ladder of interventions).

4.2 Weaknesses of nudging

Nudging as a behaviour influence tool also has a number of weaknesses.

One of the main weaknesses is the difficulty to design a policy intervention right and make sure that what works in a laboratory or intervention environment (as often used in scientific studies) also has the desired effect on a population level. The problem is that there is a lack of evidence at a population level since few applied research studies have had resources to work with an entire population as a sample. There is also a lack of evidence on cost effectiveness and long-term impact of many experimental studies (House of Lords 2011: 18–19). In addition, devising a choice architecture that successfully translates results from lab environment to the level of population is time consuming undertaking. The initial impact of nudging is therefore often small (Olstad et al. 2014) and the choice architecture often has to be repeatedly adjusted in a *trial-and-error* process before it satisfactorily achieves the desired outcome (Kopelman 2011).

Another weakness with nudging is that humans, as reflective and self-reflective beings, adjust and change their behaviour based on changes in their environment. It is therefore difficult to be sure what different individuals (or groups of individuals) make out of one and the same nudge (Marteau et al. 2011; Johnson et al. 2012). To be successful, nudging requires a high level of understanding of the context of an individual's decision-making process (Olstad 2014). What might prove successful with one group of individuals and at one point in time might loose its effectiveness over time. Wansink and Chandon (2006), for example, found that 'low fat' nutrition labels lead consumers – in particular overweight consumers – to overeat snacks. Ohlstad (2014) therefore argues that nudging might be too subtle a technique to counter the powerful impacts of other factors.

An additional problem for policy makers is that a nudge's full potential might be capitalised on after a certain adaptation period. Allcott and Rogers (2014) describe an energy saving program in which the Californian utility 'Opower' uses energy reports to inform each individual customer about their energy use and how their consumption compares to others. While the initial effect of such reports is short-lived and fades soon after the report was received, the effect becomes more long-lived over time. Allcott and Rogers find that after such reports are received for two years, the effect remains strong for a long time, with a rate of decay of 10–20% per year after individuals stop receiving the reports.

To increase the success of nudging, Marteau et al. (2011, p. 264) argue that nudging must be designed to take into account existing knowledge on what works, for which group of people, in what circumstances, and for how long one can expect results. To answer these questions for a large group of heterogeneous individuals requires considerable resources and bears the risk for policy makers to have to engage in sophisticated micro-management of markets and society, with increasing risks for unintended side-effects or simply for ineffective policies. It has, for example, been shown that energy saving

nudges that work well with liberals in the USA, do not work with conservatives (and might even have adverse effects) (Costa and Kahn 2010).

The complexity of implementing nudges at a societal scale has led some authors to raise doubts about the potential of nudging to also contribute to solving large societal problems, such as climate change, e.g. (Schlag 2010; Goodwin 2012). Goodwin (2012, p. 86) writes *"… nudging alone is not an effective strategy for changing behaviour on the kind of scale needed to solve society's major ills"*.

Finally, nudging has been criticised for placing too much focus on the System 1 type of thinking – fast and automatic, while leaving the interaction with System 2 unaddressed (Stoker 2012). This criticism is especially relevant in consumption context since it has been suggested that long-term changes in society towards pro-sustainable values require deliberative processes, societal debates and conscious choices to be combined with automatic, intuitive and routinised behaviours. It is considered unlikely that sustainability can be sneaked in into everyday lives of people; it is more likely that we need people to both think pro-sustainably and act pro-sustainably with the help of nudges (John et al. 2013), but not rely on nudges alone.

4.3 Opportunities of nudging

Even though the complicated nature of human behaviour makes it difficult and time consuming to implement successful nudge policies, a long-term strategy for nudging can have significant impact. Allcott and Rogers (2012, p. 32) claim that persistence in nudging can lead to cost effective achievements that go beyond policy makers' expectations.

It has been argued that modern Information and Communication Technologies (ICT) will increase the effectiveness of nudging and make it easier to customise nudging efforts to individuals. Baum (2011) reports on already enfolding efforts by private business to support individuals in living a healthy lifestyle. Baum identifies the smartphone – the ubiquitous and highly personalised device – as important in this process. Most recently companies have further started to develop the product category of 'wearable devices' (e.g. smart watches). All these devices include an ever-increasing number of sensors and sophisticated software, able to track, store and process data for analysis. Baum (2011) argues that the general public increasingly accepts such devices and the increasing familiarity with their functionality will increase their usefulness and sophistication. These devices offer a good platform for nudging not only because they are capable of providing real-time information in user-friendly ways, but also because the software often incorporates a social component, e.g. offering the possibility to share and compare individual data with one's peer network or the overall user base. Baum (2011) describes ICT as empowering to users to take responsibility for their own health.

Lanzarone and Zanzi (2010) further argue for the usefulness of ICT to encourage more resource efficient behaviour in private households.

They describe the spreading of smart meters, combined with homepages displaying the collected information as a system that makes it easier for individuals to save, e.g. gas and water. They use an Italian example (the MICE project implemented by the energy provider ENEL) to describe how nudging can be easily implemented in such applications. The homepage of this project offers consumers simplified information about their use (hourly consumption data, graphical presentation of the data), the possibility to compare their consumption with other consumers in the same client class, and a self-evaluating questionnaire including suggestions about more efficient behaviour. The user interface thus applies several nudge principles to influence consumer behaviour.

The usefulness of ICT to nudging individuals is obvious in many fields, such as grocery shopping (e.g. the USA-based 'GoodGuide' mobile phone app), food waste (e.g. the UK-based 'Love Food, Hate Waste' mobile phone app), transportation (various ride sharing apps), or clothes sharing (e.g. the start-up 'Share Closet').

It should be mentioned that nudging can be used as a direct policy tool, with policy makers engaging in changing the choice architecture of individuals. However, nudging can also be used indirectly by policy makers who may create legal framework that will encourage other actors (such as businesses, NGOs, civil society organisations, churches) to use nudges to direct individuals in the desired behavioural direction. Such actors are more likely to naturally engage in nudging, as they have little or no ability to force certain behaviour upon individuals as governments have. They usually represent service sectors of society, which allows them design nudges customised for special groups rather than society as a whole.

4.4 Threats of nudging

Nudging has received criticism from law scholars for its potential danger to the democratic processes at the basis of Western societies. Marteau et al. (2011), for example, identify a danger in the implicit tendency to manipulate people (or at least hold back information). Hansen and Jespersen (2013) try to overcome this critique by distinguishing between transparent and non-transparent nudges, of which only the first is deemed acceptable. However, nudging often works best when individuals are not consciously aware of being nudged. Where nudging happens on a conscious level – particularly where it opposes personal behavioural intentions – the effect of changes in choice architecture can be greatly reduced, see e.g. (Bronchetti et al. 2011; Ölander and Thøgersen 2014).

Felsen (2013) further suggests that the subconscious approach to behaviour change applied in nudging might lead to a backlash in citizens' perception of governmental efforts to change their behaviour and alleniate individuals from a public behaviour change agenda, as they might perceive this approach as manipulative and an infringement on personal autonomy.

Nudging can also be understood as unfair. Especially where nudging is applied by policy makers to achieve common goods (e.g. climate change mitigation), there is a risk that these policies will allow a minority of well-informed citizens to free-ride the efforts of the majority. Sunstein and Reisch (2013) claim that nudging often works best on the uninformed and uneducated part of society. It is democratically worrying to use nudging to influence the behaviour of those not able to identify a nudge, while allowing those that are able to identify it (and thus avoid it) can subcumb the costs while benefiting from the gains (Goodwin 2012).

Connected to the above, there is a risk in that policy makers regard nudging as an easy and comfortable way out of cumbersome and controversial attempts to implement regulation and legislation (Bonell et al. 2011). Schlag (2010) argues that the focus on preserving freedom of choice instead of adjusting the choice architecture might undermine the use of more effective, but choice-restricting policies. Discussing climate change, he claims that freedom of choice often is not the primary goal to strive for; instead a reduction in total emissions (to safeguard humankind's future) must be the ultimate goal, regardless of how this influences the freedom of choice of the individual.

5 Nudge: how the work is organised in various countries

5.1 USA

In the USA, nudging was institutionalised at the Office of Regulatory Affairs (OIRA) at the White House (Lunn 2014). OIRA develops and oversees the implementation of government-wide policies in several areas and reviews draft regulations. Cass Sunstein, co-author of Nudge, was head of this office from 2009–2012. During this time, behavioural economics was used to introduce better testing of old regulation and monitoring systems for new regulations. Examples of regulatory reforms in the USA that have drawn on behavioural economics are credit card regulations and Obama's Affordable Care Act (which both require disclosure and simplification of information to consumers), as well as an initiative called MyData which helps citizens use their digitally stored personal data to obtain more appropriate services to their specific needs (Lunn 2014). Sunstein (2011) has published detailed guidelines of how behavioural economics and evidence-based policy making are to be used in making government more effective.

Many of these initiatives aimed to adapt existing policies taking into account the idea of "framing" of information: for example, the nutritional recommendations' "food pyramid" was revised into a "food plate". According to Lunn (2014), one of the debates in which nudge has featured heavily is New York City's proposal to ban large sizes of soft drinks. The example presented earlier of energy labelling for appliances in the U.S. with framing in terms of costs is also employed for fuel efficiency labels on vehicles (presented in detail in section 6.3.1).

Cass Sunstein resigned in 2012 from OIRA. He subsequently published a book on the challenges of simplifying government and making it more effective using insights from behavioural economics (Sunstein 2013). The White House's efforts to promote the use of nudges as a new tool for government has provoked significant controversy, which is partly due to the adversarial political climate in federal politics in the USA, see (Hansen and Jespersen 2013). Perhaps "nudge" has been an easy target, since it has been often misrepresented as an effort to extend the reach of government wider and deeper into the lives of Americans. On the other hand, proponents have countered such criticism by presenting behavioural insights as offering a tool for making government more cost effective and reducing unnecessary and costly bureaucracy.

Nonetheless, in summer 2013, the White House appointed a 4–5 person "behavioural insights" team at the Office of Science and Technology Policy (OSTP). The team aims to enhance federal agencies' capacity to apply behavioural insights, create and provide resources for the agencies, and convene a "multi-agency community of practice" to identify and share promising practices and common challenges (OSTP 2013). This new federal team is inspired in part by the Behavioural Insights Team in the UK (see below).

5.2 UK

In the UK, nudge was firmly institutionalised when establishing the Behavioural Insights Team (UK BIT) at the UK Cabinet Office in 2010. This team was tasked to work as a kind of in-house consultancy developing interventions collaboratively with government departments, agencies and the private sector. It has contributed to policy development especially in public health, consumer policy, sustainability and enhanced compliance with tax and fine collection (Lunn 2014).

In February 2014, the team was 'spun out' of government and set up as a social purpose company working in co-operation with Nesta, a trust-based charity (formerly government-funded) that promotes innovation. A third of the shares will be owned by the staff, a third by Nesta and a third by the government. The UK BIT team still works primarily for the Cabinet Office and the health and energy departments, but also for other clients including foreign governments, municipalities, NGOs, private sector partners and international organisations. The use of behavioural insights is voluntary for UK government departments, and there are some concerns that the influence of the UK BIT in policy design might decline since they were divested from the Cabinet Office (Johnston 2014).

The UK BIT team has a staff of 16 people, with backgrounds in academia (behavioural sciences and experimental methodology), policy making and marketing. It is responsible for developing and testing interventions that support better choices, advancing and applying behavioural science in public policy and promoting evidence-based policy and evaluation.

There are several examples of improved policy implementation based on the nudge principles in the UK (Lunn 2014). These include improved fine collection by making it more convenient to pay fines and sending more personalised reminders. The UK BIT also organised trials that led to improved take-up of insulation measures, again by increasing the convenience of participation in the insulation programme. As concerns sustainable consumption, the UK BIT has been particularly involved in promoting sustainable behaviour change in residential energy investments and habitual energy behaviour (UK Cabinet Office 2011). Examples of projects in this field include input into the planning of the Green New Deal, a scheme for financing energy renovations, improvements to the Energy Performance Certificate design, trials with energy consumption feedback formats, as well as dedicated trials to improve loft insulation takeup by reducing hassle for homeowners to clear out loft, as well as a peer-to-peer marketing project to spread interest in loft cavity insulation (UK Cabinet Office 2011).

The work of the UK BIT team is based on a range of behavioural science findings utilised in designing and testing better policy interventions (Harford 2014; Service et al. 2014). In consumption-relevant domains, the interventions are fairly similar to earlier interventions in the UK that used sophisticated social marketing approach, see e.g. (Futerra 2007). Much of that work have

been systematised in the report MINDSPACE,[9] which outlines nine principles for behaviour change promotion by government (Institute for Government and Office; 2011). The key point is the systematic involvement of behavioural experts in policy design and the testing of alternative solutions for delivering the policy with the use of randomised control trials. The focus of the UK BIT team has been very much on policy implementation, e.g. improving the collection rate of fines and taxes, making it easier for the unemployed to apply for a new job, or increasing the rate of people enrolled as organ donors (Service et al. 2014).

5.3 EU

Behavioural insights have been applied in EU consumer policy since 2009 (van Bavel et al. 2013). The Consumer Rights Directive was the first EU legal text to recognise the power of default options by limiting the use of pre-checked boxes in standard contracts (for example, for the inclusion of extra services in hotel or travel packages). Behavioural insights have also been cited in connection with the high-profile competition case against Microsoft, as a result of which consumers must be allowed an active choice of which browser to use with Microsoft Windows (van Bavel et al. 2013; Lunn 2014). DG SANCO has continued to be the most active administration in using and promoting the use of behavioural insights.

In 2010, the DG SANCO ran the first large behavioural study to find out how consumers search for information and choose between retail investment products (Coggi 2012). Through a series of online and face-to-face experiments, DG SANCO found that consumers struggle to make good investment choices; only 2% of the subjects made all five of the tested investment choices optimally. The results of the study suggested that standardisation and simpler product information are needed. The Commission used the results of the study to review the legislation on packaged retail investment products.

Since other directorates were also interested, DG SANCO established a Frame-work Contract for the Provision of Behavioural Studies, open to all Commission services and requested scientific assistance from the Joint Research Centre. This collaboration has led to numerous studies and experiments on e.g. retail investment funds, travel packages, tobacco labelling, CO_2 labelling for cars and energy labelling (van Bavel et al. 2013; Lunn 2014).

In EU policy making, the use of behavioural insights has been promoted via information provision and advice to various directorates of the European

[9] MINDSPACE is a mnemonic for these principles, which are Messenger (we are heavily influenced by who communicates information), Incentives (responses to incentives are shaped by predictable mental shortcuts such as loss aversion), Norms (we are strongly influenced by what others do), Defaults (we "go with the flow" of pre-set options), Salience (our attention is drawn to what is novel and seems relevant to us), Priming (our acts are often influenced by sub-conscious cues), Affect (our emotional associations can powerfully shape our actions), Commitments (we seek to be consistent with our public promises), and Ego (we act in ways that make us feel better about ourselves).

Commission. For example, JRC report by van Bavel et al. (2013) offers advice on how to apply behavioural science in policy making in the European Commission (described in section 7.1).

Some academics have argued that behavioural insights should be included in a more formal way in European regulatory developement, rather than the current voluntary procedure, for example by introducing a mandatory behavioural test into its regulatory impact assessment system (Alemanno 2012). This has not yet been implemented in the European Commission. However, more collaboration among scientists and policy makers across Europe is to be expected in the future. The Euro-science Open Forum (European Science Foundation) is hosting its conference in June 21–26. One of the satellite events aims to establish a European Nudge Network, i.e., platform for accelerating information dissemination and collaboration on the use of nudge across Europe.

5.4 Denmark

Instead of establishing a governmental unit, Denmark has an active organisation outside the government supporting the use of nudges in policy making. iNudgeYou[10] is a non-profit organisation with the explicit mission to test and facilitate the use of behaviour changing tools in practice in various spheres of life (Lunn 2014).

The organisation grew out of an initiative by the Initiative for Science, Society & Policy (ISSP) at Roskilde University and the University of Southern Denmark. One example of the iNudgeYou team's contributions is a project for the City of Copenhagen to reduce littering. Experiments showed a 46% reduction in street-litter by applying green footprints on the streets leading to waste bins, which served to make litter more salient and to activate social norms. iNugeYou also initiated and helped draft a suggestion for prompted choice for organ donation to be put before Danish parliament. They have adviced several Danish authorities, including The Danish Business Authority, The Danish Competition and Consumer Authority, Danish Environmental Protection Agency, and The Danish Energy Agency.

INudgeYou has also set up the 'Danish Nudging Network' (DNN) which aims to establish a network of researchers, practitioners, stakeholders and policy makers interested in the use of behavioural science, and also organises workshops and courses on promoting the use of behavioural science in policy making (INudgeYou 2014).

The organisations runs a successful blog where latest news on nudging are shared and the results of projects run by INudgeYou are presented.

[10] http://www.inudgeyou.com/

5.5 Norway

Similarly to Denmark, Norway has an independent organisation promoting and supporting the use of nudges, GreeNudge[11]. GreeNudge has an explicit focus on sustainability and aims to initiate, fund and promote research into behavioural change as a means to mitigate climate change. Examples of projects include investigation of the rebound effect of heat pumps, the reduction of food waste in cafeterias, and an experiment to promote the sales of energy saving appliances by adding information about total life cycle costs to the energy label (Kallbekken et al. 2013).

GreeNudge (2013) has produced a report on the potential for nudging in Norway's climate policy. It presents nudging as an attractive policy instrument for climate policy because it does not entail coercion and thus reduces potential resistance. Compared to other climate policy instruments, it entails low risk, especially since measures are tested before implementation. Behavioural interventions are argued to be relatively quick and simple to implement and cost effective. As an example, the food waste reduction project delivered savings of 25 000 NOK per ton of CO_2 mitigated. The report also emphasises the potential to combine climate policy measures with health benefits.

GreenNudge has also co-operated with a climate programme among the 13 largest towns in Norway (Fremtidens Byer). In spring 2014, the municipal council of Lillehammer decided to establish a dedicated committee on nudge, focusing on climate change mitigation, cost effective government and health promotion. The committee will first study the potential for nudges, design measures and seek project funding. The project will be implemented together with Høgskolen i Lillehammer, which is starting the first Master's programme in applied environmental psychology in the Nordic countries (GreeNudge 2014).

[11] http://www.greenudge.no/

6 Nudge in various consumption-relevant domains

In the previous sections, many examples of nudging came from financial or health domains. The question remains whether nudging can help change behaviour in the consumption domains with largest environmental impacts. Governments are typically cautious with applying coercive policy measures to the realm of consumption and the daily lives of consumers, as such policies might be perceived of as encroaching on consumer sovereignty. On the other hand, any policy influences behaviour, directly or indirectly.

Nudge might be a promising tool for advancing sustainable consumption because nudge tools do not restrict consumer choice (Sunstein 2014a). So, in which consumptions domains has nudge proven to be most efficient and effective? And what are the critical factors of success?

The three most environmentally relevant areas of consumption, which together sum up to 75–80% of the life cycle environmental impacts in industrialised countries are housing (especially heating systems), transport (especially car use and air travel) and food and drink (especially meat and dairy) (EEA 2013). These areas are also the ones where nudge researchers and practitioners see the largest potential (Stordalen and Kallbekken 2014). Below nudge examples and activities in energy, food and mobility domains are analysed.

6.1 Energy use in the home

In Sweden, as in many countries, buildings account for about 40% of energy use. However, the share of CO_2 emissions is lower in Sweden because less fossil fuels are used (Swedish Energy Agency 2012). Nonetheless, the reduction of energy use in households is an important target. Decades of evidence suggest that people consistently under-invest in energy efficiency, even from a private economic viewpoint – a phenomenon which is often referred to as the "energy efficiency gap", e.g. (Persson et al. 2009). This suggests that residential energy use could be a very appropriate target for nudges since behaviour is not economically rational.

Residential energy efficiency is influenced by two types of behaviour. Much of our energy usage in households is routine behaviour, which is not the subject of conscious choices. Energy use is a "side-effect" of other things, like cooking, cleaning or having a comfortable home. Such routines have their own momentum, and just getting someone to do something differently once is not enough; policy makers need to change the pattern (hence, nudges need to be permanently in place). Energy efficiency investments are more conscious and made more rarely; thus, people look for and process more information in order to make the decision. If interventions are successful in targeting the efficiency/ investment behaviour, the effects of this behaviour are durable since

investments are usually less easy to reverse, e.g. additional insulation will probably remain in the house even after it is sold.

Nudge-type interventions are traditional in the field of energy use in the home, even though they have been only recently labelled "nudge". For example, feedback on electricity bills providing social comparison information (i.e., comparing the recipient's energy use to that of other similar households) was tested in Helsinki already in 1989–1992 and was found to reduce electricity consumption by about 1–1.5% (Arvola et al. 1993) and has been used ever since. Smart meters and modern ICTs have been able to leverage this effect to an even greater extent, as will be shown in the following section.

6.1.1 Evidence for the effectiveness and efficiency

Several nudge-based mechanisms have been used over the years (some even since several decades) to promote residential energy efficiency (Stern 1992). Table 4 displays the types of intervention most commonly used according to mechanism type and the available evidence concerning its effectiveness.

Table 4 Nudge mechanisms used to influence residential energy consumption

Nudge mechanisms used	Applications to residential energy efficiency	Evidence of effectiveness
Simplification and framing of information	Feedback on energy consumption: Informative energy bills, metering and displays	Extensive research on all scales: tailored and small-scale interventions render 1–20% savings, large field trials about 2%
	Energy labelling of appliances and buildings	Experience on a large scale, but limited evaluation of effects
Changes to the physical environment	Design for sustainable behaviour, Design with intent (of homes and appliances)	Small scale trials, little evidence of the size of the effects Standard in some environments such as hotels (key card removal turns of lights)
	Prompts as reminders of appropriate behaviour	Small scale trials, evidence of effectiveness as part of a package of interventions
Changes to the default option	Opt-out green electricity offers	95–99% of customers stay with the "green electricity default"
	Opt-out from smart grid trial (technology installed to control consumption)	Large effects (20%) in one survey study
Use of descriptive social norms	Social comparison billing feedback	Large effects in small scale trials (average 11%), smaller effects in large field trials (e.g. 2% savings)

More details are provided below on each application. *Feedback on energy consumption*, i.e., informative billing, metering and displays have been popular energy policy instruments. For decades, there have been attempts to improve electricity bills, which have traditionally been very counterintuitive. Before the introduction of automatic meter reading, meters were often read only once a year and e.g. quarterly bills were based on estimates. Because of this, it was difficult for households to know how much electricity they were consuming (Fischer 2008). Informative billing has been a way to simplify electricity bills and make the information provided more actionable. Since the introduction of automatic meter reading, also smart meters and displays are being designed to simplify and frame electricity consumption information in the best possible way. In Sweden, all households have electricity meters that are read at least once a month and billed at least four times a year.

Fischer's (2008) review of previous studies found evidence for the effectiveness of feedback with savings ranging from 1–20%, and with some studies showing no savings. In a closer analysis of what differentiates the "best case" studies, Fischer concluded that feedback is most effective when it is frequent, involves interaction and choice for households, includes a breakdown of consumption by appliances, is given over a long period, and is presented in an understandable and appealing way. Delmas et al. (2013) have conducted a meta-analysis of various kinds of intervention studies and experiments. They found that feedback rendered average energy savings of about 7%. However, results obtained in small-scale field interventions are not necessarily replicated when the intervention is rolled out on a larger scale. For example, Darby (2012) has pointed out that many early feedback and smart metering studies used selected samples: wider interventions and rollouts involving hundreds or thousands of households render lower savings of about 2%.

There is also some evidence on the efficiency, i.e., cost effectiveness, of feedback as a tool to influence residential energy consumption. This has been produced in the context of social comparison feedback, and thus is discussed below after that heading.

Energy labelling is a policy-level application of the principles of simplification and framing of information, and also of providing the information near to where the choice is made. Labelling might not strictly be considered a "nudge", since it does not merely rely on nudge-type "automatic" fast thinking, but could also include cognitively processed information (Ölander and Thøgersen 2014). Informative energy labelling (rating of appliances according to energy classes) is mandatory in the EU for all the most common types of electrical appliances. Energy labelling in the form of the Energy Performance Certificate is today also applied to buildings. Since 2009, all Swedish buildings must bear an Energy Declaration of Buildings with information on the energy performance, a reference value for comparison and proposals for appropriate energy efficiency measures. However, there has been some discussion on the design of the declaration (Fuglseth 2009), which some consider is not as salient and well-framed as in other countries.

The EU Energy Label is generally considered a great success. For example, an experiment conducted in the USA (Newell and Siikamäki 2013) found the EU Energy Label to be the most effective among several types of information, generating the greatest willingness to pay for energy efficiency in a heating appliance. The success of the EU Energy Label lead to the situation when in many product categories the majority of products have reached the A-level efficiency. The scheme has recently been upgraded to include up to A+++ categories to incorporate the most efficient products. Heinzle and Wüstenhagen (2012) and Ölander and Thøgersen (2014) found that as a result of this revision of the label, consumers are less sensitive to the most efficient categories, and tend to perceive all the A categories as fairly similar.

There is evidence that the inclusion of life-cycle cost data alongside or as part of the energy label could further improve the effectiveness of energy labelling. For example, Kallbekken et al. (2013) tested the addition of lifetime energy use data on two product categories, fridge-freezers and tumble driers, accompanied by the training of sales staff. For fridge-freezers, the authors find no significant effects. For tumble driers, the combined life cycle cost and staff training reduced the average energy use of tumble driers sold by 4.9%.

Design for sustainable behaviour aims to change the physical environment to support more sustainable behavior. When applied to residential energy consumption, the aim is to change the users' physical environment so that it supports energy conserving behaviours and discourages energy wasting ones. For example, a refrigerator can be designed so that it is more difficult to keep the door open when stocking food in it (e.g. an alarm), or so that it is easier to locate food and keep it at the correct temperature (Bharma et al. 2011). Lockton et al. (2009) and Schmaltz and Boks (2011) have demonstrated how design for sustainable behaviour can be applied to reduce energy consumption in lighting. Even though there is limited experimental evidence of the effectiveness of this approach, logic and analogies suggest that this is an effective, but expensive intervention, unless it is integrated smoothly into new product development and eco-design principles. More generally, human factors and usability design are well-established design principles which draw on behavioural science, similarly to nudge (Norman 1988).

Prompts are low-cost changes to the physical environment that aim to influence error-prone repetitive behaviour, such as stickers reminding the building user to turn the lights off. Prompts are "memory aids" that are presented in close proximity to where the behaviour occurs and should ideally focus on reminding people what the positive behaviour is (McKenzie-Mohr and Schultz 2014). Prompts are widely used in local energy saving campaigns. Practitioners and the literature consider prompts to be effective in connection with a broader package of measures promoting energy conservation. However, the effect easily wears off, and they can be perceived of as annoying by some consumers (Backhaus and Heiskanen 2009).

Changes to the default option are more recent, and until now only experimentally used tools in residential energy efficiency. The main applications are "opt-out" rather than "opt-in" contracts. In an opt-out contract, consumers are given the environmentally friendly choice as a default, but are allowed the option "opt-out" if they do not want it. This is in contrast with an "opt-in" contract or choice. For example, in order to choose "green" (renewables-based) electricity, consumers usually have to make an explicit effort to switch to an alternative electricity provider. An "opt-out" model would offer the consumers the "green" choice as the default, and they would actively have to choose "standard" electricity if they want to.

Several studies report that consumers are much more likely to select "green" electricity if this is offered as the default option. For example, Pichert and Katsikopoulos (2008) report of two "natural" experiments in Germany in which 95–99% of the consumers stayed with the "green" electricity default rather than switching to a "grey" cheaper but fossil-based electricity supply. Recently, there has also been research on other aspects of residential energy use. Ölander and Thøgersen (2014) report on a study that examined consumers' willingness to participate in a "smart grid" trial where their household's consumption could be automatically reduced at peak electricity demand periods. They experimented with two ways of offering this to consumers: one group (N=345) was offered the choice to "opt-in" to the trial (choose the option to participate), the other (N=332) was offered the choice to "opt-out"(choose the option to not to participate). The opt-in design rendered a 60% participation rate, whereas the opt-out option rendered a participation rate of almost 80%.

Social comparison feedback builds on the mechanisms of descriptive social norms, i.e., the fact that people (mostly unconsciously) tend to follow the example of other people surrounding them. This mechanism has been tested widely in electricity billing. Comparative feedback on energy use offers consumers factual information comparing their own consumption to that of other similar households. Modern technology, such as smart meters and displays, offers cost effective opportunities to provide such feedback frequently and accompanied by forceful visual effects, such as smiley faces for those consuming less than average (Thaler and Sunstein 2008). There is a great deal of research on the effectiveness of this mechanism. For example, a meta-analysis by Delmas et al. (2013) found an average effect size of 11.5% savings for social comparative feedback, although they note that most of the published studies refer to smaller scale trials than for some other interventions. Some larger trials have recently been conducted. Allcott and Mullainathan (2010) evaluated a series of programs run by a company called Opower, which sent Home Energy Report letters to residential customers comparing their electricity use to that of their neighbours, with treatment and control groups totalling 600,000 households in the USA. The comparative feedback was found to reduce electricity consumption by 2% on average. Early research on social comparison feedback suggested that some consumers who initially consume

much less than average might increase their consumption when they are informed of how much the average consumer consumes, e.g. (Fischer 2008), which makes sense since social comparison feedback aims to "show people what is normal". Some specific measures have been developed to counter this, such as smiley faces to show what is positive and what negative behaviour is. In a comprehensive evaluation of two large-scale trials of social feedback, Ayres et al. (2013) found that the least-consuming households did not increase their consumption when they received the smiley face symbols and information of how much not only average, but also "efficient" neighbours consume. However, the social comparison feedback was most effective in the households with the highest energy consumption (Ayres et al. 2013). There is also some evidence on the efficiency of social comparison feedback from a cost-benefit perspective. Ayres et al. (2012) estimated that the Opower reports cost less than 5 cents per kWh saved, which is on par to the cost effectiveness of other types of energy saving programmes, and could be further reduced via electronic delivery of reports. Alcott and Mullanaithan (2010) report even lower costs from the same reports in another region: 2,5 cents per kWh saved. Moreover Ayers et al. (2012) have calculated that the effects of the Opower reports are equal to those of raising electricity taxes by 3–7%, which is likely to be less politically feasible than the reports.

6.1.2 Critical success factors of nudging strategies

The critical success factors for nudging strategies in influencing residential energy efficiency behaviours are similar to overall critical success factors for policies in this area (Stern 1999; Dahlbom et al. 2009; Heiskanen et al. 2009): Nudging should be part of a broader policy package combining several instruments. It should be based on a careful analysis of the kind of behaviours one wants to change and on the factors influencing them. By developing a better understanding of why people use energy wastefully or do not follow advice about energy saving or respond to the financial incentive to save, improvement can be made to current market stimuli and energy policy measures. For example, sometimes the barriers to participation in an energy saving programme can be quite high and may require significant support. For instance, some people might not sign up for a home energy renovation even if it is offered for free because of the inconvenience; they might be helped to do so if the municipality offers to move their furniture, see (Backhaus 2009; Lunn 2014).

Moreover, the success of nudge – like any other instrument – will depend on the context and on the type of behaviour targeted. Nudge-based policies should be based on research into energy end-user behaviour and its context. There is a great deal of such research already available in Sweden, see (Alm et al. 2012), and behavioural scientists are likely be able to suggest a range of improvements or interventions for further development and testing. Moreover, Sweden has a large number of researchers and higher education institutions that could participate in testing, evaluating and improving interventions.

Nudges should be targeted at types of behaviours which they are capable of influencing. Daily patterns of energy consumption are habitual and "automatic", hence very appropriate for being influenced by nudges. There are also more rarely made investment decisions, like the choice of a heating system or the decision concerning what kinds of windows to install, which are likely to be appropriate since they are complex decisions involving a large amount of detail, and research indicates that consumers are quite susceptible to external influences like the recommendations of installers (Nair et al. 2012). It is also important to recognise that there are broader sustainable consumption issues related to residential energy use where the nudge approach might not offer so many benefits. This is because energy efficiency improvements are countered by a decrease in household size resulting in fewer occupants sharing the same space and an increase in the number of electrical appliances (Swedish Energy Agency 2012). Such issues of consumption growth and socio-demographic change are not likely to be amenable to nudge-based interventions, at least in their current form.

6.1.3 Lessons learned for devising more successful policies

As stated, many of the basic "nudge" tools have been used for decades in energy efficiency policy (Stern 1992). Energy use in the household is an area where behaviour is obviously not economically rational (people could save money if they saved energy, but they do not). It is also an area where psychologists and sociologists have been involved in developing policy advice since the energy crises.

One of the important contributions of behavioural economics to energy efficiency policy is to counteract the economics-based reasoning, which argues that there cannot be an "energy efficiency gap" since people always behave rationally (Geller and Attali 2005; Gillingham and Palmer 2014). Nudge supports the idea that we do need energy efficiency policy. Secondly, even though nudge-based ideas are applied in energy efficiency policy, they are often applied unsystematically and sporadically. Electricity bills are still incomprehensible (though slightly less so), even though everyone knows about information overload and the importance of information framing. "Smart" meters and displays are not designed from the user perspective to take into account framing, simplification of information, defaults or any of the other nudge principles. Appliances are still difficult to use correctly and they are designed so that they allow inappropriate user behaviour. Buildings are even more difficult to use appropriately, and are becoming more so due to the continuous integration of new technologies. Hence, the lesson from the literature would be to apply "nudge" and human factors design throughout the built environment, in energy-using appliances and every aspect of the information environment (contracts, advertising, invoices, online advice, television programmes, etc.) which influences residential energy use.

Resources, however, are limited. Even though "nudge" is effective and even efficient in many cases, it requires a great deal of tailored and customised attention. Hence, it would be best not to apply "nudge" as a separate policy area, but as an integrating and cross-cutting design element in at least the following policies:

- The Ecodesign Directive and building codes: policy makers could work to include "green defaults" and require that appliances are designed to enable and trigger sustainable behaviour. Examples could include "low-energy settings" and "automatic sleep mode" for TVs as the default setting (these are currently provided as options at least for LED TVs if the user can find them). If they were offered as defaults, users who do not want these features can then actively change them. Further benefits could be gained by considering the efficiency of entire systems rather than individual products.[12]
- Support schemes for residential energy-efficiency investments: these also could include "green defaults" and require that systems are designed for sustainable behaviour. For example, the most energy efficient option (window, heat pump) could be the default for receiving a subsidy (other solutions could receive subsidies with special justification) and only appliances and solutions that are well-designed to support appropriate user behaviour could qualify for subsidies. Advice material related to the scheme could be designed with human factors in mind.
- Labelling of appliances and buildings could be improved through better design, as described in some of the examples presented above. Additionally, building contractors, renovators and owners could be required to remind users of appropriate behaviours in the context where that behaviour occurs (e.g. with stickers). There is already quite a lot of usability and user research on building systems, which could be employed to support energy conservation, e.g. (Karjalainen 2007).
- Improvement of "smart" metering and billing practices could include e.g. "green defaults" for demand response in peak consumption periods (if this is legal and considered relevant by the authorities). More practically and immediately, such improvements could also include better design of metering and billing services to incorporate all the best lessons from international examples. Many such measures are already in use, such as consumption feedback obtained via automatic meter reading of electricity consumption. The notion of nudges could however improve the kind of feedback given on people's electricity bills or on meter displays, which could be more effective than it is today if they were designed with a more sophisticated understanding of behaviour and through systematic testing of alternative designs.

[12] See for example http://www.eceee.org/events/eceee_events/ecodesign-seminar-feb-2014

- Automatic meter reading offers the possibility to develop tailored energy saving advice, contract models and energy efficiency packages adapted to the users' particular preferences, appliance stock and behaviour patterns. In the UK, the possibility to use digital personal energy use data in this way is being explored (Lunn 2014).
- Descriptive social norms could be widely utilised, if there is political will, to change the kind of social example presented to people in the media and in their social surroundings. We are currently surrounded by social examples of wasteful energy use – for example, in American television shows or in home decoration and renovation programmes. This shows people that wasteful use of energy is the norm. It is, however, not clear how policy makers could change this situation.

Policy makers should not have unrealistic expectations toward the added value of nudge-based interventions in residential energy efficiency, since behavioural science is already widely integrated in several energy efficiency policy fields, such as energy labelling, even though the current situation can always be improved. There might be new policy areas where this type of advice has not yet been recognised and where it would be administratively easier to integrate. For example, a specific area of current concern is the actual, measured energy usage of low-energy buildings, which often exceeds that of design specifications due to user and operator behaviour (Karlsson et al. 2007; Heiskanen et al. forthcoming). Instead of providing users and operators with more information, such buildings could be designed to "automatically" trigger the appropriate kinds of behaviours. Moreover, information and training of users and staff could make use of the ideas of simplified information, framing and social comparison feedback from the nudge paradigm.

6.2 Food

Food production and consumption have major impacts on the environment. Agriculture is responsible for 13% of all greenhouse gas emissions in Sweden (Naturvårdsverket 2014), and overall food consumption represents about 25% of the climate impact of an average Swedish consumer (Röös 2012). Other potential negative impacts of food production and consumption are biodiversity loss, eutrophication, soil degradation and the pollution of land, air and water.

Increasingly, the impact of food consumption in Sweden happens abroad (Naturvårdsverket 2014). Due to increasing imports, production-oriented measures to reduce agricultural impacts are therefore becoming less effective. This increases the relevance of consumption-oriented policy-making.

Food consumption is to a large degree a habitualised and in many cases relatively unreflective process, e.g. (Gronow and Warde 2001), which makes it prone to nudging. Restaurants and other out-of-home consumption places (e.g. school canteens, workplaces) offer an environment that can be influenced

by policy makers. Even food consumption in private homes – which is hard to reach directly for a nudge intervention – lends itself to nudging though indirect means (i.e. the act of grocery shopping in the store).

6.2.1 Evidence for the effectiveness and efficiency

Nudging has been applied in the food domain primarily in attempts to cope with the increasingly problematic obesity epidemic in many Western countries, notably in the USA. To a lesser extent, nudging has been applied to promote environmental causes in food consumption, for example to reduce meat consumption (and thereby climate change) and food waste.

Table 5 Nudge mechanisms used to influence food consumption

Nudge mechanisms used	Applications to food consumption	Evidence of effectiveness
Simplification and framing of information	Provide simplified information and signifiers	Small-scale studies in controlled environments indicate large impact; no large scale studies available; impact seems to vary for different segments of society
Changes to the physical environment	Change visibility and accessibility	Strong evidence in controlled environments (i.e. canteens; restaurants)
	Influence size	Experiments with portion size and package size suggest strong impact
Changes to the default option	Positioning of product choice	Wide use in retailing suggests large impact; few studies available for pro-sustainable nudging
Use of social norms	Provide information about others' behaviour and ideal-type behaviour	Studies suggest effectiveness, particularly when behaviour is publically visible and in cases of uncertainty about appropriate behaviour

Provide simplified information and signifiers: Simplified information tailored to specific choice situations increases the likelihood of influencing individual consumers. Signifiers refer to information that is added to a context in order to make certain information more salient. Kalnikaitė et al. (2013) found that grocery shoppers base their choices in supermarkets on a very limited number of factors, and thus the salience of various factors matters. Most often these factors are price (for 46% of respondents) and health (36%), but they can be modified depending on the choice context. It is thus obvious that simplified information is necessary to influence grocery shopping choices. Governments have long been aware of this fact and engaged in legislation to simplify information. Nutritional information requirements (including their design) were introduced by most governments in the late 20th century. More recently, regulation was also passed regarding marketing claims considered to mislead consumers, such as unproven health claims. Both fields are now regulated at the European level.

A more radical example of simplified information provision in food consumption is the much discussed 'street light system', indicating good choices (green), neutral choices (yellow) and bad choices (red). This regulation has been tested in several countries (e.g. Germany) and various contexts, but no government has formally introduced it as an obligatory requirement.

Oullier, et al. (2010) report on a range of examples of nudging to promote healthy eating. In one experiment, crisp consumption was reduced by 50% by adding red-coloured crisps in regular intervals in a tube of crisps (i.e. 'Pringles' packaging). As explained by Oullier, et al. (2010, p. 44) *"[u]sing these visual markers draws the attention of the eater, gives them points of reference for their own consumption and causes them to interrupt that consumption"*.

Campos et al. (2011) reviewed studies on nutrition labels on pre-packaged foods and found that these labels enjoyed high trust among consumers. They also found that those consumers who use these labels have healthier diets. However, only some consumer segments (individuals with health conditions and special diets) show high user rates of such labels, while other consumer segments (children, adolescents, older adults) show low use of nutrition labels. Campos et al. (2011) conclude that to be effective with all consumer groups, labelling regulations need to take the entire package into account. Otherwise, information provided on the rest of the package can outcompete nutrition labels for consumer attention.

An example of the effectiveness of signifiers comes from the Swedish burger chain Max. They introduced carbon labels on all of their burgers and witnessed a 16% increase in sales of those burgers with a lower than average carbon footprint (van Gilder Cooke 2012).

Another example of the impact of menu design comes from Fox et al. (2005). They found that the way the menu was designed impacted the amount of unhealthy food chosen. By segregating healthy menu options (fruits, vegetables) but clustering unhealthy menu options (cookies and candies) the relative purchase of healthy options was increased.

Kalnikaitė et al. (Kalnikaitė et al. 2013) used a simplified information system to indicate good, neutral and bad product choices to consumers. The two information parameters were 1) food mileage, and 2) organic or non-organic production methods. The study was performed in a supermarket, with a trolley equipped with a clip-on lambent device. This device consisted of a line of LED lights, which indicated both the food mileage (the number of LEDs lid indicated distance) and production method (changed colour to indicate organic or non-organic production). The device further featured a signifier for good or bad behaviour in relation to other consumers. A little display showing a happy face, an indifferent face and a sad face was visible to the consumers, which indicated the comparison of the total content of the shopping trolley compared to a social norm (i.e. an average shopper). The study showed that 72% of chosen products had lower mean food mileages than when no such device was present. They also found that this effect was strongest where information on food mileage was small or not present at all on the

product package. At the same time, no impact was observed for the organic/non-organic parameter, which they explained with the prominent presence of the 'organic' label on food packaging when the product is of organic agriculture. This supports the idea that salience plays a great role in individual decision-making.

Changed accessibility and visibility: Many studies have been conducted on the possibility to influence individuals to chose healthier food in restaurants and canteens. Brian Wansink from Cornell University, NY, has conducted numerous experiments on nudging in this context, e.g. (Wansink and Van Ittersum 2003; Wansink 2004; Wansink and Cheney 2005; Wansink and Kim 2005; Wansink and Chandon 2006; Wansink 2010). The overall picture these studies draw of the potential of nudging in 'out-of-house catering' contexts is that the impact of visibility, presentation and experience of food has significant impact on the type and amount of food consumed. Easy access to unhealthy food, for example, significantly increases consumption of such food. Even the visibility and smell of unhealthy food impact consumption levels. Wansink (2004) reports on studies showing that an ice cream cooler without a lid resulted in higher ice cream consumption. The availability of a milk dispenser or a water pitcher close to the dining area also resulted in higher consumption of milk and water. Finally, Wansink could find an effect of plate and glass design on food consumption. Where bowls and glasses were wider but shorter total food and drink consumption increased significantly (Wansink, 2004). In one experiment with teenagers at weight-loss camps, offering short, wide glasses to them increased their juice and soda consumption by 88% compared to tall, narrow glasses (Wansink and Van Ittersum 2003). Some studies even point to relatively unrelated visual cues having an effect on food choices. Johnson et al. (2012) report on studies conducted in high school cafeterias, where the presence of bananas and green beans decreased sales of ice cream, while the presence of sugary side dishes (e.g. fruit cocktail, applesauce) increased sales of cake and chips.

Influence size: Not only the appearance of food plays a significant role in how much is consumed. Even more so, it seems that size matters. Wansink and colleagues conducted numerous studies on the impact of portion, plate and spoon size on the amount of food consumed. For example, when individuals were given a ca. 680 g bowl (24 ounces), they served themselves 31% more of ice cream on average compared to when they were given a 450 g bowl (16 ounces). In another experiment in which spoon size was influenced, patients increased their dosage of cough medicine by 22%. Wansink (2004), who reports on all these experiments, relates this to the effect that size has on humans' perception of what is a normal size. Similar findings are reported about package size for snacks: when they are doubled, consumption increased by 18–25% for meals and 30–45% for snacks (Wansink 2004).

Other studies also show that reduced plate size (in all-you-can-eat environments) (Freedman and Brochado 2010) and reduced portion size (Rolls et al. 2002) both reduce total calory intake and food waste. Focusing on the effect

of size on food waste, Kallbekken and Sælen (2012) conducted a study among hotel guests in Norway. They reduced the plate diameter from 24 to 21 cm at restaurant buffets in 7 hotels and found that, on average, food waste was reduced by almost 20%.

Not only the size of one product or portion matters, but also the size of the entire offering. If more choices are offered to an individual, the total consumption is likely to increase. For example where consumers were offered three different flavors of yogurt (compared to only one option) the average consumption of yoghurt increased by 23%. Where individuals were offered M&Ms with ten different colours (compared to seven) consumption increased by 43% (Wansink 2004).

Positioning of product choice: People tend not to observe their environment in its entirety. Usually, attention is restricted to a small section of the total context, and clear preferences for certain visual areas (e.g. eyes' height) and other positional variables can be observed (Nordfält 2007). How a choice is positioned in the room is therefore relevant to human decision-making. It is a widely known and practiced that the design of retail stores and the positioning of products has great impact on the choices of customers (Nordfält 2007). The immense impact of positioning has been proven for all types of products. However, few studies have been conducted on sustainability or health per se. In general, it is reasonable to assume that the effect on sales of such products should be comparable to any other product group. A Swedish example of product positioning to influence default options is from Systembolaget (i.e. the state-run monopoly stores for alcoholic beverages) to promote non-alcoholic alternatives. Observations show that non-alcoholic beverages are advertised in these stores and the non-alcoholic choice alternatives are often prominently placed in the entrance area of the store, while strong alcohol is often in the back of the store.

Norström et al. (2010) calculated the potential effects of replacing the Swedish alcohol retail system with licensed private stores, which would increase alcohol consumption in Sweden by 17%. The introduction of a free-market system (i.e. alcohol sold in any retail store) would increase alcohol consumption by 37.4%, leading to an additional toll of 2,000 deaths, 20,000 assaults, 6,600 drinking driving offences and 11.1 million days of sick leave per year.[13]

Provide information about others' behaviour and ideal-type behaviours: Humans seem to be greatly influenced by their social environment when it comes to the type of food and the amount of food they consume. As reported earlier, portion sizes greately affect the amount of food consumed, as well as whether people dine alone or with company. According to Wansink (2004) total food intake increases in line with the number of persons being present at the table. A meal shared with one other person was found to increase total intake by 33%, while a meal shared with seven or more people resulted in

[13] Note that these results do not primarily address the product positioning and store design policies of Systembolaget, but describe the broader effects of a regulated market for alcoholic beverages

a doubling of intake. Following this study, it can be suggested that perhaps individuals orient their intake according to those people eating the most in a social context, and not those eating an average amount or lower than average amounts.

How this can be used to achieve a pro-environmental outcome is documented in a study from Norway. Kallbekken and Sælen (2012) focus on food waste and its implications for climate change. They placed a sign at the buffet of seven hotel restaurants reading: "Welcome back! Again! And again! Visit our buffet many times. That's better than taking a lot once". They thereby introduced a cue about a normal behaviour, which resulted in 20,5% reduction of food waste compared to the pre-intervention data.

6.2.2 Critical success factors of nudging strategies

Several factors of success for nudging can be derived from literature about food consumption reviewed for this report.

Most importantly, nudging individuals to consume food differently works best in controlled environments. Numerous studies, for example, show significant impact of nudging in canteens. Canteens, of course, are places with a high level of unilateral control of one authority over the behaviour of consumers. Where a school board, a city council or a company has the ability to decide about most aspects of the consumption situation, with little or no interference by other actors, nudging can be effectively designed and implemented. On the other hand, where the actor responsible for the nudge intervention is not fully in control of the situation less success seems to be the result. This becomes apparent in the discussion about the impact of nutrition labelling on food packages, which seems to be undermined by the design of the rest of the packaging. In Sweden, the controlled environment of the state-owned alcohol stores (Systembolaget) allows for a level of nudging (for responsible alcohol consumption) not achievable in a market dominated by privately run retail stores where nudging efforts are counteracted by marketing efforts. Systembolaget is therefore able to influence the point-of-sale environment without other actors interfering in the choice architecture and can, among others, encourage consumers to consider non-alcoholic alternatives or discourage excessive drinking. This system is effective in limiting alcohol consumption.

Second, there often seems to be a low willingness to invest a lot of effort into the decision-making process. Consequently, humans show a strong willingness to react to outside cues, and are in many cases happy to follow someone else's choice for them if it makes their decision-making process easier and faster. This can happen consciously (i.e. provide certain information to influence a decision), or unconsciously (i.e. manipulate the choice environment). Salience has been shown to be of crucial importance for how individuals choose the limited factors according to which they make a decision. However, studies in food consumption also seem to point towards the importance of predispositions to certain nudges. Where individuals carry a positive attitude or desire for a particular behaviour but fail to follow this predisposition in practice, nudges appear to be more effective than in situations where the

individual is consciously opposed to certain behaviour. The impact of nutrition labels on food packages is highest for individuals predisposed to react to health-related information, while individuals not predisposed to react to such information seem to be less influenced. Being aware of the target audience and which nudges work for them should therefore considerably increase the impact that can be achieved with a nudge.

6.2.3 Lessons learned for devising more successful policies

Despite increasing efforts, results in the two major areas of application within the area of food – health and climate change – remain moderate. This is partly due to the counteracting force of marketing, and partly due to the complex and unpredictable reaction of individuals, e.g. (Wansink and Chandon 2006). While laboratory experiments and interventions both point towards considerable potential of nudging in food consumption, real-life success of nudging interventions has so far been very limited. Best results can be found where nudging can be applied without the counteracting effect of marketing. Examples are Swedish Systembolaget and school canteens. In both cases the consumer is exposed to a very controlled environment in which few counteracting forces are available and where one authority can design the nudging intervention. Public places with a relatively controlled environment are therefore better suited for nudging interventions than private places (such as supermarkets and people's homes).

This is because nudging works better when a decision context can be designed to encourage certain behaviour without the contradicting influence of other factors. Indeed, in such situations it can be argued that nudging is superior as a behaviour influence tool compared to legislative or fiscal tools. A study from Finland, for example, showed that where schools implemented a forced vegetarian day for all pupils the short-term effect was an increase of pupils leaving school for lunch rather than eating at the school canteen and – for those that ate at the canteen – higher plate waste (Lombardini and Lankoski 2013). A study from Umeå in Sweden confirms these findings, with almost half of all pupils choosing not to participate in school lunches for those days where only vegetarian food was served (Arvola and Liedgren 2014). Lombardini and Lankoski (2013) therefore suggest using nudging instead of regulatory tools for such cases. However, where nudging can only be performed in an environment of low intervention control (e.g. private homes) or where many competing factors (i.e. marketing in the retail store) are acting upon the individual, nudging cannot be expected to be as impactful.

Secondly, one can conclude that successful policy making to promote sustainable food consumption requires an underlying acceptance for such behaviour among the individuals addressed. Studies have shown that nudges sometimes are least effective on those individuals whom they are primarily aim to influence (e.g. obese individuals). Where individuals are nudged to eat less meat but do not carry an internal conviction that this is desirable, evidence shows that compliance is low. Nudging should therefore be preceded by information and education campaigns in which individuals are convinced to support

the underlying policy. A second aim with such campaigns should be to establish the social norms that are at the basis of some nudging interventions.

Finally, a sound understanding of the target audience is important to design a nudge intervention. Many studies show impressive results for nudging interventions. At the same time they are restricted to very limited sample sizes and specific environments. Scaling up a nudge interventions will likely prove disappointing unless sound knowledge of the target audience and the behavioural environment are available.

6.3 Personal transport

Transportation is the area where facilitating "good behaviour" has been going on for a long time, but where nudging as a concept has not been popularised yet.

The transport sector alone is responsible for up to 30% of household emissions and its impact is expected to grow in the future following the annual growth of 1,3% in terms of passenger kilometres recorded in the period between 1995 and 2010 (EEA 2011).

The main challenge of private transportation is the heavy reliance on private car use in many places, both in cities, in the sparsely populated areas and countryside where there is no alternative to private car use. Therefore the focus of shaping more sustainable mobility patterns heavily depends on provision of infrastructure, products, processes and shaping environments that can compete with the convenience of car use. However it has been challenging to find an alternative that would offer equal functionality as the private car does especially in rural areas or in cases of longer or multi-leg journeys. Car use in urban settings is also problematic due to the congestion problem. For example, the largest share of trips are less than 4–6 km in the UK (Department for Transport 2011b). So together with greening the car fleet itself, for example by supporting the emerging market of electric and other types of low emission vehicles, there is a need to facilitate change in people's transport behaviour and their perception about mobility and its alternatives.

An important question is of course who should facilitate the change. Existence of two market failures in transport warrants, according to some researchers (Metcalfe and Dolan 2012), the government to change behaviour. The first market failure is the failure to incorporate environmental externalities into the price of fuel and the second one is the information barriers and transaction costs that hinder people from behaving in a better for them way, e.g. driving safely, economically or in an environmentally sound manner. To address these market failures, typically a broad range of measures that target transport related patterns and levels of mobility consumption are developed (Figure 5).

Regulatory instruments often face implementation and public acceptance problems; even financial instruments meet strong resistance, as demonstrated by the strong public rejection of the UK fuel tax escalator (Dresner et al. 2006),

the congenstion charges in Manchester (Ahmed 2011) and the Edinburgh road user charge (Gaunt et al. 2007).

In Figure 5, nudge approaches are situated in the middle of the ladder and represent one element of a diverse set of options that target transport behaviour and that sometimes are put together in policy packages.

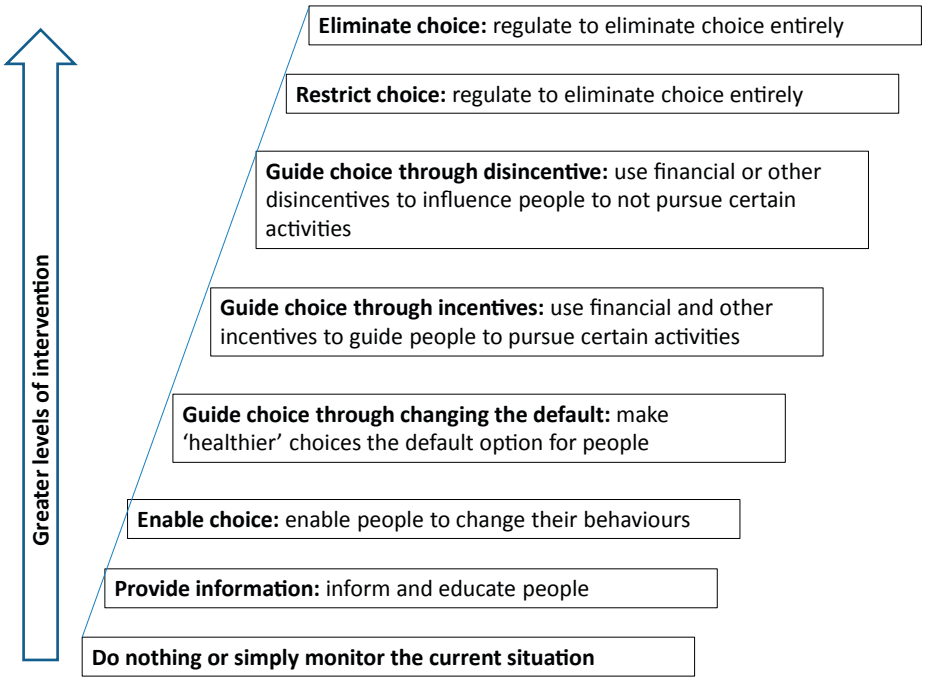


Figure 5 Ladder of interventions (Nuffield Council on Bioethics 2007)

Such packages include a wide range of tools from information provision, to shaping the infrastructure and the environment in which transportation takes place, to changing defaults in car designs and applications to enable and facilitate road safety and more environmentally sound driving habits, as well as changes in urban planning to reduce the need for travelling, such as the 10-minute city, where people have access to various services they may need in daily life within a 10-minute walking/cycling radius. Devising policy packages is considered to be an important factor in successful transport policy (see more on success factors in section 6.3.2).

6.3.1 Evidence for the effectiveness and efficiency

Despite the long history of transport policy and proliferation of various systemic approaches to addressing problems of access, congestion and environmental pollution, e.g. total mobility management or Integrated Transport Policy, there are few specific studies that evaluate the effectiveness of individual behaviour change strategies in private mobility (Tørnblad et al. 2014). On the other hand, total mobility management programmes have been evaluated and typically show between 5% and 15% reduction in car use both in the short and long term (Brög et al. 2009; Chatterjee 2009).

However, when it comes to specifically nudges, other researchers also confirm that "*[a]pplications of the nudge approach to transport have not been tested in a large scale or systematically analysed in transport contexts. Therefore their effectiveness remains an open question*" (Avineri and Goodwin 2010; Metcalfe and Dolan 2012). On the other hand, the interest in design and implementation of alternative or supplementary softer policy instruments is growing (Avineri 2012). These soft measures in transport sector aim to change traveller behaviour by "*altering their perceptions of the objective environment, by altering their judgements of the consequences associated with the use of different travel options, and by motivating and empowering them to switch to alternative travel options*" (Bamberg et al. 2010).

Table 6 Nudge mechanisms used to influence consumption of mobility

Nudge mechanisms used	Applications to mobility	Evidence of effectiveness
Simplification and framing of information	Decluttering streets, providing clear information, maps and changing framing to encourage cycling and walking, offering cycling training or personal travel plans, simplifying information on fuel consumption of cars	Average reduction of CO_2 emissions by 19% among ten travel feedback programmes and up to 35% in some cases Australian studies report 10% reduction of car use via personal travel plans[14]
Changes to the physical environment	Road and lane planning, urban design	Effective as infrastructural projects and systemic solutions
Changes to the default option	Auto-pilot decisions in cars, road planning, helmet wearing	Effective, e.g. dynamic speed-limits that reduced speed driving from 70% to 17% in Linköping.
Use of descriptive social norms	Travel or walking feedback programmes where social norms and social networks are involved Smartphone apps to encourage physical activity	Mixed evidence of effectiveness and low validity due to low sample size. In one study the app users increased their walking by 64% for a period of time.

Framing of information is important since behaviour depends to some degree on how the situation is presented or with what words the issue is formulated. A study by Larrick and Soll (2008) exemplifies the framing effect on people by showing how drivers consistently misunderstand miles per gallon as a measure of fuel efficiency, which leads to that they undervalue small improvements on inefficient vehicles. If the standard "miles per gallon" was changed to "gallons per mile" would help drivers to know exactly how much fuel they use on each trip or during a certain period of time.

[14] Reduced car use is associated with increased use of public transport, walking and cycling Socialdata (2004), *TravelSmart travel surveys*, Socialdata Australia Pty Ltd. and Ker, I. (2004), 'Household-based voluntary travel Behaviour change: aspirations, achievements and assessment' *Transport Engineering in Australia*, Vol. 9 No. 2, pp. 119–138.

This could be then linked with the help of some additional information to the amount of CO_2 emissions from each trip. In addition, the "gallons per mile" helps people to calculate cost savings from reduced fuel consumption. The results of better framing can be seen from the evolution of the fuel economy stickers in the U.S.

Choice of transportation mode. Previous successful strategies to change people's choice of transport mode from e.g. private car to public transportation have focused on targeting people at "life changing" moments, when people are moving from one place to another or expand their families. People can be nudged towards certain choices with simplified information, higher salience of certain features of alternative transport means or financial and other service offers. Provision of sustainable transport options is also a factor here. For example cargo bikes are now available in many cities, e.g. Malmo, and this makes it possible for people to use a bike where before only a car was possible.

Feedback on transport use and mobility patterns, i.e. provided through apps, comprise travel feedback programmes, including bicycling and/or walking. These programmes use personalised communication to change mobility-related behaviour, which may include personal communication and feedback between participants and experts. One study reviewed ten travel feed back programmes, mostly from Japan, and concluded that the average reduction was 19% of CO_2 emissions from transport with some travel feedback programmes reporting as high as 35% reduction of CO_2 emissions (Fujii and Taniguchi 2006).

Changing the physical environment have been reported as one of the most effective instruments to influence travel behaviour, especially in combination with other instruments (Pucher and Buehler 2008; Gössling 2013), for example, road planning with lines, colours, signs and humps that may greatly influence driving speeds, driving patterns and in general guide the flow of traffic. For example, toll stations at Öresund bridge between Copenhagen and Malmö have experienced difficulties with controlling speed limits – 200 000 cars (4% of all cars) drove 40 km/h where the speed limit was 30 km/h. They have now installed dynamic speed limits Actibump-system that go down by 4 cm if cars drive faster. The 3-year long experience with Actibump-system from Linköping show that where 70% of cars drove faster than the speed limit before only 17% do it now (Jacobsson 2014).

Figure 6. Changing in the physical environment (Foto: O. Mont)

Similarly, the location of parking lots and bicycle stands creates a powerful signal to all the participants in traffic. Instead of car parking being usually the closest parking to the entrance/exit doors, placing bicycle parking visibly near the door, then the car-pooling and sharing, then perhaps the electric vehicles

and only then the parking spaces for other cars could send a powerful signal about what travel mode is preferable and encouraged by the infrastructure. Additional services can also enable more sustainable transport choices for people. For example, Skånetrafiken offers apps for easily accessible maps and the possibility to order individual bus or taxi for the "last mile" in sparsely populated areas, thereby encouraging people to take the train and complementing it with additional and often customised service.

Feedback on driving patterns Another type of feedback can be offered to drivers through in-vehicle data recorders with the purpose of rewarding various behaviours that are considered good for road safety, the environment or for other pro-social reasons, e.g. driving within speed limits, keeping sufficient distance to other vehicles, soft rather than fast acceleration and deceleration. The use of this technology has been shown to be popular amongst the public especially when it is used together with financial incentives, e.g. paid by insurance companies. Interestingly, the popularity of the measure has been the highest among drivers with more aggressive and risky manner (Musselwhite 2004). One study found that providing drivers with feedback on dangerous driving behaviour reduced accident rates in the short term (Toledo et al. 2008).

Creating positive social norms about more sustainable travel modes is important. For that various mechanisms could be used, from traditional advertising focused on deliverying pro-social messages[15] to employing nudges that are built on descriptive social norms making people aware of how others are travelling.

Other types of behaviour change strategies include *training in cycling or eco-driving*. However, these approaches primarily affect the reflective side of our behaviour, unless they become habitual with time.

One of the fast-growing methods for influencing mobility behaviour indirectly is by encouraging walking with the help of smartphone apps. A growing number of such health-oriented apps allow people to set personal goals in terms of e.g. steps taken per day, routes, distances and walking speeds. Using the *social norm approach* they often include mechanisms for sharing the progress with other users (online community) or with friends and family and for facilitating social influence by inviting other users to take part in competition with each other. Some of these apps also provide the users with moral approval of good behaviour, e.g. through introducing avatars whose wellbeing depends on the performance of the user. Evidence of the effectiveness of these apps in promoting physical activity is mixed and is usually measured in small groups, which undermines the validity of these evaluations. In one study of 152 males using an always-on accelerometer-based smartphone app, the app users increased their walking by 64% (Harries et al. 2013).

[15] See an example of a Danish ad promoting travelling by bus as cool: Epic Bus Ad from Denmark – https://www.youtube.com/watch?v=75F3CSZcCFs

6.3.2 Critical success factors

Success factors vary depending of the type of nudge strategy related to transport behaviour. In general, however, also in transport sector the best working solutions comprise several policy instruments that work synergistically. Below not only success factors are discussed, but also the factors that make it difficult to develop policy instruments that target travel behaviour.

Policy packages to promote better choice in private mobility are considered a critical success factor since the mobility behaviour is complex and influenced by a great number of parameters, starting from where the location of home, the daily routines of people and the transport options offered by public and private actors (Department for Transport 2011b). For example, in one UK project three towns invested in packages of soft and hard measures to promote sustainable travel. The soft measures included information provision and marketing to encourage people to use more sustainable transport choices, while hard measures comprised improvements to infrastructure and public and private services. In these three towns, the following results were reported in the household survey and traffic counts (Department for Transport 2011):

- The distances driven were reduced by 5–7% per resident;
- Overall reduction in traffic was about 2%, and 8% in inner city;
- The use of bus and other public transport modes per resident were increased in two out of the three towns by 14%;
- The number of trips by bicycle increased by 26% per resident;
- The number of walking trips per resident increased by 13%.

Such results have not been observed in similar towns without the packages of sustainable transport measures that were introduced in the abovementioned cases.

The same success factor is mentioned in studies on increasing bicycle use in urban settings. For example, a review of 139 studies of programs promoting bicycle use in cities demonstrate a great variety of tools that are typically used over a long period of time that in combination lead to significant increases of bicycle use. Compare, for example, the 38% share of trips made by bicycles in Copenhagen (Gössling 2013) to 1% of trips in the UK and the USA (Pucher and Buehler 2008). The combination of these measures include: "on-road bicycle lanes, two-way travel on one-way streets, shared bus/bike lanes, off-street paths, signed bicycle routes, bicycle boulevards, cycletracks (separated by kerb from other traffic infrastructure), coloured lanes, shared lane markings, bike boxes (also called 'advanced stop lines'), bicycle phases/traffic signals, maintenance of infrastructure, wayfinding signage, techniques to shorten cyclists' routes, traffic controls/traffic calming, … car-free zones, … bike parking, bicycle stations, parking at rail stations, parking at bus stops, bike racks on buses, bikes on rail cars, short-term rental bikes, and showers at workplaces" (Gössling 2013 p. 197).

Critical success factor for the travel feedback programmes seems to be the possibility for the participants to *create their own implementation plans* (Fujii

and Taniguchi 2006). Face-to-face meetings with personal travel guides and soliciting customised assistance has also been identified as an important factor of success for changing travel behaviour.

Sharing information about travel services combined with the social norm function was highlighted as a success factor by Bartle et al. (2011). In this study the process of information sharing among cyclists commuters through a web-based interactive service was studied. The site not only shared factual informaton, but also offered social networking among the commuters. The social function allowed reinforcement of positive views of cycling as a commuting mode among the commuter group members.

6.3.3 Lessons learned for devising more successful policies

The main lesson from the existing knowledge on the use of nudge in travel behaviour is the lack of studies that can discern the effectiveness of specific mobility management instruments. Consequently, more research is needed both on the effectiveness and efficiency of individual instruments and on their synergetic effects.

When it comes to the use of nudges, the UK Department for Transport (2011) highlights that limitations in the use of nudges to facilitate changes in travel behaviour are due to a great variety of factors influencing behaviour. The same person may react differently to the same influencing factor depending on the role the person assumes at a given moment (Department for Transport 2011a). Indeed, there is compelling evidence on the great heterogeneity of people's responses to behaviour change policy tools in transport. Therefore, more research is needed on the diversity of decisions with regard to travel choice making and concerning people response to different policy meausures. In doing so, policy makers and transport planners may rely on traditional segmentations of people according to their socio-demographic and attitudinal parameters (e.g. attitudes towards sustainable transport modes), or they could also solicit research on identifying segments of people that are most likely to change their behaviour if targeted by policy measures developed based on insights of behavioural science.

People also react differently to the same factor but in different contexts. So some researchers warn about the limitations to directly transfer findings on the application of behavioural sciences to transport from other domains since the context of choice making in transport might be different from choice making in other environments (Ert and Erev 2008).

Another challenge associated with the transport domain is to devise policies that encourage pro-environmental and pro-social behaviours of individuals even though the environmental externalities of travelling can be seen as a *social dilemma*, rather than an individual problem. This means that in the transport domain people might not have as strong drive to reduce environmental impact as in energy or food domains. In this case, policy makers can draw on other features of human behaviour, such as people's tendency to "do

the right thing" (Dawnay and Shah 2005), to "act appropriately" (Lindenberg and Steg 2007) or to consider health-related aspects.

When it comes to the power of framing, loss aversion is one of the strongest mechanisms that affect the way people respond to different policy interventions. Framing messages in negative terms has higher effect than framing them in positive terms. Therefore, loss framing can be incorporated into policy design to influence people's behaviour, including personal carbon calculators, journey planners, and customised travel information provided to individuals (Waygood and Avineri 2011).

Some lessons can be drawn regarding the research design of many studies conducted in transport domain. Specifically, claims of large effects have been criticised on several grounds. To start with many of the empirical studies investigate effects of total mobility systems that contain a mix of command-and-control instruments, economic incentives and soft measures comprising information provision and nudge-like instruments. Many of the reported studies fail to provide consistent record of how the field research was done, and often lack adequate control groups (Friman et al. 2013; Tørnblad et al. 2014). Therefore, researchers call for further controlled experiement on the effectiveness of both total mobility management programmes and of individual instruments.

7 Nudge as practical application

7.1 Designing policy interventions with behavioural insights

Practicing nudge by developing and implementing policies taking into consideration behavioural insights is a process that takes time. It also places a high demand on knowledge of existing evidence about human behaviour and about behavioural patterns in specific contexts and requires resources for reviewing available evidence on different interventions, for choosing interventions that are best suited for the set goal and for devising more effective policies and instruments. Designing nudge policy instruments is thus not always the cheapest way to a more efficient policy making.

Literature offers a great diversity of models for how to design policy interventions based on insights of behavioural sciences. One of the most popular models is the "The nine principles" model developed in the UK by Darnton (2008) that draws on findings from behavioural modelling and prescribes an iterative cyclical process in policy development and application.

The process of moving from step to step is iterative, meaning that insights from later steps might imply revision of the earlier assumptions and steps. The circle represents the idea of "learning by doing" where the interventions are being continuously refined as a result of ongoing monitoring and evaluation (Bonsall et al. 2009).

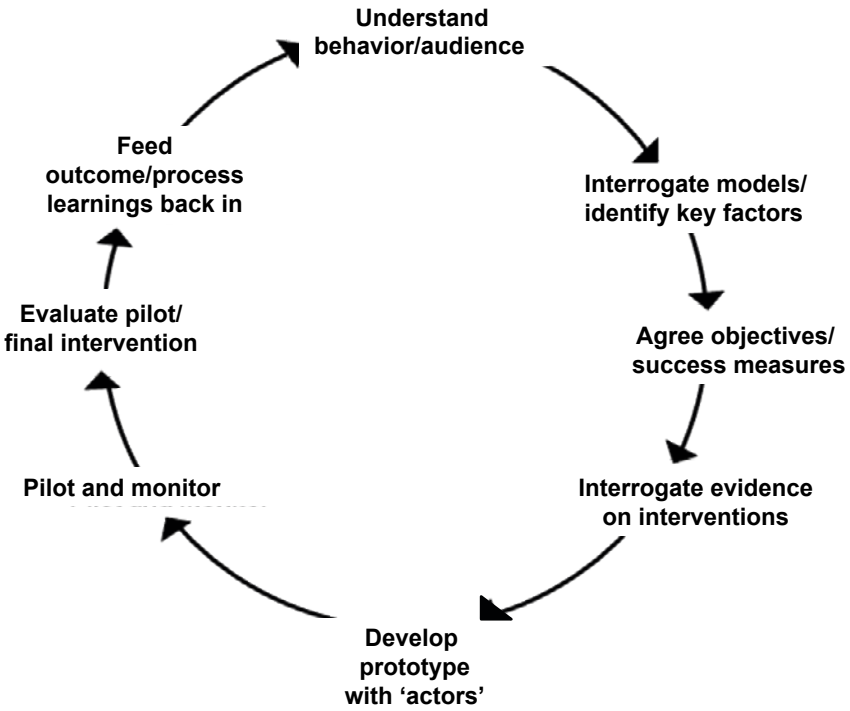


Figure 7 A framework for devising policymaking based on behavioural insights and aiming at behaviour change (Darnton 2008)

As shown in Figure 7, the framework involves the following nine steps (steps 2 and 3 are collapsed into one step):

1. *identify the audience groups and the target behaviour*. If behaviour is too complex it should be broken into simple behaviours or elements.
2. *identify relevant behavioural models* including both individual and societal models and make a short list of the most prominent influencing factors. This step may involve literature review or consultation with stakeholders.
3. *select the key influencing factors* and use them to develop objectives for the intervention strategy/policy option.
4. *identify effective intervention techniques* that have worked and were effective in the previous interventions that targeted specific influencing factors.
5. *engage the target audience for the intervention* in better understanding their behaviour and the influencing factors from the user/target audience perspective.
6. *develop a prototype intervention* and evaluate it against relevant policy frameworks and assessment tools.
7. *pilot the intervention and monitor the results* (see below an overview of interventions).
8. *evaluate impacts and processes* against the objectives developed in step 3 linked to the factors influencing behaviour.
9. *feedback the lessons learned* in order to deepen understanding of the intervention and the target behaviour.

The types of interventions mentioned in step 4 could be regulatory and coercive instruments, fiscal incentives and disincentives and soft policy tools, including information-based instruments and the nudge toolbox consisting of defaults, improving salience of information, changes in physical environment and engagement of social norms in behaviour change.

In order to evaluate which policy interventions are most effective, efficient and accepted by the public, a range of research methods can be used. Their choice depends on the purpose of the policy intervention, the target audience and other factors, e.g. context. In principle, there are four types of methods that are often used to test behavioural change and to collect insights about policy interventions : experiements, randomised controlled trials, surveys and qualitative research (described below). Each of them has its own strengths and weaknesses (see Table 7).

Experiments

Experiments are usually conducted in controlled environments with closely monitored parameters and carefully chosen small sample of subjects. Due to these design parameters, they tend to provide consistent and reliable results that can be replicated in different places and times. In a typical experiment, change in behaviour of two sets of subjects (control group vs. treatment group)

is compared. A researcher first changes one parameter that might be similar to policy intervention, e.g. provision of information or fiscal incentive, and then measures changes in the behaviour of studied sample of people (treatment group). The changes would then be compared to the control group. In this way one can draw conclusions on the effect the changed parameter has on actual behaviour of participants. The control of the parameters secures that experiments are typically systematic and rigorous, which often gives the possibility not only to establish correlations (typical for surveys), but also cause-effect relations. In experiments researchers can achieve statistically significant results from small samples, which is cost-efficient. However, experiments may have the problem of low generalisability outside the laboratory (van Bavel et al. 2013) since the outcomes of experiment might depend on the external factors and not only on the parameters controlled in the experiment itself.

Randomised controlled trials (RCTs)

RCTs are another research method established in applied behavioural science in which interventions are tested experimentally in their natural environment, wherever it might be – in a shop, at home or on the street. RCTs typically devide research subjects into two groups, where the treatment group faces changes in one or some parameters, while control group maintains status quo or receives the equivalent of a placebo. The outcomes of RCTs often depend on the target group, specific location and time of the RCT execution. Similar to experiments, RCT face the problem of generalisability to other contexts, since the effect of particular interventions can depend on the context (Pawson and Tilley 1997). It is often recommended to run RCT twice to make sure that revealed causal relations between parameters and behaviours are true. This of course increases financial costs and makes RCTs a time-consuming enterprise.

Surveys

Surveys have been widely used in supporting policy making and are based on questioning large samples of people about their behaviour. One of the strong sides of surveys is their external validity as the sample is typically representative of the larger population. On the other hand, surveys are usually designed with limited range of information to be collected, as many answers are preformulated leaving little room for flexibility and extensive comments from surveyed subjects. Surveys also offer little possibility to check the truethfulness of the answers and it is typically difficult to monitor whether people respond honestly or offer socially accetable and politically correct answers. Finally, self-reporting of behaviour implies that information provided is subjective, as experienced and perceived by the surveyed subjects and might substantially deviate from the actual behaviour. Especially when dealing with behaviours that people are not conscious of, surveys do not offer reliable findings concerning behaviour.

Qualitative research

A range of research methods that are commonly used by behavioural scientists and to some extent in policy evaluation are interviews (open ended and semi-structures), focus groups, and participant observation. These methods collect rich data about behaviours, opinions and feelings of studied subjects and much deeper accounts of events and various phenomena. Unlike in the case of surveys, interviewed or observed subjects are not restricted by the set of pre-formulated questions and are typically free to generate their own insights. Observations also typically take place in natural environments thereby giving people freedom to demonstrate actual behaviour. Qualitative research is usually done on small samples of subjects, which affects its generalisability to the level of entire population. On the other hand, the small sample size makes these methods cost effective.

Table 7 Summary of types of behavioural studies (van Bavel et al. 2013)

Type of study	Pros	Cons	Minimum time horizon needed
Experiments	Can establish causality, not only correlation Can provide statistically significant results from a relatively small sample size	Representativeness for EU-28 not feasible A laboratory is an unrealistic and artificial environment	6 months
Randomised control trials (RCTs)	Core findings can apply to other contexts Can establish causality, not only correlation Allow for observations in natural settings	Very expensive to run at EU level (and to replicate in order to validate results) Results from one location not generalisable to others	12 months
Surveys	Representativeness for EU-28 is feasible; relatively cost effective	Respondents are limited by pre-established options to questions Respondents might not be truthful Only gather data on self-reported behaviour Cannot establish causality, only correlation	4 months
Qualitative research methods	Provide richer, more nuanced data about behaviour Often take place in realistic settings Participants are given freedom to express themselves, with limited intervention by researcher	Data collected is generally not representative of the larger population Usually have small samples due to the time and cost involved	4 months

To summarise, qualitative methods are best suited for uncovering the diverse representations and expressions of the studied behaviour and the factors that affect it, while quantitative methods are best suited if the goal is to establish the prevalence of certain behaviours among a population.

The behavioural insights gained with the help of these research methods could be used at different stages of policy development process (van Bavel et al. 2013): 1) at the design stage when potential response of people to various elements of policy need to be examined and various policy designs tested; 2) at the Impact Assessment stage when decisions are made about mechanisms to introduce, enforce and monitor policy implementation. 3) The implementation stage may include experiments or pilots that could assist with choosing the most effective and cost-efficient policy options. Once a particular policy intervention has been decided upon, a behavioural pilot study could be conducted in order to test policy effectiveness on a smaller sample of people before its full-scale roll-out. The involvement of behavioural scientists in pilots and rolling out of policies is critical and there is need to integrate them much earlier upstream in the policy design stage. The small scale pilot may offer insights on behaviour that have not been anticipated earlier. This might mean that policy process may need to go back one step to the policy design stage (Figure 7). Thus, nudge is not a discrete action but a process where adaptation/ evolution of behaviour changing tools is planned for and where follow-up action is possible (House of Lords 2011). 4) Finally, behavioural insights are not only relevant in shaping new policy instruments, but also in ex-post evaluations of existing policies.

7.2 Nudge in the policy toolkit

Behaviour change is a complex system under influence of numerous societal interactions; therefore changes to behaviour require complex approaches. Nudging in itself is an array of specific nudge tools, and it is an addition to the policy toolkit for changing behaviour and in particular, a tool to make policy implementation more effective (as in the UK BIT examples). More importantly, it highlights the critical role of the *context* for decisions/behaviours of individuals. Therefore, nudge strategies and tools themselves need to be accompanied by other measures that, for example, create pro-sustainable values or offer sustainable infrastructure.

This in turn means that *nudge is one tool out of many* that are needed in order to change consumer behaviour in pro-sustainable directions and it needs to be supported by infrastructure and institutions so that the very context of the behaviour would promote the behaviour itself, e.g. information about the benefits of cycling to work are communicated while new cycling facilities are being provided. Studies indicate that combination of policy instruments improves behaviour change outcomes. For example, Dolan and Metcalfe (2011) report on a large field experiment in which they compared the effects of social norm communication on energy saving with effects achieved when social norm communication was linked to information on energy saving. The application of the combined tools doubled the effect. Thus, often the role of nudging in the policy development and application is to supplement and enhance effects of other instruments, e.g. through increasing salience of infor-

mation, by complementing eco-lable with life cycle costing (GreeNudge 2013) or by combining effects of social norms with information provision.

So, in which policy applications can nudge be an interesting policy tool? In principle, any policy directly or indirectly influences behaviour of people or has a behavioural element to it could benefit from using insights of behavioural science and where relevant, the nudge tools (van Bavel et al. 2013). Nudge may provide useful input at different stages of policy development and implementation process, from idea generation to execution and ex-post evaluations, explaining outcomes and perhaps offering valuable clarifications as to behavioural and contextual factors that affected the results. It can be useful both for designing new policies and for evaluating the effectiveness and efficiency of the existing ones.

So for which types of policies can one expect nudge to offer a useful contribution? Behavioural insights and nudge specifically can be relevant for policies that directly aim to (Lunn 2014):

1) *change specific behaviours*, for example, wear seat belts, use condoms, waste less food or quit smoking or drinking (van Bavel et al. 2013),
2) address *low-involvement products* and spontaneous purchases (sugar, soft drinks) or
3) policies that target relatively *complex products and services*, such as financial services, health insurance and other markets involving service contracts, as well as such diverse areas as online gambling, transparency of bank charges, European sales law and fees for international credit card use.

In addition, nudge tools can be useful for *the policy making process per se*, since policy makers are also subject to biases, cognitive short-cuts, and are influenced by social norms and group pressure as much as other people are (van Bavel et al. 2013). Raising awareness about these pitfalls can reduce their negative effects and improve policy design and, in the best case, policy effectiveness (Lunn 2014).

7.3 Institutionalising nudge in policy context

As briefly outlined in chapter 5, the policy application of insights from behavioural economics and cognitive psychology has been organised in different ways in various countries. For example, in the USA, behavioural insights were first applied in regulatory review, with a strong focus on evidence-based policy. However, more recently, the approach has turned more to in-house consultancy work, where administrations gain training, research support and networking. In the UK, the Behavioural Insights Team was originally established in the Cabinet Office, but has been recently divested into an external consultancy, which however mainly (but not only) works for the Cabinet Office and hence the central government. In Denmark and Norway, nudge activities were originally established outside government and to serve a broader clientele.

If the work with nudge should be given specific attention in Sweden, what are the prospective ways to institutionalise such an effort in the Swedish policy context that would allow:

1) integration of behavioural insights throughout policy making process (from idea generation to design, implementation and evaluation) and
2) testing and improvement of policy effectiveness and efficiency in various sectors of policy making, e.g. environmental, consumer, waste management, financial and health services. Several ways to organise work on nudging are conceivable:
    - A unit within the state administration or supporting institutions, e.g. agencies
    - A research team at a university or research institute
    - An independent consultancy company working with nudge experiments and policy testing

Each of these institutional arrangements has its strengths and weaknesses. However before choosing an institutional form for incorporating the insights of behavioural economics in Sweden, perhaps a roll-out of knowledge and experience to other administrations (besides the Swedish EPA) could be useful, which could help set up a network of people interested in nudge and its applications and/or who could be involved in the future work.

In addition to the establishment of a unit providing support for the development and testing of nudges, there might be a need to create demand and capacity for this kind of expertise within the public administration. Hence, training events, capacity building and/or networking might be helpful for the relevant administrations (consumer, environment, transport, food, public health, housing, energy etc.). For example, each administration might want to select a "nudge contact person" and "nudge network" meetings might be organised for these contact persons to hear experts and share experiences, insights and ideas.

A broader deployment of nudge within the public administration might also require political discussion. This might, for example, be a task for the nudge network to prepare and present for Parliament. Going ahead, it might also be relevant to engage municipal administrations, as the municipalities provide a wide range of services in general and relevant to sustainable consumption in particular.

8 Conclusions

Insights from behavioural sciences are being increasingly used to inform policy making. Examples include the simplification of complex environmental or sustainability information through the use of eco-labels, improvement of the salience of health impacts of foods through standardised nutritional information, or offering people higher levels of convenience by providing them with close-to-home recycling facilities. Lately, the focus on applications of behavioural economics such as nudge, have been helping policy makers in different countries and sectors to more systematically integrate behavioural insights into policy design and implementation in consumer and competition policies, especially when it comes to providing default options in situations with complex information (e.g. pension funds or financial services), simplifying complex information for users or mandating economic actors to provide certain information. Also making key information more salient or making preferable options more convenient for people have been widely employed.

Although scientific evidence underpins many of the policies informed by behavioural economics, the size of the effects of policy interventions and the actual outcomes of interventions in specific contexts remain hard to measure. Results from one experiment cannot be indiscriminately generalised to a different context or to a wider population. The problem is the complexity of human behaviour and the diversity of factors that influence it. Thus, even when it is possible to demonstrate visible or significant effects of a certain intervention, the precise causal mechanisms between the revealed subtle influences are hard to identify in real-life contexts. This means that the policy impact might be hard to estimate ex-ante even in the presence of sound empirical findings. Therefore policy makers need to pay close attention to the size and relevance of an effect that might be obtained from a specific policy intervention in a specific context (i.e., concerning a specific behaviour, a specific target group, at a particular time, and in a localised geographical context). Policy outcomes are always context dependent.

Despite the relatively uncertain outcomes in specific local contexts, the use of the inductive approaches of behavioural economics, such as nudges, is growing in some countries. These approaches are seen as a complement to the traditional policy instruments rather than as a substitute for coercive measures (laws and regulations) and economic tools (e.g. fiscal incentives, subsidies, taxes or fees). Nudging in general and green nudges in particular are interesting tools that can be used alongside other instruments for behaviour change (Centre d'analyse stratégique 2011). Especially in recent years, when there is a growing understanding of the importance of policy packages, nudge tools are being increasingly applied in combination with legal and fiscal instruments, for example in the case of smoking and wearing car belts. Nudge is a useful strategy for inducing changes in context-specific behaviour. Rather than being seen as a silver bullet, the largest promise of nudge is perhaps in helping design other initiatives better and in improving the effectiveness and efficiency of

policy tools and the speed of their implementation (Avineri and Goodwin 2010). Nudge is a cost effective instrument that enhances other policy tools and targets behaviours that are not addressed by other policy instruments because the behaviours are based on automatic, intuitive and non-deliberative thinking.

Nudging promotes a more empirical approach to policy design and evaluation than the tools usually applied in policy making and ex-ante evaluation. Cost-benefit analyses and regulatory and sustainability impact assessments are conducted in a more deductive way, where the gathered evidence is sieved through a theoretical framework in order to offer a reliable estimate regarding the expected effects of a certain intervention in a middle to long term. The behavioural economics approach relies on a much more dynamic interplay between theory, evidence and policy relevant outcomes. Theoretical knowledge about behaviour change may help generate a range of options for how to help various actors make better choices, but the policy-relevant outcomes – the effect of the different interventions – will nevertheless depend on the specifics of the context tested empirically. Thus, in order to assess the effectiveness of a policy intervention in a specific context, policy makers and regulators will have to employ experiments, pilots or randomised control trials, in addition to cost-benefit analysis, regulatory and sustainability impact assessments.

An important consideration for tools based on the findings of behavioural economics is their acceptance by the public. This depends, among other issues, on whether the targeted behaviours are controversial or not. Here social norms and values play a role. For example, policy tools that are designed to change the way information is presented to the users by simplification, improving the salience of certain features or increasing the level of convenience are less controversial. This is because they help people avoid clearly identifiable mistakes they are prone to make due to lack of understanding of complex information or due to paying attention to issues of lower relevance. Other tools, such as defaults, might be more controversial to apply.

Public acceptance for different nudge tools is easier to gain if there is consensus regarding the "ends" of the policy intervention – its goals, e.g. improved road safety. However, when there is no common agreement about the goal of the policy intervention, which might be the case for e.g. risky investments or gambling, high impact consumption or wasteful behaviour, it might be difficult to gain acceptance for specific measures, even though the goals of such interventions could have been accepted by the public.

One of the substantial limitations of nudge in the sustainable consumption field is the very fact that it works through influencing intuitive and non-deliberative processes of individuals and thus does not actively engage the public in debating patterns and levels of consumption. This also means that perhaps this is a possible strategy for people with low engagement in sustainable consumption and sustainability discourse. There is a growing consensus that "the best interventions will certainly be those that seek to change minds alongside changing contexts" (Dolan et al. 2012).

Nudge is an appropriate tool for small choices and behaviours that can be influenced at the level of detail required for designing better "choice architectures". Even in these cases – as in the case of all policies – there might be unintended (positive or negative) consequences (Shove 2010). Broader systems, such a the transport system of a city or a country's reliance on fossil fuels are not likely to be manageable at such a level of detail, and they are decisive for the sustainability of consumption patterns. Hence, "nudge" is only one tool to make policy measures more effective. In the case of sustainable consumption, there is also a need to understand the deeper and more societally embedded roots of unsustainable consumption. This can enable work on interventions that shape sustainable infrastructures, enlist citizens to create new meanings for them and develop new competencies (Shove 2012). The depoliticised nudge paradigm is not likely to support such broader social and institutional mobilisation for sustainable consumption.

The reliance on behavioural economics and its empirical approach in the policy context has implications for the set of skills required in order to commission, conduct and interpret the empirical assessments, both for policy makers and regulators, as well as for the type of scientists to be charged with the task of running the empirical tests and assessing the effectiveness of various policy options to change behaviour. To assist with this, one useful approach could be to organise a brainstorming session between researchers and the staff of the Swedish EPA with the purpose to identify:

- Existing successful and less successful experiences of explicitly or implicitly using nudge in the Swedish context
- New ideas for policies to be developed and later selected for testing
- Suggestions for reforming existing policies, to be subjected to testing and experimentation.

Finally, nudging is not a well-developed theory, but rather an application of a broad range of behavioural sciences to public policy. As the application field develops, the need for a coherent theory becomes more apparent and acute. Experts in nudging indicate that specifically the interaction between deliberative and non-deliberative systems of thinking need to be further explored. With regard to specific consumption domains, future research could benefit from more experimentation and piloting in the field of mobility and travel behaviour, as there is much less research available in this domain than in energy and food domains.

9 References

Ahmed, B. (2011), 'Manchester congestion charging scheme: a review' *Journal of Civil Engineering and Construction Technology*, Vol. 2 No. 11, pp. 236–241.

Alemanno, A. (2012), 'Nudging Europe', European Voice. Available online: http://www.europeanvoice.com/article/nudging-europe/, Accessed on 2014-05-26.

Allcott, H. and S. Mullainathan (2010), 'Behavioral Science and Energy Policy' *Science*, Vol. 327 No. 5970, pp. 1204–1205.

Allcott, Hunt (2011), 'Social norms and energy conservation' *Journal of Public Economics*, Vol. 95 No. 9–10, pp. 1082–1095.

Alm, M., A. Björke, et al. (2012). Konsumenten i energisystemet. Stockholm, Näringsdepartementet.

Ariely, D., A. Bracha and S. Meier (2009), 'Doing good or doing well? Image motivation and monetary incentives in behaving prosocially' *American Economic Review*, Vol. 99 No. 544–555.

Arvola, A., A Uutela and U. Anttila (1993), Billing feedback as means to encourage household electricity conservation: A field experiment in Helsinki. Proceedings of the 1993 summer study of the European Council for an energy efficient economy, Rungstedgård, Denmark, June 1–5.

Arvola, Sandra and Hanna Liedgren (2014), *En vegetariska dag i veckan: En studie som utvärderar gymnasieelevers inställning till och efterfrågan av vegetarisk skollunch, samt deras upplevda delaktighet kring skollunchen i en skola i Umeå kommun*. Samhällsvetenskapliga fakulteten, Institutionen för kostvetenskap. Umeå Umeå universitet, pp. 34.

Avineri, E. and P. Goodwin (2010), *Individual behaviour change: Evidence in transport and public health*. London, Department for Transport, pp. 33.

Avineri, Erel (2012), 'On the use and potential of behavioural economics from the perspective of transport and climate change' *Journal of Transport Geography*, Vol. 24, pp. 512–521.

Ayres, I., S. Raseman and A. Shih (2013), 'Evidence from two large field experiments that peer comparison feedback can reduce residential energy usage' *Journal of Law, Economics, and Organization*, Vol. 29 No. 5, pp. 992–1022.

Backhaus, J. (2009), *The Warm Zone Project in Kirklees, UK*, CHANGING BEHAVIOUR Case study 26.

Backhaus, J. and E. Heiskanen (2009), 'Rating Expert Advice on How to Change Energy', Vol. No.

Bamberg, S., S. Fujii, M. Friman and T. Gärling (2010), 'Behaviour theory and soft transport policy measures' *Transport Policy*, Vol. 18 No. 1, pp. 228–235.

Bandura, A. (1977), *Social Learning Theory*, Englewood Cliffs, NJ, Prentice Hall.

Bartle, C., E. Avineri and K. Chatterjee (2011), Information-sharing and communitybuilding: a case-study amongst commuter cyclists. 43rd Universities' Transport Study Group Conference, Milton Keynes, UK, 5–7 January.

Baum, Peter (2011), A new track for technology: Can ICT take care for healthier lifestyles? 22nd European Regional Conference of the International Telecommunications Society, 2011/09/18/21.

Bharma, T., D. Lilley and T. Tang (2011), 'Design for Sustainable Behaviour: Using Products to Change Consumer Behaviour' *The Design Journal*, Vol. 14 No. 4, pp. 427–445.

Bonell, C., M. McKee, A. Fletcher, P. Wilkinson and A. Haines (2011), 'One nudge forward, two steps back' *BMJ*, Vol. 342 No. jan25 3, pp. d401–d401.

Bonsall, Peter , Mark Conner and Andrew Darnton (2009), *Influencing Individual Citizens*. Leeds, Institute for Transport Studies, University of Leeds, pp. 55.

Bronchetti, Erin Todd, Thomas S. Dee, David B. Huffman and Ellen Magenheim (2011), *When a Nudge Isn't Enough: Defaults and Saving Among Low-Income Tax Filers*, National Bureau of Economic Research.

Brög, W., E. Erl, I. Ker, J. Ryle and R. Wall (2009), 'Evaluation of voluntary travel behaviour change: experiences from three continents' *Transport Policy*, Vol. 16 No. 6, pp. 281–292.

Calo , Ryan (2014), 'Code, Nudge, or Notice?' *Iowa Law Review*, Vol. 99 No. 773, pp. 773–802.

Campos, Sarah, Juliana Doxey and David Hammond (2011), 'Nutrition labels on pre-packaged foods: a systematic review' *Public Health Nutrition*, Vol. 14 No. 08, pp. 1496–1506.

Centre d'analyse stratégique (2011), *"Green nudges": new incentives for ecological behaviour*. Paris, Premier Ministre, pp. 10.

Chatterjee, K. (2009), 'A comparative evaluation of large-scale personal travel planning projects in England' *Transport Policy*, Vol. 16 No. 6, pp. 293–305.

Chkanikova, O. and M. ()).. Lehner (2013), *Private eco-brands and sustainable market development: towards new forms of SCP governance in food retailing*. Journal of Cleaner Production: Submitted to the special issue on 'Sustainability and Responsibility Supply Chains and Networks: Challenges for Governance', pp. 25.

Cialdini, Robert B. (2007), *Influence: The Psychology of Persuasion*, Harper.

Cialdini, Robert B. and Noah J. Goldstein (2004), 'Social Influence: Compliance and Conformity' *Annual Review of Psychology*, Vol. 55 No. 1, pp. 591–621.

Cialdini, Robert B., Raymond R. Reno and Carl A. Kallgren (1990), 'A Focus Theory of Normative Conduct: Recycling the Concept of Norms to Reduce Littering in Public Places' *Journal of Personality and Social Psychology*, Vol. 58 No. 6, pp. 1015–1026.

Coggi, P.T. (2012). Behavioural insights in the Commission. The European Commission supports the study and application of behavioural insights for policymaking. European Voice, June 13.

Colman, Andrew (2003), *Oxford Dictionary of Psychology*, New York, Oxford University Press.

Cooper, James C. and William E. Kovacic (2012), 'Behavioral economics: implications for regulatory behavior' *Journal of Regulatory Economics*, Vol. 41 No. 1, pp. 41–58.

Costa, Dora L. and Matthew E. Kahn (2010), *Energy Conservation "Nudges" and Environmentalist Ideology: Evidence from a Randomized Residential Electricity Field Experiment*. Cambrdige, MA., National Bereau for Economic Research, pp. 34.

Cronqvist, Henrik and Richard H. Thaler (2004), 'Design Choices in Privatized Social-Security Systems: Learning from the Swedish Experience' *The American Economic Review*, Vol. 94 No. 2, pp. 424–428.

Dahlbom, B., H. Greer, C. Egmond and R. Jonkers (2009), *Changing Energy Behaviour: Guidelines for Behavioural Change Programmes*, Produced by the BEHAVE project, supported by Intelligent Energy Europe.

Darnton, A. (2008), *GSR Behaviour Change Knowledge Review. Reference Report: An overview of behaviour change models and their uses*. London, Government Social Research Unit, pp. 83.

Dawnay, E. and H. Shah (2005), *Behavioural Economics: seven principles for policy makers*. London, New Economics Foundation.

Delmas, M. A., M. Fischlein and O. I. Asensio (2013), 'Information strategies and energy conservation behavior: A meta-analysis of experimental studies from 1975 to 2012' *Energy Policy*, Vol. 61, pp. 729–739.

Department for Transport (2011a), *Behavioural Insights Toolkit*. London, Department for Transport, pp. 64.

Department for Transport (2011b), *Creating Growth, Cutting Carbon. Making Sustainable Local Transport Happen*. London, Department for Transport, pp. 99.

Dolan, P., M. Hallsworth, D. Halpern, D. King, R. Metcalfe and I. Vlaev (2012), 'Influencing behaviour: the mindspace way' *Journal of Economic Psychology*, Vol. 33 No. 1, pp. 264–277.

Dolan, P. and R. Metcalfe (2011), *Better neighbors and basic knowledge: a field experiment on the role of nonpecuniary incentives on energy consumption*. Oxford, University of Oxford, Merton College.

Dresner, S., T. Jackson and N. Gilbert (2006), 'History and social responses to environmental tax reform in the United Kingdom' *Energy Policy*, Vol. 34 No. 8, pp. 930–939.

EEA (2013), *Environmental Pressures from European Consumption and Production*. Copenhagen, European Environment Agency, pp. 124.

Egebark, Johan and Mathias Ekström (2013), *Can Indifference Make the World Greener?*

Ekoweb (2013), *Ekologisk livsmedelsmarknad*. Stockholm, LRF, pp. 26.

Elster, Jon (1979/1984), *Ulysses and the Sirens: Studies in Rationality and Irrationality*, Cambridge, Cambridge University Press.

Energimyndigheten (2012), *Energy Efficiency Policies and Measures in Sweden*. Eskilstuna, Swedish Energy Agency, pp. 56.

Entman, R. (1993), 'Framing: toward clarification of a fractured paradigm' *Journal of Communication*, Vol. 43 No. 4, pp. 51–58.

Felsen, Gidon , Noah Casteloy and Peter B. Reiner (2013), 'Decisional enhancement and autonomy: public attitudes towards overt and covert nudges' *Judgement and Decision Making*, Vol. 8 No. 3, pp. 202–213.

Festinger, L. (1957), *A theory of cognitive dissonance*, Stanford, CA, Stanford University Press.

Fischer, C. (2008), 'Feedback on household electricity consumption: a tool for saving energy?' *Energy efficiency*, Vol. 1 No. 1, pp. 79–104.

Fox, C.R., R.K. Ratner and D.S. Lieb (2005), 'How subjective Grouping of Options Influences Choice and Allocation: Diversification Bias and the Phenomenon of Partition Dependence' *Journal of Experimental Psychology: General*, Vol. 134 No. 4, pp. 538–551.

Frederick, S. and G. Loewenstein (2002), 'Time discounting and time preference: A critical review' *Journal of Economic Literature*, Vol. 40 No. 2, pp. 351–401.

Freedman, Marjorie R. and Carolina Brochado (2010), 'Reducing Portion Size Reduces Food Intake and Plate Waste' *Obesity*, Vol. 18 No. 9, pp. 1864–1866.

Frerichs, Sabine (2011), 'False Promises? A Sociological Critique of the Behavioural Turn in Law and Economics' *Journal of Consumer Policy*, Vol. 34 No. 3, pp. 289–314.

Friman, M., L. Larhult and T. Gärling (2013), 'An analysis of soft transport policy measures implemented in Sweden to reduce private car use' *Transportation Research Part A Policy and Practice*, Vol. 40 No. 1, pp. 109–129.

Fujii, S. and A. Taniguchi (2006), 'Determinants of the effectiveness of travel feedback programs – a review of communicative mobility management measures for changing travel behaviour in Japan' *Transport Policy*, Vol. 13 No. 5, pp. 339–348.

Futerra (2007), *Rules of the Game. Evidence base for the Climate Change Communications Strategy*, Futerra, pp. 5.

Gaunt, M., T. Rye and S. Allen (2007), 'Public acceptability of road user charging: the case of Edinburgh and the 2005 Referendum' *Transport Reviews*, Vol. 27 No. 1, pp. 85–102.

Geller, H. and S. Attali (2005), *The experience with energy efficiency policies and programmes in IEA countries. Learning from the Critics*. Paris, International Energy Agency, pp. 47.

Gillingham, Kenneth and Karen Palmer (2014), 'Bridging the Energy Efficiency Gap: Policy Insights from Economic Theory and Empirical Evidence' *Review of Environmental Economics and Policy*, Vol. 8 No. 1, pp. 18–38.

Goldberg, Marvin E. and Kunter Gunasti (2007), 'Creating an Environment in Which Youths Are Encouraged to Eat a Healthier Diet' *Journal of Public Policy & Marketing*, Vol. 26 No. 2, pp. 162–181.

Goldstein, Noah J., Robert B. Cialdini and Vladas Griskevicius (2008), 'A Room with a Viewpoint: Using Social Norms to Motivate Environmental Conservation in Hotels' *Journal of Consumer Research*, Vol. 35 No. 3, pp. 472–482.

Goodwin, Tom (2012), 'Why we should reject 'nudge" *Politics*, Vol. 32 No. 2, pp. 85–92.

GreeNudge (2013), *Potensialet for nudging i norsk klimapolitikk. GreeNudge*. Oslo, pp. 11.

GreeNudge. (2014), 'Lillehammer kommune blir landets første med egen nudge-komité', GreeNudge,. Available online: http://www.greenudge.no/nudge/lillehammer-vil-nudge/, Accessed on 2014-05-23.

Gronow, J. and A. Warde (2001), *Ordinary Consumption*, London, Routledge.

Gössling, Stefan (2013), 'Urban transport transitions: Copenhagen, City of Cyclists' *Journal of Transport Geography*, Vol. 33 No. December pp. 196–206.

Hansen, Pelle Guldborg (2014), *Nudge and Libertarian Paternalism: Does the hand fit the glove?* Copenhagen, Roskilde University, pp. 23.

Hansen, Pelle Guldborg and Andreas Maaløe Jespersen (2013), 'Nudge and the manipulation of choice' *Eur J Risk Reg*, Vol. 1, pp. 3–28.

Harford, T. (2014). Behavioural Economics and public policy. Financial Times, March 21.

Harries, T., P. Eslambolchilar, et al. (2013). Walking in the Wild – Using an Always-on Smartphone Application to Increase Physical Activity. Human-Computer Interaction–INTERACT P. Kotze, G. Marsden, G. Lindgaard, J. Wesson and M. Winckler. Berlin Heidelberg, Springer 8118 19–36.

Hausman, Daniel M. and Brynn Welch (2010), 'To Nudge or Not to Nudge' *Journal of Political Philosophy*, Vol. 18 No. 1, pp. 123–136.

Heinzle, S. L. and R. Wüstenhagen (2012), 'Dynamic adjustment of eco-labeling schemes and consumer choice—the revision of the EU energy label as a missed opportunity?' *Business Strategy and the Environment*, Vol. 21 No. 1, pp. 60–70.

Heiskanen, E., B. Brohmann, U. R. Fritsche and N. Schonherr (2009), 'Policies to promote sustainable consumption: Framework for a future-oriented evaluation' *Progress in Industrial Ecology, an International Journal*, Vol. 6 No. 4, pp. 387–403.

Heiskanen, E., H. Nissilä and R. Lovio (forthcoming), 'Demonstration buildings as protected spaces for clean energy solutions – the case of solar building integration in Finland' *Journal of Cleaner Production*, Vol. No.

Heymen, J. and D. Ariely (2004), 'Effort for payment: a tale of two markets' *Psychological Science*, Vol. 15 No. 11, pp. 787–793.

House, James S. (1981), *Work stress and social support* Addison-Wesley Longman, Incorporated.

House of Lords (2011), *Behaviour Change*, The House of Lords, pp. 111.

Institute for Government and Cabinet Office; (2011), *MINDSPACE: Influencing behaviour through public policy*. London, Institute for Government.

INudgeYou. (2014), 'Homepage', Available online: http://www.inudgeyou.com/, Accessed on 2014-05-23.

Iyengar, S. and M. Lepper (2000), 'When Choice is Demotivating: Can One Desire Too Much of a Good Thing?' *Journal of Personality and Social Psychology*, Vol. 79 No. 6, pp. 995–1006.

John, Peter, Sarah Cotterill, Liz Richardson, Alice Moseley, Gerry Stoker, Corinne Wales, Graham Smith, Hanhua Liu and Hisako Nomura (2013), *Nudge, Nudge, Think, Think: Experimenting with Ways to Change Civic Behaviour*, London, Bloomsbury Academic.

Johnson, E. J. and D. Goldstein (2003), 'Do Defaults Save Lives?' *Science*, Vol. 302, pp. 1338–1339.

Johnson, Eric J., Suzanne B. Shu, Benedict G. C. Dellaert, Craig Fox, Daniel G. Goldstein, Gerald Häubl, Richard P. Larrick, John W. Payne, Ellen Peters and David Schkade (2012), 'Beyond nudges: Tools of a choice architecture' *Marketing Letters*, Vol. 23 No. 2, pp. 487–504.

Johnston, I. (2014). 'The Nudge team started out as a sort of Mission Impossible': How the Government's successful Behaviour Insights Team has had a profound effect on Whitehall. The Independent, 23 May.

Kahneman, D. (2013), Foreword. '*The Behavioral Foundations of Public Policy*'. Shafir, E. New Jersey, Princeton University Press.

Kahneman, Daniel (2011), *Thinking, Fast and Slow*, Farrar, Straus and Giroux.

Kahneman, Daniel and Amos Tversky (1979), 'Prospect Theory: An Analysis of Decision under Risk' *Econometrica*, Vol. 47 No. 2, pp. 263–292.

Kallbekken, S. and H. Sælen (2013), ''Nudging' hotel guests to reduce food waste as a win–win environmental measure' *Economics Letters*, Vol. 119 No. 3, pp. 325–327.

Kallbekken, Steffen and Håkon Sælen (2012), *Redusert matavfall. Resultater fra eksperimentet*. Oslo, GreeNudge.

Kallbekken, S., H. Sælen and E. A. T. Hermansen (2013), 'Bridging the Energy Efficiency Gap: A Field Experiment on Lifetime Energy Costs and Household Appliances' *Journal of Consumer Policy*, Vol. 36 No. 1, pp. 1–16.

Kalnikaitė, Vaiva, Jon Bird and Yvonne Rogers (2013), 'Decision-making in the aisles: informing, overwhelming or nudging supermarket shoppers?' *Personal and Ubiquitous Computing*, Vol. 17 No. 6, pp. 1247–1259.

Karjalainen, S. (2007), *Why it is difficult to use a simple device: an analysis of a room thermostat.*, Berlin Heidelberg, Springer

Karlsson, F., P. Rohdin and M. L. Persson (2007), 'Measured and predicted energy demand of a low energy building: important aspects when using building energy simulation' *Building Services Engineering Research and Technology*, Vol. 28 No. 3, pp. 223–235.

Ker, I. (2004), 'Household-based voluntary travel Behaviour change: aspirations, achievements and assessment' *Transport Engineering in Australia*, Vol. 9 No. 2, pp. 119–138.

Kopelman, Peter (2011), 'Debate: Tackling obesity—to 'nudge' or to 'shove'?' *Public Money & Management*, Vol. 31 No. 4, pp. 236–238.

Lanzarone, Gaetano Aurelio and Antonella Zanzi (2010), 'Monitoring gas and water consumption through ICTs for improved user awareness' *Information, Communication & Society*, Vol. 13 No. 1, pp. 121–135.

Larrick, R.P. and J.B. Soll (2008), 'The MPG illusion' *Science*, Vol. 320 No. 5883, pp. 1593–1594.

Lindenberg, S. and L. Steg (2007), 'Normative, gain and hedonic goal frames guiding environmental behavior' *Journal of Social Issues*, Vol. 63 No. 1, pp. 117–137.

Lockton, D. , D. Harrison, T. Holley and N.A. Stanton (2009), Influencing interaction: development of the design with intent method. Proceedings of the 4th International Conference on Persuasive Technology (Persuasive '09). New York, NY, USA.

Lombardini, Chiara and Leena Lankoski (2013), 'Forced Choice Restriction in Promoting Sustainable Food Consumption: Intended and Unintended Effects of the Mandatory Vegetarian Day in Helsinki Schools' *Journal of Consumer Policy*, Vol. 36 No. 2, pp. 159–178.

Lunn, Pete (2014), *Regulatory Policy and Behavioural Economics*. Paris, OECD, pp. 74.

Maniates, M. (2010), Editing out unsustainable behaviour. '*State of the World: Transforming Cultures from Consumerism to Sustainability*'. Worldwatch Institute. New York and London, W.W. Norton and Company.

Marteau, T.M. , D. Ogilvie, M. Roland, M. Suhrcke and M.P. Kelly (2011), 'Judging nudging: can nudging improve population health?' *British Medical Journal*, Vol. 342, pp. d228.

McKenzie-Mohr, D. and P. W. Schultz (2014), 'Choosing effective behavior change tools' *Social Marketing Quarterly*, Vol. 20 No. 1, pp. 35–46.

McKenzie-Mohr, Doug (2011), *Fostering sustainable behavior: An introduction to community-based social marketing*, New Society Publishers.

Metcalfe, Robert and Paul Dolan (2012), 'Behavioural economics and its implications for transport' *Journal of Transport Geography*, Vol. 24 No. September pp. 503–511.

Moisander, Johanna, Annu Markkula and Kirsi Eraranta (2010), 'Construction of consumer choice in the market: challenges for environmental policy' *International Journal of Consumer Studies*, Vol. 34 No. 1, pp. 73–79.

Mont, O. and K. Power (2013), *Understanding factors that shape consumption*. Copenhagen, ETC-SCP.

Mont, Oksana, Ed. (2013), *Sustainability landscape of Swedish food retailers in the European context*. Lund, Lund University.

Musselwhite, C. (2004), Technological humps and having the hump with technology. International Conference on Traffic and Transport Psychology, Albert Hall, Nottingham, 5–9 September.

Nair, G., K. Mahapatra and L. Gustavsson (2012), 'Implementation of energy-efficient windows in Swedish single-family houses' *Applied Energy*, Vol. 89 No. 1, pp. 329–338.

Naturvårdsverket (2014), *'Miljömål.se – den svenska miljömålsportalen'*. Available online: http://www.miljomal.se/, Accessed on 2014-04-20

Newell, R.G. and J. Siikamäki (2013), *Nudging Energy Efficient Behaviour. The Role of Information Labels*. Washington DC, Resources for the Future.

Nordfält, Jens (2007), *Marknadsföring i butik: Om forskning och branschkunskap i detaljhandeln*, Liber.

Norman, D. (1988), *The Psychology of Everyday Things*, New York, Basic Books.

Norström, Thor, Ted Miller, Harold Holder, Esa Österberg, Mats Ramstedt, Ingeborg Rossow and Tim Stockwell (2010), 'Potential consequences of replacing a retail alcohol monopoly with a private licence system: results from Sweden' *Addiction*, Vol. 105 No. 12, pp. 2113–2119.

Nuffield Council on Bioethics (2007), *Public health: Ethical Issues, showing the range of potential interventions which could be used to promote positive lifestyle changes*.

O'Donoghue, T. and M. Rabin (1999), 'Doing it now or later' *American Economic Review*, Vol. 89, pp. 103–124.

Olstad, Dana Lee , Laksiri A. Goonewardene, Linda J. McCargar and Kim D. Raine (2014), 'Choosing healthier foods in recreational sports settings: a mixed methods investigation of the impact of nudging and an economic incentive' *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 11 No. 1, pp. 6.

Oskamp, Stuart, Lynnte Zelezny, P. Wesley Schultz, Sharrilyn Hurin and Rachel Burkhardt (1996), 'Commingled Versus Separated Curbside Recycling Does Sorting Matter?' *Environment and Behavior*, Vol. 28 No. 1, pp. 73–91.

OSTP (2013), *Research to Results: Strengthening Federal Capacity for Behavioral Insights*. Washington, D.C., Office for Science and Technology Policy.

Oullier, O., R. Cialdini, R. Thaler and S. Mullainathan (2010), Improving public health prevention with a nudge. ' *Improving public health prevention with behavioural, cognitive and neuroscience'*. Oullier, O. and S. Sauneron. Paris, pp. 165.

Park, Seejeen and Frances S. Berry (2013), 'Analyzing effective municipal solid waste recycling programs: the case of county-level MSW recycling performance in Florida, USA' *Waste Management & Research*, Vol. 31 No. 9, pp. 896–901.

Pearce, David (2002), *The role of property rights in determining economic values for environmental costs and benefits*. London, Environmental Agency.

Persson, A., A. Göransson and E. Gudbjerg (2009), Bridge over troubled water – spanning the energy-efficiency gap. In Act! Innovate! Deliver! Reducing energy demand sustainably. Proceedings of the 2009 eceee Summer Study, Stockholm, Berg Publishers.

Pichert, D. and K.V. Katsikopoulos (2008), 'Green defaults: information presentation and pro-environmental behaviour' *Journal of Environmental Psychology*, Vol. 28 No. 1, pp. 63–73.

Pucher, John and Ralph Buehler (2008), 'Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany' *Transport Reviews*, Vol. 28 No. 4, pp. 495–528.

Rasul, I. and D. Hollywood (2012), 'Behavior change and energy use: Is 'nudge' enough? ' *Carbon Management*, Vol. 3 No. 4, pp. 349–351.

Reisch, Lucia A. and Wencke Gwozdz (2013), Smart defaults and soft nudges. How insights from behavioral economics can inform effective nutrition policy. '*Marketing, food and the consumer. Festschrift in Honour of Klaus Grunert*'. Scholderer, J. and K. Brunsø. New Jersey, Pearson Publisher, pp. 189–200.

Reisch, Lucia A. and Andreas Oehler (2009), ‚Behavioral Economics: Eine neue Grundlage für die Verbraucherpolitik?' *Vierteljahrshefte zur Wirtschaftsforschung*, Vol. 78 No. 3, pp. 30–43.

Rolls, Barbara J., Erin L. Morris and Liane S. Roe (2002), 'Portion size of food affects energy intake in normal-weight and overweight men and women' *The American Journal of Clinical Nutrition*, Vol. 76 No. 6, pp. 1207–1213.

Rothman, Russell L., Ryan Housam, Hilary Weiss, Dianne Davis, Rebecca Gregory, Tebeb Gebretsadik, Ayumi Shintani and Tom A. Elasy (2006), 'Patient Understanding of Food Labels: The Role of Literacy and Numeracy' *American Journal of Preventive Medicine*, Vol. 31 No. 5, pp. 391–398.

Röös, Elin (2012), *Mat-klimat-listan*. Uppsala, Swedish University of Agricultural Sciences.

Sacks, Gary, Mike Rayner and Boyd Swinburn (2009), 'Impact of front-of-pack 'traffic-light' nutrition labelling on consumer food purchases in the UK' *Health Promotion International*, Vol. 24 No. 4, pp. 344–352.

Samuelson, W. and R. Zeckhauser (1988), 'Status quo bias in decision making' *Journal of risk and uncertainty*, Vol. 1 No. 1, pp. 7–59.

Schlag, Pierre (2010), 'Nudge, choice architecture, and libertarian paternalism' *Michigan Law Review*, Vol. 108 No. 6, pp. 913–925.

Schmaltz, J. and C. Boks (2011), Simultaneous Application of Design for Sustainable Behavior and Linked Benefit Strategies in Practice. '*Glocalized Solutions for Sustainability in Manufacturing*'. Hesselbach, J. and C. Hermann. Berlin & Heidelberg, Springer, pp. 173–178.

Schwartz, M.B. (2007), 'The influence of a verbal prompt on school lunch fruit consumption: a pilot study' *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 4 No. 1, pp. 6.

Service, O., M. Hallsworth, D. Halpern, F. Algate, R. Gallager, S. Nguyen, S. Ruda and M. Sanders (2014), *EAST Four simple ways to apply behavioural in-sights*, The Behavioural Insights Team.

Shafir, Eldar (2013), Introduction. '*The Behavioral Foundations of Public Policy* '. Shafir, E., Princeton University Press pp. 1–9.

Shove, E. (2010), 'Beyond the ABC: climate change policy and theories of social change' *Environment and Planning A*, Vol. 42 No. 6, pp. 1273 – 1285.

Shove, E. (2012), 'Putting practice into policy: reconfiguring questions of consumption and climate change' *Contemporary Social Science:* (ahead-of-print), pp. 1–15.

Shove, E. and A. Warde (2002), Inconspicuous Consumption: The Sociology of Consumption, Lifestyles, and the Environment. '*Sociological Theory and The Environment*'. Dunlap, R. E., F. Buttel, P. Dickens and A. Gijswijt, Rowman and Littlefield.

Socialdata (2004), *TravelSmart travel surveys*, Socialdata Australia Pty Ltd.

Stern, P. C. (1999), 'Information, incentives, and proenvironmental consumer behavior' *Journal for Consumer Policy*, Vol. 22 No. 4, pp. 461–478.

Stern, P.C. (1992), 'What Psychology Knows About Energy Conservation' *American Psychologist*, Vol. 47 No. 10, pp. 1224–1232.

Stoker, Gerry (2012), *The Politics of Nudge: dilemmas in implementing policies for sustainable consumption*. University of Southampton, pp. 17.

Stordalen, Gunhild A. and Steffen Kallbekken (2014), Grønne nudge for trippel vinn Sustainable Marketing – Focus Nudging. De små puffarnas styrka, Stockholm, 29 april 2014.

Sunstein, C. R. (2014a), *Why Nudge?: The Politics of Libertarian Paternalism (The Storrs Lectures Series)*, Yale University Press

Sunstein, C. R. (2013), *Simpler. The Future of Government*, New York, Simon & Schuster.

Sunstein, C.R. (2014b), Nudges and Nudging. Sustainable Marketing – Focus Nudging. De små puffarnas styrka, Stockholm, 29 april 2014.

Sunstein, Cass, R. (2011), 'Empirically Informed Regulation' *The University of Chicago Law Review*, Vol. 78, pp. 1349–1429.

Sunstein, Cass R. (2014c), Behavioural economics, consumption, and environmental protection. '*forthcoming in "Handbook of Research on Sustainable Consumption"*'. Reisch, L. and J. Thøgersen, Edward Elgar Publishing.

Sunstein, Cass R. and Lucia A. Reisch (2013), 'Green by Default' *Kyklos*, Vol. 66 No. 3, pp. 398–402.

Tajfel, Henry, M. G. Billig, R. P. Bundy and C. Flament (1971), 'Social categorization and intergroup behaviour' *European Journal of Social Psychology*, Vol. 1 No. 2, pp. 149–178.

Thaler, R.H. and S. Bernartzi (2004), 'Save more tomorrow: Using behavioral economics in increase employee savings' *Journal of Political Economy*, Vol. 112 No. 1.

Thaler, Richard H. and Cass R. Sunstein (2008), *Nudge: Improving decisions about health, wealth, and happiness*, New Haven, CT., Yale University Press.

Toledo, T., O. Musicant and T. Lotan (2008), 'In-vehicle data recorders for monitoring and feedback on drivers' behavior' *Transportation Research Part C*, Vol. 16 No. 3, pp. 320–331.

Tørnblad, Silje H. , Steffen Kallbekken, Kristine Korneliussen and Torben K. Mideksa (2014), 'Using mobility management to reduce private car use: Results from a natural field experiment in Norway' *Transport Policy*, Vol. 32, pp. 9–15.

US EPA. (2014), 'Fuel Economy and Environment Labels ', US EPA. Available online: http://www.epa.gov/carlabel/labelcomparison.htm, Accessed on 2014-05-22.

van Bavel, René , Benedikt Herrmann, Gabriele Esposito and Antonios Proestakis (2013), *Applying Behavioural Sciences to EU Policy-making*. Paris, EU JRC, pp. 13.

van Gilder Cooke, Sonia (2012). Why Going Green Can Mean Big Money for Fast-Food Chains. Times, April 9.

Wansink, B. and M. M. Cheney (2005), 'Super bowls: Serving bowl size and food consumption' *JAMA*, Vol. 293 No. 14, pp. 1723–1728.

Wansink, B., J. Painter and K. van Ittersum (2001), 'Descriptive menu labels' effect on sales' *The Cornell Hotel and Restaurant Administration Quarterly*, Vol. 42 No. 6, pp. 68–72.

Wansink, B. and C. S. Wansink (2010), 'The largest Last Supper: depictions of food portions and plate size increased over the millennium' *International Journal of Obesity*, Vol. 34 No. 5, pp. 943–944.

Wansink, Brian (2004), 'Environmental factors that increase the food intake and consumption volume of unknowing consumers' *Annual Review of Nutrition*, Vol. 24 No. 1, pp. 455–479.

Wansink, Brian (2010), *Mindless Eating: Why We Eat More Than We Think*, New York, Bantam.

Wansink, Brian and Pierre Chandon (2006), 'Health halos: How nutrition claims influence food consumption for overweight and normal weight people' *FASEB Journal*, Vol. 20 No. 5, pp. A1008.

Wansink, Brian and Junyong Kim (2005), 'Bad Popcorn in Big Buckets: Portion Size Can Influence Intake as Much as Taste' *Journal of Nutrition Education and Behavior*, Vol. 37 No. 5, pp. 242–245.

Wansink, Brian and Koert Van Ittersum (2003), 'Bottoms Up! The Influence of Elongation on Pouring and Consumption Volume' *Journal of Consumer Research*, Vol. 30 No. 3, pp. 455–463.

Waygood, O. and E. Avineri (2011), The effect of loss framing on the perceived difference of CO_2 amounts: Implications for advanced travel information systems (ATIS). 43rd Universities Transport Study Group Conference, Milton Keynes, UK, 5–7 January.

Verplanken, Bas and Wendy Wood (2006), 'Interventions to Break and Create Consumer Habits' *American Marketing Association*, Vol. 25 No. 1, pp. 90–103.

Wolff, Franziska and Norma Schönherr (2011), 'The Impact Evaluation of Sustainable Consumption Policy Instruments' *Journal of Consumer Policy*, Vol. 34 No. 1, pp. 43–66.

Ölander, F. and J.. Thøgersen (2014), 'Informing Versus Nudging in Environmental Policy' *Journal of Consumer Policy*, pp. 1–16.

Nudging

A tool for sustainable behaviour?

OKSANA MONT, MATTHIAS LEHNER
AND EVA HEISKANEN

REPORT 6643

SWEDISH EPA
ISBN 978-91-620-6643-7
ISSN 0282-7298

The authors assume sole responsibility for the contents of this report, which therefore cannot be cited as representing the views of the Swedish EPA.

Nudging is a tool that can be used for enabling behaviours and private decisions that are good for individuals and often for the society as well.

Nudges do not try to change one's value system or increase information provision. Instead they address routine behaviours or situations with complex information by offering default options, by making key information more salient, by simplifying complex information for users, or by changing the physical environment to make preferable options more convenient for people.

This report was written by researches from Lund University. The study builds on literature analysis of the existing body of knowledge on nudging approaches in different policy contexts and in different countries. The report analyses the existing evidence with regard to the role, limitations and the varying degree of success of nudging in three domains of household consumption: energy use in the home, food and personal transport. It then describes potential avenues for employing behavioural science in policy making.

RESEARCH ENVIRONMENTAL OBJECTIVES

KNOWLEDGE FOR ENVIRONMENT

NATUR VÅRDS VERKET

Swedish EPA SE-106 48 Stockholm. Visiting address: Stockholm - Valhallavägen 195, Östersund - Forskarens väg 5 hus Ub, Tel: +46 10 698 10 00, fax: +46 10 698 10 99, e-mail: registrator@swedishepa.se Internet: www.swedishepa.se **Orders** Ordertel: +46 8 505 933 40, orderfax: +46 8 505 933 99, e-mail: natur@cm.se Address: Arkitektkopia AB, Box 110 93, SE-161 11 Bromma. Internet: www.swedishepa.se/publications