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What a Waste?!

Exploring the influence of nudging on consumer behaviour towards food waste

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Abstract

Recognizing the importance of food waste as an environmental and social problem, this thesis aims to test nudging as a successful tool to promote a pro-environmental behaviour towards food waste reduction. The present research uses an experiment in a university canteen in Gotland, Sweden, with two interventions - posters with informational prompts and practical tips.

Through quantitative analysis, we were able to conclude that nudging reduced overall food waste, but with no statistical significance for the informational treatment. Furthermore, the informational prompts and the suggestions of shortcut solutions had similar positive impacts in food waste, with no significant difference. However, the study highlights some aspects that limit these results to a short-term perspective due to the experimental period of two months. On the other hand, the complementary qualitative data from interviews with customers revealed that nudges, especially practical suggestions, can be more useful as an awareness tool, rather than a technique to actually change behaviours.

Overall, the findings show that the two interventions reduced food waste with a continuous decreasing trend. Therefore, nudging can be a useful technique for canteens and restaurants to influence consumers' behaviour towards food waste reduction.

Keywords: Food Waste, Social Nudging, Prompting, Consumer Behaviour, Experimental Research, Pro-environmental Behaviour, Sustainability

Table of content

List of figures

List of tables

List of abbreviations

CO2	Carbon dioxide
EU	European Union
FAO	Food Agriculture Organization of the United Nations
FSC	Food Supply Chain
SDG	Sustainable Development Goals
SPSS	Statistical Package for Social Science
TPB	Theory of Planned Behaviour
UN	United Nations

1. Introduction

This chapter will introduce the topic of the thesis, starting with the background information in section 1.1, the purpose of the research in 1.2, our motivation for the thesis in 1.3 and the research question in 1.4.

1.1. Background

In 2019, 690 million people lived in hunger, while around 931 million tonnes of food per capita was wasted in the same year (Environment, 2021). The urgency to fight against food waste has been recognised by the United Nations (UN) in their Agenda for 2030. In the Sustainable Development Goal (SDG) 12, "Ensure sustainable consumption and production patterns", the UN (2023) states in target 12.3 "*By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses"*. Especially in the food service sector, a lot of food is wasted. In 2019, 26% of the 931 million tonnes per capita of food was wasted in the food service sector. Food waste also contributes to climate change by generating greenhouse gas emissions. In 2019, 3,3 gigatonnes of carbon dioxide (CO2) was emitted into the atmosphere caused by food waste (FAO, 2019). Over the years, the concerns about our environment have increased, but still, there is a lack of awareness and knowledge about food waste and how to prevent it, as the report by the European Commission (2011) has shown.

Our literature review shows that food waste is a big problem, environmentally, socially and economically, but we wonder why no significant change is happening. It has been shown that food waste is connected to consumer behaviour. There can be laws and regulations to reduce food waste, but there will be no significant change if consumers do not change their behaviour towards food waste. (Parfitt et al., 2010) also combined this thought by suggesting increasing awareness around the topic since consumers show great potential for reducing food waste. Therefore, the theory of nudging evolved in the field of social science as a potential solution. Nudging includes any aspect that changes people's behaviour (Thaler & Sunstein, 2009). Within pro-environmental behaviour, nudging consumers towards more sustainable behaviours has shown to be an effective and useful tool (Lehner et al., 2016; Schultz, 1999; Whitehair et al., 2013).

1.2. Purpose of research

Several studies have been developed to test different nudging strategies that may reduce food waste, especially in canteens and restaurants. These can be major contributors to the vast amounts of food waste (Whitehair et al., 2013). From all the studies, we highlight some that focus on providing informational prompts with or without personalised and emotional content (Septianto et al., 2020; Whitehair et al., 2013). On the other hand, some studies nudge consumers with specific recommendations and shortcut solutions for reducing food waste (Jagau & Vyrastekova, 2017; Kallbekken & Sælen, 2013). However, it was identified a lack of studies on nudging interventions towards food waste, especially that integrate and compare both these proven successful strategies. A successful practice on a previous study can have a different outcome later as the object of study - consumer behaviour - is highly volatile. Since the lack of studies integrating different nudging tools might happen because of the difficulty of incorporating several strategies into one study. Hence, this study aims to understand how nudging can be a useful tool to promote pro-environmental behaviours in the field of food waste.

1.3. Motivation

For the authors, sustainability is something that belongs to their day-to-day life. Thus, raising awareness and reminding people to adopt a more sustainable lifestyle has become a personal and professional interest to which we like to dedicate our time to. In connection with the importance of food waste as a global issue that needs to be tackled, we then decided to investigate how we could create an impact by influencing people to not waste food at the consumption level. Starting with some research around awareness and consumer behaviour, we got to know nudging as an emerging pro-environmental behavioural tool. Since it is a more recent concept, we identified a lack of research and application of this strategy to food waste related topics, especially when combining more than one nudging technique. Therefore, this research aimed to contribute with more knowledge to the field while trying to create a real impact with an experiment in a canteen. The chosen canteen was Maltfabriken at the authors' university, due to its convenience and direct impact on our surroundings.

1.4. Research questions

Recognising the amount of food wasted in commercial and retail food operations, including university canteens (Whitehair et al., 2013), the present research aims to identify if nudging consumers influences their behaviour to decrease food waste. With this, the present research combines and compares different successful nudging strategies. This aim is presented in our research question:

RQ1. *How does nudging influence consumer behaviour towards food waste?*

To get a better understanding of the consumers' perception and their awareness around food waste, an additional research question was developed. By analysing how consumers perceive food waste as an environmental and social problem, this question aims to understand if consumers are aware enough of food waste's impact. This awareness should exist so that nudging can influence consumers pro-environmental behaviour. The question is presented below:

RQ2. *Do consumers perceive food waste as an important environmental and social problem?*

To answer these questions, we organise our study into six chapters. Firstly, we introduce all the concepts and existing theories in Chapter 2 - Literature Review. Secondly, we present our research design, methods, ethical considerations, and limitations and explain how we will conduct our study in Chapter 3 - Methodology. In Chapter 4, we present our results with the data preparation, the data analysis and the empirical analysis, while in Chapter 5, we discuss those results and insights of the study. Finally, Chapter 6 presents the conclusion of this research and further research suggestions.

2. Literature review

This chapter introduces the relevant literature and the theories used as a theoretical framework to conduct the present study. Section 2.1 focuses on food waste with its definition (2.1.1), an overview of food waste in Europe with a special focus on Sweden (2.1.2), a short overview of the Food Supply Chain (FSC) and the waste hierarchy (2.1.3), the impact food waste has on the environment, the society and the economy (2.1.4) and a highlight of the causes of food waste in canteens and restaurants (2.1.5). The following section (2.2) will highlight the theory of nudging and consumer behaviour. Within this section, nudging is introduced as our leading theory. This concept is also the base of the research, so it is also linked with consumer behaviour (2.3). To round up the chapter, section 2.4 presents the theoretical framework used in the study. This will summarise the theory and the underlying literature and introduce our hypotheses, which are used later in the analysis and discussion to ground our study.

2.1. Food waste

The environmental, social and economic impacts of food waste have become a more relevant topic (Papargyropoulou et al., 2014). Several studies have shown that consumers produce most of the food waste at the end of the FSC (Aydin & Yildirim, 2021; van Doorn, 2016). In response to its increasing focus, reducing global food waste has also become part of the SDGs. In fact, as a part of SDG 12, reducing food waste is included in target 12.3 (FAO, 2019).

2.1.1. Definition of food waste

The term of food waste constantly evolves over the years, so there is no common definition for it. However, one definition is stated by the Food Agriculture Organization of the United Nations (FAO). In their report, the FAO understands food waste as the "weight of wholesome edible material that humans would have normally consumed" (Food and Agriculture Organization of the United Nations & United Nations Environment Programme, 1981, p. 5). Upon this definition, different terms such as food loss and food supply chain have been incorporated into newer definitions. Food loss and waste can be understood as "the decrease in quantity or quality of food along the food supply chain, [where] food losses [are] occurring along the food supply chain [and] food waste, on the other hand, occurs at the retail and consumption level" (FAO, 2019, p. 12).

Food loss emerges at the beginning of the food supply chain caused, for example, by bad harvesting, which causes a decrease in the quantity and quality of the food and is unusable for human consumption (Parfitt et al., 2010).

The European Commission states in their report that “Food waste is composed of raw or cooked food materials and includes food loss before, during or after meal preparation in the household, as well as food discarded in the process of manufacturing, distribution, retail and food service activities” (European Commission. Directorate General for the Environment., 2011, p. 9). Furthermore, food waste can be categorised into three terms: “avoidable, probably avoidable, and unavoidable” (Kavitha et al., 2020, p. 3). Avoidable food waste at the consumption level is food which does not need to be wasted, such as when it reaches the expiring date. Probably avoidable food waste is defined as food that is generally edible, but some people might not eat it due to personal preferences. Unavoidable food waste is the one being created during the preparation of food that cannot be eaten under any condition. For a better understanding, more examples of these three terms will be shown in section 2.1.5.

2.1.2. Food waste in the European Union and Sweden

Within the European Union (EU), “approximately 88 million tons of food is wasted every year” (Aydin & Yildirim, 2021, p. 1). In 2019, around 931 million tonnes per capita of food waste was generated, with 26% of the total amount in the food service sector (Environment, 2021). The European Commission estimated a total amount of 2,05 million tonnes per capita of food waste in the year 2010 for Sweden (European Commission. Directorate General for the Environment., 2011). In 2021, 2,08 million tonnes per capita of food waste was generated, which makes 42 kg per person of food waste in Sweden in 2021 (*Swedish Waste Management 2021*, 2022).

2.1.3. Food supply chain and waste hierarchy

The food supply chain comprises eleven stages of food waste generation (Parfitt et al., 2010). Papargyropoulou et al.(2014) adapted and shortened the eleven stages in their paper to give an overview of the FSC. Within their model, they describe the four main sectors and where food waste occurs.

Figure 1 is adapted to their model and shows the four main stages: agriculture; food processing and manufacturing; retail; and consumption. As the reports by the FAO (2019), the European Commission (2011) and Swedish Waste Management (2022) have shown, these are the four sectors where food is wasted the most.

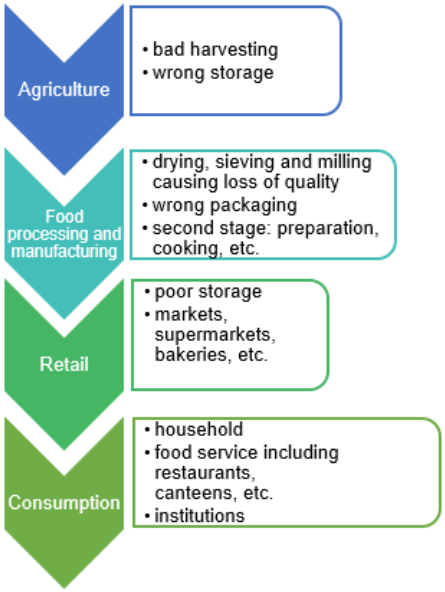

Figure 1 *The four stages of the FSC adaptation from Papargyropoulou et al. (2014)*

In the earlier stages of the FSC, food is wasted due to technical facts or wrong food handling. However, food waste at the end of the FSC at the retail or consumer level can be linked to consumer behaviour (Papargyropoulou et al., 2014). There are different adaptations to the waste hierarchy. One adaptation commonly used in Asia is the three R's hierarchy: reduce, reuse, and recycle. Another way to illustrate the waste hierarchy is shown in Figure 2. Within this structure, the “most favourable option is ‘prevention’, and at the bottom of the inverted pyramid, the least favourable option is ‘disposal’” (Papargyropoulou et al., 2014, p. 110).

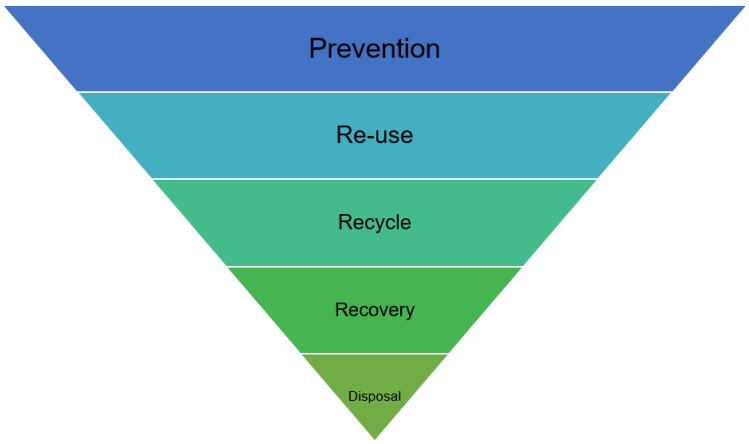

Figure 2 *Food waste hierarchy adaption from Papargyropoulou et al. (2014)*

2.1.4. Environmental, social and economic impacts of food waste

Studies and reports issued by the FAO have shown that food waste contributes to climate change, environmental harm, social injustice and inequality (FAO, 2019; Lewis, 2022; Seberini, 2020). Throughout studies about sustainability, the Triple Bottom Line, introduced and studied by Elkington (1998), is one of the most known frameworks to illustrate sustainability within its three pillars. Therefore, it can be used to present the different types of impact food waste has on the environment, the society and the economy, as it will now be done. The most significant impact of food waste can be allocated to the environment and society, where the focus of this literature review lies (Seberini, 2020).

Environmental impacts: With the immersive use of water, soil and energy, food waste has a significant negative impact on the environment. In 2013, the FAO calculated that "the global carbon footprint of food loss and waste, excluding emissions from land use change, is 3.3 gigatonnes of carbon dioxide (CO2) equivalent, corresponding to about 7% of total GHG emissions" (FAO, 2019, p. 92). By reducing the amount of food waste, about 6-8% of all human-caused greenhouse gases could be reduced (*Fight Climate Change by Preventing Food Waste*, 2023).

Another big part of food waste is agriculture. The FAO (2019, p. 92) states that "almost 1,4 billion hectares, equal to about 30% of the world's agricultural land, are used to produce food that is later lost or wasted". Farmers need groundwater resources to grow food. For that, the FAO calculated the use of 250km^3 groundwater for the crops, which represents around 6% of the total water withdrawals (FAO, 2019). The further along the FSC, the greater the impact of food waste on the environment. At later stages, it is also important to consider the energy used in transporting, storing and cooking (*The Environmental Impact of Food Waste* | *Move For Hunger*, 2023).

At the end of the FSC, the environmental impact grows again due to the rotting of landfills. When food ends up in landfills, it subsequently releases methane. This gas, which is 25 times stronger than carbon dioxide, lingers, after its release, for up to 12 years and traps the heat from the sun (Lewis, 2022).

Social impacts: The social impact of food waste can be attributed to the problem of food security as a global issue (Papargyropoulou et al., 2014). Food is thrown away most of the time in developed countries, which could have been consumed in developing countries (Seberini, 2020). In 2019, 690 million people were living in hunger (Environment, 2021). Food waste within society also has ethical and moral dimensions, particularly the inequality between wasteful practices in developed countries and food poverty in developing countries (Papargyropoulou et al., 2014).

Economic impacts: There is a lack of research regarding the impact food waste has on the economy. One of the consequences that can be thought of is the money that has been invested throughout the FSC to produce the food that is wasted. Approximately 1000 billion US dollars per year are unnecessarily used to produce food that is wasted. Especially in developed countries, food waste affects the pricing policy since more food waste increases the price of non-wasted food. It shows a relation between the greater amount of waste influencing the demand and leading towards an increase in the price of food supply. This also affects society since people with lower incomes then struggle to purchase the products (Seberini, 2020).

2.1.5. Food waste in canteens/restaurants

The sector of commercial and retail food operations, which includes university canteens, is one of the significant contributors to the total amount of food waste. In this sector, 54 billion tons of food is wasted, from which around 540 million tons are generated by university canteens each year (Whitehair et al., 2013). The European Commission lists the following causes for the high amount of food waste: portion size, logistics, attitude towards food, awareness towards food loss and waste and preferences within the food (European Commission. Directorate General for the Environment., 2011).

In the case of canteens and restaurants, food waste can be a big problem regarding consumers' attitude, awareness towards food waste and the portion size, since customers cannot serve themselves the amount they want or need (van Doorn, 2016).

Several studies (European Commission. Directorate General for the Environment., 2011; van Doorn, 2016; Whitehair et al., 2013) have shown that one of the main causes for food waste is the lack of awareness around this topic, since customers show a great potential to change their behaviour when they are aware of their impact. Hence, these studies showed that there is a need to raise awareness around food waste, especially on the impact it has and how to avoid and prevent it.

Another important term to understand when talking about food waste in canteens and restaurants is its avoidability. Most of the food that is being wasted in canteens and restaurants is avoidable and probably avoidable. In restaurants and canteens, avoidable food waste is very common. Most of the time, canteens are not self-serving, meaning the customer cannot decide on the desired quantity. This factor can cause more food waste when the canteen serves bigger portions compared to what customers actually want (van Doorn, 2016). Similarly, this is usually the case in restaurants since the portion size is managed by the restaurant itself. In the case of self-serving canteens, the avoidable food waste can be produced when customers serve themselves more food than they can actually eat, ending up throwing most of the meal away. Probably avoidable food waste can be food that a customer has on their plate but does not like. Since canteens are normally not self-serving, it does not give the opportunity for the customer to choose not to include something in their meal unless they specifically ask. This type of food waste is mainly about preferences and can potentially be avoidable. During the preparation of the food, there is also unavoidable food waste such as eggshells or meat bones, but this thesis focuses on the consumption level (Kavitha et al., 2020).

2.2. Nudging and consumer behaviour

The next sections focus on the theory of nudging as a potential solution to the lack of awareness that exists about the impact consumers and their corresponding behaviour have on the environment and society, in the case of our study. In section 2.2.1, the overall theory of nudging is introduced, which is then complemented by the different strategies of nudging in 2.2.2 and the tool used in this study - prompting, in 2.2.3. Nudging is strongly linked with the theory of consumer behaviour, so section 2.2.4 gives a short introduction to that theory and its connection with nudging.

2.2.1. Nudging

The theoretical concept of nudging first came up with the book *Nudge: Improving Decisions About Health, Wealth and Happiness* by Sunstein and Thaler (2009), where the authors defined a nudge as “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” (Thaler & Sunstein, 2009, p. 6). In this case, choice architecture is defined as the context where people make decisions (Thaler & Sunstein, 2009), which can be altered with nudges to guide and enable individuals to make choices automatically (Dudley & Xie, 2022).

Later, Hansen (2016) thoroughly analysed the original definition to complete it with relevant information. The author included the fact that nudges influence people’s judgement, choices or behaviours, which is possible due to cognitive boundaries, biases, and routines in decision-making.

Furthermore, Dudley and Xie (2022) highlighted that individuals do not always behave rationally as they are subject to cognitive biases. These lead to systematic differences in their judgements and decisions. Hence, nudging may pose some barriers to people’s rational performance towards their own interests. Additionally, Hansen (2016) works on the definition of integrating rational arguments and factual information as part of a nudge.

Nudging has been discussed as a useful tool to guide people’s behaviour. It started with Sunstein and Thaler’s (2009) perspective as a concept that creates benefits in individuals’ lives and makes them healthier, wealthier and happier. Subsequently, it was recognized as a valuable instrument to induce changes towards specific desired behaviours, especially in environmental settings.

Lehner et al. (2016) added that nudging can potentially reduce environmental and social impacts with low engagement in areas such as sustainable energy, food and transport.

The relation between nudging and sustainability fits with the fact that nudges can be more appropriate and useful when individuals' choices have delayed effects, are difficult or are more complex and ambiguous. This is exactly the case with the environmental consequences of our decisions, when we make a choice in which its environmental impact is usually only noticed in a longer-term, such as the case of food waste. Nudging must be recognised as an advantage when connected to the well-known malleability of human beings' preferences. This can lead to better design choice architectures to nudge individuals in a more beneficial direction (Thaler & Sunstein, 2009)

However, within the theory of nudging, there is a thin line between respecting people's own behaviour and manipulation. Lehner et al. (2016) present a repercussion of nudging in which they agree that approaching the subconscious of individuals with a nudge in order to change their behaviour can be seen as "manipulative and an infringement on personal autonomy" (Lehner et al., 2016, p. 175). In the article, the authors point out that the way nudging is used can tend to manipulate people by withholding information, for example. Furthermore, the effectiveness of nudging has been questioned as it can be affected by the surrounding environment. In a real-life setting, many distractions can cause individuals not to notice nudges and the information they provide.

Additionally, since nudges are connected to human behaviour and changes in it, they can also be influenced by the long-term personal goals of the targeted group, which may limit the overall effectiveness of nudging. At last, the level of exposure to nudging strategies is also a factor to consider when studying their effectiveness (Wee et al., 2021).

2.2.2. Strategies

Since nudges are often used to improve behavioural decisions in different areas with multiple goals, such as energy consumption, resource conservation and responsible food production (Ostheimer & Unger, 2021). Moreover, it can also be effectively communicated through various channels, such as press and advertising, through practical tips, hints, specific suggestions and advice that individuals can implement (Quested et al., 2013). Several studies have therefore been developed to discover strategies and framings that make nudging more effective and successful (Chapman et al., 2019; Cialdini, 2003; Goldstein et al., 2008; Jagau & Vyrastekova, 2017; Lehner et al., 2016; Quested et al., 2013; Septianto et al., 2020; Waitt & Phillips, 2016; Wee et al., 2021).

Simplification and framing of information

Lehner et al. (2016, p. 168) explain the four different types of tools, represented in figure 3, that can be used to better describe the different strategies associated with nudging: "simplification and framing of information; changes in the physical environment; changes to default policies; and use of social norms." The first concerns how information is presented, as its simplification makes it more straightforward and easier for the recipient to understand, facilitating the decision-making process. Besides simplification, the framing of messages can also be used to consciously organise information in a way that activates an individual's desired values and attitudes (Lehner et al., 2016).

Another way to frame information is to bring it in the form of practical feedback on how an individual is moving towards a particular goal since a change of behaviour is more likely when individuals receive clear and immediate feedback on how they act (Thaler & Sunstein, 2009). Over time, several researchers have used feedback to achieve desired behaviour in many environmental domains. Additionally, one study found that providing group feedback was more efficient than individual feedback.

Also, providing feedback yielded more results than simply providing information and encouraging consumers (Schultz, 1999). On the other hand, Jagau and Vyrastekova (2017) centred their intervention’s message on a single person’s impact instead of providing group feedback, as mentioned, based on the theory of psychic numbing, which argues that individuals cannot process large numbers or events properly.

Changes in the physical environment and to default policies

Two other important nudging tools are also highlighted by Lehner et al.(2016). The first represents changes in the physical environment, which includes techniques such as product placement and proximity, urban planning and sizing. The second includes changes to the default policy focusing on changing the standard choices - the defaults - that determine the outcome if individuals do not make a decision. One example of this is when someone wants to print a document and if the person does not decide whether the print will be single-sided or front and back, the default will automatically be the single-sided print option (Lehner et al., 2016).

Social norms

In their study, Lehner et al. (2016) also describe the fourth type of nudging: the use of social norms. This tool is explained through the example of an intervention where a hotel spread a message saying that most guests reuse their towels. This simple tactic increased towel-reuse results in a more efficient way than simply providing information about the environmental impact of reusing towels (Goldstein et al., 2008). As observable, social norms can be a powerful motivator to change human behaviour (Lehner et al., 2016).

With the conceptualisation of social norms, Cialdini et al. (1990) identified two types of social norms. The first type is injunctive norms that represent the perception of which behaviours are generally approved or disapproved by society. The second type is descriptive norms of the perception of which behaviours are actually usually performed. By bringing this distinction, it is important to understand which social norm can be more efficient and in what kind of contexts, especially related to pro-environmental behaviours. Thus, Cialdini (2003) investigated the topic and reached the conclusion that descriptive norms can be detrimental if the behaviour that is dominant is the one that is harmful to the environment.

For example, if we use a descriptive norm when people waste a lot of food, we will incentivize people to follow the negative prevalent behaviour, which is to waste food as well. Nevertheless, if the prevalent behaviour is the one that is generally accepted, descriptive norms can be successfully applied, according to the author. Hence, it is important not to nudge people to engage in behaviours that are socially disapproved, even though they are widespread.

Continuing to decipher which type of social norm is more effective, Goldstein et al. (2008) discovered that descriptive norms have a greater impact on behaviours with messages containing in-group information, such as previous room guests in the hotel example, rather than other technically relevant in-groups such as citizenship, gender or general hotel guests. Hence, the authors concluded that descriptive norms could have a better influence when the context of the description of the social norm is comparable to the individual's own context (Goldstein et al., 2008). Petty and Cacioppo (1986) also reinforce this finding by classifying personal relevance, involvement and responsibility as variables that improve the processing of argument quality in models of persuasion.On the one hand, personal relevance and involvement mean that an individual's motivation to truly grasp the content of a message lies in the significance of the message's impact on the individual's life. In contrast, personal responsibility for a specific subject increases the motivation to make the necessary cognitive effort to evaluate arguments related to that subject. The following figure 3 presents a summary of these types of nudging tools from Lehner et al. (2016) and additional literature that complements the several strategies.

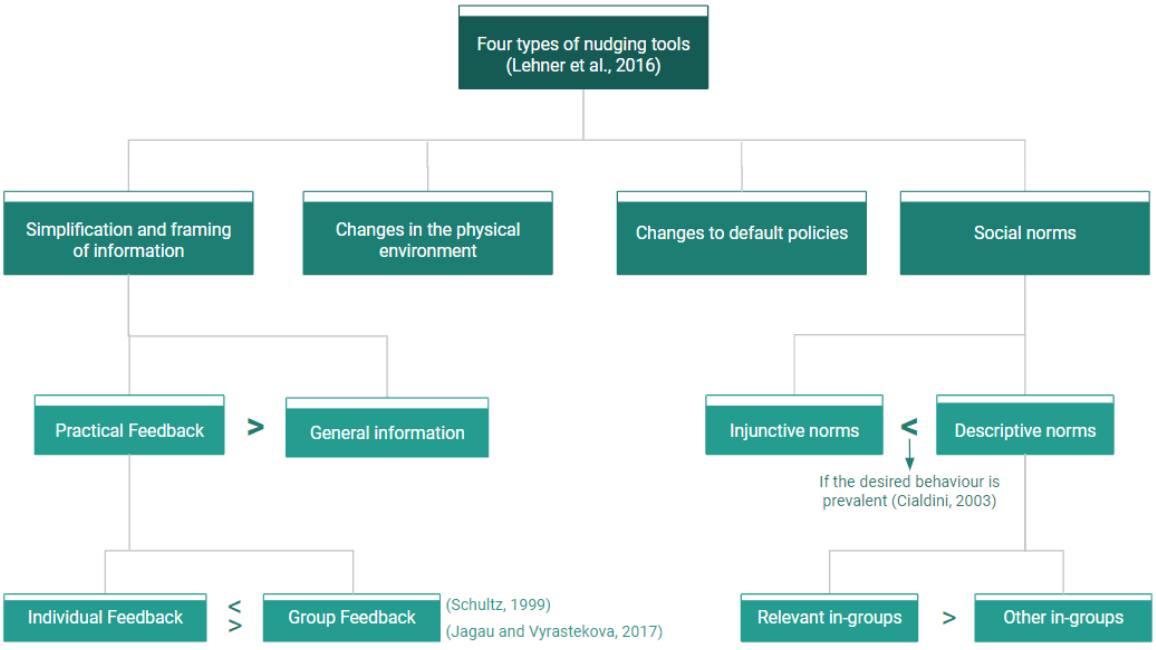

Figure 3 *Types of nudging tools (own figure)*

Multiple nudges

Another strategy for increasing the efficiency of behavioural interventions relies on multiple simultaneous nudges within one context. This technique emerges because one single nudge may not be efficient enough to influence people's decisions (Chapman et al., 2019). With this approach, it is important to understand that repetition of nudges can also be a convincing strategy. Repeating a particular message tends to have more impact at first because it gives the recipient a chance to better understand the impact of the content of the message in an objective way. The benefits of repetition are even greater when it enables individuals to process messages that are difficult to understand simultaneously. However, this persuasion diminishes over time with excessive exposures that can lead to boredom and reactance (Petty and Cacioppo, 1986).

Evocation of emotions

A final key strategy and framing of nudging messages focus precisely on the feelings and emotions that social prompts can evoke in individuals. Jagau and Vyrastekova (2017) used the prospect theory to design their message in a consumer behaviour intervention. This theory says that “value is assigned to gains and losses rather than to final assets'' (Kahneman & Tversky, 1979, p. 2).

Therefore, instead of using messages focused on reducing food waste's environmental and social benefits, the authors wanted to evoke a feeling of loss in individuals who waste food, as it is a strong motivator when changing behaviours (Jagau & Vyrastekova, 2017). Furthermore, Septianto et al. (2020) argued that emotions such as guilt and shame are associated with social cooperation as motivators for behavioural changes. Waitt and Phillips (2016) argued that shame and disgust could also be included in that group of behavioural motivators.

On the other hand, Hastings et al. (2004) argued that eliciting such emotions raises ethical questions as it can, for example, promote anxiety in individuals. Therefore, Septianto et al. (2020) sought to investigate how positive emotions, more specifically gratitude, enhance the effectiveness of message framing, resulting in positive behavioural change. The authors concluded that messages containing gratitude appeals could be efficient, especially when combined with loss-framed implications, as is the example of increased environmental issues. This example is shown in figure 4 which wraps up some other nudging strategies discussed in this section.

Figure 4 *Prompting example (Septianto et al., 2020, p. 11)*

2.2.3. Prompting as a type of nudging

Since sustainability and sustainable consumption have become more popular in the last decade, nudging individuals and groups towards pro-environmental behaviour has gained attention, especially the prompting type. Within the theory of nudging, there have been developed several different techniques and strategies. According to Wee et al. (2021), these can be organised into seven types: prompting, sizing, proximity, presentation, priming, labelling and functional design. In this thesis, we will focus on the prompting type which is the one being more connected to consumer behaviour and how canteens can easily implement a tool that does not involve changing the way they prepare and present their meals. This type and connection will be further explained.

The prompting type is defined as a tool to use non-personalised information to raise awareness about, for example, environmental issues on a targeted behaviour, which can include factual information and social norms (Lehner et al., 2016).

The use of social norms can influence individuals and their consumer behaviour in a relevant way, being a promising tool for changing pro-environmental behaviour. To achieve a level of efficiency, the social norm must be visible through leaflets, posters, and signage card stickers. This visibility is extremely important, especially to the targeted group that is being influenced in their decision through clear descriptions of what others are doing and how a change in their behaviour can have an impact (Lehner et al., 2016). Moreover, Wee et al. (2021) explain that for the nudge to have a relevant effect, factual information and social norms need to be connected and combined.

In this way, prompting is a good example of the nudging technique used to reduce food waste. By informing the targeted group about the environmental issues food waste has, the goal is to influence these people to change their behaviour. Then, the hope is to achieve a chain reaction when each individual influences their network and community by nudging them as well (Lehner et al., 2016).

However, it is noticeable that nudging is not bound to one specific method, as several techniques can be implemented. The method suitable for the nudge lies in the decision, judgement and interpretation of the researcher, the targeted group, and the existing environmental setting (Wee et al., 2021).

2.3. Consumer behaviour

As shown before, the definition of nudging mentions an influence on individuals' behaviours. Hence, it is important to explain the connection between nudging and consumer behaviour. The theory of consumer behaviour is represented by "the dynamic interaction of effect and cognition, behaviour, and environmental events by which human beings conduct the exchange aspects of their lives" (Blythe, 1997, p. 2). Within this, dynamic interactions include changes in social conditions, new rules and new ideas, which may lead to changes and adaptation in the behaviour of humans. The factors of interaction known as cognition, affect, behaviours and environmental events play an important role when it comes to the theory of consumer behaviour (Blythe, 1997).

Additionally, consumer behaviour can be viewed as the study of an individual's perceptions or even a group's perceptions, where cultural, social, personal and psychological factors can influence their behaviour.

According to Jisana (2014), this theory can be organised into two different models: the traditional and the contemporary. In the traditional model, there is the model of psychoanalytic.

This model states that consumers can be affected consciously and unconsciously. In the theory of nudging, it is said that when a nudge happens, consumers can be aware of the nudging intervention but not realise that other processes are triggered unconsciously. Resulting from that, the consumers' intentions may be reflected more deeply in their unconsciousness (Jisana, 2014).

According to Chartrand (2005), there is a connection between conscious awareness and consumer behaviour that he highlights through the three types of consciousness: environmental features, automatic process and outcome of the automatic process (see figure 5). Consumers are generally unaware of automatic processes. Therefore, raising awareness through nudging can achieve control, modification, elimination, and changes in consumer behaviour and trigger automatic processes.

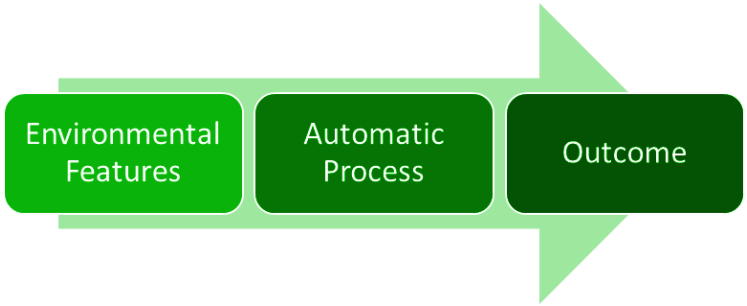

Figure 5 *Model of the automatic process according to Chartrand (2005, p.204)*

External influences such as nudges can trigger the three types of consciousness presented, as seen in figure 5. First, we have the environmental features, which are dependent and can be triggered by the presence of other people, events and objects, places and by social situations. For example, by hanging up posters with informational content, nudging can be used to trigger environmental features. On the other hand, automatic processes can be triggered by the activation of attitudes, automatic evaluation and emotion, unconscious behavioural imitation, automatic traits, stereotype activation, and the unconscious pursuit of goals. This can be achieved by bringing up emotions of guilt, shame and gratefulness in the nudge, which is part of the environmental features. Finally, outcomes can be influenced by individual actions, motivations, judgments, choices, and feelings.

Within nudging, an outcome can be seen as the effect the nudge had on the consumer and its consequent choice or behaviour. Therefore, it is important to identify what consumers perceive and are aware of in order to trigger automated processes optimally (Chartrand, 2005).

Another theory usually used in raising awareness towards sustainability topics is the Theory of Planned Behaviour (TPB) after Ajzen (1991). This theory has three main factors: attitude towards the behaviour, subjective norm, and perceived behavioural control. These factors intend to shape the behaviours and intentions of a person consciously. Since several studies claim that consumer behaviour is shaped by unconscious factors (Chartrand, 2005; Dijksterhuis et al., 2005), the TPB is not being used as a theory to support this study.

2.4. Theoretical framework

In the previous sections of the literature review, the relevant concepts and theories have been explained. In this section, we will connect our theory with the literature. Figure 6 demonstrates how we connected food waste with the theories of nudging and consumer behaviour. Our literature review shows the relevancy of the food waste problem, both environmentally and socially. Its connection with consumer behaviour emerges by recognizing that around one-quarter of the global food waste is generated in the food service sector, especially in canteens and restaurants (European Commission. Directorate General for the Environment., 2011). Hence, Parfit et al. (2010) identified a need to generate awareness on consumers in order to change their behaviour towards food waste. Therefore, the theory of nudging evolved in the field of social science as a potential solution.

The automatic process - decision to avoid food waste -, according to the theory of Chartrand (2005), gets triggered by nudging strategies. Those are represented in the figure as the environmental features, which are the posters. With the two nudging interventions, awareness towards food waste is raised. The outcome of this automatic process will be if consumers decide to waste food or not after having the environmental features triggering their decision process.

Hence, this framework (see figure 6) will allow us to test if consumers are changing their behaviour and, consequently, if food waste is decreasing in the canteen.

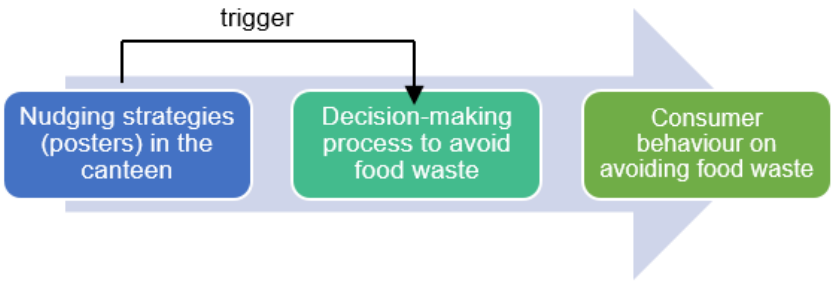

Figure 6 *Theoretical framework of the study (own figure)*

Bringing the literature around food waste and nudging together, our research question one was developed as follows:

> **RQ1.** *How does nudging influence consumer behaviour towards food waste?*

As the literature review has also shown, food waste is a global problem (FAO, 2019). With our additional research question RQ2, this study will explore the consumers' perception of food waste and its impact on the environment and society as well as if consumers perceive food waste as a relevant problem. Hence, the aim is to understand if consumers are aware of the sustainability issue of food waste. Furthermore, in the article by Quested et al. (2013), it is mentioned that people in sustainable surroundings, as can be the case of our targeted canteen, are more aware of sustainability issues. Therefore, our second research question is as follows:

> **RQ2.** *Do consumers perceive food waste as an important environmental and social problem?*

For the experiment and the analysis, two hypotheses were created based on the literature review. Several studies and articles, for example, Lehner et al. (2016), Ostheimer and Unger (2021) and Wee et al. (2021), stated that nudging interventions can be a useful tool to achieve pro-environmental behaviour in consumers towards food waste. Thus, the first hypothesis is as follows:

Hypothesis 1*. The nudging behavioural interventions on consumers reduce overall food waste.*

For the second hypothesis, the studies of Goldstein et al. (2008), Lehner et al. (2016), Schultz (1999) and Thaler and Sunstein, (2009) were used as a base. These showed that shortcut solutions can be more efficient than informational prompts in changing consumers' behaviour to reduce their food waste. Therefore, this study proposes hypothesis two:

Hypothesis 2. *A suggestion of shortcut solutions is a more successful behavioural intervention to reduce food waste than an informational prompt.*

These two hypotheses will be analysed and discussed throughout the study.

3. Methodology

In this chapter, we go through the methodology of this study, starting with explaining our research design in section 3.1. Secondly, in section 3.2, we explain our mixed method. Then, we explain the timeline and conduct of our study (section 3.3 and 3.4). In section 3.5 we explain the ethical aspects taken into consideration during the study and in section 3.6 we describe our study's limitations.

To answer our research questions, we collaborated with Maltfabriken, the canteen at Campus Gotland, Uppsala University. Therefore, we set this one canteen as our sample size, including its customers and the consequent food waste they produce. The choice of Maltfabriken as the studied canteen reflects on convenience sampling, where we recognise the time and location constraints within our master's thesis and, therefore, select the canteen of our university. However, this convenience sampling is not representative of all the canteens as it is a type of non-probability sampling (Bryman, 2016).

Maltfabriken is a restaurant located at the main building of Campus Gotland in Visby. It is open every weekday, except for public holidays, from 8 to 16 o'clock and serves lunch between 11 and 14 o'clock. The meals present different options: meat, fish, vegetarian or pasta, which are chosen by the customer and served by an employee. Besides that, the lunch price includes drinks, coffee, and a large fresh salad buffet with bread and butter on a self-service basis. Every week, Maltfabriken changes the menu, which presents one fish and one meat option, with different daily dishes. Besides that, there is a weekly pasta dish and a weekly vegetarian dish. The canteen also offers an option for takeaway meals in boxes (*Maltfabriken – Restaurangen Vid Uppsala Universitet På Gotland*, n.d.).

The restaurant usually serves around 110 lunches per day, according to Maltfabriken (personal communication, 2023, March). Maltfabriken allowed us to conduct our study with two nudging interventions (presented in Appendix A) and the daily weighing of the food waste bin. This was done both during March and April of 2023, according to the timeline demonstrated in figure 7, which will be further explained.

Figure 7 *Timeline of the study (own figure)*

3.1. Research design

Our research aims to explore the effectiveness of nudging to create pro-environmental behaviour that decreases food waste in a canteen. This requires experimenting with nudging interventions to analyse if the collected food waste data may have varied. Therefore, we use the experimental design, precisely a field experiment, where participants are divided into one control group and one experimental group. The experimental group receives a treatment, which in this case are the nudging interventions, whereas the control group does not receive any kind of treatment (Bryman, 2016).

In this study, there is no control group because of time and operational constraints of the master thesis, as we have a short time to develop and implement the study. Therefore, this research fits in the form of a quasi-experiment which occurs in the case of natural experiments that manipulate a social setting in an attempt to alter social arrangements. In this case, the impossibility of assigning individuals randomly to experimental and control groups may affect the study's internal validity. However, its ecological validity as a non-artificial intervention in a social setting strengthens the study even more (Bryman, 2016). Furthermore, it is also important to highlight that there is only one university canteen in Campus Gotland that worked as our experimental group.

Therefore, in this experiment, we weigh the food waste before and during the nudging intervention to conduct a before-and-after comparison and analysis. We use two sets of variables: the food waste during the period without intervention and the food waste in the intervention weeks. The first set of variables represents the constant used to compare the differences with the intervention set.

This experiment aims to find a solution to decrease food waste at a university canteen by testing if nudging interventions can influence consumers' behaviour. If our hypotheses are proven to be accurate, the nudging intervention can be an important strategy for other canteens to apply and decrease their food waste.

3.2. Research methods

As a primary approach, we adopt a quantitative method by weighing food waste daily at the selected canteen. However, we are not only studying how the amount of food waste can vary but also how customers behave by being nudged in relation to food waste. Therefore, we decided to complement the quantitative approach with a qualitative method. According to Elimelech et al. (2018), interviews can be a useful tool to provide information about food waste practices. Thus, we selected interviews as our second method, which allows us to get more insights into how people perceive food waste and nudging interventions towards that topic. This way, this research uses a mixed methods approach that integrates quantitative and qualitative research through different methods (Bryman, 2016).

3.2.1. Measurements

To understand if nudging consumers effectively decreases food waste in a canteen, we examined numerical data collected by weighing food waste daily at Maltfabriken, before and after every lunchtime, respectively, at 11 and 14 o'clock. All the values are presented in kilograms and collected with a scale. Since the number of customers varies daily and weekly, we present the daily value of food waste per customer for better data comparison and analysis.

According to Bryman (2016), quantitative data provides more precise estimates of the degree of relation between different constructs, which in this case correspond to nudging and food waste analysed through the food waste weighing. Therefore, a deductive approach was taken where the theory guides the research (Bryman, 2016).

Firstly, the existing theory and deduced hypotheses were identified and then translated into quantitative and qualitative data to operationalise and conduct our investigation. The quantitative data allowed us to test our theories statistically by understanding the relation between behavioural interventions and the variation of food waste throughout time. The essence of this method regards its precision and accuracy in identifying fine and clear distinctions in the data. Furthermore, measurements, in this case weighing food waste, are an instrument that provides consistency over the time of the study (Bryman, 2016).

3.2.2. Interviews

As a complement to the objective quantitative data, we conducted semi-structured interviews with a few available customers. The interviews constituted a series of prepared and written questions. These could always be reinforced and complemented with potential questions identified by the interviewer, according to the definition of semi-structured interviews (Bryman, 2016).

Firstly, we interviewed three customers in the middle of the first intervention, all on the same day. Then we interviewed another three customers during the second intervention, one month later. In total, six interviews were conducted. Our selection of interviewees was based on convenience sampling, according to Bryman's (2016) definition, since we simply interviewed customers who showed availability for the interview when we approached them, according to what was convenient for both the interviewee and interviewers. This type of sampling is not representative of our target audience. Furthermore, since the two groups of interviews at each intervention are designed to compare the interviewees' perceptions towards each nudging period, the interviews present the same structure.

Before conducting each interview, the interviewees were asked for permission to record the meeting. Then, the interviewers would start the interview which was divided into three parts. The first part would try to understand if customers perceive food waste as an environmental and social problem. The second part aimed to understand how interviewees think that a nudging intervention, like the one designed in this thesis, could influence consumer behaviour towards food waste.

The third part questioned how customers would feel by seeing these posters with nudges. After all questions were asked, the interviewer explained to the interviewee the experiment and the aim of the thesis, so that the study's purpose would not influence the interviewee's answers. The complete script of the interview is presented in Appendix B.

Furthermore, the interviews were designed to understand the customers' perception of nudging's influence on consumer behaviour. Hence, the interviews script had two possible versions depending on whether the interviewee had noticed this study's nudges. Based on that, the interviewer would choose a different set of questions previously prepared for both scenarios, as demonstrated in the script. This way, we could keep some flexibility to really understand the interviewees' perception towards nudging, even if they did not notice the posters developed for this experiment. In this case, the interviewer would explain the posters used in this study and then ask similar questions compared to customers that actually noticed the nudges.

3.3. Timeline of the study

Our study occurred between March 6th and April 28th for eight weeks. This period is organised into two different nudging interventions, each one with four weeks: one baseline week (weeks 1 and 5) and three intervention weeks (weeks 2 to 4 and 6 to 8). The period of the study was adapted to the available time we had in the tight time capacity of this thesis. The timeline of the study will now be explained in detail, according to Figure 8 presented below.

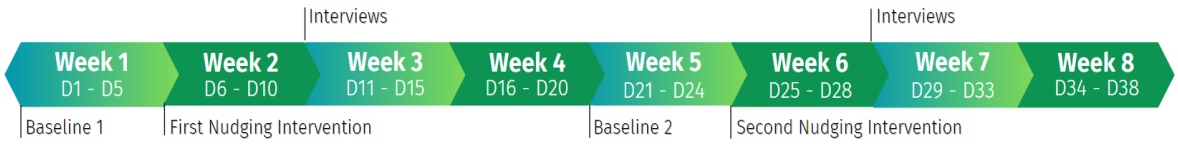

Figure 8 *Timeline of the study with variables (own figure)*

The organisation of our data collection periods are due to several reasons. Firstly, one of the hypotheses of this study aimed to compare two different nudging strategies with each other, as one is more informational and the other is more practical. For that, having the same periods for each intervention was essential. However, it is important to recognize that, even though we had a baseline week for the second intervention, this data can have some influence from the first intervention, as nudging strategies can be reinforced over time. This is also our second reason for splitting our experiment into not just one but two nudges. Thirdly, we wanted to understand the impact of social nudging over time, even though it would be important to have a more extended period to make exact conclusions. This three-week intervention period also allows customers to notice the nudges and possibly increase their awareness throughout the three weeks.

Even though we have been mentioning our period organised in weeks to an easier comprehension, the data will be analysed daily, which gives us a more significant and larger sample of 38 days rather than eight weeks. This will allow us to better understand how food waste varies daily, considering that the days of the week have different environments since the number of customers, menu or other important factors vary daily.

The presented number of days corresponds to five working days per week, except for the two public holidays on April 7th and 10th. This means that our variables will be categorised in days, from D1 to D38, having D1 to D5 as our baseline 1 and D21 to D24 as our baseline 2. These variables represent the average weight of food wasted daily per customer and can be observed in figure 8.

3.4. Conduct of the study

During the eight weeks of the study, we continuously weighed the food waste. Firstly, we had a baseline week where no intervention was performed. Then, from March 13th to 31st, we placed nine posters with nudges on the tables, bins and one wall around the canteen. Both our nudging interventions correspond to the prompting type. However, the first nudging intervention is mainly characterised by the use of information about food waste and how it affects the environment and society. We use gratefulness to incite behavioural change, as studied by Septianto et al. (2020).

Then, we present some facts to explain food waste's environmental and social impact, creating a sense of responsibility for the positive consequences if we stop wasting food. Finally, according to Schultz (1998), we provide some feedback with relevant information about the amount of food wasted at the studied canteen. With this, we are providing a descriptive social norm that proves to be more effective if it comes from the in-group represented by the past customers at Maltfabriken, according to Fornara et al. (2011). These posters can be seen in Appendix A.

Following this first treatment, we had a break of one week to let the data stabilise between the two treatments, after being affected by the first intervention, i.e., to stop having an influence by the previous nudges. This aimed to compare the two intervention periods clearly and without any mutual influence. This break is identified as baseline two. Then, we proceeded with the second nudging intervention between April 10th and 28th, where we placed two posters. Both these posters were more suggestive with practical tips on how people can reduce their food waste at the canteen. The first one suggested that customers ask for a smaller portion if they wanted to, explaining that smaller portions can reduce food waste (Werkman et al., 2022). This poster was hung on a pillar at the beginning of the canteen line so that people could see it before being served.

The second poster was placed at the salad bar for customers to see when they leave the serving line to serve themselves salad. This poster incentivised people to serve themselves as much as they wanted to eat, not as much as the plate could take, since they could always return to the salad bar to take more if needed. This is aligned with the portion size issue, one of the causes of food waste, mentioned by van Doorn (2016) and the European Commission Directorate General for the Environment (2010). In the second week of each intervention, we also interviewed three customers during each period. These interviews aimed to understand if they had noticed the posters and if they had felt a change in their food waste behaviour as a consequence.

3.5. Ethical considerations

The question of whether nudging is considered ethical has been raised. Therefore, Sunstein (2015) argued that this answer depends on whether the nudge in question promotes or undermines welfare, autonomy, and dignity.

In this study, the nudges are made to hopefully promote aggregate welfare over time, both for the environment and society. This welfare would be achieved by reducing the amount of food waste. However, the influence of nudging in consumer behaviour towards food waste is yet to be proven by this study. On the other hand, these nudges provide factual information about food waste and its impact, promoting an informed decision-making process and consequent choices. This means that, according to Sunstein (2015), our nudges stimulate welfare and autonomy and are, consequently, ethical.

Regarding the ethical considerations of this study, the food waste weighing was done for the whole amount of food wasted by all the customers. This kept each customer's privacy protected as we did not identify or disclose any personal data about their individual food waste. This means that from the data collected, it was impossible to trace back the individual food waste of each customer. Regarding the interviews, we asked the interviewees whether they felt comfortable having a recorded interview in English, if they would be available to have the interview at that moment or a scheduled time and if they were comfortable having the interview at the canteen or if they preferred another place. Additionally, what mattered to our study was to capture a few opinions about food waste and the impact of nudging on consumer behaviour. Hence, we highlighted that any personal information from the interviewees would be disclosed, as the focus was not on each customer's opinion.

3.6. Limitations of the study

As in any research, there are limitations to our study that can influence the results. Therefore, we share the ones we identified before we dive into the results. First, our main methodological limitation is the fact that we don't have a control group because of time constraints for this thesis, as mentioned before. Secondly, we have identified some practical limitations of our quasi-experimental study. Firstly, the data collection period has two public holidays on weekdays, on April 7 and April 10, related to Easter.

Even though we weigh the food waste daily, the means of food waste per week can vary due to this, as there can also be people out of town for an extended weekend besides the two holidays. Another important limitation is that every day and every week, there is a different menu for lunch at Maltfabriken, which can, of course, impact how much food customers waste since the type of food can be an important cause for more waste, as well as more weight. Moreover, there can be different customers at the canteen per week, which means that the customers during the baseline period can be different from the following weeks and, consequently, make the food waste vary independently from the experiment. Additionally, it is important to highlight that there is a small number of customers that purchase takeaway meals which are included in the daily amount of customers considered in this study, even though there is no food waste generated by these customers in the canteen. This brings us to our last limitation represented by the difficulty identifying to which degree the variation of the food waste during the experiment period is actually due to our nudging interventions.

These limitations, especially the last one, justify why we developed a mixed method with customer interviews to strengthen our study. This complement provides more information on our research questions. However, in the interviews, we also identified one main limitation: the few numbers of customers interviewed, which does not represent the totality of our target audience. These interviewees may provide opinions that do not represent the most common opinion around customers at the canteen. This is associated with the convenience sampling mentioned before.

Regarding the limitations of the researchers, our main constraint was the limited time of the master's thesis, which did not allow us to have an extended baseline period for a clearer comparison of the before and after results of the interventions as well as a bigger sample size. Furthermore, it is hard to make any long-term conclusions about the influence of nudging on consumers towards food waste within such a short time. Therefore, we will mention this topic as one important suggestion for future research.

4. Results

The results chapter starts by describing how the data from the measurements and interviews was prepared, in section 4.1. Then, the data analysis for the food waste weighed is introduced with the explanation of some important technical terms, in section 4.2. Finally, the empirical analysis is developed and presented for each one of the two hypotheses, in section 4.3.

At this point, it is crucial to consider the previously identified limitations of the study that can influence this variable, such as the different meal options and their corresponding weight, as different types of food have different weights. However, the most significant thing to remember is the existence of two public holidays that alter our data set.

In the case of the qualitative method, we simply selected one day during each intervention to conduct interviews with six customers in total, in D14 and D32. This method and correspondent empirical analysis will be focused on further in this chapter.

4.1. Data preparation

The following sections describe the data preparation done before the data analysis. Firstly, section 4.1.1 describes how the measurements were organised and analysed using SPSS. Then, section 4.1.2 describes how the data from the interviews was prepared for the analysis.

4.1.1. Measurements

To make a thorough statistical analysis of our data, we used the Statistical Package for the Social Science (SPSS) (*SPSS Software*, 2023). Firstly, we started by calculating the food waste generated daily in the canteen based on the weight before and after lunch. Then, we divided that weight by the number of customers on each day. Finally, we imported the daily variables of our experiment to SPSS. The variables represent the daily average of food waste per customer, in kilograms. In the table (see table 1) below, we have put together an overview of all the collected data.

Additionally, it is relevant to keep in mind that the second intervention period lacks one sample in comparison to the second intervention, due to the Easter holiday. Thus, we had to insert a 15th sample for the second intervention which corresponds to the mean of the second intervention. This way, the added sample does not affect the results of the study and allows SPSS to conduct the necessary statistical analysis.

Week	Day	Variable	Food waste per day (kg)	Daily numbers of customers	Food waste per customer
Week 1	March 6	D1	3,8	106	0,03585
	March 7	D2	4,3	113	0,03818
	March 8	D3	3,54	131	0,02700
	March 9	D4	2,49	115	0,02167
	March 10	D5	2,822	118	0,02392
Week 2	March 13	D6	3,809	121	0,03148
	March 14	D7	5,154	122	0,04225
	March 15	D8	3,816	145	0,02632
	March 16	D9	3,814	135	0,02825
	March 17	D10	1,474	110	0,01340
Week 3	March 20	D11	2,574	115	0,02238
	March 21	D12	3,109	106	0,02933
	March 22	D13	1,663	90	0,01848
	March 23	D14	3,481	102	0,03413
	March 24	D15	3,208	112	0,02864
Week 4	March 27	D16	2,049	99	0,02070
	March 28	D17	3,099	126	0,02460
	March 29	D18	2,972	142	0,02093
	March 30	D19	5,058	135	0,03747
	March 31	D20	4,167	124	0,03360
Week 5	April 3	D21	7,052	164	0,04300
	April 4	D22	3,443	188	0,01831
	April 5	D23	6,402	206	0,03108
	April 6	D24	4,546	145	0,03135
	April 7	-	-	-	-
Week 6	April 10	-	-	-	-
	April 11	D25	3,181	120	0,02651
	April12	D26	5,136	100	0,05136
	April 13	D27	2,814	84	0,03350
	April 14	D28	4,769	91	0,05241
Week 7	April 17	D29	2,831	117	0,02420
	April 18	D30	4,009	105	0,03818
	April 19	D31	2,421	92	0,02632
	April 20	D32	4,035	124	0,03254
	April 21	D33	2,35	111	0,02117
Week 8	April 24	D34	2,67	104	0,02563
	April 25	D35	3,81	129	0,02954
	April 26	D36	3,36	119	0,02827
	April 27	D37	4,658	139	0,03351
	April 28	D38	3,065	119	0,02576

Table 1 *Overview of the data collection from measurements (own table)*

4.1.2. Interviews

The interviews were transcribed and put together in one document (see Appendix B). The answers of the interviewees will be used in the analysis to support our hypotheses and the research questions as well as in the discussion. For the analysis and the discussion, similarities between each interview were filtered out and used in the analysis in section 4.3 and the discussion in chapter 5.

4.2. Data analysis

According to Bryman (2016), data analysis corresponds to applying statistical techniques to the collected quantitative data, which is the food waste weighed daily in our case. Besides that, we will also analyse the qualitative data of the interviews. However, these analyses will correspond to different hypotheses. The quantitative data will be statistically analysed to test our hypotheses 1 and 2. On the other hand, the qualitative data will be analysed to complement this analysis and further answer the two hypotheses.

4.2.1. Measurements - modelling strategy (SPSS)

Firstly, we identified the necessary variables to test each hypothesis. Then, to test the first hypothesis, we use a one-sample t-test to compare the means of the 15 days of each intervention period to the test value of the mean of each baseline week. A t-test will allow us to compare if the means of the different periods are significantly different, this is if the increase or decrease in average food waste per customer was significant. To test the second hypothesis, we will use a paired samples t-test to compare the means of the first nudging intervention to the second one.

The results will be presented based on the following components:

- Dx - The average weight of food wasted, in kilograms, per customer on day x.
- x - The days of the data collection period, between 1 and 38.
- H - The respective hypothesis for which the test was performed.
- Model of Comparison - The number of the weeks in which means are being compared, between 1 and 8. The comparisons can be presented between the baseline and the intervention weeks (W1-W234 and W5-W678) or between the two intervention periods (W234-W678).
- Mean - The calculated mean of the weight of food waste per customer per week.

- N - The number of samples which represent the number of days of food waste weighed.
- Increased or decreased - Indicates whether the mean of the corresponding week has increased or decreased compared to the mean of its baseline week, which reveals if the food waste increased or decreased during the intervention period.
- Change in Means - The difference of the compared mean values, where a negative value indicates a decrease in the average food waste per customer's face to the baseline week and a positive value indicates an increase.
- T-Value - The difference's magnitude relative to the variation in the sample's data, where the closer the T-value is to zero, the likeliest it is not to have a significant difference (Field, 2018).
- Df - The degree of freedom is the "number of 'entities' that are free to vary when estimating some kind of statistical parameter" (Field, 2018, p. 784).
- One-sided p-value - Indicates if the results of the t-test are significant if the one-sided p-value is below the alpha value of 0.05 (Field, 2018).

Furthermore, the tables of results presented in the following sections are colour coded, which helps understanding the interpretation of the data:

Food waste decreased
Food waste increased
Result is statistically significant
Result is not statistically significant

Table 2 *Colour coding for results (own table)*

4.3. Empirical analysis

In this section, we will present our results by testing our two hypotheses. These were formulated through the use of the literature review, as mentioned before. The hypotheses are supported by the interviews we conducted as well as through statistical analysis with SPSS. In the table below, we have put together the primary analysis of our data (see table 3) with the means for each week. The increased or decreased column indicates whether the mean of that week increased or decreased compared to its corresponding baseline week. This clarification helps in understanding the results of the tests that SPSS will provide for H1 and H2.

Week	Mean	Increased/Decreased
Week 1	0,029322	Baseline 1
Week 2	0,02834	Decreased
Week 3	0,02659	Decreased
Week 4	0,02746	Decreased
Week 5	0,03094	Baseline 2
Week 6	0,04094	Increased
Week 7	0,02848	Decreased
Week 8	0,02854	Decreased

Table 3 *Overview of data analysis (own table)*

4.3.1. Hypothesis 1

Hypothesis 1. *The nudging behavioural intervention on consumers reduce overall food waste.*

To test if each intervention decreased overall food waste, we conducted the one-sample t-test, which compares the means of each intervention period with the test value represented by the mean of its corresponding baseline week 1 or 2. The table 4 below presents the results of the statistical analysis for both the first and second interventions, synthesising the main outcomes of the SPSS analysis coming from the data collected in table 1. Table 4, then, indicates which weeks are being compared and provides the joint mean of each intervention period along with the statistical outcome from the t-tests.

For this hypothesis, we assumed that nudging behavioural interventions can influence customers to reduce food waste according to the literature review. To test it, we started by looking at the one-sample t-test of the first nudging intervention that compares the mean of the three weeks of intervention 2, 3 and 4 to the baseline week 1. By observing the change in means, we can see that the food waste per customer decreased by 0,00184 kg daily. Extrapolated for the daily number of customers, this represents a reduction of 3,3 kg of food waste in the first intervention. Nonetheless, this decrease was not significant as the one-sided p-value is higher than the alpha value of 0,05.

Stepping to the second intervention, similarly to the previous analysis, we conducted a one-sample t-test of the mean of the three weeks of intervention 6, 7 and 8 compared to the second baseline week's mean (week 5). Contrary to the hypothesis, the means present a significant increase in daily food waste per customer during the intervention since the one-sided p-value of 0,001 is inferior to 0,05. However, the mean of week 6 was considerably higher than any other week, which will be discussed in the next chapter. Hence, we also conducted a one-sample t-test of the second intervention excluding week 6, which presented a decrease in food waste that was significant, because of the one-sided p-value lower than 0,05.

To test if each intervention decreased overall food waste, we conducted the one-sample t-test, which compares the means of each intervention period with the test value represented by the mean of its corresponding baseline week. The table below presents the results of the statistical analysis for both the first and second interventions.

Intervention	Model of comparison	Baseline week		Intervention week		Increased or Decreased	Change in Means	T-Value	df	One-sided p value
		Mean	N	Mean	N					
First Nudging Intervention	W1-W234	0,02930	5	0,02746	15	Decreased	-0,00184	-0,926	14	0,185
Second Nudging Intervention	W5-W678	0,03094	4	0,03206	14	Increased	-0,27730	-117,257	14	<0,001
	W5-W78	0,03094	4	0,02851	10	Decreased	-0,28085	-176,031	9	<0,001

Table 4 *Results of hypothesis 1 (own table)*

In summary, the statistical results demonstrate that both interventions reduced overall food waste in accordance with H1, but not significantly in the case of the first intervention and excluding week 6 in the case of the second intervention. To better explain the potential reasons behind the evidence, the results of this hypothesis will be discussed in the next chapter. Nevertheless, it is possible to identify a trend of food waste reduction in both intervention periods.

As a support to our statistical results, we also conducted interviews. To get a better understanding on hypothesis 1, we asked the interviewees in question 3 about the nudging interventions and their behaviour towards food waste, depending on whether they saw the interventions (Appendix B). Overall, two interviewees noticed the intervention in the canteen, three interviewees did not see them, and one could not remember. The interviews showed that all interviewees are aware of food waste and their own consumption, for example, "*usually, I don't waste that much food*" (Interview 1), *"brought up finishing what I took on my plate"* (Interview 2) or "*I'm already perfect. No, joking."* (Interview 6).

As a follow-up question, we also tried to find out if the interviewees think an intervention like the one designed in this study can influence their behaviour towards food waste. Here too, the interviewees had similar answers to that question. In summary, most of them think that nudging is a good option to influence people, but it might not be enough to change people's behaviour as mentioned by Interviewee 4: *"It can certainly raise awareness [...] I'm not sure if it will change the behaviour*". In the same line of thought, most of the other answers are connected to raising awareness, as it can be seen in Interview 1: "*You become more aware when you see the posters"*.

As a conclusion for H1, we can see that the interviewees think nudging consumers can be a way to remind them to be more aware of food waste and their consumption. However, they agree it does not contribute to changing their behaviour towards wasting food. According to the interviews, H1 is not supported as the interviewees generally said that nudging does not change their behaviour and, consequently, does not decrease food waste

4.3.2. Hypothesis 2

Hypothesis 2. *A suggestion of shortcut solutions is a more successful behavioural intervention to reduce food waste than an informational prompt.*

Hypothesis 2 assumes that the second intervention with suggestions of shortcuts and practical solutions would be more successful in reducing food waste than the first intervention with informational posters. Hence, we conducted a paired samples t-test which compares the means of the three weeks of the first intervention (weeks 2, 3 and 4) with the three weeks of the second intervention weeks 6, 7 and 8). The table below presents the results of the t-test.

As observed in table 5, the mean of the first intervention (weeks 2, 3 and 4) is lower than the mean of the second intervention (weeks 6, 7 and 8), which contradicts the hypothesis. The t-test shows that this difference is close to being statistically significant since the one-sided p-value is 0,057, which is close to the alpha value of 0,05. However, the descriptive statistics showed that the data was not normally distributed. Consequently, a nonparametric test was conducted as a robustness check. This test provided the same result as the paired samples t-test, as it showed a non-significant difference between the two interventions. In conclusion, hypothesis 2 was not sustained by these results as the first nudging intervention demonstrated to decrease food waste at a higher rate than the second one, this is, it demonstrated to be more successful, yet, with no statistical significance.

Hypothesis	Model of comparison	N	Mean W234	Mean W678	Mean W234 > W678	T-Value	df	One-sided p value
H2	W234-W678	15	0,02746	0,03206	False	-1,685	14	0,057

Table 5 *Results of hypothesis 2 (own table)*

In hypothesis 2, we also looked at the results of the interviews (see Question 3, Appendix B) to support our statistical analysis and to see if it is in line with the interviews. Interviewee 5 stated that an informational prompt could not be enough to change behaviours: *"I would say that people don't change their behaviour because of the data and the news".* Additionally, the interviewee said that consumers could change their behaviour more easily with posters containing emotional triggers and information about the negative impacts that food waste would bring to each consumer, individually.

Moreover, the other interviewees answered this question in a similar way by suggesting that giving practical tips towards food waste reduction is more impactful than just providing informational data. Therefore, the results of the interviews support hypothesis 2, but they are not in line with the statistical results that contradict the hypothesis.

4.3.3. Overview

As a conclusion for this chapter, table 6 shows an overview of our results.

Hypothesis		Statistical Result	Interviews Result
H1	The nudging behavioural intervention on consumers reduce overall food waste.	Yes, but not significantly for the first intervention	No
H2	A suggestion of shortcut solutions is a more successful behavioural intervention to reduce food waste than an informational prompt.	No, not significantly	Yes

Table 6 *Overview of the results (own table)*

5. Discussion

In this chapter, we will discuss the results of our empirical analysis, which support our hypotheses, further implications of the study and the answers to our research questions in the last section. The main results are based on our two hypotheses analysed statistically and with the results of the interviews. Our findings for hypotheses 1 and 2 cannot be fully classified as statistically significant. Nevertheless, they show trends and results that can be used for future studies.

As mentioned in Section 3.5, our study had some limitations, which can affect the findings of the study. These include the small sample size with the time limitations, the variation of the lunch menu at the canteen as well as the two public holidays in weeks 5 and 6. One additional factor we must remember while discussing the interviews is that we only conducted six interviews. These six interviews cannot represent the customers at the canteen during our experiment but gave us a glimpse into the perception of some customers and their behaviour towards food waste.

5.1. Hypothesis 1

The first hypothesis tested if the food waste overall reduced during our nudging interventions in the canteen. Hypothesis 1 was tested statistically and with the results of our interviews. To analyse both interventions, we compared the means of each intervention's weeks to its baseline week. During the first intervention, the statistical results showed a decrease, but not significant. We believe this is due to our lower power in the statistical analysis resulting from the small sample size, which limits the significance of our results.

The statistical results for the second intervention showed a significant increase in food waste from the baseline week (week 5 compared to week 6, 7 and 8). However, we noticed that the data collected in week 6 was marginally abnormal, showing an unusually low number of customers. This can be related to our small sample size in week 5 and week 6, composed of four days instead of five. We believe this data can be traced back to the fact that week 6 was right after the Easter holiday. Consequently, there were only 395 customers compared to the weekly average of 578 customers. Because of that, we then conducted another one-sample t-test for the second intervention excluding the data of week 6. This test resulted in a significant decrease for the second intervention with a p-value lower than the alpha-value.

This shows that week 6 was, in fact, out of the ordinary and that, after all, food waste was reduced as well during the second intervention, significantly. For external factors like holidays, as we had in our experiment, it can be useful to conduct a sensitivity analysis as well, even though this would have exceeded the capacities for this thesis. As suggested by Gurevitch et al. (2018), this analysis would allow an understanding of these factors' potential influence on the data.

Another factor for H1's results is what we also can see in our interviews: most of the consumers are already aware of the food waste problem and their own consumption. This can be connected to the fact that Campus Gotland focuses a lot on sustainability topics, and, consequently, the consumers could be more generally aware than outside of this campus, at a restaurant for example. Nevertheless, we also have to keep in mind the risk of perceived social desire, when looking at the transcripts of our interviews. Due to that, the interviewees could have answered our questions in a way that would make them feel good regarding their position towards food waste and its impact on sustainability.

There are two other important limitations to be aware of at this point. First, the variation of the lunch menu. While analysing the results, the weight of each type of food must be considered. This plays an important role since the weight of the food waste is also dependent on the different types of food that can be heavier, such as potatoes compared to rice. Secondly, during the statistical analysis, we had to keep in mind the fact that we have a lower power due to the small sample. One way to resolve this would have been to have a longer experiment duration, providing better long-term insights and a deeper understanding of how nudging interventions can influence consumer behaviour. This is also an outcome of previous studies that we looked at in our literature review. Lehner et al. (2016) mentioned in their article that to have more successful nudges, a longer period of time is necessary to see changes in behaviour.

5.2. Hypothesis 2

Articles and studies by Goldstein et al. (2008), Lehner et al. (2016), Schultz (1999) and Thaler and Sunstein (2009) mentioned previously that shortcut solutions are a more successful behavioural intervention than informational prompts. The second hypothesis tested whether the second nudging intervention was more successful than the first nudging intervention. Therefore, we compared the means of the weeks of both interventions (weeks 2, 3 and 4 against weeks 6, 7 and 8).

The result showed that the first intervention has a lower mean than the second intervention, which contradicts our hypothesis 2. This result shows a difference between the two interventions close to being statistically significant since the one-sided p-value is 0,057 compared to the alpha-value of 0,05.

However, the descriptive statistics showed that the data is not normally distributed. Here again, this can be associated with the small sample size, giving us a lower power that has to be kept in mind while looking at our findings. Consequently we did a non-parametric test as a robustness check. The results of this test provided us with the same results as the paired-samples t-test, but with less significance. Hence, the statistical analysis showed that the first intervention was more successful than the second one, but not significantly. One other factor could be the fact that we only placed two posters for the second intervention compared to the nine posters in the first intervention. This could have influenced the customers' perceptions that may have needed more time to recognize these posters in the weeks 6 to 8. Nevertheless, the result showed that both interventions had very similar outcomes in reducing food waste in the canteen, without a significant difference between the two strategies.

Regarding the results of the interviews for hypothesis 2, we can see that consumers are more likely to change their behaviour due to shortcut solutions rather than informational prompts. In the end, H2 is supported by the interviewees' opinion, even though we have a small sample size, but rejected by the statistical results.

5.3. Overview

To answer our first research question “How does nudging influence consumer behaviour towards food waste?”, we created two trend lines using Excel to have an overview of the food waste variation during our experiment (figure 9 and figure 10).

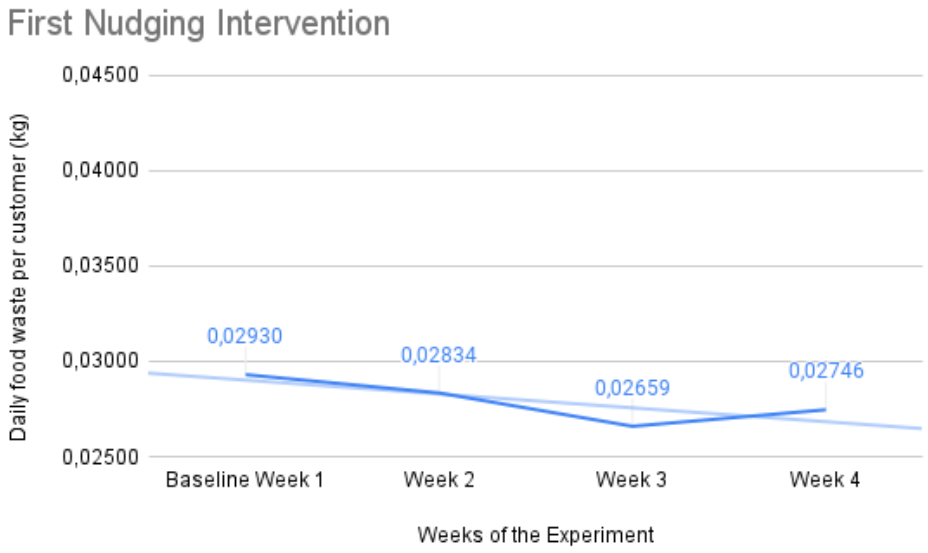

Figure 9 *Trend line for the first intervention (own figure)*

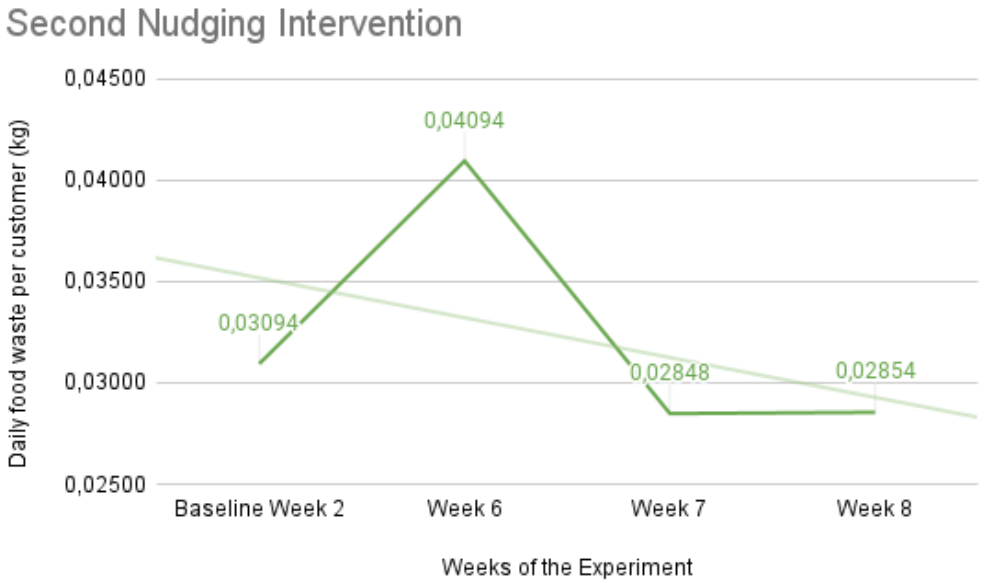

Figure 10 *Trend line for the second intervention (own figure)*

Figure 9 and 10 present the variation of the food waste during the first and second interventions, respectively. Comparing both figures, at first, customers did not react as much to the nudging, since the first week of each intervention (week 2 and 6) had just a slight decrease compared to the baseline week.

Nevertheless, later, the impact of nudging is more visible in the longer term as there is a bigger decrease from the second to the third week of each intervention. However, there was a main difference between the two interventions because of week 6. As discussed in the previous sections, week 6 was marginally abnormal due to the Easter holidays, which can be seen in the sharp peak. Even so, the two interventions presented a similar variation throughout time: an initial slight decrease followed by a more accentuated decrease and then a slight increase in the end.

Based on the trend lines in the figures, we can see that in both interventions, the weekly mean of daily food waste per customer decreased from the baseline to the last week of each intervention. However, the trend line of the second intervention is more accentuated than the first one, which can be related to external factors that affected week 6. This difference in the slope of the trend lines can also mean that the second intervention has a bigger potential for a decrease in food waste in the longer term. Furthermore, these lines show that there is a trend of a continuous decrease in food waste even after the interventions. In conclusion, you can say that nudging can influence consumer behaviour in the longer term rather than in the short term. This also shows that overall our experiment went as described in the literature review.

To answer our second research question “Do consumers perceive food waste as an important environmental and social problem?”, we analysed our qualitative data from the interviews. These showed that five of the six interviewees supported the statement that food waste is an important environmental and social problem (Question 3, Appendix B). However, we have to acknowledge the fact that we only interviewed six consumers, which cannot be used to resemble all of the consumers’ opinions and their perceptions of food waste. Another point that we have to mention is the way our question was formulated. Since the third question of our interviews is phrased as a statement similar to RQ2, it could have influenced the interviewees to agree with it rather than answer with their own opinion on this topic. Besides that, they could have answered based on what they think it is socially acceptable and correct rather than their own real opinion. Even though, we, as interviewers, tried to avoid influencing the customers' opinion as we only explained the full aim of the interviews and the study at the end of each interview.

Nevertheless, we also have to remember that this campus focuses on sustainability issues. Hence, and as a conclusion for our additional research question, we can identify a trend in the interviews in which the customers of this canteen seem to be more aware of environmental and social issues, such as food waste, than elsewhere, which is also indicated by the interviewees. However, we must consider that the customer's opinion may have been biased and limited to only a few customers.

6. Conclusion and further research

This thesis aimed to answer the research questions of how nudging influences consumers' behaviour towards food waste and if these consumers perceive food waste as an environmental and social problem. In order to do that, an experiment with two nudging interventions was developed in a university canteen, Maltfabriken, at Campus Gotland, Uppsala University, in Sweden.

Recognizing the importance of food waste as an environmental and social problem (Papargyropoulou et al., 2014), consumers have a relevant impact as one of the main contributors to food waste (Aydin & Yildirim, 2021). Therefore, when thinking of ways to solve this problem, the European Commission (2011) identified the lack of awareness and knowledge about food waste and its prevention as an essential obstacle to overcome. Then, nudging emerged as a successful tool to promote this pro-environmental behaviour (Wee et al., 2021). Based on the literature review, the interventions of this study were then developed to take into consideration past successful strategies in influencing consumer behaviour towards food waste through the concept of nudging.

Using those interventions as an experiment, two hypotheses were formulated and tested to answer our first research question, both through statistical analysis of the food waste's weight at the canteen and analysis of the interviews with six customers. The results show that there was an overall reduction in food waste since the last week of each intervention period presented a lower amount of food waste than the baseline week. However, statistically, this decrease was not significant for the first intervention. Moreover, although the interviewees agreed that the nudging interventions could influence customers and raise awareness, they believe that probably it could not change their behaviour and, consequently, make them reduce their food waste.

For our second hypothesis, the results show that the first intervention with informational posters was more successful than the first intervention with shortcut solutions to reduce food waste, contrary to the hypothesis stated. However, this difference was not statistically significant, which shows that both interventions had similar results regarding food waste reduction. On the other hand, the interviewees agreed that the best way to influence consumers is through practical tips on how they can change their behaviour, which is in accordance with hypothesis 2.

Summarising the findings of this study, we understand that, even though not all the results were significant, there was, in fact, some positive influence on consumer behaviour resulting from the nudging interventions. Hence, our first research question can be answered by the fact that nudging can change the behaviour of consumers towards food waste, even though nudging interventions with a longer duration can present better outcomes. These findings support that nudging can be a simple tool to raise awareness, inform customers and, consequently, make them more conscious about food waste as an environmental and social issue.

Regarding our second research question, the customers interviewed stated that they interpret food waste as an important environmental and social problem which they are generally aware of and consider in their consumption. However, agreeing with RQ2 is not possible with the opinion of only six customers which could have been influenced by the interview and the aim of the study itself. Hence, to better answer this question, a deeper analysis with a bigger sample should be developed in further research. Besides that, it could be useful to formulate the question of the interviews associated with RQ2 (Question 3) not as a statement, so that the interviewees' answer is not influenced and limited by the question itself.

Furthermore, as described, this research had several conditions that could limit the study's outcomes. These limitations can also be relevant suggestions for further research. First, we suggest conducting a similar study with a longer intervention period to better understand how nudging influences consumers in the long term. The longer data collection period would also provide a bigger sample size, automatically giving the researchers more power while analysing and extracting conclusions from the data. This suggestion is similar to other studies mentioned in our literature review (Lehner et al., 2016). Additionally, we strongly suggest the existence of a control group. This would have allowed for a better comparison of the real effect the posters may have had on consumers since, in this study, we were not able to compare our findings with a control group due to time and logistics constraints. Furthermore, the existence of two public holidays for Easter was also an important limitation that may have altered the results of this study. Therefore, we suggest further research that is able to avoid unusual interferences such as holidays or university breaks. In case these external factors exist, we suggest including a sensitivity analysis.

Overall, the present thesis analyses how nudging influences consumers' behaviour towards food waste with the aim of contributing to its reduction. For that, this study was developed through an experiment in a university canteen in Sweden, Maltfabriken, in Campus Gotland, Uppsala University. This research provided a better understanding of nudging strategies with the goal of contributing to an important environmental and social issue.

As concluded in this and other studies, nudging can be a useful pro-environmental tool in influencing people's behaviour. The experiment allowed for a decrease in food waste at the canteen, even though without statistical significance in some cases. This reduction through nudging can then be extended to similar contexts, saving important resources while contributing to the environment and society. In conclusion, our experiment, and constantly nudging, was able to raise awareness towards food waste and remind consumers to waste less food and be responsible about their own consumption. This positive impact, for us, is a success for itself and for our study.

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Appendix

Appendix A: Posters for the nudging interventions
Posters for the nudging strategy 1 in English and Swedish

BE GRATEFUL YOU HAVE FOOD ON YOUR PLATE.

DON'T WASTE FOOD!

- Around one-third of the food in the world is wasted, which could feed 1.26 billion hungry people every year.
- If we stop wasting food, we will contribute to:
  - reducing ~8% of all human-caused greenhouse gas emissions;
  - saving our biodiversity and wildlife;
  - not-wasting 70% of fresh water and groundwater.

VAR TACKSAM FÖR ATT DU HAR MAT PÅ DIN TALLRIK

SLÖSA INTE MAT!

- Omkring en tredjedel av maten i världen går till spillo, vilket skulle kunna ge mat åt 1,26 miljarder hungriga människor varje år.
- Om vi slutar att slänga mat bidrar vi till att:
  - minska ~8 % av alla mänskligt orsakade utsläpp av växthusgaser;
  - rädda vår biologiska mångfald och vårt djurliv;
  - inte slösa bort 70 % av färskvattnet och grundvattnet.

BE GRATEFUL YOU HAVE FOOD ON YOUR PLATE.

DON'T WASTE FOOD!

In this canteen, people waste around 17 kg of food in one week.

- around 1/3 of the food in the world is wasted
- around 70% of fresh and groundwater is wasted
- around 8% of human-caused greenhouse gas emissions is produced through food waste
- food waste harms our biodiversity and wildlife
- food waste contributes to the climate change

VAR TACKSAM FÖR ATT DU HAR MAT PÅ DIN TALLRIK

SLÖSA INTE MAT!

I den här matsalen slösar man i genomsnitt 17 kg mat per vecka.

- ungefär 1/3 av maten i världen går till spillo
- cirka 70 % av färsk- och grundvattnet går till spillo
- ungefär 10 % av alla utsläpp av växthusgaser orsakas av matavfall
- matavfall bidrar till klimatförändringarna
- matavfall skadar den biologiska mångfalden och djurlivet

Posters for the nudging strategy 2

Appendix B: Interview guide and transcripts

Interview Guideline and Schedule

Introduction and Outline

1. Introduce ourselves and our thesis of an experiment on consumer behaviour at this canteen.
2. Ask if the person would be available for a **recorded** interview of around 5 minutes with us **at this moment or at another scheduled time**.
3. Mention that the identity of the person will not be shared in our thesis, only the content of the interview
4. Ask if the person feels comfortable being recorded so we can create a transcript of the interview.
5. Ask where the person feels comfortable having the interview and sit at an available table

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Questions

1. How often per week do you eat here in the canteen Maltfabriken?
2. How much of a problem do you think food waste is within social and environmental sustainability?
3. Have you noticed the posters about food waste around the canteen?

If yes:

    1. Which ones did you notice and how would you describe what you remember about them?
    2. Do you think these posters had an impact on your behaviour towards food waste?
        1. If yes, what changed in your behaviour and why do you think that happened?
        2. If not, why not?
    3. What emotions came up when you saw and read through these posters?

If not:

4. Explain posters (posters raising awareness towards food waste and explaining the negative impact it has on the environment and society)

1. Do you think that those posters can influence consumer behaviour? How?
2. What emotions do you think would come up to consumers seeing these kinds of posters?

Conclusion:

1. Thank you so much for the interview
2. Explain our thesis topic better
3. If they show any interest in our thesis, we can show our availability to share with them the outcome if they provide us with an email

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Transcripts

Interview 1

Raquel - OK, so how often per week do you eat at this canteen?

Interviewee 1 - About two to three times a week.

Raquel - OK. And how much of a problem do you think food waste is within social and environmental sustainability?

Interviewee 1 - Well, I think it's a big problem.

Raquel - And have you noticed the posters about food waste around the canteen?

Interviewee 1 - Yes!

Raquel - Yes? Good, good to know. Which ones did you notice? And how would you describe what you remember about them?

Interviewee 1 - Or I think I remember hearing about it first and then I passed one of them and well, I just appreciate it. Just just like yes, good!

Raquel - Do you think these posters had an impact on your behaviour towards food waste?

Interviewee 1 - Well, not personally I don’t think 'cause I am usually quite… I think it is important, so I think about it and usually, I don’t waste that much food and I don’t think I do it at home either actually.

Raquel - OK, OK. So you feel that nothing changed your behaviour? (because you already?)

Interviewee 1 - No, not really, it's just that you become more aware when you see the posters and yeah.

Raquel - OK. Nice, and how did you feel when you saw and read through these posters?

Interviewee 1 - I, as I said, I just feel: Yes, yes. Good, good, good initiative and good!

Raquel - Thank you so much for the interview. It pretty much was this, so now we can explain to you a bit more our topic, but basically, we didn't want to explain that much, so we wouldn't influence your answers, but we're trying to understand if putting these posters about food waste and raising awareness and nudging people towards the subject. If it would have an impact and decrease food waste in the canteen, so we have been measuring and weighing the food waste to see if there is a variance.

Basically, it's this. Thank you.

Interviewee 1 - So yeah, good luck and I hope to. hear about the results.

Raquel - Thank you so much.

Interview 2

Raquel - So how often do you eat here in the canteen?

Interviewee 2 - I would say 2 to 3 times a week.

Raquel - And how much of a problem do you think food waste is within social and environmental sustainability?

Interviewee 2 - Well I think it's a big, big problem in so many ways, but I know that… Well, yeah, it’s a big problem, absolutely.

Raquel - Ok. And have you noticed the posters about food waste around the canteen?

Interviewee 2 - Have I? Maybe I have. Yes, I think so. Yeah.

Raquel - And which ones did you notice and how would you describe what you remember about them?

Interviewee 2 - I didn't think about it today. Because I was in a rush when I was having lunch, and I haven't been here for a few days. So, I will have to think about that… What have I noticed? Actually, I probably won't be able to answer because I don't know. So, maybe I didn't notice it then.

Raquel - And do you think these posters had any impact on your behaviour towards food waste?

Interviewee 2 - No, since I can't really recall seeing them, but I tried to… I think in a way I was brought up finishing what I took on my plate, which is not always a good thing. But, so for me, I tried to be very as in to think about how much or what I'm putting on my plate. How much food I'm taking and sometimes [it's] too much, but I end up finishing it so. Whether I like to or not sometimes but yeah. So I'm trying to be, you know, to think about that, but I haven't noticed any of the others.

Raquel - And how did you feel when you saw and read through these papers? Like… if you can remember?

Interviewee 2 - Yeah, it's difficult since I haven't actually been in, I haven't been to the restaurant since sometime last week. So I haven't really thought about it. No. Yeah, yeah.

Raquel - It's fine! Then we can ask actually, like… do you think that posters raising awareness towards food waste and explaining the negative impact it has on the environment and society can influence consumers' behaviour?

Interviewee 2 - Maybe if we notice them, I guess. I don't know. I'm probably from a generation where we are [and] we were used to being, you know, informed by posters and handouts and so on. I don't know about the younger generations. If they pay attention to those, but yeah, I would say normally I would agree.

Raquel - OK. And how would you think it would be influencing then, the consumers?

Interviewee 2 - With the posters? Hopefully, well, as in they think about how much food they want and how much, how hungry they are and try to make sure that they're not asking for too much and then throwing it away. But I guess it's a little bit difficult as well since you're not able to take all the food yourself, someone is handing it to you, which can be a good thing, but it can also, I guess, lead to people eating more or getting more food than they really wanted. So, I don't really know about the posters inside.

Raquel - It's fine. We ask regarding how you would feel if you have seen them. So how do you think consumers would feel seeing these kinds of posters raising awareness?

Interviewee 2 - Well, hopefully they will notice it and think about, you know, their consumer behaviour or eating behaviour or how much food they want to take, but it's difficult to know.

Raquel - OK. Thank you so much. Yeah. Thank you.

Interviewee 2 - Yeah. OK. That was it. OK.

Interview 3

Laura - Ok, perfect. Thank you! So then Raquel will start with the interview.

Raquel - Yeah. OK. So how often per week do you eat here in this canteen?

Interviewee 3 - Three times, yes.

Raque - And how much of a problem do you think food waste is within social and environmental sustainability?

Interviewee 3 - No, I don’t think it is.

Raquel - Ok, and have you noticed the posters about food waste around the canteen?

Interviewee 3 - No. Because I usually eat my food (Interviewee shows fast shovelling in mouth)

Raquel - OK. So basically we hang some posters raising awareness and nudging people towards food waste with some explanation about the impact that food waste has environmentally in society and we put some posters in here. So do you think that this kind of poster can have an influence on consumer behaviour?

Interviewee 3 - Yes.

Raquel - And how would you see that influence?

Interviewee 3 - I think that you… I like nudging and then I think that you need to be reminded. So I think it is one big part of how to.. how you can lower the waste. then.

Raquel - OK. And what kind of emotions do you think would come up to consumers seeing this kind of poster?

Interviewee 3 - No, I haven't seen them, but if you, I think that if you the emotions of guilty?

That's one good in this way. And then… Yeah, because guilt is for example, not just that we're producing things you don't eat or use, but also someone else could eat that… in a not in an easy way... It's not just sending it to Africa or something, but still, if you know what the point is, someone else could have used this.

Raquel - Pretty much was that it. This is really a short interview.

Interviewee 3 - OK. Yeah. Yes. Nice.

Raquel - Thank you very much just to explain our thesis to you better then because we didn't want to explain it too much, so we wouldn't influence your answers, but basically, we're trying to understand if, nudging consumers here, so with this kind of Posters will decrease food Wates. So, we have been weighing food waste here and we want to try to understand if it will vary, and hopefully decrease.

Interviewee 3 - Yeah, yes. But it's, it's, it's a shame I missed them (referring to the posters and not seeing them.)

Raquel - Thank you so much.

Interviewee 3 - Good luck

Interview 4

Laura - So, how often do you eat here at Maltfabriken?

Interviewee 4 - Well, I usually don't work here. I work in Upsala, so I come here every second week. So once every second week I would say.

Laura - Ok, and how much of a problem do you think food waste is within the social and environmental sustainability?

Interviewee 4 - I don’t know about this place [Maltfabriken], but I know that food waste is a huge problem in society. I mean a lot of food is just thrown away.

Laura - OK. And since you're not often here, I would assume that you haven't seen our awareness and the posters around the canteen probably or have you seen them?

Interviewee 4 - No, I don’t think so.

Laura - Ok, so we hung up posters here in the canteen to raise awareness towards food waste; and showing like the negative impacts food waste has on the environment. Do you think that those posters can influence consumer behaviour and how can it influence?

Interviewee 4 - It can certainly raise awareness. But I'm not sure if it will change the behaviour. Maybe some more nudging is needed?

Laura - Ok. What emotions do you think would come up to consumers seeing those posters?

Interviewee 4 - They will probably feel bad for a while *(laughs)* when they think about the last time they threw away food, but I'm not sure if they will change something.

Laura - Ok, so thank you for the interview!

Interviewee 4 - You're welcome

Interview 5

Laura - So, how often do you eat here in the canteen?

Interviewee 5 - So when I was a student five years ago, I ate here like once a day because I had class. But now when I'm working, I live just three minutes walking from here, so I usually go back home and eat.

Laura - Ok, and how much of a problem do you think food waste is within the social and environmental sustainability?

Interviewee 5 - I think it's a big problem since for example on Gotland… So we create more food than we actually needed, so that's a big problem. And also if you know Food Rescue and community kitchen, which previous students founded. Community kitchen and food rescue provide students affordable meals and also save waste, ingredients from ICA and Coop. So, I think some people do take the initiative, but not a lot of people know about it and also a lot of people don’t realise that they buy more than they need.

Laura - OK. Have you noticed the posters around the canteen?

Interviewee 5 - Can you point where the poster is? No, I don't think I saw any posters. But I realised one thing in the canteen. It was one time that I ordered a meal and then it was too much for me, so I came back and asked: Can I have a take away box, I want to bring it back home. And then he said no, because it is a buffet, so I can't eat first and then take away. So, I have to finish it or throw it away, it is not good, because it is too big, I can't eat it but it doesn't allow me to take it back, so it kinda creates more waste.

Laura - Ok, so we hung up posters here in the canteen to raise awareness towards food waste; and showing like the negative impacts food waste has on the environment. Do you think that those posters can influence consumer behaviour and how can it influence?

Interviewee 5 - It really depends on what you wrote on the posters, but I would say that people don't change their behaviour because of the data and the news. They change their behaviour because when some functionality, some emotions are involved, that make them think, that they really need to make a change. So, change peoples behaviour is a slow process that you manifest in peoples life not as like in "Oh, I saw this poster I need to stop wasting food." People have their own lifestyle that they follow, so I think that you make the poster in a more emotionally attached way or can provide some functions that they can be aware of, that in a long term it is not good for them, maybe they will slowly change their behaviour.

Laura - OK, what emotions do you think would come up when seeing those posters?

Interviewee 5 - You mean when people see the posters and what emotions? In this university the people are aware of the food waste and sustainability I would say. So, honestly I don't think it will change that much their emotions because here people are aware of sustainability. If it is put somewhere else for example at ICA, maybe people will notice more and be more aware about it. It really depends on what is on there and how you present it and where you present it.

Laura - Thank you for taking your time and your answers!

Interview 6

Laura - Ok, so how often per week do you eat here at Maltfabriken?

Interviewee 6 - On average, three lunches maybe per week, two or three.

Laura - How much of a problem do you think food waste is within social and environmental sustainability?

Interviewee 6 - Yeah, I think it is a major problem or actually I know that, but it depends on what type of food waste we are talking about and what sector or private or in a canteen, restaurant or… So, yes, it is a big problem if you want me to rank or score that, but yes.

Laura - Have you noticed the posters about food waste around the canteen?

Interviewee 6 - Yes.

Laura -Which ones did you notice and how would you describe what you remember about them?

Interviewee 6 - Oh…trick question. I seem to remember seeing some notes and posters as you grab your plates over there *(points to the start of the line).* And it said something like: Food waste … but I don't remember all the details. I have some students that have been working around this. I used to do some research around food and sustainability, that's part of my background. Whenever I see some sort of sign and posters, i'm always yeah great!

Laura - OK, perfect. So do you think these posters had an impact on your behaviour towards food waste?

Interviewee 6 - I'm already perfect. No, joking. Of course, when you are reminded, although I'm working around sustainability for decades now, it is always good with reminders. To what extent it affected me, positively, always when I eat here, I cannot remember a single time where I have left something on my plate.

Laura - Yeah, OK. And what emotions came up when you saw and read those posters?

Interviewee 6 - That would have been, just made me happy and clapping and saluting that it is that people are nudged with that or just reminded or that sort of also becoming

mainstream to advocate to talk about this. Emotions, feelings, just yes! This is where I want to live and work, so it is good that it is flagged and communicated, so only positive.

Laura - OK. So thank you so much for. The interview. That's it.

Interviewee 6 - Ok, you are welcome!