The dangers of leaving food leftovers on your plate: Consumer behavior and food plate waste

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Abstract

The food plate has recently been identified as a major source of food waste. Simultaneously, concerns have been raised about the consequences of throwing food away unnecessarily. Wasteful behavior has been scientifically proven to have a negative impact on our future lives. Is it possible to waste less food?

The purpose of this dissertation is to gain a better understanding of how customers feel about the food that remains on their plate after they have finished their meal when they order take-out to eat at home.

The Covid-19 pandemic has resulted in an increase in the number of food orders received at home. As a result, it is critical that those who order and those who sell food work together to reduce food waste.

According to the findings of this dissertation, organizing the Menu layout, displaying choices of portions from smallest to largest, plays an important role in persuading consumers to choose a smaller Menu. A second finding was that pride in wasting less food on the plate increases the intention to waste less food on the plate and reduce environmental impact. Finally, personal norms regarding plate waste and sustainability self-regulate consumers' intention to reduce what is left on their plate when they order extra food. The findings of this thesis show that there are ways to reduce the amount of food left on our plates.

Title: The dangers of leaving food leftovers on your plate: Plate waste and consumer behaviors when ordering food through a menu to eat at home

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Resumo

O desperdício de comida que fica no prato foi recentemente reconhecido como uma das principais causas de desperdício alimentar. Simultaneamente, foram levantadas questões sobre as consequências de deitar desnecessariamente fora alimentos. Está cientificamente provado que o desperdício de alimentos tem um impacto negativo nas nossas vidas futuras. Será possível desperdiçar menos alimentos?

O objetivo desta dissertação é obter uma melhor compreensão do que os consumidores sentem com os alimentos desperdiçados que são deixados no seu prato assim que terminam a refeição, quando encomendam comida para comer em casa.

A pandemia Covid-19 aumentou o número de encomendas de comida recebidas em casa. Como resultado, é fundamental que aqueles que encomendam e aqueles que vendem alimentos trabalhem em conjunto para reduzir o desperdício alimentar.

De acordo com as conclusões desta dissertação, a organização do esquema do Menu, exibindo escolhas de porções da mais pequeno à maior, desempenha um papel importante na persuasão dos consumidores a escolherem um Menu mais pequeno. Uma segunda descoberta foi que o orgulho em desperdiçar menos comida no prato aumenta a intenção de desperdiçar menos comida no prato e reduzir o impacto ambiental. Finalmente, as normas pessoais sobre desperdício no prato e sustentabilidade autorregulamentam a intenção dos consumidores de reduzir o que fica no prato quando encomendam alimentos extra. Os resultados desta tese mostram que existem formas de reduzir a quantidade de alimentos deixados nos nossos pratos.

Título: Os perigos de deixar restos de comida no prato: Desperdício de comida no prato e o comportamento do consumidor quando encomenda comida através de um menu para a comer em casa

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Palavras-Chave: Desperdício de comida no prato, Comportamento do consumidor, Manipulação do Menu

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1 Introduction

1.1 Background and Problem Statement

The concept of sustainability first appeared in the Bruntland Report in 1987, when the document discussed a better future for humanity and the scarcity of natural resources. Since then, the concept has evolved, and the significance of sustainability has grown. We now understand that the well-being of future generations is dependent on resources that may run out. It is necessary to find a balance between well-being and the number of resources that should be used. Sustainability is a matter of natural resources, quality of the environment, and capital that we pass on to future generations (Kuhlman & Farrington, 2010). Science has proven that our behavior regarding natural resources puts the future of many species in danger. To ensure the survival of species on Earth, being ecologically sustainable must be a priority (Laininen, 2019).

Because of the ongoing rise in food waste levels, food waste became a topic of discussion in the 2000s (Young et al., 2018). It has an environmental impact because it consumes a lot of water and fossil fuels. Simultaneously, food decomposition contributes to CO_2 emissions. Furthermore, over a quarter of the world's fresh water is used for food that will be wasted (Hall et al., 2009).

A large portion of wasted food is discarded during the consumption stage. This reveals a major issue that today's society is facing, in which countries with medium and large financial wealth waste food daily. According to a study conducted by the United Nations Food and Agriculture Organization, each person in Europe wastes between 95kg and 115kg of food per year on average (Food and Agriculture Organization of the United Nations, 2014). The problem is directly related to consumer behavior in higher-income countries (Gustavsson, 2011).

The majority of the environmental impact is caused by waste at home; however, food waste is not the only environmental issue. Food waste is also an economic issue; for example, the amount of waste causes food prices to rise globally. This makes it more difficult for everyone to buy food and harms the low socioeconomic population who cannot afford the prices. (Young et al., 2018). Hunger is a daily occurrence for millions of people around the world, even though there is enough food produced to feed the entire population. Food waste can be avoided if it is managed properly (Al-Domi et al., 2011).

1.2 Aim and Scope

Understanding how to reduce food waste is critical because one-third of all food produced is wasted. Agriculture accounts for one-quarter of global greenhouse gas emissions, occupying 40% of land and consuming 70% of freshwater. A quarter of the world's greenhouse

gas emissions are due to agriculture, which occupies 40% of the land and uses 70% of freshwater. Fertilizers used in agriculture pollute surface water, resulting in dead zones in the oceans. These environmental consequences are only likely to worsen in the coming years as humans increase their food consumption. (Springmann et al., 2018).

Food loss is classified into two types: food that is discarded because it is unfit for human consumption and food that is edible but is wasted. This study focuses on edible food that has been left on the plate. Food may be wasted before it is cooked, but it frequently ends up on consumers' plates and is not consumed. Food waste has increased dramatically since 1974, and it is now one of the most serious issues of our time. Daily resources, land, and farmers are invested in food production, and a portion of the food produced is not consumed. Reducing food waste and overconsumption would benefit both the economy and the environment (Birney et al., 2017).

One reason that could explain the Generations' behavior is that younger generations have not encountered food scarcity in recent years, leading them to trust that food will always be available. This aids in the acceptance of wasteful food practices. Plate Waste, which is edible food that is left on the plate after the meal is finished and then thrown away, is a new type of wasteful practice (von Massow & McAdams, 2015).

Consumer behavior regarding food waste demonstrates a lack of concern for the current state of the environment. We live in an era of pollution, polluted air, natural disasters, and rising water levels, which are all contributing factors to our way of life. We often overlook the small things we can do to improve our living conditions on Earth (Närvänen et al., 2020).

For example, consumers know that using leftovers for another meal will reduce waste, but they still do not change their behavior. It is difficult to motivate consumers to reduce the amount of edible food they throw away. Evidence suggests that people are more willing to change when campaigns present opportunities and skills that prove effective for reduction (Närvänen et al., 2020).

This study takes a fresh look at Plate Waste and consumer behavior. Ordering food has become a habit in people's daily lives in recent years because it is more convenient than going to a restaurant. Customers began using more digital tools, including delivery services for food to eat at home, as a result of confinement and stay-at-home during the Covid 19 pandemic. In Germany, delivery services increased by 8% compared to before the pandemic (Strotmann et al., 2021). The words hotel and restaurant were less frequently used in Google searches, while delivery was more frequently used (Strotmann et al., 2021).

When food was ordered at the start of the pandemic, it was obvious that the customer had no idea how much food was ordered. The customer would over-order food, contributing to waste (Sharma et al., 2021). Plate waste accounts for 30% of household waste in the United Kingdom, making it one of the most common sources of food waste in the home. When the individual eats food from somewhere other than home, having a variety of menu options helps to avoid waste. It is common for a consumer to desire a specific Menu while knowing that he will not consume everything on the Menu (Roe et al., 2018). This research focuses on Plate Waste food prepared outside the house and delivered to the home after being ordered from a Menu.

Several factors influence the consumer's decision to reduce food waste on the plate. To begin, the order of the food options on the Menu influences the customer's selection. Item displays can play a significant role in influencing the buyer's decision. Knowing how to place the items on the menu is advantageous if the goal is to lead the customer to choose certain items (Kim et al., 2019). A different issue is that large portions of food are to blame for plate waste. When the consumer consumes food prepared outside the home, he or she is surprised by the over-serving. Food establishments should reduce waste by adjusting portions to what the consumer will eat (Heikkilä et al., 2016).

The purpose of this study is to determine whether the layout of the Menu influences consumer choice. That is, whether the consumer is influenced to choose a smaller meal if the order begins at the top with the smallest meal and progresses down to the largest meal. When the opposite occurs, the first meal at the top is the largest and descends to the smallest meal, regardless of whether the consumer selects larger meals.

Participants tend to choose smaller portions when the menu is limited. A simple detail, such as allowing customers to select the number of pizza slices, resulted in a shift in behavior. When given the option of ordering one to three slices of pizza, the participants ordered more (H. Liu et al., 2022).

The second goal to comprehend is how the consumer is more likely not to over-order food prepared outside the home and delivered at home after ordering food from a menu while experiencing feelings of guilt or pride. Pride can increase a person's commitment to environmentally friendly behavior (Bissing-Olson et al., 2016). While guilt reduced the commitment to environmentally friendly behavior.

As a result, which of the four hypotheses is more proactive in reducing plate waste will be tested. The combination of a menu beginning with the smallest plate and ending with positive feelings, a menu beginning with the smallest plate and ending with negative feelings,

a menu beginning with the largest plate and ending with positive feelings, or a menu beginning with the largest plate and ending with negative feelings.

2 Literature review

2.1 Consumer Plate Waste

Plate waste is defined as the amount of edible food that is left over after the meal (von Massow & McAdams, 2015). Food waste represents a significant amount of waste. According to a UK study, 34% of restaurant food waste is what is left on customers' plates (Toma et al., 2020). This is due to various factors such as the consumer losing their appetite, having more food on their plate than they would eat, and being disappointed with the taste of the food (Toma et al., 2020).

The reason it is difficult to control food leftovers on the plate is due to the consumer's relationship with the meal. This type of waste can occur for a variety of reasons, including the food being raw, the quantity being large, the consumer's preference for taste or appearance, and the consumer's state of hunger (Ferreira et al., 2013). To reduce plate waste, consumers must be influenced by making choices that encourage them to avoid having more food on their plates than they will eat (Toma et al., 2020).

Reducing the amount of food that is left on the plate can be accomplished by reducing the size of the plate or changing the menu. As a result, consumers do not reduce food waste by overeating or cleaning their plates. They are not socially encouraged to do so, and it does not appear to be the best approach to encouraging this behavior, which is linked to being overweight or obese (H. Liu et al., 2022).

Plate leftovers are rarely reused in most people's homes. When someone leaves food on their plate after they have finished their meal, it is discarded. The same thing happens in restaurants. Plate waste contributes significantly to food waste in these establishments but cannot be reused (Talwar et al., 2021). Thus, one of the major contributors to consumer food waste is leaving food on the plate (Yaşar University, Turkey et al., 2020).

2.2 Consumer Plate waste when eating food prepared outside the home

Younger generations have not been exposed to a food scarcity situation, so they believe that food will never run out, which leads to serious food waste (von Massow & McAdams, 2015). Understanding the motivations for reducing plate waste, in general, is critical. The Ikea effect of liking something more when you make it yourself applies to food as well. When people eat something, they made themselves, they prefer it to something made by others. This is known as the "I cooked it myself" phenomenon. This suggests that when people eat food prepared by others, they waste more because they do not have the same sense of accomplishment that they do when they prepare it themselves (Dohle et al., 2014).

Restaurant managers frequently do not understand why all the food is not consumed. According to the findings of a study, leaving food on the plate was caused by excessive quantity rather than poor food quality. In other words, consumers do not eat everything because of large portions. When the portion size increases, so do the amount eaten. When the portion size is reduced, the amount of plate waste decreases as well (von Massow & McAdams, 2015).

Von Massow et al. conducted a study with two groups and found that the first group received information about Food Waste for three weeks while the second group received no information but had smaller food portions. In the first group, there was no change in plate wastage reduction, whereas in the second group, there was a 20% reduction. The most effective way to reduce plate waste is to serve smaller food portions. An informational campaign about food waste raises awareness of the problem but does not effectively reduce waste. It does, however, alter the intent of the person's behavior (von Massow & McAdams, 2015).

When most restaurant chefs think of a normal serving size, they envision something that is two to four times the size recommended by the United States Department of Agriculture. Because the chefs did not want to fail to meet customer expectations by reducing food quantities and presentation, they were already factoring plate waste into their costs (von Massow & McAdams, 2015). Restaurants account for 21% of all waste in Italy (Secondi et al., 2019). The waste on the customer's plate accounts for 34% of restaurant waste (Secondi et al., 2019). The size of the portion should be adjusted based on what the customer eats and how hungry the customer is. According to this study, consumer demographics can influence food waste, with higher-income individuals more likely to waste more food and lower-income individuals less likely to waste less food (Secondi et al., 2019). Controlling the amount of food wasted and leftovers allows you to know how much to reduce the quantities in meals. Controlling plate waste is the most difficult challenge because it is dependent on the customer's relationship with the meal. We need to understand why customers leave food on their plates in order to reduce plate waste (Ferreira et al., 2013).

Tall glasses, which have reduced excessive drinking in establishments, are an example of success in reducing waste. Similarly, smaller plates in restaurants may reduce waste. Smaller plates reduce over-serving and over-consumption of food. Because the customer will not notice the change in plate size, the level of satisfaction will not decrease because the customer's experience will be the same as it was when the plate was larger (Wansink & van Ittersum, 2013). Outside the home, consumers waste food because the quality or taste of the food does not meet their expectations, causing them to lose their appetite. As a result, if the food does not meet their standards, it is left on the plate. Waste management can be difficult because it

necessitates knowledge of the problem. Reducing waste in businesses can make it difficult to attract customers. Other restaurants in the marketplace will focus on meeting consumer expectations, and failure to do so may result in customer loss (Heikkilä et al., 2016).

When a client eats food outside the home, loses control of several things. The customer has no control over the seasoning, appearance of the meal, quality of the ingredients, or portion size. To address this issue, the restaurant may be responsible for suggesting portions. Waiters can play this role in the restaurant, but when it comes to ordering food online, the restaurant can create a menu that accommodates this situation (T. Liu et al., 2021).

2.3 Consumer Plate waste when eating food prepared outside the home and delivered at home after ordering food from a menu

Consumers have embraced online food ordering to avoid going to the store. They select the food they want from a digital menu and then wait for it to arrive at their door, ready to eat. The popularity of online delivery services has skyrocketed. It is quick and convenient for customers, and it was created in response to consumer demand (Pigatto et al., 2017). As one of the most popular markets among consumers, online food delivery is the largest market in the world of e-commerce. Restaurants are no longer constrained by physical space. Previously, if a consumer wanted to eat food made outside, they had to go to a restaurant and reserve a table. Restaurants are no longer limited by space, and they are gaining more customers by selling food through an online delivery service. It has become more convenient for the consumer to have an application that eliminates the need to leave the house (Ali et al., 2020).

It is now easier to order takeaway food from the comfort of your own home using online food delivery services. This service's popularity has grown, which is contributing to an increase in the consumption of food prepared away from home (Keeble et al., 2020).

The Corona Virus took over everyone's life in March 2020. The disease prompted restaurants to go digital, which increased food consumption via apps. Restaurants had to join Food Delivery Apps to maintain their revenue. As a result of pandemic restrictions, Food Delivery Apps became the primary point of contact for people with the outside world. A link between consumers and restaurants, allowing consumers to enjoy food prepared outside and eat it at home (Zanetta et al., 2021).

Because of the pandemic, restaurants changed their plans. Menus with information about the dishes can be created using digital technology, including the selection of the best ingredients, optimization of the amount of food produced, and the proper portion size. Digitization has simplified the process. Food service has been improved by digital technologies

(Strotmann et al., 2021). One adjustment in the menu plan, having a correct representation of the quantities and number of ingredients in the meal, and offering doggy bags to customers are all elements that restaurants must consider in order to combat the food waste problem. Customers can reduce their waste by having the calories and quantities on the menu, ordering smaller portions to avoid leftovers on the plate, and using doggy bags. Restaurants could encourage customers to choose their portions based on how hungry they are to reduce waste. The Covid-19 pandemic has had a significant impact on food waste (Principato et al., 2021). So, avoiding leftovers on the plate should be a priority in the design of restaurant menus. Recognizing what is left on the plate at the same time aids in portion control and customer satisfaction. Because leftovers can reflect both the quality and quantity of food. As a result, plate waste should be valued in order to assess the performance of a menu (Yiğitoğlu, 2020).

Menu design is essential for guiding the consumer. Simple details like the menu's organization and the colors you use can have a big impact on the customer's decision. The menu, for example, is linked to the food experience. It not only serves to present the options available in the restaurant, but it also represents the establishment's image. The customer is more likely to enjoy the experience if the menu evokes positive emotions in him. Furthermore, a well-designed menu can entice customers to pay closer attention to the food that the restaurant wishes to sell (Ozdemir & Caliskan, 2014).

Consumers are influenced not only by the menu layout, but also by the number of options available. In the case of a naked menu, where they could choose how many slices of pizza they wanted, they had more control and ordered fewer pizza slices. When they were given the option of selecting the number of pizza slices, they opted for larger quantities. Because the food is the same, consumers who choose larger quantities are more likely to waste their plates. When presented with a menu with several options for the number of slices, customers regard the options as suggestions. According to the study, a menu with smaller portions of food may encourage consumers to limit the amount of food they eat and thus avoid waste. The solution is to offer a simple menu with a recommendation to target individuals who have trouble regulating their impulses and unnecessarily choose huge quantities. (T. Liu et al., 2021).

In a restaurant, customer choice is a major contributor to negative environmental effects. Restaurant menus can be intelligently crafted to accommodate client preferences in order to be more environmentally friendly and sustainable. According to the findings, restaurant owners are dubious of menus and their impact on customers. This is a roadblock in the development of more responsible menus. Restaurant operators are also noticing that customers are becoming more conscious of the environmental impact of their food choices. Notes on a

physical menu, on the other hand, are frowned upon because they may cause disruption to the consumer. Restaurants have started using digital menus in recent years as a way to connect with customers in a more aesthetically appealing way (Filimonau & Krivcova, 2017).

People's daily food routines at home were drastically altered as a result of the pandemic. Many things changed in people's lives after the pandemic, and one was an increase in online food ordering. Ordering food became essential. Consumers have a need for a certain type of food, don't give it a second thought, and order it online. However, the fact that it is an impulse, and they see food from a distance reduces the food's value. As a result, consumers have less attachment to food, making it easier to waste and throw away (Roe et al., 2021).

Concerning the issue of the amount of food in a meal when ordering food online, a recommended serving size should be provided to avoid food waste. It can support in the consumer's decision to avoid falling to the temptation to order more food (T. Liu et al., 2021). To summarize, the future of online food delivery apps and services can encourage consumers to be more environmentally conscious and reduce their carbon footprint (Li et al., 2020).

2.4 Consumer food waste from leftover in the plate, and hence emotional self-regulation to try to help reduce it

It is difficult to communicate with the consumer. Topics such as climate change, food waste, and plate waste are even more difficult to address. They are scientifically complex issues with uncertain and inaccessible outcomes. So, when communicating one of these issues, in this case, Plate Waste, it is necessary to make it less abstract and clearer for people to understand, and one way to do so is to communicate through feelings (Born, 2019).

Sustainability messages have failed to persuade audiences to change their behavior. However, the literature suggests that consumers are more likely to respond positively when messages refer to sustainable practices that they can engage in and are constructed positively (Font et al., 2017).

Understanding how emotions affect consumer attitudes should be a top priority. The majority of studies focus on cognitive aspects of changing consumer behavior toward food waste. However, emotional motivation appears to be the most appropriate way to improve consumer behavior in this regard. To improve effectiveness, it is necessary to comprehend how the consumer feels when he realizes he is wasting food and what emotions he wishes to associate with his new behavior. Would feelings of guilt, or, on the contrary, feelings of gratitude, help them change their behavior? (Septianto et al., 2020).

Although social norms may encourage people not to waste food, when the time comes, some people are overcome with feelings of shame. For example, if they are at a restaurant and

have leftovers, they are embarrassed to ask to take them home. When they don't, they feel bad about wasting food. Although a person's sense of guilt may increase, this does not imply that they will engage in pro-social behaviors (Sirieix et al., 2017).

Individuals are not completely opposed to changing their behavior, but they will oppose help if they believe they are to blame for a problem. This occurs because of the way change is managed. Individuals experience mixed emotions during the transition. They oppose the new transformation and refuse to accept it as the new normal. They do not welcome the new regulations with open arms (Gonzalez-Arcos et al., 2021). Participants who have unfavorable views about wasting, for example, had stronger goals not to waste but to waste more. This is due to the fact that conflicting emotions force people to behave in ways that are counter to their intentions. Participants who have more control and are more at ease with the idea of minimizing waste, on the other hand, waste less. Emotions and habits play a big role in shaping behavior. To encourage change, less negative incentives should be offered. As a result, efforts that encourage the formation of beneficial behaviors are required to reduce household food waste (Russell et al., 2017).

Anger and frustration can be a barrier to ecologically responsible conduct, whereas happiness and optimism can motivate pro-environmental activity. Committing to pro-environmental behaviors boosts one's self-esteem while lowering one's guilt. People do not spend much time feeling guilty for not committing to a sustainable practice, according to the study, thus guilt does not drive them to be environmentally conscious. Instead, pride is more likely to drive people to behave in a sustainable manner (Bissing-Olson et al., 2016).

It is important to emphasize that when people realize that there are more people engaging in this type of behavior, they feel more pride in doing the same. When important people in their lives do more for the environment, they are inspired to do the same. As a result, perceptions of the social context are important in motivating people to engage in pro-environmental behavior (Bissing-Olson et al., 2016). In contrast, emphasizing negative aspects can elicit a defensive response in some consumers, which does not help to improve their relationship with food waste. They respond defensively to protect their integrity and avoid admitting the error. In this case, emphasizing positive accomplishments and emotions in this type of consumer would yield a better result (Graham-Rowe et al., 2019).

Customers are accustomed to negative emotions in campaigns, but positive emotions can also play an important role. Positive emotions can be used to influence behavior and motivate customers. It is effective to emphasize what the consumer can gain by changing his or her eating habits (Septianto et al., 2020). Several studies suggest that using gentle

communication is the best way to get a consumer to support a movement, but environmentally friendly campaigns are assertive. If people do not believe the cause is important, it will take more persuasive campaigns to persuade them. Because the campaigns are mostly created by people who believe that caring for the environment is important, they may fail to recognize that the general public does not (Kronrod et al., 2012).

As a result, while negative messages in marketing are common, the effectiveness of this type of method is heavily contested. Not everyone responds well to frightening messages, and they may respond inappropriately. For example, if the campaign is about something that directly affects the person who sees it, they may suffer from chronic anxiety. Those who are not represented and who do not identify with the campaign because they are not in that situation are dissatisfied. Techniques other than fear, such as the use of irony and humor, reinforce better consumer behavior. There is evidence that fear messages cause avoidance and are less effective (Hastings et al., 2004).

2.5 Research hypothesis

This chapter will introduce and explain the hypotheses. The goal of this study is to determine whether positive or negative emotions are more likely to reduce plate waste when ordering from a menu at home. There are two types of menus in the survey; the first starts with smaller food portions and the second with larger food portions.

Each menu contains six options. Menu A is three slices of pizza plus drink, Menu B is five slices of pizza plus drink, Menu C is garlic bread plus three slices of pizza plus drink, Menu D is garlic bread plus five slices of pizza plus drink, Menu E is garlic bread plus three slices of pizza plus dessert and drink, and Menu F is garlic bread plus five slices of pizza plus dessert and drink. The second menu has the reverse order Menu A garlic bread plus five slices of pizza plus dessert and beverage, Menu B garlic bread plus three slices of pizza plus dessert and beverage, Menu C garlic bread plus five slices of pizza plus beverage, Menu D garlic bread plus three slices of pizza plus beverage, Menu E five slices of pizza plus beverage and lastly Menu F three slices of pizza and beverage.

This thesis will test whether the order of the Menu affects the consumer's choice. That is, whether the order starts at the top with the smallest menu and works its way down to the largest menu influences the consumer to choose a smaller menu. When the opposite occurs, the

first menu at the top is the largest and descends to the smallest menu, regardless of whether the consumer chooses larger menus.

When the menu was limited, people might choose smaller portions. A simple detail, such as customers selecting the number of pizza slices, resulted in a shift in behavior. When given the option of ordering one to three slices of pizza, the participants ordered more slices (H. Liu et al., 2022).

The second thing to understand from this study is how the consumer is more likely not to over-order food prepared outside the home and delivered at home after ordering food from a menu while feeling guilty or proud. A study on the effects of pride and guilt on environmental behavior found that feelings of pride increased commitment to environmentally friendly behavior. While guilt reduced the commitment to environmentally friendly behavior. Similarly, to this study, I want to know whether positive or negative emotions increase the likelihood of committing to reducing the amount of food left on the plate.

Participants were randomly assigned either a question about positive feelings or a question about negative feelings. The previous study on feelings of pride and guilt concluded that positive feelings like pride were more effective in motivating people to engage in pro-environmental behavior (Bissing-Olson et al., 2016).

Whether or not this occurs will be tested. Do consumers have a stronger desire not to order extra food when they are filled with pride or guilt?

H1 Positive feelings in combination with a Menu starting on the smallest portions are related to the intention not to over-order food to eat at home.

H2 Negative feelings in combination with a Menu starting on the smallest portions are related to the intention not to over-order food to eat at home.

H3 Positive feelings in combination with a Menu starting on the biggest portions are related to the intention not to over-order food to eat at home.

H4 Negative feelings in combination with a Menu starting on the biggest portions are related to the intention not to over-order food to eat at home.

According to the literature review, it is expected that the menu, beginning with the smallest plate, will influence the reduction of leftovers on the plate. Positive feelings are also more persuasive than negative feelings. As a result, of the four hypotheses, Hypothesis 1 may be the most effective.

The combination of a menu beginning with the smallest plate and ending with positive feelings, a menu beginning with the smallest plate and ending with negative feelings, a menu beginning with the largest plate and ending with positive feelings, or a menu beginning with

the largest plate and ending with negative feelings. The most efficient of the four combinations will be determined at the end of this study.

3 Methodology and Research Framework

To obtain credible results, a well-done methodology is required, so this chapter will clarify the methodology process and explain why certain decisions were made.

3.1 Research Approach

This research aims to comprehend the intention not to over-order food at home and then leave leftovers on the plate. A thorough literature review was conducted in order to identify appropriate variables. In each hypothesis, a relationship was established between the variables in order to determine which hypothesis is the most effective. This thesis was not written with a veil of ignorance; rather, it was based on a well-organized Literature Review. However, in the case of this dissertation, no similar study has yet been conducted, so it will be explored to reach a clear conclusion about the subject, making it an exploratory study.

3.2 Research Methods and Design

The study is deductive because it is based on previous research. The Qualtrics survey was used to collect data since there are several advantages to using a quantitative method for this type of investigation. This study is about something we all experience on a regular basis but rarely think about. As a result, a survey with questions that guide the respondent to answer in accordance with the thesis purpose would be effective. This form of study aids in the creation of generalizations about the sample as well as the understanding of trends among the participants.

The topic of this dissertation is a problem that does not apply to only one type of person. Younger generations may order food by cell phone, but there is no requirement to respond to the survey. As it is a topic that occurs in people's homes, many people do not think much about it, which means that the respondent is not prepared to have strong thoughts or answers about it and is also unaware that it may be controlled through feelings or menu layout. So having a random or precise date is not required for the study because it is a topic that is not commonly discussed in the public.

As previously stated, this research was conducted using Qualtrics, and the questions were not open-ended in order to obtain useful responses for this study. To obtain trustworthy data, the questions were either rating scales or multiple choice. Allowing respondents to interpret the questions could lead to a different outcome for the study. As a result, providing answer options forces the participant to stay on track with the thesis goal.

3.3 Data analysis

To interpret the results, the Qualtrics data is downloaded into SPSS. Then, any responses that have not been completed by the respondents are erased, allowing the data analysis to commence.

Because the hypotheses involve two independent variables: sentiments and menu organization, they must be investigated using a Two-Way Anova. A manipulation is done on four groups, and the results are compared to see whether group has a stronger association with the objective to reduce food waste on the plate. Descriptive analysis is also used to define the sample's description.

3.4 Questionnaire Design

The questionnaire comprises seven sections, however only five are visible to the participant due to the fact that there are four versions of this questionnaire. The first piece is divided into two parts, both of which begin with the identical language concerning the impact of food waste and how it relates to plate waste. In the first version, you are asked to estimate how much food you typically leave on your plate and thereby waste. This is followed by a guilt question, in which you are asked how much guilt you feel for leaving food on your plate. To conclude, the responder is asked how they feel about leaving uneaten food on their plate. From extremely indifferent to not at all indifferent, from not at all guilty to extremely guilty, from not at all with a sense of failure to an extremely strong sense of failure, and from not at all sad to extremely sad. The same text appears in the second edition of this part as indicated above, and this time an estimate of how much food is eaten off the plate and thus not wasted is requested. The question this time is how proud the respondent is to have consumed the amount of food on their plate. Finally, they are asked how they feel when they do not leave leftovers on their plate, ranging from not caring at all to extremely caring, from not proud at all to extremely proud, from not caring at all to extremely successful, and from not caring at all to extremely happy.

The Menu part, which features two new variations, is the second section. The first menu starts with the smallest pizzas and progresses to the largest pizzas. The questioner is asked to pretend that is alone at home and wants to order pizza for dinner. What pizza menu would he or she order? The second version of the menu asks the same question and goes from the largest pizza menu to the smallest pizza menu. Following their menu selection, students were asked to estimate how much food they wanted to eat from the menu.

There will no longer be two versions of the questions. The interviewee was next asked about his or her consumer habits and beliefs. What is their intention to reduce the environmental impact of their actions, what is their intention to reduce the amount of food they leave uneaten

on their plate, do they order more food than they can eat, do they supersize the menu when ordering food from a restaurant that offers a discount on the price, if they feel ashamed of wasting food even though no one knows they are doing it, if they believe that not wasting food is a way to save money, if they feel guilty for wasting food even if no one notices, if they believe that not wasting food is a method to save money, if they feel terrible for throwing away food that could have been eaten, and finally, if leaving leftovers on their plate makes them feel guilty for others who do not have enough to eat.

The second-to-last set of questions are designed to get to know the consumer and his relationship with food. How frequently does the participant order take-out food to eat at home, how frequently does the participant eat fast food, how much does the participant like pizza, how hungry is the participant when answering the survey, and if the participant was ever concerned that he/she might not have enough money to buy food during this month.

Finally, there are questions about customer demographics. Gender, age, nationality, monthly income, job or occupation, and education level are all questions.

4 Analysis and Results

4.1 Sample Characterization

Table 1 Sample socio-demographics

		Mean	*Standard Deviation*	*Frequency*	*Percentage*
Nationality	*Portuguese*			*102*	*87,2%*
	Non-Portuguese			*15*	*12,8%*
Gender	*Male*			*41*	*35%*
	Female			*76*	*65%*
Age		*26,34*	*7,98*		
Education Level	*Basic Education*			*1*	*0,9%*
	Secondary Education			*16*	*13,7%*
	Bachelor or Undergraduate University Diploma			*50*	*42,7%*
	Master or Post-Graduate Diploma			*48*	*41,0%*
	Doctorate University Diploma			*2*	*1,7%*
Job	*Student*			*31*	*26,5%*
	Student Employee			*30*	*25,6%*
	Employed			*44*	*37,6%*
	Self-employed			*5*	*4,3%*
	Housewife/Homemaker			*2*	*1,7%*
	Retire or Pensioner			*1*	*0,9%*
	Unemployed			*4*	*3,4%*
Income	*< 500€*			*6*	*6,5%*
	501 – 999€			*12*	*12,9%*
	1.000 – 1.500€			*20*	*21,5%*
	1.501 – 2.000€			*15*	*16,1%*
	2.001 – 5.000€			*26*	*28,0%*
	5.001 – 10.000€			*12*	*12,9%*
	>10.000€			*2*	*2,2%*
	Total			*93*	

A total of 143 responses to the questionnaire were received, but not all respondents finished the survey. The total of responses considered was 117.

Concerning the question "Indicate the average monthly income of your household" only 93 participants answered their income, 11 participants answered that they didn't go out, and 13 that they preferred not to answer.

Most of the respondents in this sample are Portuguese (*87,2%*) and the percentage of men (*35%*) is lower than women (65%) who responded to the survey. The average age is 24 and varies between 18 to 56. Most of the sample have a Bachelor or Undergraduate University Diploma and their occupation is employed. Finally, the vast majority have an income of 2.001€ to 5.000€ per month.

Table 2 Sample Food behaviors

	Mean	*Standard Deviation*	*Frequency*	*Percentage*
How often do you order food out to eat at home?	*2,78*	*1,53*		
How often do you eat fast food?	*1,85*	*1,22*		
How much do you like pizza?	*7,95*	*1,07*		
How hungry are you right now?	*3,38*	*3,08*		
During this year, have you ever felt worried you might not have enough food to eat due to lack of money?				
No, never.			*104*	*88,9%*
Yes, at least once.			*9*	*7,7%*
Yes, often.			*4*	*3,4%*

When asked how often individuals ordered food out to eat at home the answer was between once a month and two to three times a month. The same response was obtained when we asked participants how often they ordered fast food. Overall, the participants like pizza a lot.

To understand if the interviewees could be influenced by their appetite, they were asked how hungry they were at the moment they were answering the Survey and they responded that they were not very hungry.

To conclude we ask the respondents if during this year 2021 they have ever been worried about not having enough food to eat due to lack of money. Most of the participants

answered: "No, never". Nine of the participants confessed that they have been worried at least once this year, and finally four of the participants are often worried.

Table 3 Sample uneaten food and negative feelings

	Mean	*Standard Deviation*	*Cronbach's Alpha*
Percentage of total plate of food typically not eaten.	*15,11*	*19,37*	
How guilty do you feel for leaving this amount of food uneaten on your plate?	*2,71*	*1,23*	
How do you feel when <u>you leave food uneaten</u> on your plate?			
Indifferent	*3,90*	*1,13*	
Guilty	*3,29*	*1,09*	
Failure	*2,67*	*1,15*	
Sad	*2,76*	*1,08*	
Mean of negative feelings	*3,15*	*0,88*	*0,80*

Table 4 Sample food that is eaten and positive feelings

	Mean	*Standard Deviation*	*Cronbach's Alpha*
Percentage of total plate of food typically eaten.	*81,70*	*25,78*	
How proud do you feel for eating this amount of food from your plate?	*3,58*	*1,05*	
How do you feel when <u>you do not leave food uneaten</u> on your plate?			
Caring	*3,70*	*1,20*	
Proud	*3,43*	*1,35*	
Successful	*3,51*	*1,30*	
Happy	*3,68*	*1,32*	
Mean of positive feelings	*2,85*	*1,29*	*0,83*

The section concerning feelings has two different parts, one amount of the respondents received some questions and the other amount received others. I will start by analysing the answers that concern negative feelings. First, the respondents read a text and then they were asked how much food they do not normally eat from their plate and the average response was 15,11% (Standard deviation= 19,23) of food that is not eaten.

The respondents feel somewhere between a little guilty to guilty for leaving this amount of food uneaten on their plate. Overall, they do not feel much indifference about leaving food behind, they feel very guilty, a little bit let down, and a little sad. All in all, they appear to

have negative feelings with a mean of 3,15. This data has a good reliability level because it has a Cronbach's Alpha of 0,80.

The second group of interviewees was asked questions about positive feelings. The first question was about how much food they usually eat from a plate. When they are asked how proud they feel of having eaten that amount of food from their plate they answer that they feel proud. When they do not leave food on their plate the respondents feel proud, successful, and very happy. The Average of these responses is 3,58 which shows that they feel positive feelings when they eat everything. About Cronbach's Alpha, the date is reliable because it has a value of 0,83.

The study sample is mostly young and not afraid of not having food because of lack of money. Only 13 people out of 117 have already worried about not having money to eat this year. Perhaps this could be a sample that is not in touch with the idea of not having food one day. One way to explain the behavior of the younger generations is that they have not experienced food scarcity and that this makes it acceptable to waste food (von Massow & McAdams, 2015). Looking at sample data the average of how guilty they feel about leaving 15,11 (Standard deviation=19,37) on average of food on their plate is 2,71(Standard deviation=1,23). And when the other group, which on average eats 81,70 (Standard deviation=25,78) of the plate the average feeling of pride for what they have eaten is 3,58 (Standard deviation=1,05), which is more significant than the feeling of guilt for leaving food on the plate. If they are proud even when they leave food on their plate and do not feel much guilt about not eating all the food on their plate, it seems that there might be a normalization of plate waste in the sample.

Table 5 Menu 1 results

		Mean	*Standard Deviation*	*Frequency*	*Percentage*
Menu1	*Menu A*			*14*	*22,6%*
	Menu B			*3*	*4,8%*
	Menu C			*23*	*37,1%*
	Menu D			*14*	*12,0%*
	Menu E			*6*	*5,1%*
	Menu F			*1*	*1,6%*
	None of the above			*1*	*1,6%*
Estimate food eaten		*84,13*	*24,930*		

Another thing reviewed in the literature, before choosing a menu, the consumer already knows what will not eat. In these data the respondents knew they would not eat everything as can be seen by the estimated average food is eaten and food uneaten (Roe et al., 2018).

Similar to the last groups, the same thing happened with the Menus. There was one group that gets one Menu and the other one gets a different Menu. The first Menu has food options from the smallest to the largest menu. Most of the respondents chose Menu C, which includes Garlic bread, three slices of pizza, and a drink.

The second menu has food options from the biggest menu option to the smallest one. In this case, the most chosen answer was Menu D which happens to be the same option as Menu C from the first menu, but here the percentage of respondents choosing this menu is lower.

Table 6 Menu 2 results

		Mean	*Standard Deviation*	*Frequency*	*Percentage*
Menu2	*Menu A*			*8*	*14,5%*
	Menu B			*5*	*9,1%*
	Menu C			*14*	*25,5%*
	Menu D			*16*	*29,1%*
	Menu E			*5*	*9,1%*
	Menu F			*5*	*9,1%*
	None of the above			*2*	*3,6%*
Estimate food eaten		*86,00*	*22,35*		

On the first Menu, 37,1% chose option C of garlic bread, three slices of pizza, and a drink while on the second Menu 29,1% chose this option. And in the first Menu, option A that consists of three slices of pizza with a drink is the second most chosen with 22,6% while in the second Menu this same option which is called F has only 9,1% of the participants select it. The second choice of the participants who received Menu 2 was option C which includes garlic bread, five slices of pizza, and a drink.

When manipulating the layout of the Menus, there were effectively more respondents influenced to choose a smaller Menu when the order of the menus starts with the smallest. This is consistent with what was concluded in the Literature Review that simple menu changes such as the placement of food options can influence consumer decision-making *(Kim et al., 2019)*.

Also, a Menu is a guide for the consumer (Ozdemir & Caliskan, 2014) so simple details such as the menu arrangement are crucial to manipulate the consumer.

Table 7 Sample habits and opinions

	Mean	*Standard Deviation*	*Cronbach's Alpha*
I intend to reduce the impact of my actions on the environment.	*4,40*	*0,79*	
I intend to reduce the amount of food I leave uneaten in my plate.	*4,26*	*1,02*	
I would feel ashamed if I wasted food, even when nobody would be aware of this.	*4,08*	*0,94*	
I would feel guilty if I threw away food that could have been eaten.	*4,47*	*0,85*	
Leaving food uneaten on my plate would make me feel guilty about people who do not have enough to eat.	*3,98*	*1,11*	
Mean Food Waste habits and intentions.	*4,24*	*0,68*	*0,75*
I tend to order more food than I can eat.	*2,37*	*1,15*	
I would supersize my food menu orders if the restaurant delivering them would offer this option with a temporary price discount.	*2,99*	*1,21*	
Not wasting food is a good way to save money.	*4,53*	*0,84*	

Respondents' habits and opinions are important to understand their relationship with sustainability, food waste, and plate waste. From the answers, we can conclude that in general, they intend to reduce their impact on the environment and to reduce the amount of food left on their plates. Generally, participants feel ashamed of wasting food even if no one is watching and feel guilty of throwing away food that could have been eaten. Compared to the other responses the participants feel slightly less guilty about leaving food on their plate when there are people who have nothing to eat, but still, overall, the mean was significant. Therefore, the average of these habits and intentions is 4,24 and its respective standard deviation is 0,68, this shows that the survey sample has strong intentions to reduce waste and feels bad when they do not behave accordingly. As the Cronbach's Alpha is above 0,70 it means that the data scale is reliable.

When asked if they order more food than they will eat, the answers show that they order, not much but they do. When the restaurant offers a discount, the respondents answered that they are likely to order more food than they eat. Finally, in the question Not wasting money

is a way to save money there was a strong agreement, being the answer with the most significant mean.

4.2 Main analysis

This study's experimental design involved two treatments, each with two levels; orders of presentation of treatments and levels were randomized. The first treatment entailed activating personal norms about plate food waste (N=70, priming guilt for leaving food uneaten on plate vs. N=47, priming pride for NOT leaving food uneaten on the plate). As a manipulation check, participants were asked to report how they felt when leaving food uneaten on their plate on four items (Guilt: 1 - Not at all indifferent (recoded 5) /guilty /with a sense of failure /sad, 5 - Extremely indifferent (recoded 1) /guilty/ with a sense of failure/ sad; Pride: 1 - Not at all caring /proud /successful /happy, 5-Extremely caring /proud /successful /happy). Reliability analysis results yielded Cronbach's Alphas of 0,80 for the four guilt items, and 0,83 for the four pride items; item scores were, therefore, averaged across each level to create a composite guilt/pride response variable. Results of an independent sample t-test show that the mean of this composite variable differed significantly across levels of information treatment (Guilt: mean = 3,15; Sd = 0,88; Pride: mean = 3,58; Sd = 1.05; t_{115}=-2,370; p=,019).

The second treatment entailed exposing participants to the menu of a fast-food pizza restaurant that varied in the order of presentation of the six meals on offer (N=62, Small2Large; N=55, Large2Small) and asking them which meal they would choose if they were home alone and wanted to order pizza for dinner (with a no-choice option: N=1, Small2Large; N=2, Large2Small). Frequencies of meal choices (recoded Small2Large in the Large2Small level) were cross-tabulated by treatment and Fischer's exact test statistics for small samples were computed to verify treatment effects. Results indicate that participants' meal choices were not independent of the order of presentation of offers in the menu (N=114, Fischer-Freeman-Halton Exact Test = 11,017; p=0,047). Reviewing the meal choice frequencies bar chart per level uncovers that the smallest meals were chosen by more participants when presented firstly in the menu and largest meals were chosen by fewer participants when presented lastly in the menu.

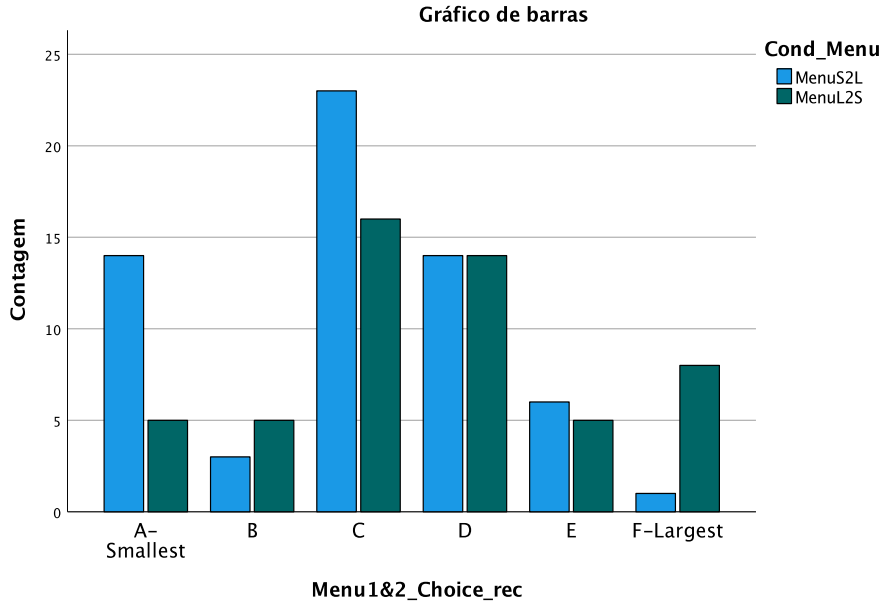

Figure 1 Meal Choice Bar Chart

Personal norm activation treatment was not significantly associated with participants' meal choices and the mean of the composite guilt and pride variable did not differ significantly across menus (results shown in Appendix).

Intentions to reduce plate food waste and impact of own actions on the environment were measured on a 5-point labeled scale (N=117, 1 - Definitely not, 5 – Definitely yes) as dependent variables. Correlation between item scores was 0,354 (95%) CI [0,184; 0,503] and hence the two times were collapsed into a single dependent measure.

Univariate Analysis of Variance with the two experimental treatments as factors yielded a significant interaction effect $F(1; 116) = 4{,}40$; $p = 0{,}038$; $\eta^2=0{,}037$, but no significant main effects (full results shown in Appendix). For participants primed for pride for not leaving food uneaten on the plate (i.e., for not causing food waste), exposure to the Large2Small menu significantly increased intentions to reduce plate food waste and the impact of own actions on the environment. Univariate Analysis of Variance with two treatments and treatment order of presentation as factors yielded a similar two-way interaction effect $F(1; 116) = 4{,}37$; $p = 0{,}039$; $\eta^2=0{,}039$; but no other significant main or interaction effects (results shown in Appendix). Activation of personal norms about food plate waste and its impacts on sustainability might therefore help self-regulate the behavior of leaving food uneaten on the plate, namely in situations when ordering more food than desired or wanted for consumption is nudged by how meal offers are presented (e.g., in menus where larger portion meals are presented first than smaller portion ones).

4.3 Discussion

The results of the mean scores of feelings of pride and guilt are reliable, and when the two groups were tested in an Independent Sample T-test, there was a high probability that these results would be repeated, that is, the results are trustworthy if the same study were repeated because the T-test value is -2,370. The p-value of 0,019 is smaller than 0,05, indicating that the difference between the two means differs and that the likelihood of observing different findings is low.

Fischer-Freeman-Halton the Exact Test yielded significant results, with a p-value less than 0,05 indicating that Menu layout does influence the consumer. According to the Menu Choices Bar Chart, when larger food options were presented first, more people chose greater portions, but when smaller food alternatives were presented first, less people chose larger portions. A menu can serve as a guide for the consumer (Ozdemir & Caliskan, 2014) hence it was important to determine whether the layout influenced the consumer's choices in this study. Although past studies have explored the influence of the menu, none of them studied the arrangement from the largest to the smallest menu particularly. As a result, this study reveals that the layout from the smallest food selection to the largest can influence the consumer's preference for a smaller quantity.

A link was established between the variables intentions to limit plate food waste and reduce the influence of my activities on the environment, with the result being a somewhat favorable correlation with a value of 0,354. As a result, when one variable rises, the other rises as well.

When exposed to the Large to Small Menu, respondents who were exposed to the manipulation of pride feelings were shown to have increased intention to reduce plate food waste and influence of personal actions on the environment. Feelings of pride and guilt were compared, and it was determined that pride was more effective (Ozdemir & Caliskan, 2014). Based on this, there were some anticipation that it would be reflected in the study, and indeed, the modification of pride was important in lowering plate food waste.

On the Large to Small Menu, it was also discovered that an incentive in the respondent's social norms and environmental impacts can help self-regulate the behavior of leaving food uneaten on the plate, specifically in situations where ordering more food than desired or wanted for consumption is nudged by how meal offers are presented. People are encouraged not to waste food by social norms (Sirieix et al., 2017) and social context is vital for people to commit to pro-environmental behavior (Bissing-Olson et al., 2016). The Univariate Analysis of Variance results suggests that social norms and decreasing

environmental effects also support self-regulate food waste when it occurs on the plate. Furthermore, it was demonstrated to be a factor in self-regulating plate waste in scenarios when individuals wish to purchase more food or the manner the food is presented induces a want to get more.

5 Conclusions and Implications

5.1 Conclusion

Plate waste is becoming a prominent concern as one of the leading causes of food waste. Understanding the consumer's relationship with plate waste is beneficial to everyone, including the customers who waste food on a daily basis, as well as companies and marketing. Reducing food waste on the plate that will not be eaten is a shared responsibility of people and higher entities such as brands and the government.

The purpose of this dissertation was to deepen knowledge in a new and significant field with few studies, information about the consumer's relationship with squandering food on the plate while one is at home and orders food from outside through a menu. The thesis topic is narrow since it seeks to comprehend the over-ordering of a food app during a time when ordering meals by mobile phone is prevalent. It has revealed a greater grasp of what can self-regulate the consumer when they are in this circumstance. It raised some significant assumptions that should be investigated further: if plate waste in the case of ordering food can be attributed to young people never having experienced a lack of food; the consumer knows in advance what he will be unable to eat, designing different online menus can be a solution to overcome plate waste.

The data show that the Menu arrangement, beginning with the lowest food option, influences the consumer's choice of the smallest Menu. Feelings of pride when eating everything on a menu together, from the largest to the tiniest quantity, appear to influence consumers' intentions to reduce plate food waste and the environmental impact of their activities. Finally, when ordering extra food, personal standards regarding leaving food on the plate and the impact on the environment appear to have a self-regulating relationship. This finding suggests that when this occurs, customers tend to leave less food on their plates.

The study emphasized the importance of menu layout for the consumer, which is a great asset for the food sector and individuals who purchase meals from places other than their homes. A better-organized menu can help to reduce the amount of food that is left on the plate. When the menu is organized from smallest to largest portion size, it appears that the consumer chooses a lesser piece for himself naturally. On the other, if the menu is designed from the largest option down, activating feelings of pride about not leaving food on the plate, personal norms about plate waste, and personal norms about sustainability may inspire the consumer to have more control over their selections. However, it appears that these elements had less of an impact on the Menu, beginning with the smaller option because constructing the Menu in this manner already achieves the desired result.

Responses to marketing campaigns regarding sustainability and food waste vary, but the underlying message is frequently that we are doing something wrong and must change. Meanwhile, the campaigns are not yielding the desired results. In this study, the most commonly employed emotions, shame, and pride were assessed to determine which ones would be most helpful in minimizing plate waste based on the findings. The study's findings underline the superiority of feelings of pride over feelings of remorse. Despite this, most environmental social initiatives rely on feelings of guilt rather than pride. According to the conclusions of this article, using feelings of pride when talking with customers is more effective. It can be difficult to change people's habits of excessive plate waste but raising awareness through feelings of pride appears to be the most successful approach.

5.2 Recommendations

Based on the previous conclusions, some recommendations will be presented in this chapter.

Restaurants, cafes, bakeries, and other food establishments should pay close attention to menu design. The order of meal alternatives should be considered because it impacts the consumer's impression. This study discovered a substantial link between choosing smaller portions and a menu that begins with smaller serving options. Plate waste is a daily problem in restaurants and other food outlets. Choosing a smaller plate is one approach to reduce waste in restaurants.

Food companies, retailers, and government agencies all want to reduce wasteful plate waste, whether for environmental or economic reasons. To be successful, social campaigns must consider the best way to engage consumers. Pride emotions are rarely used in sustainable marketing, but they proved useful in this study. As a result, in order to limit plate waste, these organizations must focus on feelings of pride.

5.3 Limitations

Some limitations encountered during the thesis development process will now be discussed. Some decisions had to be made throughout this dissertation. The results could be different if the meal was different instead of fast-food pizza, or if only people who usually order food at home were interviewed.

It was decided to change the layout of the menus. Perhaps the outcomes would be different if the meal selections were priced.

In other investigations, other emotions were examined with the consumer relationship rather than sentiments of shame and pride. When diverse values and emotions are incorporated in social promotions, they might be found to be effective. It would be interesting to preserve the menu modification but test it in relation to feelings of thankfulness and altruism in future investigations. Nonetheless, the study's design decisions yielded results. It was feasible to demonstrate the menu's relevance to the consumer and recognize that marketing campaigns could be more effective if they took a positive tone, such as pride.

In a future study, participants might be divided into two groups: one that orders pizza and the other that cooks the pizza. Half of the first group and half of the second group would experience guilt, while the remaining participants would experience pride for leaving food on their plates. In a future trial, participants will be able to pick how much of the meal they eat. One group would be given favorable thoughts about plate waste, while the other would be given negative feelings about plate waste. Similar studies would improve the likelihood that the results will be replicated, allowing these conclusions to be more certain.

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Qualtrics Survey

Dear participant,

thank you for answering this survey on consumer behavior.

It plays a key role in the conclusion of my Master's in Business. The answers are anonymous, confidential and there are no right or wrong answers, so please be as honest as possible. Participants can quit at any time without punishment. The survey takes 5 minutes.

Thank you for your help!

Section One Guilt

Emotion_Prime_G According to the United Nations, the food consumers waste has a negative impact on resource conservation and food security, causing great environmental, social, and economic costs. Therefore, reducing food waste is necessary for achieving healthy diets and sustainable food systems worldwide.

A major source of consumers' food waste is the food left uneaten on their plates, also known as plate food waste.

Please provide an estimate of the percentage of food you typically leave uneaten on your plate <u>and is therefore wasted:</u>

0 10 20 30 40 50 60 70 80 90 100

Percentage of total plate of food typically not eaten	

Extent_GuiltFW How guilty do you feel for leaving this amount of food uneaten on your plate?

- ○ Not guilty at all
- ○ A little guilty
- ○ Guilty
- ○ Very guilty
- ○ Extremely guilty

FeelPlateWaste How do you feel when <u>you leave food uneaten</u> on your plate?

	1	2	3	4	5	
Not at all indifferent	○	○	○	○	○	Extremely indifferent
Not at all guilty	○	○	○	○	○	Extremely guilty
Not at all with the sense of failure	○	○	○	○	○	With an extreme sense of failure
Not at all sad	○	○	○	○	○	Extremely sad

Section One Pride

Waste_Prime_P According to the United Nations, the food consumers waste has a negative impact on resource conservation and food security, causing great environmental,
social and economic costs. Therefore, reducing food waste is necessary for achieving healthy diets and sustainable food systems worldwide.
A major source of consumers' food waste is the food left uneaten on their plates, also known as plate food waste.

Please provide an estimate of the percentage of food you typically eat from your plate <u>and is therefore NOT wasted:</u>

0 10 20 30 40 50 60 70 80 90 100

Percentage of total plate of food typically eaten	

Extent_PrideNFW How proud do you feel for eating this amount of food from your plate?

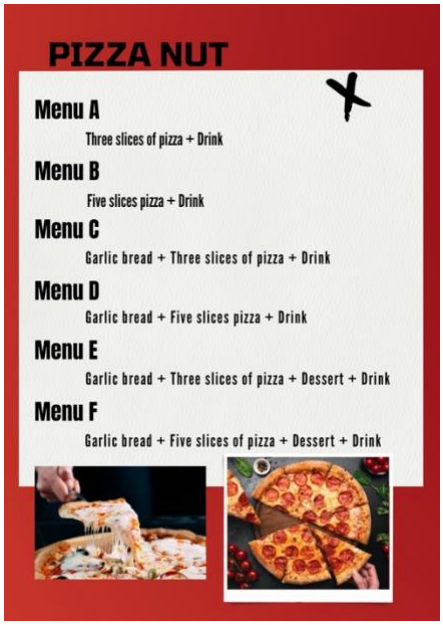
- ○ Not proud at all
- ○ A little proud
- ○ Proud
- ○ Very proud
- ○ Extremely proud

FeelNPlateWaste How do you feel when you do not leave food uneaten on your plate?

	1	2	3	4	5	
Not at all caring	○	○	○	○	○	Extremely caring
Not at all proud	○	○	○	○	○	Extremely proud
Not at all successful	○	○	○	○	○	Extremely successful
Not at all happy	○	○	○	○	○	Extremely happy

Section Two Menu 1

Menu1_Choice Please imagine that you are at home alone and want to order pizza for your dinner. Which pizza menu would you choose from the following?



- ○ Menu A
- ○ Menu B
- ○ Menu C
- ○ Menu D
- ○ Menu E
- ○ Menu F
- ○ None of the above

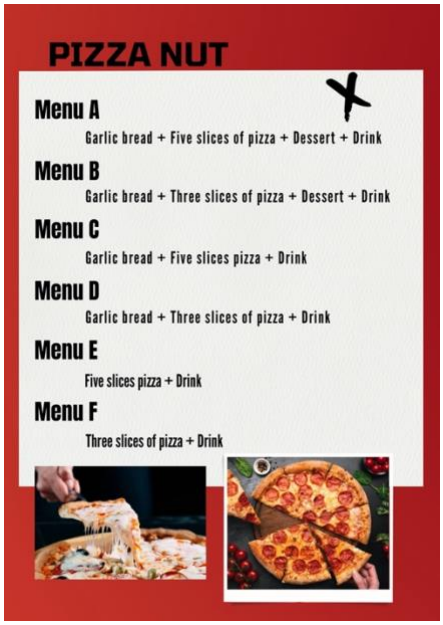
EstimateFoodEaten_M1 Please provide an estimate of how much food you would likely eat from this menu:

0 10 20 30 40 50 60 70 80 90 100

Percentage food eaten from menu	

Section Two Menu 2

Menu2_Choice Please imagine that you are at home alone and want to order pizza for your dinner. Which pizza menu would you choose from the following?



- ○ Menu A
- ○ Menu B
- ○ Menu C
- ○ Menu D
- ○ Menu E
- ○ Menu F
- ○ None of the above

EstimateFoodEaten_M2 Please provide an estimate of how much food you would likely eat from this menu:

	0 10 20 30 40 50 60 70 80 90 100
Percentage food eaten from menu	

Section Three Measures

Intro Please share now with us some of your opinions and habits as a consumer.

BIntentionG I intend to reduce the impact of my actions on the environment.

- ○ Definitely not
- ○ Probably not
- ○ Might or might not
- ○ Probably yes
- ○ Definitely yes

BIntention_FW I intend to reduce the amount of food I leave uneaten in my plate.

- ○ Definitely not
- ○ Probably not
- ○ Might or might not
- ○ Probably yes
- ○ Definitely yes

Order2Much I tend to order more food than I can eat

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Order2MuchProm I would supersize my food menu orders if the restaurant delivering them would offer this option with a temporary price discount

- ○ Extremely likely
- ○ Somewhat likely
- ○ Neither likely nor unlikely
- ○ Somewhat unlikely
- ○ Extremely unlikely

ShameFW I would feel ashamed if I wasted food, even when nobody would be aware of this.

- ○ Definitely not
- ○ Probably not
- ○ Might or might not
- ○ Probably yes
- ○ Definitely yes

FW_SaveM Not wasting food is a good way to save money.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

GuiltFW_T I would feel guilty if I threw away food that could have been eaten.

- ○ Definitely not
- ○ Probably not
- ○ Might or might not
- ○ Probably yes
- ○ Definitely yes

UnplannedFBuy I tend to buy foods I did not plan to when shopping for groceries.

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Very often
- ○ Always

Stockpile I tend to buy higher amounts of foods when the supermarket offers them at a discounted price.

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Very often
- ○ Always

Shoplist I shop for groceries using a shopping list.

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Very often
- ○ Always

FW_GuiltOthers Leaving food uneaten on my plate would make me feel guilty about people who do not have enough to eat

- ○ Definitely not
- ○ Probably not
- ○ Might or might not
- ○ Probably yes
- ○ Definitely yes

Section Four Food Behavior

FoodOrder_freq How often do you order food out to eat at home?

- ○ Never
- ○ Less than once a month
- ○ Once a month
- ○ 2-3 times/month
- ○ Once a week
- ○ 2-3 times per week
- ○ 4-5 times per week
- ○ 6-7 times per week

FastFood_Freq How often do you eat fast food?

- ○ Less than once a month
- ○ Once a month
- ○ 2-3 times/month
- ○ Once a week
- ○ 2-3 times per week
- ○ 4-5 times per week
- ○ 6-7 times per week
- ○ Click to write Choice

Pizza_Like How much do you like pizza?

- ○ Like extremely
- ○ Like very much
- ○ Like moderately

- ○ Like slightly
- ○ Neither like nor dislike
- ○ Dislike slightly
- ○ Dislike moderately
- ○ Dislike very much
- ○ Dislike extremely

Hunger_Level How hungry are you right now?

	Not at all									**Extremely**
	0	1	2	3	4	5	6	7	8	9	10
											

SpecDiet_What Please indicate if you are following any special diet or food pattern:

- [ ] I am not following any special diet or food pattern
- [ ] Vegan
- [ ] Vegetarian
- [ ] Weight maintenance
- [ ] Weight loss
- [ ] Weight gain
- [ ] Low calorie
- [ ] Low fat
- [ ] Low sugar
- [ ] No lactose
- [ ] No gluten
- [ ] Organic food
- [ ] Diabetes control
- [ ] Intermittent fasting
- [ ] Low salt
- [ ] High protein
- [ ] Low fibre
- [ ] Paleo Diet
- [ ] Flexitarian

- [ ] Outra(s). Qual/Quais?
- [ ] Keto Diet
- [ ] Atkins Diet
- [ ] High fibre

FoodInsecure During this year, have you ever felt worried you might not have enough food to eat due to lack of money?

- ○ No, never
- ○ Yes, at least once
- ○ Yes, often

Section Five Demographics

Gender What is your gender?

- ○ Female
- ○ Male
- ○ Other

Age What is your age?

Nationality Where are you from?

Income Please indicate the average monthly income of your household:

- ○ < 500 €
- ○ 501 - 999 €
- ○ 1.000 - 1.500 €
- ○ 1.501 - 2.000 €
- ○ 2.000 - 5000 €
- ○ 5000 - 10000€
- ○ > 10000€
- ○ Don't know
- ○ Rather not answer

Job Please indicate your main occupation:

EduLevel Please indicate your completed education:

- ○ Basic Education - First Cycle (4 years)
- ○ Basic Education - Second Cycle (6 years)

- ○ Basic Education - Third Cycle (9 years)
- ○ Secondary Education (12 years)
- ○ Bachelor or Undergraduate University Diplona
- ○ Master or Post-graduate University Diploma
- ○ Doctorate University Diploma

Appendix

Table 8 Reliability Statistics of Guilt Manipulation

Cronbach's Alpha	Alfa de Cronbach based on standardized items	N items
0,802	0,803	4

Table 9 Item Statistics of Guilt Manipulation

	Mean	Standard Deviation	N
FeelPlateWaste_1_rec	3,90	1,131	70
FeelPlateWaste – Not at all guilty: Extremely guilty	3,29	1,092	70
FeelPlateWaste – Not at all with the sense of failure: With an extreme sense of failure	2,67	1,151	70
FeelPlateWaste – Not at all sad: Extremely sad	2,76	1,083	70

Table 10Summary Item Statistics of Guilt Manipulation

	Mean	Minimum	Maximum	Interval	Maximum / Minimum	Variance	N item
Item Means	3,154	2,671	3,900	1,229	1,460	,321	4
Item Variance	1,242	1,172	1,325	,153	1,131	,005	4
Covariances between items	,625	,459	,890	,431	1,937	,024	4
Item Correlations	,505	,353	,714	,361	2,024	,017	4

Table 11 Scale Statistics of Guilt Manipulation

Mean	Variance	Standard Deviation	N items
12,61	12,472	3,532	4

Table 12 Pride Manipulation

		N	%
Cases	Valid	47	40,2
	Excluded	70	59,8
	Total	117	100,0

Table 13 Reliability Statistics of Pride Manipulation

Cronbach's Alpha	Cronbach's alpha based on standardized items	N items
0,829	0,825	4

Table 14 Item Statistics of Pride Manipulation

	Mean	Standard Deviation	N

FeelNPlateWaste – Not at all caring: Extremely caring	3,70	1,196	47
FeelNPlateWaste – Not at all proud: Extremely proud	3,43	1,347	47
FeelNPlateWaste – Not at all successful: Extremely successful	3,51	1,300	47
FeelNPlateWaste – Not at all happy: Extremely happy	3,68	1,321	47

Table 15 Summary Item Statistics of Pride Manipulation

	Mean	Minimum	Maximum	Interval	Maximum / Minimum	Variance	N items
Item Means	3,580	3,426	3,702	0,277	1,081	0,018	4
Item Variance	1,670	1,431	1,815	0,384	1,268	0,028	4
Covariances between items	0,915	0,438	1,278	0,840	2,918	0,117	4
Item Correlations	0,541	0,282	0,730	0,448	2,591	0,032	4

Table 16 Scale Statistics of Pride Manipulation

Mean	Variance	Standard Deviation	N items
14,32	17,657	4,202	4

Table 17 Fischer-Freeman-Halton Exact Test

	Value	df	Asymptotic Significance (Bilateral)	Exact Sig (2-sided)	Exact Sig (1-sided)	Point Probability
Pearson's chi-square	11,048[a]	5	0,050	0,048		
Likelihood ratio	11,934	5	0,036	0,047		
Fisher-Freeman-Halton exact test	11,017			0,047		
Linear by Linear Association	6,023[b]	1	0,014	0,014	0,008	0,003
N of Valid Cases	114					

Table 18 Univariate Analysis of Variance with the two experimental treatments as factors yielded a significant interaction effect

Between-subjects effects testing						
Dependent variable: COMPUTE Mean_FW_DV2=MEAN(Bintention_FW,BintentionG)						
Origin	Type III Sum of Squares	df	Mean Square	Z	Sig.	Partial square eta
Model corrected	2,641[a]	3	,880	1,606	0,192	0,041
Intercept	2110,721	1	2110,721	3850,686	0,000	0,971
Cond_Emotion	,327	1	,327	0,597	0,441	0,005
Cond_Menu	,084	1	,084	0,153	0,696	0,001
Cond_Emotion * Cond_Menu		1	2,413	4,401	0,038	0,037
Pattern		113	0,548			
Total	2,413	117				
Total corrected	61,940	116				

Table 19 Univariate Analysis of Variance with two treatments and treatment order of presentation as factors yielded a similar two-way interaction effect

Between-subjects effects testing Dependent variable: COMPUTE Mean_FW_DV2=MEAN(BIntention_FW,BIntentionG)						
Origin	Type III Sum of Squares	df	Mean Square	Z	Sig.	Partial square eta
Model corrected	4,057[a]	7	0,580	1,044	0,405	0,063
Intercept	2070,201	1	2070,201	3728,269	0,000	0,972
Cond_Emotion	0,483	1	0,483	0,871	0,353	0,008
Cond_Menu	0,038	1	0,038	0,068	0,794	0,001
FL_26_DO_FL_27	0,013	1	0,013	0,024	0,876	0,000
Cond_Emotion * Cond_Menu	2,429	1	2,429	4,374	0,039	0,039
Cond_Emotion * FL_26_DO_FL_27	0,920	1	0,920	1,656	0,201	0,015
Cond_Menu * FL_26_DO_FL_27	0,468	1	0,468	0,843	0,360	0,008
Cond_Emotion * Cond_Menu * FL_26_DO_FL_27	0,000	1	0,000	0,000	0,989	0,000
Pattern	60,525	109	0,555			
Total	2257,250	117				
Total corrected	64,581	116				

Table 20Intentions to reduce plate food waste and impact of own actions on the environment were measured on a 5-point labeled scale (N=117, 1 - Definitely not, 5 – Definitely yes) as dependent variables

Correlations						
Variable	Variable2	Statistic Correlation	Count	Lower C.I.	Upper C.I.	Notes
BIntentionG	BIntention_FW	0,354	117	0,184	0,503	
Missing value handling: PAIRWISE, EXCLUDE. C.I. Level: 95,0						