Flipping the Menu: Nudging Sustainable Food Choices Online by Using a Default Nudge +

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Use of technology and other resources

1. Did you use any tools or services to paraphrase text from other sources (for example, a thesaurus or the Academic Phrasebank)? Please name them.
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→ I used ChatGPT to:

- Rewrite sentences
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- Check if sentences/paragraphs were logically formulated
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Abstract

Nowadays, it is increasingly important for individuals to make sustainable choices in an online food ordering environment to address environmental challenges. Previous research has found that nudges can effectively stimulate sustainable behavior. This study investigated the effect of a pledge, where individuals have the option to commit to choosing a sustainable meal, combined with a sustainable default menu, on influencing Dutch people to choose a more sustainable meal in a digital food ordering app environment using an online experiment. It was expected that both the default nudge and the pledge would increase the likelihood of choosing a sustainable meal. The effectiveness of the pledge and nudge was measured by the frequency of sustainable meal choices. Data on past sustainable food behavior was also collected to assess its potential moderating effect. The analysis showed that participants were 10.98 times more likely to choose a sustainable meal when presented with a sustainable default nudge (+ pledge) compared to an unsustainable default nudge (+ pledge). The effect of the default nudge was significant. However, adding a pledge did not significantly increase the possibility that people would choose a sustainable meal. There was also no evidence found that past sustainable behavior significantly moderated the effectiveness of the nudge (+ pledge). In conclusion, a default nudge is effective in promoting sustainable food choices in an online food ordering context, but adding a pledge does not yield additional benefits. These findings suggest that digital food ordering companies can promote sustainability by changing their default options. Future research may explore the application of the pledge combined with a default nudge in real-world settings, and include a control condition.

Keywords: nudging, online, default nudge +, sustainability, food choices

Table of contents

1. Introduction

The global concern regarding the environmental impact of food consumption is becoming increasingly urgent. The annual carbon dioxide (CO2) emission from the food consumption of an average Dutch household (2.2 persons) is 4,200 kg (Milieu Centraal, 2023). This is equivalent to the carbon footprint of a round-trip flight between the Netherlands and Hawaii (*Flight emissions calculator*, n.d.). This high carbon footprint is problematic because it plays a significant role in contributing to the greenhouse effect and climate change. CO2 emissions have consequences in the short and long term. It causes global temperatures to increase, sea levels to rise and these changes are often irreversible (Solomon et al., 2009).

Addressing this environmental concern requires individuals to shift their food choices toward more sustainable options, potentially reducing the carbon emissions related to food by up to 50% (Hallström et al., 2015). With the rise of digitalization, people are not limited to making those choices in the supermarket or a restaurant, but people increasingly make those choices digitally. However, motivating individuals to alter their food choices remains difficult. Therefore, efforts to promote sustainable food choices must focus on the online sphere where a significant portion of decision-making now takes place. For instance, individuals now make food choices by ordering meals or groceries online. In 2023, 41.5% of the Dutch population had ordered at least one meal online (Online food delivery in the Netherlands, 2024). Specifically, Thuisbezorgd.nl is the most popular delivery website in the Netherlands at this moment (Top websites Netherlands food and drink restaurants and delivery, 2023). Notably, a significant portion of the meals offered online are fast food, which not only leads to health risks but is also less sustainable (Osaili et al., 2023).

But how can individuals be influenced to make the ‘right’ choice? Despite individuals often intending to act sustainably, this intention does not always result in actual behavior. This phenomenon, known as the 'intention-behavior gap’, makes it challenging to effectively promote sustainable food consumption (Sheeran, 2002). Previous research shows that people can be steered in the desired direction by using a so-called ‘nudge’ (Ferrari et al., 2019; Hansen et al., 2019; Velema et al., 2018). A nudge, which can be seen as a gentle push towards a desired option, is a change in the choice architecture that often influences people unconsciously. Importantly, nudges do not forbid any options, and they can be avoided by recognizing them (un)consciously and choosing to ignore the nudge and act differently (Thaler & Sunstein, 2008). Nudging is a low-cost strategy that is easy to implement (Schmid et al., 2018). An example of a nudge in the supermarket, is placing vegetables at eye level. There are also different kinds of nudges. For instance, the default nudge automatically presents a pre-selected option (default-option) that is automatically selected when the individual does not actively choose an alternative option (Egebark & Ekström, 2016).

Banerjee et al. (2022) investigated what kind of nudge was most effective in pushing people to make a more sustainable choice in an online meal ordering experiment. The findings revealed that people significantly made a more sustainable choice when a shorter menu was shown that displayed only the sustainable options with an option to opt-out, i.e., by using a default nudge. Also, research suggests that carbon labeling meals to indicate the carbon emission of the meal can significantly increase the sale of sustainable options (Banerjee et al., 2022; Kühne et al., 2023). This can be accomplished using a traffic light color system.

These results are promising, however, critics argue that the use of nudges may undermine individuals' autonomy by exploiting biases, by lacking transparency and manipulating choices,

by limiting active decision-making, and finally by weakening personal agency (BehavioralEconomics.com, 2020). Moreover, a meta-analysis by Hummel and Maedche (2019) showed that only 62% of nudging experiments are significantly effective. Lastly, a lot of research on nudges is done offline, and it remains unclear whether the results found in offline research can be used for online nudging.

A relatively new term in nudging research is the 'nudge +'. A nudge + adds an element of reflection to a nudge which makes people's thinking process switch by raising people's decision-making processes to a more conscious level. It increases the transparency of the nudge and it gives people more autonomy in decision-making (Banerjee & John, 2021). This reflective element can be added before, simultaneously with, or after the nudge, depending on its intended goal. For example, a nudge + can be realized by adding a so-called 'pledge', which serves as a pre-nudge element where individuals are informed of the rationale behind a certain choice and then given the option to accept or decline the pledge. Adding this reflective element removes the unconscious part of a nudge and stimulates people to consciously think about their decision, potentially leading to long-term behavioral changes (Jung & Mellers, 2016). Similarly, a field experiment conducted in a restaurant setting shows that this transparency actually increased the effectiveness of the nudge (Buratto & Lotti, 2024). Furthermore, Banerjee et al., (2023b) showed that the default nudge with a pledge presented before the nudge (default nudge +) increased the intention to order a sustainable meal by 30%.

Therefore, this research will dive into the effectiveness of a nudge + by examining the effects of a pledge followed by a default menu with an opt-out option (default nudge +), on stimulating sustainable food behavior via food ordering apps. Sustainable meals are those that have a minimal impact on the environment, meaning those meals have low carbon emissions

linked with production and consumption (Nelson et al., 2016). To communicate the meals' sustainability, traffic light carbon labels will be used. Additionally, this study will examine the sustainability of participants' prior food choices, aligning with Bacon and Krpan's (2018) recommendation to consider individuals' past behaviors when studying the impact of nudges on sustainable food choices. Bacon and Krpan (2018) discovered that participants who regularly consumed vegetarian meals in the past were less likely to select a vegetarian option when nudged, whereas the opposite effect was observed among those who rarely ate vegetarian dishes. Furthermore, there is only limited research on the nudge + and nudging sustainable food choices. Therefore, the research question that will be investigated in this study will be as follows:

***RQ**: 'To what extent can the presence of a pledge before a sustainable default menu (default nudge +) influence Dutch people to choose a more sustainable meal on a digital food ordering app?'*

2. Theoretical Framework

This chapter explains and discusses the most important concepts underpinning this study. In paragraph 2.1, the causes and impacts of climate change are discussed, as well as the specific contribution of carbon emissions from food production and consumption. Paragraph 2.2 explains the intention-behavior gap in relation to sustainable food consumption. Paragraphs 2.3-2.5 explain different types of nudges, the cognitive mechanisms underlying nudging, and the impact of nudging on promoting more sustainable food choices. Finally, this chapter will outline the research question and hypotheses.

2.1 Carbon emissions of food and climate change

Climate change refers to the long-term alteration in climate patterns, including shifts in temperature, precipitation, and weather extremes. The release of greenhouse gases (GHG) from both natural processes and human actions primarily drives these alterations (Fawzy et al., 2020). The rising global temperatures due to climate change (global warming), have led to widespread melting of ice caps and glaciers, rising sea levels, more frequent and intense heat waves, disrupting ecosystems, and more (Kumar et al., 2021; Upadhyay, 2020). The rising temperatures pose a threat to human health by causing diseases (Kumar et al., 2021; Rossati, 2017). Moreover, according to Bunker et al. (2016), a temperature rise of just one degree increases the risk of mortality from various health issues for the elderly, including cardiovascular, respiratory, and infectious diseases. These changes, resulting from climate change, are often irreversible, emphasizing the importance of reducing GHG emissions (Solomon et al., 2009).

One of the most important GHGs is carbon dioxide (CO2), which is responsible for over 80% of the total GHG emissions (Kumar et al., 2021). CO2 emissions are primarily caused by human activities such as burning fossil fuels for energy, transportation, industrial processes, and deforestation. Additionally, natural sources such as volcanic eruptions, wildfires, respiration by living organisms, and decomposition of organic matter also contribute to CO2 emissions (Yoro & Daramola, 2020).

While CO2 emissions from fossil fuel combustion are widely recognized as the primary driver of climate change, the role of CO2 emissions from food production and consumption is increasingly gaining attention (Vermeulen et al., 2012). As previously mentioned, the annual CO2 emission from the food consumption of an average Dutch household (consisting of 2.2 persons) is 4,200 kg (Milieu Centraal, 2023). The entire food supply chain, including production,

distribution, processing, packaging, and transportation contributes to the total CO2 emissions (Vermeulen et al., 2012). To mitigate climate change, people need to make more sustainable food choices in terms of CO2 emissions associated with the production and consumption of food. Differences in meat consumption and dairy intake have the highest impact on CO2 emissions when comparing different kinds of food (Temme et al., 2014). However, despite the imperative to make sustainable food choices, individuals often face challenges due to the intention-behavior gap (Sheeran & Webb, 2016).

2.2 Intention-behavior gap

The intention-behavior gap refers to the phenomenon where individuals express intentions to act in a certain way but fail to follow through with corresponding behaviors (Sheeran, 2002). Research suggests that this gap poses a challenge in promoting sustainable food consumption, as individuals may intend to make sustainable choices, but in half of the cases, these intentions are not translated into action (Sheeran, 2002; Sheeran & Webb, 2016). Additionally, an experiment in the Netherlands about sustainable food consumption showed that almost 78% of the participants found it important to make sustainable choices. However, only 33% actively considered the sustainability of the product when making purchases (Van der Molen, 2022). When individuals have to decide, habits and impulses can influence their decision, which could be an explanation for the intention-behavior gap (Papies, 2017). To address this gap and facilitate the translation of intentions into actions, behavior change interventions are needed to support individuals in their decision-making process (Papies, 2017). An example of a behavioral intervention that could address the intention-behavior gap and promote more sustainable food choices is nudging, which will be explained in the following section.

2.3 Nudging

Nudging, a concept within behavioral science, can be defined as any modification to the choice environment that predictably alters people's behavior, without eliminating any options or significantly changing their economic incentives. Nudges are subtle interventions designed to steer individuals towards desired choices while maintaining their freedom of choice (Thaler & Sunstein, 2008). For instance, placing the most sustainable options at the top of the menu counts as a nudge, whereas removing less sustainable options does not align with the concept of nudging because it eliminates consumer choice. Furthermore, other researchers have expanded Thaler and Sunstein's definition, emphasizing that nudges should not impose additional costs in terms of time, trouble, or social consequences (Hausman & Welch, 2010). Research indicates that nudging is a low-cost intervention that is often effective in bridging the intention-behavior gap, making it a promising approach to promoting sustainable food behavior (Banerjee et al., 2022; Buratto & Lotti, 2024; Campbell-Árvai et al., 2012; Damgaard & Nielsen, 2018; Lehner et al., 2016). Unlike traditional persuasive communication, which relies on explicit messaging to induce long-term behavioral changes, nudging employs subtle modifications in the choice environment aimed at shaping people's behavior precisely at the moment of decision-making (Thaler & Sunstein, 2008).

To comprehend how nudging influences decision-making, it is important to consider the cognitive processes underlying nudging. According to the Dual Process Theory (DPT) of Kahneman (2011), there are two kinds of cognitive systems in decision-making. System 1 decision-making, is fast, unconscious, automatic, and operates on making decisions that are based on heuristics and previous experiences with identical or similar decisions. An example of system 1 thinking is automatically adding sugar to coffee or tea without consciously thinking

about the health implications. On the other hand, system 2 thinking is slow, conscious, and requires more effort. An example of system 2 decision-making would be reading food labels and comparing ingredients to make an informed decision about which product to purchase. Nudges primarily target system 1 thinking, leading to unconscious and automatic decision-making. For example, default nudges that influence people's choices by pre-selecting particular options as the default choice, appeal to system 1 thinking. Individuals are more likely to stick with the default choices presented to them, as it requires less cognitive effort (Hansen & Jespersen, 2013).

Former research has extensively explored the effectiveness of nudging in promoting sustainable food choices in restaurants, supermarkets, and school cafeterias. Studies by Bacon and Krpan (2018), Buratto and Lotti (2024), Campbell-Árvai et al. (2012), and Ferrari et al. (2019) have demonstrated that nudges positively influence individuals' food choices toward more sustainable options. For example, Bacon and Krpan (2018) found a significant increase in the consumption of vegetarian dishes following the implementation of nudges on restaurant menus. Similarly, Marcano-Olivier et al. (2019) highlighted the effectiveness of nudges in promoting healthier eating habits among children in school cafeteria settings. Also, the meta-analysis conducted by Ferrari et al. (2019) confirmed the efficacy of nudging in promoting more sustainable eating habits and behaviors.

However, despite the extensive research conducted in these offline contexts, there is a notable gap in the application of nudging techniques to stimulate sustainable food behavior online. Specifically, there is a lack of empirical evidence regarding the effectiveness of nudging strategies on digital platforms, such as food ordering apps. This research gap emphasizes the need for further investigation into the effectiveness of nudging sustainable food behavior in

online environments, especially considering the growing prevalence of digital food ordering in modern Dutch society (FSIN Dossier Delivery, 2018).

Various types of nudges can be implemented across different stages of decision-making to influence behavior. These include priming and pledge nudges before decision-making, default, and informational nudges during decision-making, and feedback and social norm nudges after decision-making (Berger et al., 2022). This study focuses on examining the effectiveness of the pledge and default nudges accompanied by an informational nudge.

2.4 Default nudge

The default nudge guides individuals towards a specific option by preselecting that option as the default choice. This option becomes the chosen one if the decision maker does not specify or considers any alternative (Egebark & Ekström, 2016; Thaler & Sunstein, 2008). According to Banerjee et al., (2022), the default nudge is the most effective nudge to promote sustainable food behavior. Other research also shows that the default nudge is more effective in promoting sustainable behavior in online grocery stores than a priming nudge or social norm nudge (Berger et al., 2020). Furthermore, compared to a control condition, the default nudge effectively increases the sales of vegetarian meals, which are also more sustainable (Campbell-Árvai et al., 2012). On the other hand, evidence suggests that while the default nudge is influential in consumer choice and health-related decisions (such as purchasing products or healthcare treatments), its effectiveness diminishes in promoting sustainable behavior (Jachimowicz et al., 2019). This weak evidence emphasizes the need for further research on the effectiveness of the default nudge in promoting sustainable behavior online.

As stated in the introduction, nudges have faced criticism for being perceived as manipulative, non-transparent, and limiting active decision-making, thus weakening personal agency (BehavioralEconomics.com, 2020). To address these concerns, a new type of nudge, called 'nudge +', was introduced by Banerjee and John (2021) and will be explained in the following section.

2.5 Nudge +

A nudge + adds an element of reflection to the nudge, which helps increase the probability that individuals will make the ‘right’ choice. One way of realizing this element of reflection is to add a so-called ‘pledge’-option to the decision architecture. Pledges inform individuals about the environmental effects and consequences of certain choices and provide them with the option to commit themselves to a certain choice beforehand. Therefore, a nudge + is a specific form of a commitment nudge, which is a broad type of nudging that involves making a pledge or promise to engage in a particular action. The commitment nudge is an effective form of nudging according to Koessler (2022). In a field study on the effectiveness of the commitment nudge on reducing food waste in a professional kitchen environment, the commitment nudge led to a reduction of daily food waste of 33.5% (De Visser-Amundson & Kleijnen, 2019).

The addition of a pledge to the nudge addresses concerns about transparency and personal autonomy, as it causes a shift from system 1 to system 2 thinking, thereby promoting more conscious decision-making (Banerjee & John, 2021; Banerjee et al., 2023a). The transparency added by a pledge will increase the effectiveness of the nudge (Buratto & Lotti, 2024). Although further research is needed to confirm the long-term behavioral effects of nudge +, initial studies suggest promising results (Jung & Mellers, 2016). Furthermore, one study

investigating the effectiveness of nudge + in online meal selections showed a 40% reduction in emissions when a pledge was added before the nudge (Banerjee et al., 2023b). In summary, the nudge + represents a significant advancement in nudging strategies. It is a promising solution to mitigate the criticisms and enhance the effectiveness of nudges in promoting sustainable behavior.

2.6 Research question and hypotheses

Research suggests that implementing a pledge prior to a nudge can influence individuals to make more sustainable choices. This nudge + also enhances the transparency of the choice process, thereby effectively addressing associated criticisms of nudging (Banerjee & John, 2021; Banerjee et al., 2023b). In this study, the sustainability of meals is based on the CO2 emissions associated with food production and consumption because it is the most important GHG (Kumar et al., 2021). Also, the default nudge is most effective according to Banerjee et al., (2022), and with people increasingly ordering meals online it is important to investigate the effects of both the pledge and default nudge in steering individuals toward making more sustainable choices when ordering meals online. The current study also investigates the combined effects of the pledge and default nudge, as Jesse et al. (2021) found that a hybrid nudge, which combines different nudges, significantly increases the probability of choosing a nudged item. Additionally, the results of Bacon and Krpan (2018) suggest that future research should take into account individuals' past behavior when investigating the impact of nudging on sustainable food choices. Therefore, the research question and corresponding hypotheses investigated in this study are as follows:

***RQ**: 'To what extent can the presence of a pledge before a sustainable default menu (default nudge +) influence Dutch people to choose a more sustainable meal on a digital food ordering app?'*

***H1**: A sustainable default nudge leads to more sustainable meal choices.*

***H2**: A pledge before a sustainable default nudge leads to more sustainable meal choices than the default nudge on its own.*

***H3**: Past sustainable food behavior moderates the relationship between the default nudge and meal choice.*

***H4**: Past sustainable food behavior moderates the relationship between the pledge and meal choice.*

3. Method

3.1 Design

In order to study the research question, a 2x2 between-subject experimental design has been conducted, with the default nudge and pledge as independent variables (IVs), and food choice as the dependent variable (DV). Participants were randomly assigned to one of the four conditions, each containing either a pledge option or no pledge option, followed by either a sustainable default menu or an unsustainable default menu (Table 1). In addition, some demographic questions about age, gender, education, and food ordering frequency were asked. Also, sustainable food behavior has been measured after the experiment to include as a (moderating) variable.

The experiment was conducted digitally using a self-designed online meal ordering environment in Qualtrics, which resembles the Thuisbezorgd app. Participants were all presented with the same restaurant page, and depending on the condition, participants were either shown a default menu with the seven most sustainable meal options or a default menu with the seven least sustainable meal options. All conditions included a button to access the entire menu with all possible meal options. In all four conditions, the meals were accompanied by traffic light-colored carbon labels to indicate the sustainability of each meal. The dependent variable, food choice, was measured by allowing the participants to choose one meal categorized as sustainable or unsustainable.

Table 1

2x2 design conditions

		Default nudge	
		Sustainable	Unsustainable
Pledge	Yes	Sustainable nudge +	Unsustainable nudge +
	No	Sustainable nudge	Unsustainable nudge

3.2 Participants

For this research, 230 Dutch-speaking individuals older than 18 years were recruited. This was done through convenience sampling and snowball sampling. A link to the Qualtrics experiment was distributed using the following social media platforms; WhatsApp, LinkedIn, Instagram, and Facebook. Also, participants could win a voucher worth 20 euros by providing their email address at the end of the survey. This was done to increase the likelihood that people would want to participate in the study. The final sample consisted of 215 participants after

excluding those who did not complete the survey. The age of the participants ranged from 18 to 77 years (M = 41.61, SD = 17.41), and the majority of participants identified as female (73.0%). A minimum of 30 participants per condition was needed. The conditions involving a pledge needed more participants due to the uncertainty surrounding people's responses to the pledge. More specifically, there were people in the groups with a pledge who took the pledge, and there were people who did not take the pledge. For these groups, 60 participants per group had to be recruited. So, at least 180 participants in total were needed for this study. Therefore, this study has enough participants in total to obtain an interesting effect; however, the pledge condition groups have a little less than 60 participants each. All participants provided informed consent before participating in the study. The data was stored in a secured folder, and after completing the research, the data was deleted.

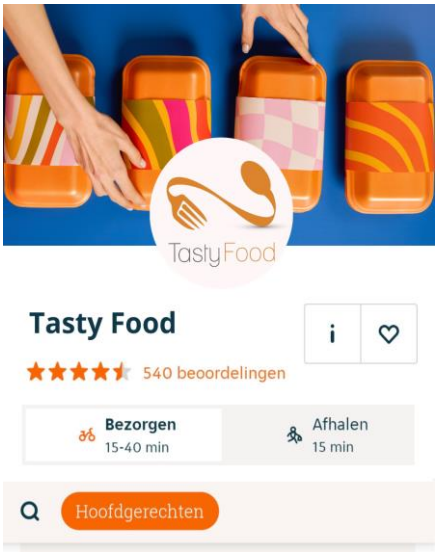
3.3 Stimuli

Restaurant page

The experiment was digital using a self-designed shopping environment in Qualtrics. The restaurant order page of the Thuisbezorgd app was used to create the stimuli (Appendix B). To make it feel more authentic, a fictional restaurant named ‘Tasty Food’ was created for the experiment, which was displayed in a manner consistent with real restaurants on the Thuisbezorgd app. A neutral logo was created, accompanied by an image of food order boxes that did not convey any information about food type or sustainability. Furthermore, the Thuisbezorgd brand name was not visible (see Figure 1).

Figure 1

Fictional restaurant page of 'Tasty Food'



Meals and carbon footprint labels

The menu boxes that displayed the meal choices looked the same as the format in the Thuisbezorgd app, apart from the added carbon footprint labels (see Figure 2). The meals used for the menu in this experiment are listed in Appendix C. The vast majority of these meals were extracted from the most ordered meals of Thuisbezorgd in 2023 (Thuisbezorgd.nl, 2024). Among these, the pizza margherita, döner kebab, and cheeseburger are ranked as some of the most popular choices. Depending on the condition, the default menu only included the seven most sustainable or the seven least sustainable options from the full menu. The whole menu presented both sustainable and unsustainable choices. On all menus, the meals were accompanied by a carbon emission footprint label.

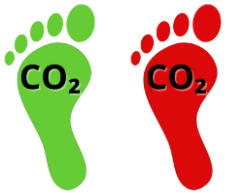
Figure 2

Part of the menu

For each meal, the carbon emission in gCO2 per serving was calculated together with My Emissions. My Emissions is an organization whose goal is to reduce the environmental impact of food by helping individuals make more sustainable choices (My Emissions, 2024). My Emissions creates carbon labels for food products from food companies and restaurants. The ingredients of each meal were added into the My Emissions system by the researcher and then the carbon emissions were calculated and provided automatically. My Emissions assigns a sustainability rating of A to E to each meal, with A representing the most environmentally friendly and E the least. For this research, carbon emission labels were created: meals rated A or B received a green label, while those rated D or E received a red label (see Figure 3).

Figure 3

Carbon emission labels



Green-labeled meals represent the most sustainable options, while red-labeled ones represent the least sustainable choices. See Appendix C for the carbon emission in gCO2, corresponding carbon ratings, and ingredients of the meals used in this study.

Default nudge (+)

The default nudge used in this study followed the method used in the study conducted by Hansen et al. (2019). The default nudge was integrated into the meal options presented to the participants on the menu. Participants were assigned to either a condition that featured a default menu with sustainable meal options and the option to view the entire menu, or an unsustainable default menu with the same option. Both conditions contained the following text alongside the menu:

Sustainable nudge (+) condition: *'Our restaurant preferably offers sustainably prepared meals. Our offer can be found below.*
You can of course also view what our regularly prepared meals are. To do this you can click the button below.

Unsustainable nudge (+) condition: *'Our restaurant offers the following meals. Our offer can be found below.*
You can of course also view our sustainably prepared meals. To do this you can click the button below.

After receiving task information but before viewing the menu, participants assigned to one of the groups with a pledge option saw a pop-up displaying the pledge. The pop-up contained the following text (translated to Dutch) extracted from research by Banerjee et al. (2023a): *'To reduce the impact on the environment, one can consume an environmentally sustainable diet. An environmentally sustainable diet is one with a low environmental impact.*

Sustainable food items have low carbon emissions associated with their production and consumption. You can contribute to sustainability by pledging to choose an environmentally sustainable meal in order to reduce your carbon footprint. Please indicate if you would like to pledge towards this cause. Thank you for your cooperation'. Then, participants could choose to accept or reject the pledge. Accepting the pledge indicated that the participant pledged to choose a sustainable meal and rejecting the pledge indicated that the participant did not pledge to choose a sustainable meal. However, participants were not forced to keep their promise.

3.4 Instruments

Demographic information

Demographic information including age, gender and education level was collected through survey questions. Additionally, familiarity with ordering meals online was assessed with a multiple-choice question that asked about the frequency of online meal ordering. See Appendix A for the complete questionnaire.

Food choice

The food choice showed how sustainable the chosen meal of the participant was. Each participant was asked to select one meal from the menu provided. Meals labeled green indicated sustainable meals and meals with a red label represented unsustainable meals. The scoring for this was as follows; 1 = sustainable, 2 = unsustainable.

Past sustainable food behavior

The sustainability of participants' past food behavior was measured through a series of ten questions concerning their dietary habits. First, participants were asked what diet matched

their eating style (vegetarian, vegan, flexitarian, pescatarian, no specific diet). Additionally, information about any food restrictions associated with each diet was provided. After that, nine 'yes' and 'no' items were shown to measure sustainable food behavior. These items were extracted from Verain et al. (2015). Equivalent to the study of Verain et al. (2015), a dichotomous scale was chosen. Respondents had to indicate whether they performed the behavior at least once each month in the past year. Examples of the statements are: 'buying organic meat', 'buying products with a sustainability label', and 'eating smaller portions of meat'. A score has been calculated by summing the scores of the nine items (yes = 1, no = 2). These scores ranged between 9-18 with 9 indicating the most sustainable food behavior and 18 indicating the least sustainable food behavior (M = 13.15, SD = 2.31). The reliability of the items lied between a = .608 and a = .812, in the research of Verain et al. (2015), which is acceptable.

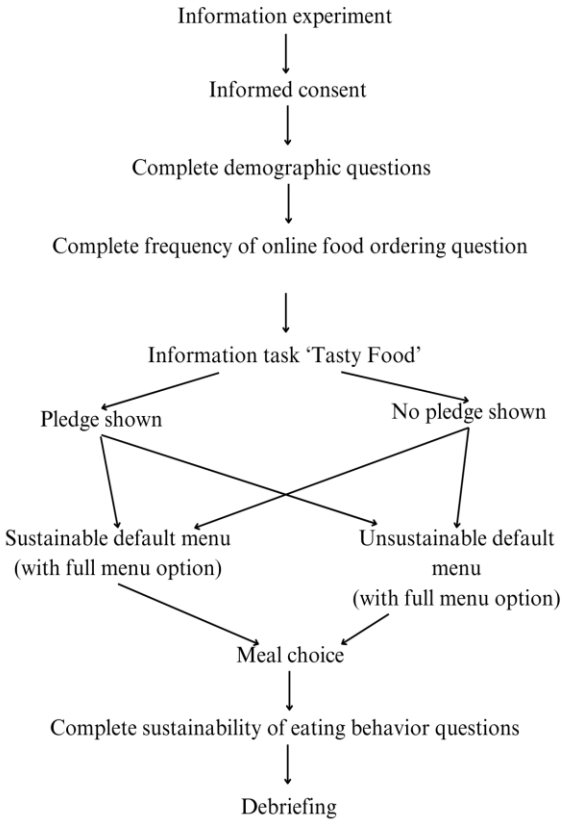
3.5 Procedure

To answer the research question of this study, an online questionnaire was utilized (Appendix A). Upon clicking the provided link, participants were directed to the questionnaire where they were informed about the study's purpose, duration, and other relevant details. Subsequently, participants encountered a consent form, and only those who agreed to the terms outlined in the informed consent could proceed with the survey. Participants who declined to consent were redirected to the end of the survey. Upon consenting, participants provided demographic information including age, gender, education, and frequency of online meal ordering. Participants were then instructed to select one meal from the menu provided by 'Tasty Food'. Next, half of the participants were shown the pledge (nudge + and pledge condition) which they could accept or reject. The remaining participants were not shown a pledge. Participants were then shown either a sustainable default menu with an opt-out option or an

unsustainable default menu with an opt-out option, depending on the condition. In all four conditions, participants were then asked to select their preferred dish from the menu. Following this, nine questions were asked regarding the sustainability of the eating behavior of the participants. At the end of the survey, participants had the chance to enter their email address to have a chance at winning a voucher worth 20 euros. Finally, participants were directed to the end of the survey and thanked for their participation. The procedure is summarized in Figure 4.

Figure 4

Procedure



3.6 Statistical analysis

The collected data was analyzed using SPSS/Jamovi. Participants with missing data were deleted and the data was checked for errors before analyzing the data. A loglinear analysis was

conducted to examine the interactions between the categorical variables. After that, chi-square tests were performed to analyze the relationships between the binary DV and IVs. Lastly, a binary logistic regression was performed to explore the moderating effect of past sustainable food behavior on the relationship between the nudge/pledge and (sustainability of) meal choice. Assumptions of the chosen analyses were checked and met before conducting the analyses.

4. Results

4.1 Sample characteristics

After deleting incomplete responses, the final sample consisted of 215 participants. The age of the participants ranged from 18 to 77 years (M = 41.61, SD = 17.41). 73.0% of the participants identified as female and 27.0% as male. Regarding educational background, the largest group had an HBO bachelor's or master's degree, representing 34.0% of the participants. Most of the participants did not follow a certain diet (79.1%) and of the participants that did follow a diet, no one was vegan. Also, the majority had used meal ordering once a year or more (80.5%) and the biggest group of participants ordered meals multiple times per year (34%). The past sustainable behavior scores of the sample ranged from 9 (lowest score possible) to 18 (highest score possible), with a mean score of 13.15 (SD = 2.31). The participants were divided into four conditions: sustainable nudge + (n = 54), unsustainable nudge + (n = 51), sustainable nudge (n = 55), and unsustainable nudge (n = 55). In the unsustainable nudge + condition, the average age was the highest (M = 45.92, SD = 16.51), only 15.7% of them followed a diet, and the past sustainable food behavior was also the lowest for this group (M = 12.92). The demographic information per condition is summarized in Table 2.

Table 2

Demographic information per condition

Condition	Participants	Age	Gender**	Diet* (yes)	Past sustainable food behavior	Uses online meal ordering
Sustainable nudge +	*n* = 54	*M* = 41.94	70.4% F	22.2%	*M* = 12.94	77.8%
Unsustainable nudge +	*n* = 51	*M* = 45.92	72.5% F	15.7%	*M* = 12.92	82.4%
Sustainable nudge	*n* = 55	*M* = 40.71	74.4% F	21.8%	*M* = 13.13	80.0%
Unsustainable nudge	*n* = 55	*M* = 38.20	74.5% F	23.6%	*M* = 13.60	81.8%
Total	N = 215	*M* = 41.61	73.0% F	20.9%	*M* = 13.15	80.5%

* ‘Yes’ in the parentheses behind diet indicates the percentage of participants that follow a diet (vegetarian/flexitarian/pescatarian).

** ‘F’ stands for female.

4.2 Meal choice descriptives

Table 3 shows the cross-tabulation of the expected and observed meal choice counts per condition.

Table 3

Cross-tab of the expected and observed meal choice count per condition

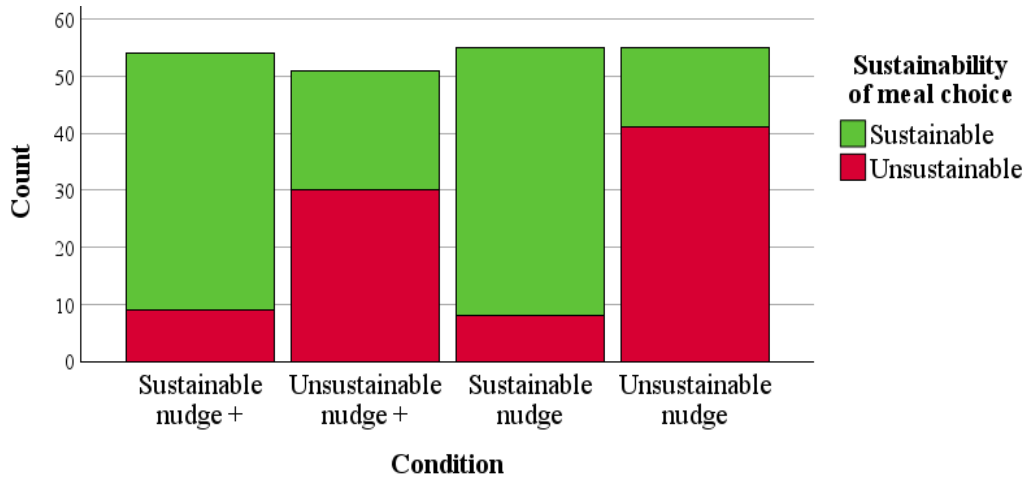
			Condition				
			Sustainable nudge +	Unsustainable nudge +	Sustainable nudge	Unsustainable nudge	Total
Sustainability of meal choice	Sustainable	Count	45	21	47	14	127
		Expected Count	32	30	32	32	127,0
	Unsustainable	Count	9	30	8	41	88
		Expected Count	22,1	20,9	22,5	22,5	88,0
Total		Count	54	51	55	55	215
		Expected Count	54,0	51,0	55,0	55,0	215,0

It shows that the frequencies of sustainable and unsustainable meal choices differed largely from the expected values depending on the condition. For example, for the participants that were in the sustainable nudge + condition, 45 out of 54 chose a sustainable meal, which is higher than the expected count of 32. This condition also had a relatively low count of unsustainable choices (9 out of 54), compared to the expected count of 22.1. The number of sustainable meal choices differed the most from the expected value in the unsustainable nudge condition. Here, participants chose sustainable meals 14 times out of 55, which is lower than the expected count of 32.5.

The chi-square test revealed that the condition and meal choice interaction was significant, $\chi^2(3, N = 215) = 61.45$, $p < .001$. Additionally, all standardized residuals (SR) were above 1.96 or below -1.96, indicating a significant difference from the expected values in meal choice for each condition. The highest and lowest SRs were found in the unsustainable nudge condition; -3.2 for sustainable meal choices and 3.9 for unsustainable meal choices, indicating a negative relationship between the unsustainable nudge condition and choosing a sustainable meal. The odds of people opting for a sustainable meal were 10.98 times larger for participants in the sustainable nudge (+) condition than participants in the unsustainable nudge (+) condition. The distribution of meal choice per condition is also visualized in Figure 5.

Figure 5

Meal choice distribution based on condition



4.3 Effect default nudge

To test whether the two factors pledge/no pledge and nudge sustainable/unsustainable showed an interaction with regard to participants' choice of meal, a three-way loglinear analysis was conducted followed by a chi-square test. Nudge (sustainable/unsustainable), pledge (shown/not shown), and meal choice (sustainable/unsustainable) were added to the analysis. The analysis produced a final model that retained only the nudge-meal choice interaction, but no three-way interaction. The likelihood ratio of the complete model was non-significant, $\chi^2(4, N = 215) = 3.22$, $p = .52$, meaning that this model fits the data well. A chi-square test including the nudge and meal choice was conducted to further investigate this nudge x meal choice interaction. The chi-square test revealed a significant interaction, $\chi^2(1, N = 215) = 58.69$, $p < .001$. This interaction indicates that the ratio of sustainable and unsustainable meal choices was different for the participants who were shown the sustainable default menu and the participants who were shown the unsustainable default nudge menu. As indicated in the former section, the odds of

choosing a sustainable meal were 10.98 times more likely when participants were shown a sustainable default menu than an unsustainable default menu.

An additional chi-square test was run to analyze these effects of the default nudge without the influence of the pledge (H1). Therefore, only participants who were not shown the pledge before the sustainable (sustainable default) or unsustainable default menu (unsustainable default) were included in the model. Table 4 displays the distribution of expected and observed meal choice count for the (un)sustainable nudge conditions (no pledge).

Table 4

Cross-tab of the expected and observed meal choice count based on (un)sustainable nudge

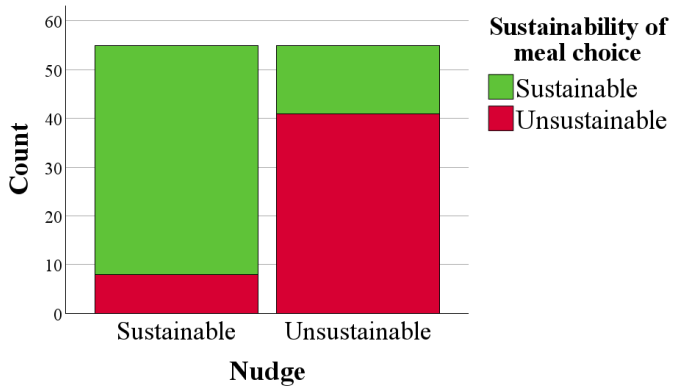
			Nudge		
			Sustainable	Unsustainable	Total
Sustainability of meal choice	Sustainable	Count	47	14	61
		Expected Count	30,5	30,5	61,0
	Unsustainable	Count	8	41	49
		Expected Count	24,5	24,5	49,0
Total		Count	55	55	110
		Expected Count	55,0	55,0	110,0

It shows that for the participants in the sustainable nudge condition, 47 out of 55 chose a sustainable meal, which is higher than the expected amount of 30.5. Also, 41 out of 55 participants chose an unsustainable meal in the unsustainable nudge condition, which is higher than the expected value of 41. The analysis showed a significant effect of the nudge on meal choice: χ^2 (1, N = 110) = 40.08, $p < .001$. All SRs were greater than 1.96 or smaller than -1.96. The SR was 3.0 for choosing a sustainable meal in the sustainable nudge condition and -3.0 for choosing a sustainable meal in the unsustainable nudge condition. The odds ratio for the nudge

(no pledge) indicated that the odds of choosing a sustainable meal were 17.21 times more likely when participants were shown a sustainable default menu than an unsustainable default menu. These findings support H1. Figure 6 visualizes the distribution of meal choices across the sustainable nudge and unsustainable nudge conditions based on Table 4.

Figure 6

Meal choice distribution based on (un)sustainable nudge



4.4 Effect default nudge +

Pledge presence

To test if a pledge before a sustainable/unsustainable default nudge (sustainable nudge + / unsustainable nudge +) leads to more sustainable meal choices than the default nudge on its own (sustainable nudge / unsustainable nudge) (H2), a chi-square test was conducted. Table 5 shows the meal choice frequency based on pledge presence.

Table 5

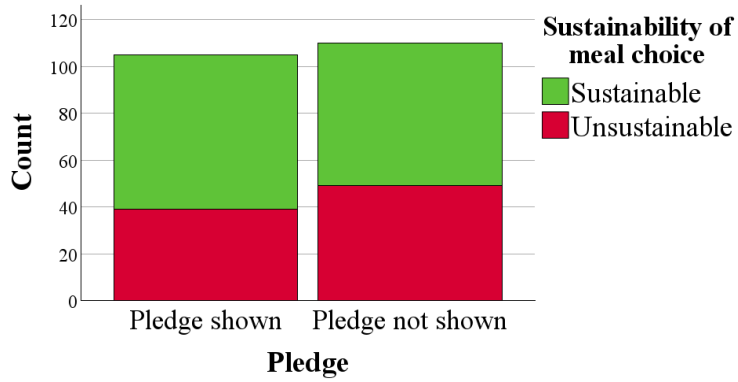
Cross-tab of the expected and observed meal choice count based on pledge presence

			Pledge		
			Shown	Not shown	Total
Sustainability of meal choice	Sustainable	Count	66	61	127
		Expected Count	62,0	65,0	127,0
	Unsustainable	Count	39	49	88
		Expected Count	43,0	45,0	88,0
Total		Count	105	110	215
		Expected Count	105,0	110,0	215,0

It shows that 66 out of 105 participants who saw a pledge chose a sustainable meal, which is higher than the expected value of 62 (OR = 1.36). However, this association between the pledge presence and meal choice is not significant: χ^2 (1, N = 215) = 1.22, p = .270. This means that the participants who were shown the pledge did not make sustainable choices significantly more often than participants who were not shown the pledge. These results do not support H2. Figure 7 visualizes the distribution of meal choices for the (un)sustainable nudge + (pledge shown) versus (un)sustainable nudge (pledge not shown) conditions.

Figure 7

Meal choice distribution based on pledge presence



Additionally, when analyzing the effect of the presence of the pledge in the unsustainable nudge (+) condition only, the results revealed there was an effect on the sustainability of meal choice. However, this effect was also not significant, χ^2 (1, N = 106) = 2.96, p = .085. The odds that a participant in the unsustainable nudge + condition chose a sustainable meal were 2.1 times higher than the chance that a participant in the unsustainable nudge condition chose a sustainable meal. These results do not support H2.

Pledge decision

Furthermore, it is interesting to look at the differences in meal choices between participants who took the pledge and those who refused the pledge. Table 6 displays the sustainability of meal choices based on the pledge decision.

Table 6

Cross-tab of the expected and observed meal choice count based on pledge decision

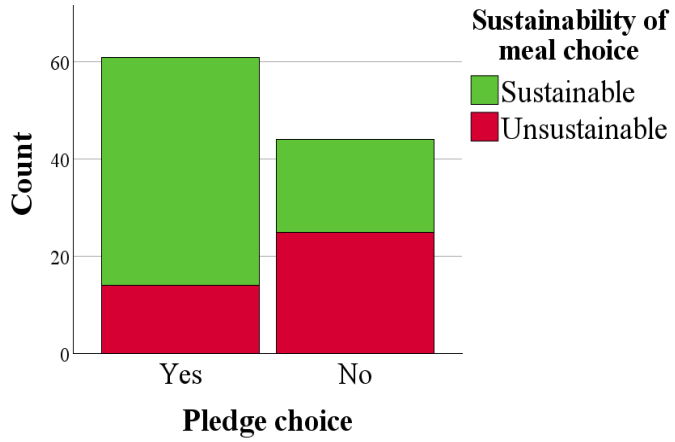
			Pledge Choice		
			Yes	No	Total
Sustainability of meal choice	Sustainable	Count	47	19	66
		Expected Count	38,3	27,7	66,0
	Unsustainable	Count	14	25	39
		Expected Count	22,7	16,3	39,0
Total		Count	61	44	105
		Expected Count	61,0	44,0	105,0

It shows for example that 47 out of 61 people who accepted the pledge, chose a sustainable meal. This is higher than the expected count of 38.3. The chi-square test showed that this relationship between meal choice and pledge choice is significant, χ^2 (1, N = 105) = 12.56, p < .001. The SRs indicated that only the relationship between not taking the pledge and choosing an unsustainable meal is significant (SR = 2.1). The odds ratio indicated that participants who took the pledge were 4.42 times more likely to choose a sustainable meal than participants who

refused the pledge. Figure 8 visualizes the distribution of meal choice among the participants who accepted or refused the pledge based on Table 6.

Figure 8

Meal choice distribution based on pledge decision



4.5 Menu viewing

Finally, it was investigated whether nudge type and pledge presence affected people's decision to view the whole menu. To analyze this question, a binary logistic regression was performed with nudge type and pledge presence as predictors, and the decision to view the whole menu as outcome. The type of nudge was a significant predictor of viewing the whole menu (OR= 0.56, 95% CI [0.317, 0.980]). Participants exposed to the sustainable default nudge were 1.79 times less likely to view the whole menu compared to those exposed to an unsustainable nudge. Additionally, the presence of a pledge significantly predicted viewing the whole menu (OR = 1.85, 95% CI [1.051, 3.251]). Participants shown a pledge were 1.85 times more likely to view the whole menu compared to those not shown the pledge.

A series of odds ratios were calculated based on a condition x whole menu crosstab to evaluate the effect of different types of nudges on the likelihood of viewing the whole menu. The comparisons and their corresponding odds ratios are presented in Table 7. Participants who were

shown the pledge followed by an unsustainable default menu were almost 4 times more likely to view the whole menu compared to those who were not shown the pledge before the unsustainable default menu (OR = 3.78). A crosstab comparing this specific influence of the unsustainable nudge (+) on viewing the whole menu showed that participants in the unsustainable nudge + condition viewed the whole menu significantly more often than the unsustainable nudge condition, χ^2 (1, N = 106) = 10.77, p = .001.

Table 7

Odds ratios for viewing the whole menu by nudge condition

Comparison	Odds Ratio
Sustainable nudge + vs. Unsustainable nudge +	0.27
Sustainable nudge + vs. Sustainable nudge	0.87
Sustainable nudge + vs. Unsustainable nudge	1.03
Unsustainable nudge + vs. Sustainable nudge	3.19
Unsustainable nudge + vs. Unsustainable nudge	3.78
Sustainable nudge vs. Unsustainable nudge	1.19

4.6 Past sustainable food behavior

A binary logistic regression was conducted to investigate if past sustainable food behavior moderates the relationship between the default nudge and the sustainability of meal choice (Table 8). The nudge and sustainable food behavior were added as covariates in the model, and meal choice was the dependent variable. As could be expected based on the previously reported outcomes, Model 1, which included only the nudge, was a significant fit for the data (χ^2 (1, N = 110) = 43.16, p < .001, Nagelkerke R^2 = .43) and showed a significant effect of the nudge on meal choice (B = 2.85, p < .001). Sustainable food behavior was added to Model

2, which also was a significant fit of the data (χ^2 (1, N = 110) = 11.50, p < .001, Nagelkerke R^2 = .52) and showed a significant effect of past sustainable food behavior (B = -.39, p = .002). This indicates that participants who scored higher on the past sustainable food behavior items, indicating *less* sustainable food behavior, were less likely to choose a sustainable meal. Model 3, which included both covariates and the interaction effect, was not a significant improvement compared to model 2 (χ^2 (1, N = 110) = .32, p = .572, Nagelkerke R^2 = .53). The results showed a non-significant effect of past behavior on the relationship between the nudge and meal choice (B = -.14, p = .572). These results do not support H3.

Table 8

Logistic regression of nudge and past sustainable food behavior on meal choice

Variable	*B*	*SE*	OR
Model 1 χ^2 (1, N = 110) = 43.16**			
Nudge	2.85**	.49	17.21
Model 2 χ^2 (1, N = 110) = 11.50**			
Nudge	3.48**	.62	32.44
Past sustainable food behavior	-.39**	.13	.68
Model 3 χ^2 (1, N = 110) = .32			
Nudge	5.36	3.43	213.01
Past sustainable food behavior	-.16	.41	.85
Nudge x Past sustainable food behavior	-.14	.25	.87

* p < .05, ** p < .001

A second binary logistic regression analysis was conducted to analyze if past sustainable food behavior moderates the relationship between the default nudge + (pledge) and the sustainability of meal choice (Table 9). The pledge and sustainable food behavior were added as

covariates in the model, and meal choice as a dependent variable. Again, as could be expected based on previously reported results, Model 1, which included only the pledge, was not a significant fit for the data (χ^2 (1, N = 215) = 1.22, p = .269, Nagelkerke R^2 = .008) and the effect of the pledge on meal choice was non-significant (B = .31, p = .270). Model 3, which included both covariates and the interaction effect, was not a significant improvement compared to model 2 (χ^2 (1, N = 215) = .07, p = .787, Nagelkerke R^2 = .05). And results showed a non-significant effect of past behavior on the relationship between the nudge and meal choice (B = -.03, p = .787). These results do not support H4.

Table 9

Logistic regression of nudge + and past sustainable food behavior on meal choice

Variable	*B*	*SE*	OR
Model 1 χ^2 (1, N = 215) = 1.22			
Pledge	.31	.28	1.36
Model 2 χ^2 (1, N = 215) = 5.98*			
Pledge	.38	.29	1.46
Past sustainable food behavior	-.15*	.06	.86
Model 3 χ^2 (1, N = 215) = .07			
Pledge	.82	1.65	2.27
Past sustainable food behavior	-.13	.09	.88
Pledge x Past sustainable food behavior	-.03	1.13	.97

* p < .05, ** p < .001

5. Discussion & Conclusion

This study aimed to investigate the effectiveness of a default nudge (+) on influencing participants to make more sustainable food choices in an online food ordering app environment. In addition, the moderating effect of past sustainable food behavior on this relationship was studied.

5.1 Default nudge

The results showed that a sustainable default nudge leads to more sustainable meal choices, which indicates support for H1: a sustainable default nudge leads to more sustainable meal choices. Participants who were shown a shorter menu displaying only the sustainable option with an option to view the whole menu, were choosing a sustainable option more often. Additionally, participants who were shown a shorter menu, displaying only the unsustainable options, with an option to view the whole menu, were choosing an unsustainable option more often. This suggests that the default nudge was effective in both directions. This finding is in line with former research suggesting that default nudges can steer people effectively in the desired direction (Banerjee et al., 2022; Berger et al., 2020; Campbell-Árvai et al., 2012; Jachimowicz et al., 2019; Thaler & Sunstein, 2008).

5.2 Default nudge +

The pledge opportunity given before the default menu did not significantly increase the chance that people chose a sustainable meal compared to participants who were not shown a pledge before the default menu. These results imply no support for H2: a pledge before a sustainable default nudge leads to more sustainable meal choices than the default nudge on its

own. Additionally, the pledge had a larger, yet insignificant, effect on stimulating people to choose a sustainable meal in the unsustainable nudge condition compared to the sustainable nudge condition. The odds of choosing a sustainable meal were higher in the unsustainable nudge + condition compared to the unsustainable nudge condition than in the sustainable nudge + condition compared to the sustainable nudge condition. In other words, participants who saw the pledge before an unsustainable default menu selected a sustainable option slightly more often compared to those who did not see a pledge. Additionally, the increase in sustainable choices was greater compared to when participants saw a pledge before a sustainable default menu. An explanation for this could be that, due to the pledge, participants were actively making efforts to choose sustainable options despite the default nudge trying to influence them toward unsustainable choices. A reason for the insignificant findings could be that the effect of the nudge + was measured differently in this study compared to previous studies. Those studies investigated the effectiveness of a nudge + by comparing its effect to a control condition (Banerjee et al., 2023b). In this research, no control condition tested how many participants chose a sustainable option without the nudge (+).

Interestingly, participants who were shown the pledge were significantly more likely to look at the whole menu after seeing the unsustainable menu compared to participants who were not shown a pledge before viewing the unsustainable menu. This suggests that participants were considering making a sustainable choice as a result of the pledge. Additionally, participants who took the pledge were significantly more likely to choose a sustainable meal compared to those who did not take the pledge. This indicates that the pledge worked, as it suggests that people tend to keep their promise and follow through with choosing sustainable options when accepting the pledge.

5.3 Past sustainable food behavior

Furthermore, results showed that past sustainable food choices did not moderate the relationship between the nudge (+) and sustainability of meal choice. Participants who made more sustainable food choices in the past were more likely to choose a sustainable food item compared to participants who indicated less sustainable behavior in the past, but these results were not significant. Therefore, H3 (past sustainable food behavior moderates the relationship between the default nudge and meal choice) and H4 (past sustainable food behavior moderates the relationship between the pledge and meal choice) are not supported. This indicates that nudging people works to encourage sustainable food choices, even with those who did not exhibit sustainable habits in the past. These findings contradict previous research by ElHaffar et al. (2020) who found that consumers who are normally not buying sustainable products are more likely to be influenced by nudges that trigger unconscious responses (like the default nudge in the current study) than consumers who are normally buying sustainable products. Also, this study found that consumers who often buy sustainable products, but sometimes tend to fail in choosing sustainable products, are more likely to buy sustainable products when the intervention triggers conscious cognitive decision making like the pledge in the current study. The lack of a significant moderating effect of past sustainable food behavior in this study could potentially be attributed to differences in the measurement scales used compared to previous studies. Notably, this study employed a dichotomous scale. Future research might benefit from utilizing or developing an instrument with a continuous scale.

5.4 Limitations

As is the case with all research, this study has some limitations. Firstly, participants may have judged the unsustainable nudge + condition somewhat unrealistic as it presents a kind of contradiction: while the pledge encourages choosing a sustainable option, the default nudge in this condition does not do so. This inconsistency would arguably not occur easily in real-life settings, and this might have affected the study's ecological validity. However, these conditions were intentionally designed this way to be able to measure the influence of each independent variable individually. Secondly, this research did not include a control condition, because of the small sample size, but this did limit the ability to compare the effectiveness of the nudge + intervention against the 'standard' choice architecture of a typical food ordering app. Including a control group in future studies would perhaps provide a clearer baseline for evaluating the impact of the interventions. Lastly, there was a gender imbalance among the participants, with significantly more women participating in the study. This does not accurately represent the Dutch population that orders food online, where 82.2% of food delivery app users are men and only 17.8% are women (Statista, 2024). Moreover, gender and other demographic variables such as socioeconomic status (SES) were not controlled for in this research. Therefore, this may imply some limitation concerning the generalizability of the findings to a broader population. Future research should aim for a more representative sample to improve the generalizability of the results.

5.5 Implications

The findings of this study have both theoretical and practical implications. Theoretically, this study contributes to the existing literature on nudging sustainable behavior online. More

specifically, by implementing the sustainable default nudge +. Additionally, this study offers insights into how past sustainable behavior impacts the effectiveness of the default nudge +, an area suggested by former research but not previously investigated (Bacon & Krpan, 2018). Despite the insignificant impact of past behavior in this research, further investigation is required.

Practically, the results of this study suggest that the default nudge is effective in altering the behavior of consumers of a food ordering app in a predictable way. Therefore, online food ordering companies can use this information to integrate sustainable defaults into their ordering systems to encourage their customers to make more sustainable choices. This will not only contribute to the environmental sustainability of the company, but also improve how the company is perceived by customers. It shows that these companies are committed to making positive contributions to society and the environment, which can also enhance the brand image of the company.

5.6 Conclusion

To conclude, this study found evidence that a sustainable default nudge implemented in a digital food ordering app effectively stimulates Dutch consumers to choose a sustainable meal. While the presence of a pledge before a default nudge does increase the likelihood that consumers will choose a sustainable meal, this effect was not significant in this study. Nonetheless, the findings from this research create new opportunities for future research and bring the literature a step closer to bridging the intention-behavior gap in sustainable meal choices that exists among Dutch individuals. Therefore, contributing to creating a more sustainable environment.

Future research should take into account the limitations of this study when investigating the potential effects of the nudge + further. For example, future studies could explore the effect of the default nudge (+) on making multiple food choices instead of one, include a control condition, examine other factors that may influence the effectiveness of the nudge +, or implement a trial in a real food ordering app to assess its impact in a practical setting.

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Appendix A

Survey (in Dutch)

Survey introduction

Online maaltijden bestellen

Hallo,

Welkom bij deze enquête over het **bestellen van maaltijden online**. Ik ben een masterstudent Bedrijfscommunicatie en Digitale Media aan de Universiteit van Tilburg. Als u de enquête invult, helpt u mij mijn onderzoek uit te voeren en daarvoor ben ik u zeer dankbaar.

Het invullen van de enquête duurt ongeveer **3 minuten**. Deelname is volledig vrijwillig en u kunt op elk moment stoppen. Aan deelname zitten geen risico's verbonden. Door de enquête in te vullen, **maakt u kans op een cadeaubon ter waarde van 20 euro!** (geef hiervoor aan het einde van de enquête je e-mailadres op)

De gegevens worden vertrouwelijk behandeld en deelname is volledig anoniem. De gegevens worden na afronding van het onderzoek verwijderd.

Bij voorbaat dank voor uw deelname!

Mocht u vragen of opmerkingen hebben over de enquête of het onderzoek, neem dan contact op via c.c.j.velings@tilburguniversity.edu

Klik op 'Start' om te beginnen.

Start

Informed consent

Door verder te gaan met de enquête verklaart u dat u de informatie over het onderzoek heeft gelezen en begrepen en dat u akkoord gaat met deelname aan het onderzoek.

- Ja, ik ga akkoord met deelname aan dit onderzoek
- Nee, ik ga niet akkoord met deelname aan dit onderzoek
    - (--> When this option is selected, the participant will be directed to the end of the survey with this message: ‘Helaas voldoet u niet aan de deelnamecriteria van dit onderzoek. U wordt nu naar het einde van de enquête gestuurd.’)

Demographic questions

Hoe oud bent u? (in jaren)

____

Met welk geslacht identificeert u zich het meest?

- Man
- Vrouw
- Non-binair
- Zeg ik liever niet

Wat is uw hoogst afgeronde opleiding?

- Geen diploma
- Basisschool
- VMBO
- MAVO
- HAVO
- VWO
- MBO
- HBO bachelor/master
- WO bachelor/master
- PhD

- Zeg ik liever niet
- Anders: _____

Hoe vaak bestelt u maaltijden online?

- Meerdere keren per week
- 1 keer per week
- 1 keer per maand
- Meerdere keren per jaar
- Minder dan 1 keer per jaar
- Nooit

Introduction

Voor de volgende vraag wil ik u vragen zich voor te stellen dat u één maaltijd gaat bestellen bij ‘Tasty Food’ via een maaltijdbezorgers app. Kies alstublieft voor de maaltijd die u in een werkelijke situatie ook zou kiezen. Nadat u een keuze heeft gemaakt zullen er nog enkele aanvullende vragen worden gesteld. Onthoud dat er geen goede of foute antwoorden zijn.

Pledge: only shown in sustainable nudge + and sustainable nudge condition

Beste deelnemer,

Om de impact op het milieu te verminderen, kan men een ecologisch duurzaam dieet volgen. Een ecologisch duurzaam dieet is een dieet met een lage impact op het milieu. Duurzame voedselproducten hebben een lage CO2-uitstoot als gevolg van hun productie en consumptie. U kunt bijdragen aan duurzaamheid door te beloven een ecologisch duurzame maaltijd te kiezen om uw ecologische voetafdruk te verkleinen. Geef aan of u zich voor dit doel wilt inzetten.

Bedankt voor uw medewerking.

- Ja
- Nee

Sustainable nudge (+) condition

Ons restaurant biedt bij voorkeur duurzaam-bereide maaltijden aan. Ons aanbod vindt u hieronder:

'Sustainable menu shown' (see left picture in Appendix B first page)

U kunt uiteraard ook een van onze regulier bereide maaltijden bestellen. Mocht u dat willen kunt u dat hieronder aangeven:

- Ik kies uit bovenstaand menu
- Ik wil graag het reguliere menu zien *(Whole menu shown when clicked on button; see left picture in Appendix B second page)*

Unsustainable nudge (+) condition

Ons restaurant biedt de volgende maaltijden aan. Ons aanbod vindt u hieronder:

'Unsustainable menu shown' (see right picture in Appendix B first page)

U kunt uiteraard ook bekijken wat onze duurzaam-bereide maaltijden zijn. Mocht u dat willen kunt u dat hieronder aangeven:

- Ik kies uit bovenstaand menu
- Ik wil graag het reguliere menu zien *(Whole menu shown when clicked on button: see right picture in Appendix B second page)*

Food choice

Welke maaltijd kiest u? (Let op! De volgorde van de gerechten kan verschillen van de volgorde op de afbeelding!) (Only the meals were shown that were on the menu that was shown to the participant)

- Tofu poké bowl
- Kip wrap (vegetarisch)
- Lasagne (vegetarisch)
- Pizza margherita
- Kip burger (vegetarisch)
- Kip teriyaki
- Zalm poké bowl
- Butter chicken
- Pizza shoarma
- Beef noodles
- Garnalen pasta
- Cheeseburger
- Mexicaanse wrap
- Kapsalon

Past sustainable food behavior

Selecteer het dieet dat het beste past bij uw eetgewoonten van het afgelopen jaar?

- Vegetarisch (geen vlees en vis)
- Veganistisch (geen dierlijke producten)
- Flexitarisch (hoofdzakelijk vegetarisch, maar af en toe vlees/vis)
- Pescotarisch (geen vlees, wel vis)
- Geen specifiek dieet
- Anders: _____

Geef bij de volgende vragen aan of u dit gedrag het afgelopen jaar minimaal één keer per maand heeft vertoond.

	Ja	Nee
Biologisch vlees kopen	○	○
Biologische groenten en fruit kopen	○	○
Biologische zuivel kopen	○	○
Vlees met vrije uitloop kopen	○	○
Producten kopen met een duurzaamheidslabel	○	○
Kleinere porties vlees eten	○	○
Minder eten	○	○
Minder zuivel eten	○	○
Eén vleesvrije dag per week	○	○

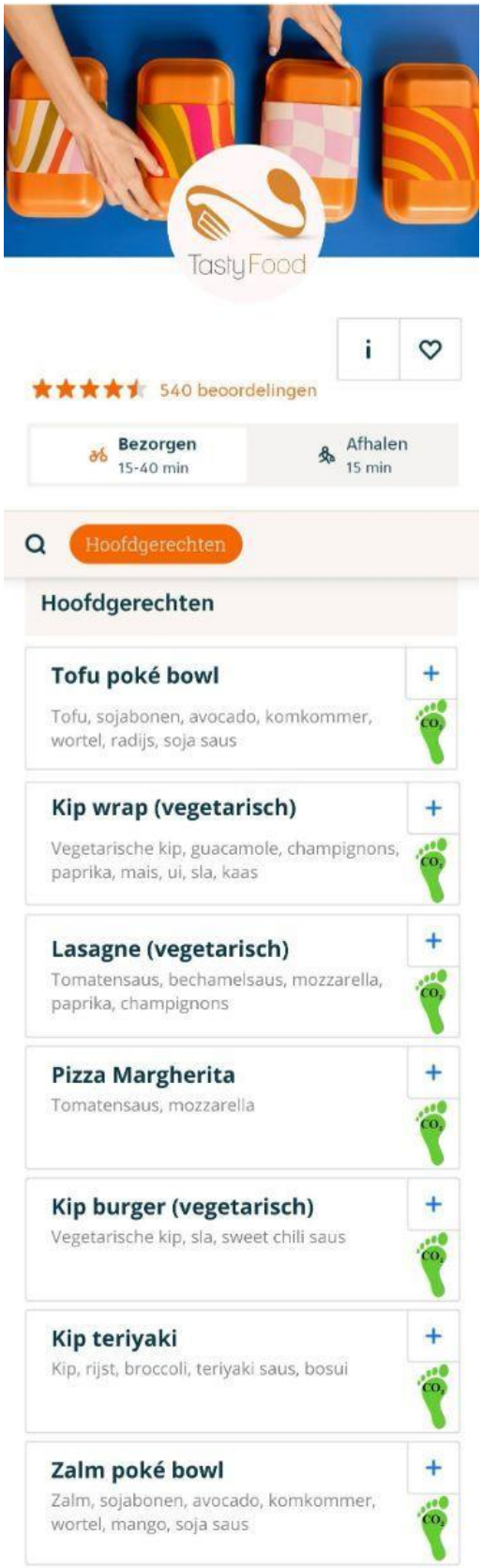
Laat hieronder je e-mailadres achter om kans te maken op een voucher ter waarde van 20 euro.

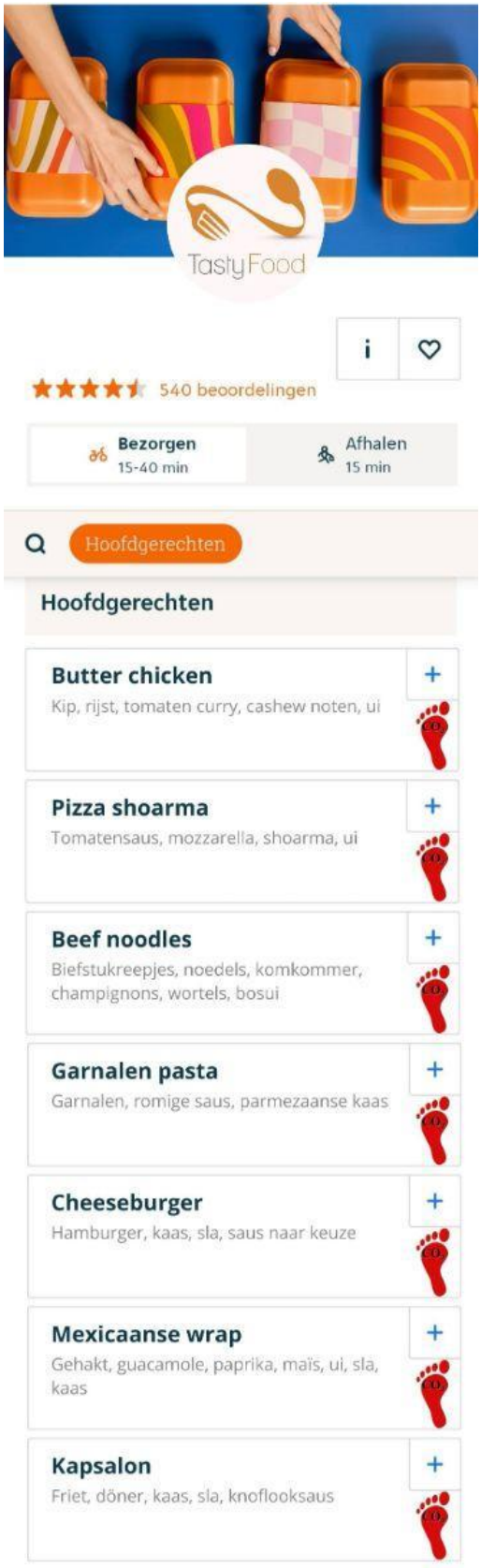
_____

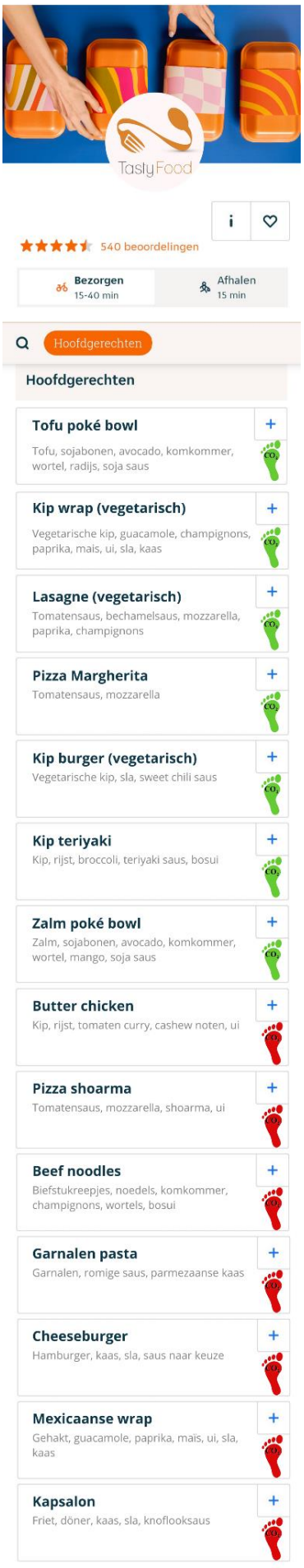
Bedankt voor het invullen van de enquête. Als u updates wilt ontvangen over de resultaten, stuur dan een e-mail naar c.c.j.velings@tilburguniversity.edu

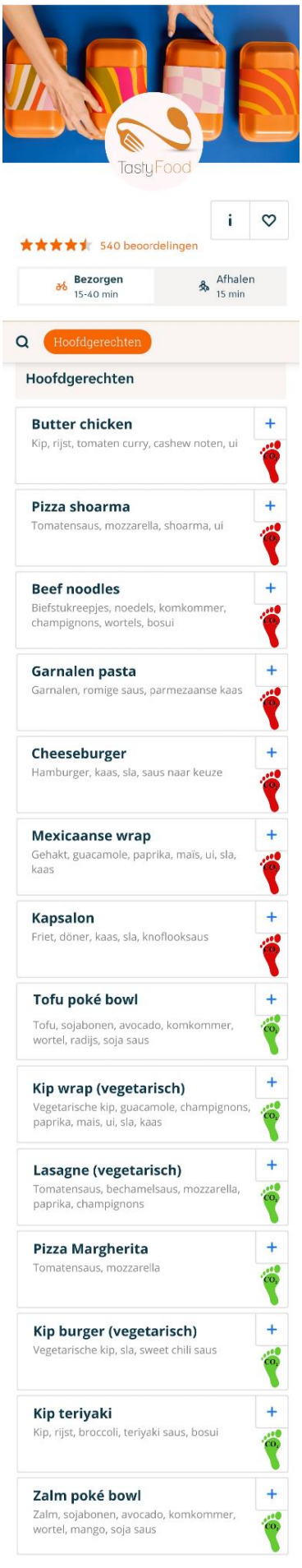
Appendix B

Tasty Food stimuli






TastyFood
540 beoordelingen
Bezorgen
15-40 min
Afhalen
15 min
Hoofdgerechten
Hoofdgerechten
Tofu poké bowl
Tofu, sojabonen, avocado, komkommer, wortel, radijs, soja saus
Kip wrap (vegetarisch)
Vegetarische kip, guacamole, champignons, paprika, mais, ui, sla, kaas
Lasagne (vegetarisch)
Tomatensaus, bechamelsaus, mozzarella, paprika, champignons
Pizza Margherita
Tomatensaus, mozzarella
Kip burger (vegetarisch)
Vegetarische kip, sla, sweet chili saus
Kip teriyaki
Kip, rijst, broccoli, teriyaki saus, bosui
Zalm poké bowl
Zalm, sojabonen, avocado, komkommer, wortel, mango, soja saus
Butter chicken
Kip, rijst, tomaten curry, cashew noten, ui
Pizza shoarma
Tomatensaus, mozzarella, shoarma, ui
Beef noodles
Biefstukreepjes, noedels, komkommer, champignons, wortels, bosui
Garnalen pasta
Garnalen, romige saus, parmezaanse kaas
Cheeseburger
Hamburger, kaas, sla, saus naar keuze
Mexicaanse wrap
Gehakt, guacamole, paprika, mais, ui, sla, kaas
Kapsalon
Friet, döner, kaas, sla, knoflooksaus


TastyFood
540 beoordelingen
Bezorgen
15-40 min
Afhalen
15 min
Hoofdgerechten
Hoofdgerechten
Butter chicken
Kip, rijst, tomaten curry, cashew noten, ui
Pizza shoarma
Tomatensaus, mozzarella, shoarma, ui
Beef noodles
Biefstukreepjes, noedels, komkommer, champignons, wortels, bosui
Garnalen pasta
Garnalen, romige saus, parmezaanse kaas
Cheeseburger
Hamburger, kaas, sla, saus naar keuze
Mexicaanse wrap
Gehakt, guacamole, paprika, mais, ui, sla, kaas
Kapsalon
Friet, döner, kaas, sla, knoflooksaus
Tofu poké bowl
Tofu, sojabonen, avocado, komkommer, wortel, radijs, soja saus
Kip wrap (vegetarisch)
Vegetarische kip, guacamole, champignons, paprika, mais, ui, sla, kaas
Lasagne (vegetarisch)
Tomatensaus, bechamelsaus, mozzarella, paprika, champignons
Pizza Margherita
Tomatensaus, mozzarella
Kip burger (vegetarisch)
Vegetarische kip, sla, sweet chili saus
Kip teriyaki
Kip, rijst, broccoli, teriyaki saus, bosui
Zalm poké bowl
Zalm, sojabonen, avocado, komkommer, wortel, mango, soja saus

Appendix C

Carbon emission meals

(My Emissions platform is used for calculation)

Product	Total Emissions (gCO_2e)	Carbon Intensity ($kgCO_2e/kg_{food}$)	Rating (A-E)
Tofu poke bowl	590.2	1.42	A
Vegetarian wrap	472.2	1.55	A
Vegetarian lasagne	653.9	1.92	B
Pizza margherita	635.7	1.99	B
Vegetarian chicken burger	806.4	2.11	B
Chicken teriyaki bowl	1048.3	2.76	B
Salmon poke bowl	1091.6	2.91	B
Butter chicken	1886.4	4.39	D
Pizza shawarma	2152.4	4.41	D
Beef noodle bowl	2969.5	7.42	E
Shrimp pasta	2859.6	10.59	E
Cheeseburger	4545.4	10.82	E
Mexican wrap	3603.6	12.22	E
Kapsalon	5087,7	13.94	E

Ingredients meals

Product	Ingredients
Tofu poke bowl	Basmati rice (80g), soybean (50g), avocado (50g), tofu (100g), cucumber (50g), carrot (50g) Chinese radish (20g), soy sauce (15g)
Vegetarian wrap	Vegan chicken (100g), tortilla wrap (60g), cheese (10g), bell pepper (30g), guacamole (15g), maize (20g), lettuce (20g), mushroom (30g), red onion (20g)
Vegetarian lasagne	Mozzarella (50g), pasta (100g), bechamel sauce (50g), tomato sauce (80g), bell pepper (30g), mushroom (30g)
Pizza margherita	Flour (125g), yeast (2g), salt (2g), olive oil (10g), tomato sauce (80g), mozzarella (100g)
Vegetarian chicken burger	Vegan chicken burger (250g), burger bun (100g), lettuce (20g), sweet chili sauce (13g)
Chicken teriyaki bowl	Chicken (100g), brown rice (80g), broccoli (150g), teriyaki sauce (30g), spring onion (20g)
Salmon poke bowl	Salmon (100g), basmati rice (80g), soybean (50g), avocado (50g), cucumber (50g), mango (30g), soy sauce (15g)
Butter chicken	Chicken (165g), basmati rice (80g), butter (20g), heavy cream (25g), yoghurt (35g), tomato sauce (80g), cashew nut (15g), onion (10g)
Pizza shawarma	Flour (125g), yeast (2g), salt (2g), olive oil (10g), tomato sauce (80g), mozzarella (100g), pork meat (150g), red onion (20g)
Beef noodle bowl	Beef (100g), egg noodle (160g), cucumber (50g), mushroom (50g), carrot (30g), spring onion (10g)
Shrimp pasta	Shrimp (110g), pasta (100g), parmesan cheese (20g), heavy cream (30g), butter (10g)
Cheeseburger	Beef (250g), cheddar cheese (50g), burger bun (100g), lettuce (20g)