The power of behavioural nudges tailored to plant-based dishes when eating out

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> *Still, I don't do much meat, except when I eat out.*
>
> *Powers (2006, p. 140)*

> *[R]estaurants have a large influence on consumption patterns, which they could use to shift to dietary choices towards healthier and more sustainable choices.*
>
> *Westhoek, Doelman, Muilwijk, and Stehfest (2021, p. 2)*

15.1 Introduction

15.1.1 Pressing need for more plant-rich diets

Prevailing eating conventions in the Western world cause substantial environmental and human health burdens. In the past few decades, a growing body of research has added to the recognition that changing consumers' food choices from meat-heavy diets to more plant-based food consumption patterns represents an important contribution to alleviate these burdens (to refer here only to an early and recent work belonging to this strand of literature: IPCC, 2022; Pimentel & Pimentel, 2003). Broad scholarly consensus exists nowadays about the claim that a sustainable food future needs a shift in dietary choice towards eating less meat due to the detrimental effects of meat consumption on environmental sustainability, human health, food security and welfare of farmed animals. Nevertheless, meat remains deeply ingrained in contemporary food culture and high meat consumption has become normative in most of the modern world. Consequently, global demand for meat keeps rising and is projected to continue to do so in the foreseeable future (Parlasca & Qaim, 2022).

Encouraging food consumers in high-income countries to moderate their abundant intake of meat by adopting more plant-rich diets can significantly help to

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reduce the ecological footprint of their habitual food choices. Behavioural interventions aimed at influencing consumers' food choices towards healthier and more sustainable, that is, more plant-based, options are urgently needed to rebalance the plant-based to animal-based food ratio of contemporary diets in affluent societies.

15.1.2 The importance of eating out of home

The centrality of meat in Westerners' diets is particularly reflected when eating out of home. Because many modern people regularly dine out, frequently make use of takeaway options or have breakfast, lunch or snacks away from home, food service companies responsible for providing foods outside of the home are potentially of great importance to enabling the 'protein transition' in which a shift towards less meat-intensive diets is pivotal (Aiking & de Boer, 2020; Dagevos, 2021).

Next to workplace dining facilities, school or hospital cafeterias, and cafés or canteens, restaurants are a prominent part of the food service sector. Meat generally dominates the menus and dishes of restaurants, ranging from fast-food restaurants to fine-dining restaurants (Dagevos, 2021). Encouraged by this dominance of meat dishes on the menu, the proportion of meat eaten by Western consumers as restaurant patrons is often relatively high (Attwood, Chesworth, & Parkin, 2020a; Biermann & Rau, 2020; Horgan, Scalco, Craig, Whybrow, & Macdiarmid, 2019; Reinders et al., 2020).

Although restaurants are unmistakably vital to the provision of food out of home and, therefore, at the heart of encouraging and enticing diners to eat sustainably and healthy, it is remarkable that the possible role of restaurants has been largely neglected for long. This holds even more for scholarly attention to chefs as change agents helping to make the less meaty choice the easy and tasty one. Research focusing on chefs is scarce (Batat, 2020; Lamy, Costa, Sirieix, & Michaud, 2023; Sauer & Wood, 2018), but chefs themselves sometimes highlight the professional and inspirational contribution they could make in transitioning to dishes and diets which are healthier for people and the planet (e.g., Charas, 2017; Gonçalves, 2020). Research with a focus on the possible role of restaurants in shaping and enabling the environment for more sustainable and healthy food choices, however, has gained momentum in recent years (Attwood, Voorheis, Mercer, Davies, & Vennard, 2020b; Meier, Andor, Doebbe, Haddaway, & Reisch, 2021). This is understandable given that out-of-home environments in the form of restaurants are an interesting setting to investigate whether and which behavioural 'nudge' interventions could possibly influence diners' food choices in more healthy and sustainable directions, that is, encourage a dietary shift towards meat reduction and more plant-based eating conventions when eating out.

15.1.3 This chapter

For collecting the studies in this chapter, we did not conduct a strict systematic review, but an overview based on the following four eligibility criteria. Particularly the studies included in the core Sections 15.3 and 15.4 should be (1) of recent

publication date (2018−22), (2) concern a nudging study, (3) are devoted to a restaurant setting and (4) are focused on decreasing meat consumption by shifting consumers towards plant-based options. Such a collection reveals that studies differ in scope and approach. In Section 15.2, by focusing on recent review studies, criteria (2)−(4) are lifted somewhat as we concentrate on contemporary work that adopts a wide scope in addressing sustainable food choices in an out-of-home setting. Section 15.3 proceeds with presenting studies of a more specific nature. That is, these intervention studies report on one or several behavioural nudges in an out-of-home setting. Section 15.4 briefly outlines the design and highlights of a real-life nudging study we recently conducted in a restaurant. Finally, Section 15.5 gives some room for a few reflections on the power of behavioural nudges within the specific context of intervention studies as well as from the perspective of the protein transition at large. All in all, by presenting and synthetising findings of prior research, the current chapter aims to improve our insight into how powerful behavioural nudges appear to be to move consumers from meat-based into more plant-based directions in restaurant contexts.

15.2 Behavioural nudges in a broad perspective

Following up on the 2008 book *Nudge* by Thaler and Sunstein, the concept of nudging has gained considerable popularity. Nudges nonobtrusively adapt the decision context ('choice architecture') wherein food choices are made. Nudges do not limit or exclude options but modify the way in which choices are presented with the aim to steer the decision of what to choose. A nudging intervention subtly favours choosing a particular option and gives a (desirable) behavioural option a soft push to make it an easier and/or attractive option. In other words, freedom of choice is maintained but people's choices are guided in a certain direction − leaving philosophical discussions aside on whether strict freedom of choice exists anyway given that our choices are inevitably influenced by the physical and/or social environment. Research devoted to examining the role and impact of nudging as a behaviour change intervention has developed into a vibrant field of study.

More specifically regarding meat reduction and out-of-home consumption, several recent studies have assessed systematically the state of play. Rather than focusing on presenting the findings of a specific experimental study or series of studies (see Section 15.3), this literature collects and synthesises prior research. Relevant examples of reviews taking both a broader perspective and a behavioural approach are Bianchi, Garnett, Dorsel, Aveyard, and Jebb (2018a; 2018b); Blackford (2021); Cesareo et al. (2022); Gynell, Kemps, and Prichard (2022); Harguess, Crespo, and Hong (2020); Kwasny, Dobernig, and Riefler (2022); Reynolds et al. (2019); Vandenbroele, Vermeir, Geuens, Slabbinck, and Van Kerckhove (2020) and Vecchio and Cavallo (2019). In addition, we note that Grundy et al. (2022) recently provided a review of review studies (a 'meta-review') with a focus on examining and evaluating interventions targeted at influencing meat or dairy consumption, that

is, primarily interventions intended to decrease the consumption of animal-based products. Of the review studies included in this section, the two studies by Bianchi and colleagues and the one by Harguess and colleagues also belong to the 18 studies included in this meta-review.

A distinction could be made between review studies. On the one hand, studies that specifically focus on interventions to reduce meat consumption but that pay attention to a broader set of behavioural mechanisms than merely nudging (Bianchi et al., 2018a; 2018b; Harguess et al., 2020; Kwasny et al., 2022). In other words, criterion four is emphasised. On the other hand, review studies that specifically focus on nudging in relation to food, but with a broader scope than meat reduction specifically (Blackford, 2021; Cesareo et al., 2022; Gynell et al., 2022; Reynolds et al., 2019; Vandenbroele et al., 2020; Vecchio and Cavallo, 2019). Thus, the focus here is on criterion 2.

15.2.1 A broader scope than nudges

Regarding the first group of studies, Bianchi et al. (2018a, 2018b) provide a broad and comprehensive overview of intervention studies (conducted up to and including 2018) aimed at reducing meat consumption, published in two review studies. The first review by Bianchi, Dorsel, Garnett, Aveyard, and Jebb (2018a) evaluated intervention studies targeting conscious behavioural determinants, such as those providing information or education programmes (e.g., enhancing knowledge of meat consumption's environmental and health effects). Following dual-process models of human behaviour, the second review (Bianchi et al., 2018b) paid attention to the more habitual and automatic side of human behaviour that is heavily influenced by features of the choice environment. As a result, this review evaluated intervention studies on restructuring physical microenvironments to reduce the demand for meat. The authors defined physical microenvironments as the 'settings in which people may gather for specific purposes and in which they may acquire or consume food' (p. e385), such as canteens, restaurants or supermarkets. They found that reducing portion sizes of meat and manipulating the sensory properties of meat or meat-free alternatives appeared to be promising interventions. They conclude that, despite mixed findings, such interventions have the potential to lower consumer demand for meat products. As such, these reviews provide an important first indication of the potential of information-based or environment-based interventions to reduce meat consumption and thus to contribute to more sustainable consumption behaviour.

In addition, both Harguess et al. (2020) and Kwasny et al. (2022) discuss various strategies to reduce meat consumption that may not strictly fall into the category of nudging. Harguess et al. (2020), for example, aimed to identify the predictive factors that are associated with reduced meat consumption. The authors describe strategies related to evoking empathy for animals, inducing cognitive dissonance (i.e., psychological discomfort stemming from conflicting feelings, beliefs or actions) regarding meat-eating, letting people read a message implying that meat consumption is changeable and can therefore be lowered, and formulating concrete 'If, then'

plans (e.g., 'If I visit the cafeteria for lunch tomorrow, then I will choose a vegetarian meal'). Although this review provides first insights into the factors that may play a role in reducing meat consumption, the use of too narrowly defined search terms makes this study far from complete to get a good picture of how meat consumption can be reduced in restaurants.

In their recent and extensive review of experimental research studies between 2001 and 2019, Kwasny et al. (2022) state that interventions might have varying success among different groups of individuals. Stated differently, the effectiveness of interventions differs across consumer groups with different sociodemographic and sociocultural characteristics, personality traits, values and meat-related lifestyles. Furthermore, they indicate that there is a future need for more intervention studies that go beyond enhancing people's knowledge but that also focus on habitual and external factors.

15.2.2 Nudging beyond meat

Going beyond meat consumption per se, several review studies focused on nudging strategies. To start with, in their systematic review of nudging interventions aimed at increasing healthy food choice, Vecchio and Cavallo (2019) report a wide range of nudging approaches, such as healthy product placement, using default options or priming messages. They found that over 80% of the twenty-six reviewed empirical articles reported positive outcomes. Although this percentage seems to be encouraging, the authors report several limitations of the nudging interventions, such as the lack of insight into long-term effects (see further Section 15.5.2), and the small and nonrepresentative samples that are often used.

In their recent review, Cesareo et al. (2022) also focus on healthy consumption more generally, but with a specific focus on nudges carried out in university cafeterias. The authors discuss various successful nudging strategies to promote healthy food choices (e.g., making these choices more convenient by placing them as the default option on a menu) and show that such strategies can be effective in shifting consumer behaviour in a healthy direction. In doing so, they also add to the substantial literature on nudging strategies that are (successfully) applied to outdoor dining settings such as restaurants and cafeterias.

Another recent paper is the systematic review by Gynell et al. (2022), which specifically focuses on nudging food menus to promote healthier eating behaviours. The most promising of these so-called implicit interventions in food menus were placing healthy food items in certain locations on a menu and making healthy items as the preset, default, choice options on the menu. Although this study focuses on a specific set of behavioural nudges that can be implemented in restaurant settings, namely, related to food menus, the findings of this study are increasingly relevant in the light of the growing importance of online ordering apps, where food menus play a pivotal role in directing consumers' choice.

Reynolds et al. (2019) have shown that certain nudging interventions aimed at reducing unhealthy consumption can be successfully applied to a broader range of products than merely meat or vegetarian foods. More specifically, their findings

indicate that graphic warning labels are perceived as an acceptable and effective nudging strategy when applied to alcohol, tobacco or high-calorie snacks (especially when evidence for the labels' effectiveness is asserted). However, their study did not examine actual consumption behaviour, which begs the question of whether such product labelling can reduce the actual consumption of alcohol, tobacco and high-calorie snacks.

In relation to sustainable food consumption, Vandenbroele et al. (2020) discussed the effectiveness of various nudging strategies on actual behaviour. Their review indicated that various labelling strategies (e.g., eco-labelling) can effectively nudge consumer behaviour in a more sustainable direction. The nudging strategies discussed are not limited to labelling, however, with sensory enhancement of products (to increase their appeal) and adjustments in convenience and product size being examples of nudging interventions that have been found to successfully increase the consumption of sustainable products.

Blackford (2021) also focuses on nudging interventions on sustainable food choices. Due to a difference in methodology, an additional set of articles were reviewed in addition to Vandenbroele et al. (2020) (i.e., this article provides a non-exhaustive review, whereas the article by Blackford is a systematic review). Interestingly, they found that strategies that required little conscious involvement from consumers produced higher statistically significant outcomes compared to nudging interventions which required more deliberation. Successful nudges included combinations of enhanced availability and accessibility of sustainable food options, altered portions sizes and targeted appealing dishes in combination with a default menu.

Together, the above-mentioned review studies provide a general picture of the current state of research on nudging food choices, as well as illustrate the potential of applying nudging strategies within various domains (i.e., those of healthy, sustainable, and meat consumption), and, lastly, place nudging in the broader context of behaviour change interventions.

15.3 Zooming in: nudging in eating-out contexts

This section focuses on behavioural nudges tailored to plant-based dishes that have been explored and identified recently and their impact on the choices of food consumers as restaurant customers. Contemporary studies are briefly reviewed (for more detailed comments on intervention design, setting or participants of many of the covered studies below, see Meier et al., 2021). More specifically, this section zooms in on various studies putting emphasis on nudges that intervene in the conditions of consumer choice by bringing the meat-free option to the fore. The design of the choice architecture increases the accessibility, availability or attractiveness of plant-based consumption choices, for instance, by menu shifts, by providing information, by changing portion sizes of meat and vegetables or making vegetarian food options more prevalent.

15.3.1 Meat-free by default

Already an early study in this field of modifying the default in a dining context demonstrated the effectiveness and impact of nudging consumer choice to the vegetarian option (Campbell-Arvai, Arvai, & Kalof, 2014). The default is the most 'automatic' choice or 'standard' option in a set of choices. Mertens, Herber, Hahnel, and Brosch, (2022, p. 2) defined choice default as 'the preselection of an option that is imposed if no active choice is made'. In this study, nonvegetarian food options were placed 'in a slightly less convenient position' (Campbell-Arvai et al., 2014, p. 465): diners received a menu with only meat-free options, while the meat and fish options (e.g., cheeseburger, grilled salmon) are presented on a different menu displayed on a wall approximately 3.5 m away from their table. As a result, more meat-free options were chosen in comparison with a choice architecture in which all meat-free and animal-based options were presented on the same menu. Such a subtle nudge as making it a bit more difficult for customers to opt for a meat option appeared to be promising to steer people's food choices into more plant-based directions.

In the wake of this work, various related studies have been conducted since to further explore the power of nudges as a behavioural change tool. The principal topic of several studies is a redesign of the menu. Nudging food choices, for example, was examined by applying a (minor) modification in the menu that made the vegetarian choice more salient. Bacon and Krpan (2018) presented the vegetarian dish as the chef's recommendation, and this nudge increased the likelihood of choosing this option among infrequent eaters of vegetarian foods – but this menu design did not have this effect on the vegetarian food choices made by flexitarians, who are already used to regularly eating a meatless meal. A similar finding is made by Hielkema, Onwezen, and Reinders (2022). Their online study also revealed that the effectiveness of a meat-reducing behavioural nudge differed between avid meat eaters and flexitarians. The presentation of a vegetarian default ('Vegetarian Black Bean Burger – Black bean burger with fries and salad 110DKK/€14.50' with a separate box stating 'Would you rather have a Classic Burger? – Ask the waiter'.), led to an increasing choice of vegetarian burger, but more pronounced among dedicated meat-eaters.

Gravert and Kurz (2019), in turn, presented an alternative lunch menu that only offered a vegetarian dish (and a fish dish), while a meat dish was not directly displayed on the menu but was available upon request. This nudge effectively influenced what people chose, resulting in an increase in vegetarian (and fish) dishes. More specifically, their field experiment showed that, during their three-week intervention, most customers who received the original menu, which included a meat dish (and a fish dish) while a vegetarian dish was only available upon request, chose meat (and fish) dishes and relative few customers chose the vegetarian option. But when customers received the alternative vegetarian menu, the choice for the meat option decreased and the choice for a vegetarian dish increased considerably. Thus, a simple rearrangement of menus without banning meat or changing prices resulted in an increase in meat-free dishes and a decrease in the share of

meat dishes sold. Such findings accord with the outcome of a related experiment in university restaurants, where a change in menu layout (visibility of the vegetarian dish) and menu order (vegetarian dish on top) resulted in an increase in the sales of vegetarian lunches – without finding out what share each of the two changes had (Kurz, 2018).

Likewise, a meat-free default menu study by de Vaan, van Steen, and Müller (2019) showed that offering an all-vegetarian menu with the possibility to add meat to each dish resulted in an increase in vegetarian dish choices. Redesigning the menu with a preselected vegetarian 'dish of the day' had a significant influence on the choices made by 33 Danish MSc students participating in a nudge intervention by Perez-Cueto (2021).

A variation on the theme of offering meat-reduced and/or plant-based meals and menus in an eating-out context is provided by Hansen, Schilling, and Malthesen (2021). Their research revealed a large effect of the default nudge on vegetarian choices. In this default intervention study, the researchers investigated whether people who were electronically registering for a conference would more likely choose a vegetarian lunch buffet when they were presented with a vegetarian buffet as the default than when they were presented with a nonvegetarian buffet as the default. The differences in outcomes were large: Much more meat-free lunch choices were made when a vegetarian lunch buffet was the default choice. Changing the default into a vegetarian default proved to be behavioural nudges that influenced food choices with considerable success.

15.3.2 More 'veggie' options

This general finding was corroborated by studies on nudging in which the number of vegetarian meal options on offer was increased in university cafeterias (Garnett, Balmford, Sandbrook, Pilling, & Marteau, 2019). This intervention resulted in a considerable increase in the choice of vegetarian alternatives and thus in increased vegetarian sales. This is comparable with the outcome obtained by Egeler and Baur (2022). This study also found that an increase in the share and range of vegetarian dishes in two Swiss university canteens lead to a decreased consumption of meat dishes and an increased plant-based food consumption. In accordance with the studies of Bacon and Krpan (2018), Garnett et al. (2019), and Hielkema et al. (2022), the revised menu with an increase in vegetarian dishes received more response from customers with meat-oriented lunchtime eating habits – albeit from a lower starting point – than from flexitarian-oriented customers who were already more accustomed to choosing a vegetarian lunch. In one of the studies reported in Reinders et al. (2020), several meat dishes in a restaurant buffet were replaced with vegetarian dishes and a dish where the portion size of meat was cut in half. This higher ratio of plant-rich options resulted only in a small reduction in meat intake. Such a result indicates that a claim by Kwasny et al. (2022) about 'increasing the visibility and variety of vegetarian dishes in food environments decreases meat-eating' is less straightforward than suggested.

A recent study by Parkin and Attwood (2022) found that significantly more participants chose vegetarian dishes when they were presented with a menu on which 75% of the dishes were vegetarian compared to participants' choices made after having received a menu with a meat-vegetarian ratio of 50:50. Steering the nudged participants away from the meaty choice by increasing the availability of vegetarian foods turned out to be an effective nudge.

15.3.3 Reduce the proportion of meat dishes

Other strategies followed in nudging studies tailored to limiting meat consumption in a dining setting are to decrease the portion size of animal-based ingredients (Spencer, Rowe, Bonnell, & Dalton, 2021) or the portion sizes of meat (Reinders, Huitink, Dijkstra, Maaskant, & Heijnen, 2017) in favour of plant-based ingredients or vegetable portion sizes on the plate, respectively. Recipe modification is the approach employed by Spencer et al. (2021) to decrease the meat intensity of diets. In this case, recipes were modified by replacing a large portion of animal-based ingredients (such as meat and dairy) with more plant-based ingredients (such as legumes and vegetables) in dishes and desserts. Neither an increase in the proportion of plant-based ingredients in several East Asian cuisine-inspired bowl recipes nor offering a 'plant-forward' version of the dessert course negatively impacted consumer liking, feelings of satiety and satisfaction.

A similar result was obtained by Reinders et al. (2017) who decreased the portion size of meat while increasing vegetable portions. In the intervention period, portion sizes of meat were reduced by on average 12.5% and simultaneously portion sizes of vegetables were doubled (150 g of vegetables instead of 75 g). The results of the experiment showed that meat consumption was significantly lower during the intervention period than during the control period. In addition, total vegetable consumption (including side dishes) was significantly higher during the intervention period than during the control period. Furthermore, although participants evaluated the amount of meat to be lower in the intervention period compared to the control period, participants were still (very) satisfied with their main dish. This suggests that portion size could significantly affect meat consumption while leaving restaurant customers' satisfaction largely unaffected.

15.3.4 Social nudging

All the above-mentioned choice architecture interventions concentrated on making changes in the physical environment (e.g., menu design approaches, changing the number of vegetarian meals offered). In addition to altering the physical environment in which consumers make decisions, the social environment also has an impact on the food choices made by restaurant patrons. Although 'social nudging' is not an established term or field of research to the best of our knowledge [even though Thaler and Sunstein (2008, Chapter 3) pay ample attention to social influences], it could be stated that social nudges in the food choice setting of a restaurant or café have received some consideration in the work of for instance

Christie and Chen (2018), Horgan et al. (2019) and Sparkman, Macdonald, Caldwell, Kateman, and Boese (2021).

The latter studies by Sparkman and colleagues deserve special mention. In this work, café customers are exposed to so-called dynamic norm information. This is information about the behavioural change of others. The underlying idea is that information about behaviour that is gaining prevalence motivates personal change. When it is publicised that many people are already adopting a meat-reduced diet, this is supposed to inspire other people to start or maintain eating less meat. Based on this, dynamic-norm messaging in menus to promote vegetarian choices is applied. In one of the studies reported in Sparkman, Weitz, Robinson, Malhotra, and Walton (2020), it was found that putting the message 'We've noticed that our customers are starting to choose our meatless dishes more often' on the menu of a fine-dining Italian restaurant during lunchtime resulted in a modest positive effect, that is, an increase in the ordering of vegetarian dishes. However, a subsequent experiment during dinner wherein the same norm was highlighted resulted in a remarkably increased number of meat-containing dishes. Findings of Sparkman et al. (2021) also show a difference in results: this time not in mealtimes but in messages. Exposing participants to the dynamic norm communication of reducing meat intake appeared more effective in cutting down on meat than an appeal to cutting meat out entirely. In other words, flexitarianism is a more appealing dietary form to many than vegetarianism. This is on par with current research on meat reduction (Dagevos, 2021).

Related to the work by Sparkman and colleagues is an intervention study by Çoker et al. (2022) applied dynamic social norm messaging to encourage customers visiting the in-store restaurants of a retail chain to shift away from meat-based meals to plant-based alternatives. The following descriptive social norm message was displayed on the digital menu, information screen boards and other prominent locations within the stores and the restaurants: 'More and more [retail store name] customers are choosing our veggie options'. Unlike the cautious results obtained by Sparkman and colleagues, this study did not find any evidence of an effect of the employed social norm messaging intervention on the percentage of plant-based meal sales across the 22 participating restaurants.

Notwithstanding such a result, we should not deny the fact that food behaviour is often influenced by what other people do, adopt, approve or feel passionate about. The behaviour of (significant) others provides 'social proof'' of what is acceptable or worth pursuing; what is proper and commendable or improper and condemnable behaviour. This social evidence also informs and influences choices to maintain or abstain from eating meat. The approach of Sparkman and colleagues makes us realise that nudging is indeed not only a matter of steering people to the easiest option, but people could also be guided to a particular choice by communicating what others around us are doing.

15.3.5 Summing up

The general finding in the earlier cited intervention studies in restaurant contexts is that meat-free defaults can nudge food consumers to reduce meat consumption and

increase consumer choice of vegetarian foods. Overall, modifications in the choice architecture appear to offer promising opportunities to effectively limit meat consumption. For a summary of recent studies referred to in succession in Sections 15.3 and 15.4, see Table 15.1.

Table 15.1 Summary of studies exploring the impact of behavioural nudges on the choices of restaurant customers.

Study	Country (City)	Type of nudge	Effect
Bacon and Krpan (2018)	UK	Chef's recommendation/ Descriptive (more appealing) description of a vegetarian dish	The likelihood of choosing this option among infrequent eaters of vegetarian foods increased
Hielkema et al. (2022)	Denmark and the Netherlands	The presentation of a vegetarian default	An increased choice of the vegetarian burger, but mainly among avid meat-eaters
Gravert and Kurz (2019)	Sweden (Gothenburg)	The presentation of an alternative lunch menu that only offered a vegetarian dish (and a fish dish), while a meat dish was available upon request	An increased choice for vegetarian (and fish) dishes
Kurz (2018)	Sweden (Gothenburg)	Menu order change/ Enhancing the visibility of vegetarian dish	An increase in the sales of vegetarian lunches
de Vaan et al. (2019)	The Netherlands	An all-vegetarian menu with the possibility to add meat to each dish	An increased choice for a vegetarian dish
Perez-Cueto (2021)	Denmark (Copenhagen)	A redesigned menu with a preselected vegetarian 'dish of the day'	An increased choice for the dish that was preselected
Parkin and Attwood (2022)	UK	Presenting a menu on which 75% of the dishes were vegetarian compared to 50%.	An increased choice for vegetarian dishes
Garnett et al. (2019)	UK (Cambridge)	The number of vegetarian meal options on offer was increased in university cafeterias	An increase in the choice for vegetarian alternatives, and thus an increase in vegetarian sales
Egeler and Baur (2022)	Switzerland	An increase in the share and range of vegetarian dishes	A decreased consumption of meat dishes and an increased plant-based food consumption

(*Continued*)

Table 15.1 (Continued)

Study	Country (City)	Type of nudge	Effect
Hansen et al. (2021)	Denmark (Copenhagen)	Presenting a vegetarian buffet as the default in an electronic register for a conference	A large increase in meat-free lunch choices
Spencer et al. (2021)	The United States (Philadelphia)	Recipes replaced a large portion of animal-based ingredients with more plant-based ingredients in dishes and desserts	No negative impact on consumer liking, feelings of satiety and satisfaction
Reinders et al. (2017)	The Netherlands	Decreased the portion size of meat while increasing vegetable portions	Meat consumption was lower, total vegetable consumption was higher and participants remained satisfied
Sparkman et al. (2020)	The United States	Implementing a dynamic norm on the menu.	An increase in the ordering of vegetarian dishes during lunchtime, but during dinner it resulted in a remarkably increased number of meat-containing dishes
Sparkman et al. (2021)	The United States	Implementing a dynamic norm focused on reducing meat intake (vs. cutting meat out entirely)	Reduced meat consumption in dietary reports five months later
Çoker et al. (2022)	UK	Implementing a dynamic norm message	No evidence of an effect on the percentage of plant-based meal sales
Taufik, Bouwman, Reinders, and Dagevos (2022)	The Netherlands (Wageningen)	Redesigning the menu such that a vegetarian main course is a default	Substantially more menus were ordered with a vegetarian main course

15.4 A real-life menu-based default nudge

As several studies that were highlighted in Section 15.3 indicate, the restaurant menu can be redesigned in several ways to nudge restaurant patrons from choosing meat towards meat-free choices, with varying degrees of effectiveness. In this section, we turn to a brief presentation of recent empirical research that we conducted in a restaurant setting (for further details, see Taufik et al., 2022). We address the

need to further investigate optimal redesigns of a restaurant menu to steer consumers towards plant-based food choices. Besides, we address the need to test behavioural nudges in a real-life setting where consumers make actual choices in a real-life setting (Harguess et al., 2020).

15.4.1 Briefly on the design of the intervention study

Our study was conducted in a cosy family restaurant in the Netherlands. Most of the patrons are meat-eaters. The restaurant offers a broad range of affordable meat and fish dishes on its menu and multiple vegetarian options. In addition to these dishes, the restaurant offers a three-course 'menu of the month' for an attractive price (€ 41). For this three-course menu, the restaurant preselects a different appetiser, main course and dessert every month. In our field experiment, we used the 'menu of the month' for our default intervention. During our study, on that menu, the default main course either was a meat dish, with a sentence below that stated in italics that on request patrons could also get a vegetarian version of the same dish, functioning as the control group, or the default main course was a vegetarian dish, with a sentence that stated that a version of the same dish with meat was also available (experimental condition; for pictures of the menus used, see Taufik et al., 2022). During the experiment, the appetiser and dessert remained the same. Thus, patrons who ordered the 'menu of the month' had the possibility to switch their default main course to an alternative option, either switching from a meat dish to a vegetarian dish or from a vegetarian dish to a meat dish.

Viewed in light of the EAST framework developed by the Behavioural Insights Team in the United Kingdom (Easy, Attractive, Social, Timely; Hallsworth et al., 2016), this particular default nudge has the potential to nudge restaurant patrons towards the vegetarian main course in several ways. According to this framework, people will more likely perform a behaviour when it is made Easy, Attractive, Social and when it is requested at the right Time. Our default intervention meets these four criteria. First, the suggestion is made that the vegetarian dish is more Easy to select for patrons (no extra request needs to be made; though in reality, an order has to be made either way). Second, patrons' attention is attracted towards the vegetarian dish as it is placed somewhat more prominently on the menu than its meat counterpart. Third, there is a potential Social element that comes into play as patrons can have the perception that the restaurant 'seemingly recommends the vegetarian dish for the main course'. Finally, fourth, the default nudge can be considered Timely, as it is presented to patrons right before their decision-making moment of placing their order.

15.4.2 Briefly on the findings

The experiment ran for four weeks: in two weeks (weeks 1 and 3) the default main course on the 'menu of the month' was a meat dish, and in two weeks (weeks 2 and 4) the default main course was a vegetarian dish. The target variable was the proportion of vegetarian main courses ordered by patrons, relative to the total number

of 'menu of the month'-main courses ordered. We examined to what extent this proportion differed depending on whether a vegetarian dish or a meat dish was the default on the menu. The findings revealed that across the four weeks, of all the ordered menus, 39% of the patrons who ordered the 'menu of the month' did so with the vegetarian dish for their main course. When disentangling this percentage based on which of the two menus, with varying defaults, the restaurant handed over to patrons, a striking pattern emerged: in the two weeks in which the restaurant used the 'menu of the month' with the meat-based main course as the default, 12% of the patrons that ordered the menu did so with the vegetarian main course. In contrast, when the vegetarian main course was presented as the default, substantially more menus with a vegetarian main course were ordered: in these two weeks, of all 'menus of the month' that were ordered in the restaurant, 67% of the patrons selected the vegetarian main course; (statistically) significantly more than when the default main course was a meat dish.

The experimental study showed that a relatively easy to incorporate change in the design of the restaurant menu can have substantial effects on restaurant patrons' decision-making in a way that nudges patrons towards plant-based dishes. In this experiment, altering the menu design in a way that suggests that the vegetarian main course is the default (as opposed to the same dish, only meat-based) led to over five times more plant-based dishes ordered relative to when the main course with meat was the default.

15.4.3 Behind the scenes

This study was possible due to the constructive collaboration with the restaurant. In preparation for the study, the head chef of the restaurant developed a main course, namely wraps, that was suitable as a meat dish and a vegetarian dish. These dishes were taste tested by both the restaurant and the researchers. Keeping the dish the same and only changing the fact that it was vegetarian or not, made sure that the type of dish did not influence the effects we found. Moreover, for the 'menu of the month' that was altered for the study, we used the design that the restaurant already was using for it, and it was also printed by the regular partner of the restaurant who normally also prints the menus. Every week, the restaurant sent us the sales data needed for the analyses, where the main course dishes of the 'menu of the month' were clearly labelled as meat or vegetarian. After someone had finished their main course, the employees of the restaurant also handed out a card with a QR code for an online version of a short survey. Paper versions were also available if patrons asked for them. However, only a small percentage of the total amount of patrons filled in these surveys, thus these survey results are likely biased and therefore do not give an accurate picture of all the patrons that visited the restaurant. As researchers, we visited the restaurant at the start of the study and every time a different menu was implemented to help where necessary. The total amount of costs (financial and timewise) for this study for both the restaurant and the researchers was feasible, also considering the effects we found.

15.4.4 In conclusion

In accordance with results reported in the extant literature, and a related recent systematic review by Stiles, Collins, and Beck (2022), our real-life restaurant experiment highlights that a default intervention study in a restaurant environment could lead to a large increase in plant-based food consumption. Restaurant owners who are interested in steering people towards healthier and more sustainable dietary choices can easily implement a default nudge, as it only requires a small change to their menu. Restaurants who do not have vegetarian or vegan dishes on their menu additionally have to introduce these dishes. Nowadays, a plant-based version of a meat dish can be easily made with the same taste experience, due to the multitude of plant-based product options. Offering these options in restaurants can already stimulate a shift towards more plant-based consumption and positioning them as the default on the menu can help even more.

15.5 A few closing reflections

15.5.1 Taking up nudges by practitioners is supported by main conclusion

Food service providers like restaurants are potentially important in helping food consumers to move to more plant-based diets that are healthier for both people and the planet. Plausibly, many of today's restaurant owners will not identify themselves as stakeholders in the protein transition. But in fact restaurateurs and chefs are well placed to enable and encourage the promotion of meat-reduced meal options, and thereby contribute to a food culture that is less meat-centric. Hopefully, our exploration of intervention studies highlighting different nudges (menu redesign, portion size enhancement, recommendation by information, etc. – see Table 15.1) is therefore enabling and supportive to restaurant managers and chefs to experiment and implement such behaviour change interventions tailored to encouraging consumers to make more plant-based choices and distancing from meat options as the 'obvious' choice on the menu. The present work has shown that they could choose from various as well as accessible options ranging from menu redesign, portion sizes, presenting more plant-based foods to norm messaging. In addition to practicality, practitioners' interest in nudging interventions may also be created by the effect they often generate. Our overview provided support for taking up nudges in the restaurant setting as the conclusion of various nudging studies was that moderate to sometimes large changes in food choices could be observed. Thus, nudges have been shown to be a relatively easy to implement and potentially effective strategy for inducing food behavioural change. This main finding coincides with a conclusion recently drawn by Mertens et al. (2022) after their meta-analysis of nudges in six behavioural domains: nudges appeared to have a particularly strong effect on behaviour in the food domain. This receptiveness of food choices to nudges is recognisable after our explorations reported in the previous sections.

15.5.2 Nudging is no panacea

After this observation, we should not ignore that in some instances nudges in the food domain also turned out to be ineffective in moving food choices by having little to no behavioural impact. Studies on shifting food choices away from meat options to vegetarian options reporting limited to no demonstrable effect of behavioural nudges are, for instance, Attwood et al. (2020a); Çoker et al. (2022); Dos Santos et al. (2020); Garnett, Marteau, Sandbrook, Pilling, and Balmford (2020); Zhou et al. (2019). In reflecting upon the effect of nudges, it is also relevant to realise that possible doubts could be raised about the longevity of behavioural effects of nudging as well as about the persuasiveness of changing defaults in the longer run. The proven suitability of a nudge within the context of an intervention study does not answer the questions whether and how a nudge exerts longer-lasting impacts or only short-term effects that are going to disappear quickly.

Particularly with respect to eating meat with its engrained cultural meanings and identity values, we should neither ignore that meat attachment, hedonic enjoyment of meat, links between meat and (religious) holidays or family gatherings as well as associations of meat as normal and necessary are serious hurdles to overcome for the veggie choice to become the default choice. Strong meat preferences and cherished expectations about the inclusion of meat in meals as the social norm undoubtedly hamper the effectiveness of nudges targeting plant-based food consumption choices. This is even more so in the context of out-of-home consumption where 'meat is a treat' is prominently or subtly communicated responding to perceptions of meat as festive, and 'pro-meat' nudges are deployed, that is, meat options being the easier choice to make when dining out. Recent research underscores the idea that meat-eating habits are particularly difficult to change in a restaurant environment. In addition to studies referred to in the Introduction with respect to the issue that contemporary consumers are used − and eager − to eat (much) meat in restaurants, this relationship between meat and the contextual domain of restaurants where hedonic reasons come first is further strengthened in recently published studies (Elzerman, Keulemans, Sap, & Luning, 2021; Michel, Hartmann, & Siegrist, 2021).

15.5.3 Nudges are like drops in the ocean

A final reflection on the power of nudges has to do with the question whether the libertarian paternalism of nudges that prescribes to preserve the freedom of choice by changing the choice architecture without eliminating options is of much help to make substantial progress in realising a protein transition in which meat intake levels − at least − fall within environmental boundaries and meet dietary guidelines. One may wonder whether nudges as gentle and nonbinding behavioural interventions are enough to realise a timely and far-reaching demand-side transition towards reduced consumption of (ruminant) animal foods and more plant-based consumption. It is highly plausible that radical shifts towards sustainable diets require transformative + change in food consumer behaviour far beyond incidental

and incremental changes in individual choices by subtle modifications in the restaurant choice architecture (see also Dagevos & Reinders, 2018). Although this chapter has shown that the power of behavioural nudges on shifting away from the meat choice and moving to more plant-based food intake varies from modest to relatively great in intervention studies, this should not cause us to lose sight of the fact that nudge interventions are quite powerless from the perspective of the centrality of meat in the prevailing food culture and the powers that be that persistently foster the high meat diet. While behavioural nudges generate possibilities for consumer behavioural change, profound and compelling food-environmental changes – both structural and socio-cultural ones – are needed to facilitate long-term and large-scale change to the adoption and maintenance of more plant-based diets.

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