Interaction of Defaults and Incentives to Encourage Sustainable Eating Behaviors

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ABSTRACT

Defaults have been widely shown to affect people's behaviors—also when it comes to fostering sustainable behaviors. In this project, we examine how default effects interact with incentives in the context of plant-based meat consumption. Specifically, we examine whether defaults remain effective when there is a disincentive on the default option—such as when the "non-default" alternative is cheaper or lower in calories (and hence likely to attract choice shares). Our preliminary results suggest that making plant-based meat (vs. regular meat) the default increases its choice share even in the presence of price or calorie incentives on regular meat. Theoretically, our findings shed light on the interaction of defaults and incentives and suggest that defaults can help buffer against disincentives on the target options. For retailers and producers, it means that instead of discounting sustainable products (and losing margin) or changing their compositions, a more cost-effective way can be to change the choice architecture.

Keywords: choice architectures, default effects, incentives, sustainable consumption, plant-based diet

INTRODUCTION

One of the *UN Sustainable Development Goals* is to provide a sustainable and healthy diet to 10 billion people by 2030 (United Nations Sustainable Development, n.d.). To achieve this, the 2019 *EAT-Lancet Commission Report* has concluded that changes in food habits are one of the major levers: "consumption of foods such as red meat [….] will have to be reduced by more than 50%." (Willett et al., 2019). Some countries have followed suit. In the UK, the Climate Change Committee has set out a National Food Strategy, which called for a 30% reduction in meat consumption by 2030 (Ho, 2021; London School of Hygiene & Tropical Medicine, 2021).

To achieve the 30% target, researchers conclude that it would only require "individuals made simple switches" (Ho, 2021). But how simple can this be? Meat-eating consumers perceive regular meat to be the "main part" of a dish (Graça et al., 2019; Hoek et al., 2011; Holm & Mohl, 2000). Of course, one option could be to directly replace meat by making vegetables the "main part" of a dish. However, this would likely make the "switching" extremely difficult for meat eaters (Fiddes, 1991; Kildal & Syse, 2017). Thus, another, likely more promising option, could be to substitute that "main part" with an equivalent plant-based meat, that is, a plant-based product that maximally resembles meat in its look, taste, and texture (Graça et al., 2015).

However, *knowing* that plant-based meat is better for the environment and one's health than regular meat is likely not enough to help meat eaters reduce meat intake. We know from myriads of past research that behavior change is difficult and that intentions to switch to more sustainable behaviors often don't follow suit in the necessary actions (Bublitz et al., 2023; White et al., 2019). Thus, for meat-eaters, switching to plant-based substitutes will most likely be anything else than "simple" as Ho (2021) wishfully stated above. However, there is a silver lining to how to nudge green behavior. Prior research has shown that choice architecture, that is how

choices are presented to people, can materially affect their preferences (Johnson, 2021) and help them establish habits (White et al., 2019).

One choice architecture tool that has been shown to reliably affect people's choices is setting defaults—or pre-selecting choices (Goswami & Urminsky, 2016; Jachimowicz et al., 2019; Johnson & Goldstein, 2003). A classic example is opt-out schemes. A famous study on organ donation, for example, shows that in countries where people are organ donors by default, only a small percentage opts out, whereas in countries where people need to opt-in to become organ donators only a small percentage will opt-in, leading to massive differences in the pool of organ donators in countries with opt-in versus opt-out schemes (Johnson & Goldstein, 2003). The positive default effects of opt-out schemes have been replicated in many other domains, like the promotion of women leaders (He et al., 2021).

In this paper, we examine how defaults can be used to reduce meat intake. One complication in this context is that, as for many sustainable products, plant-based meat is typically more expensive than the regular meat it tries to mirror (BEUC, 2020; Michel et al., 2021). On top of it, on some occasions, plant-based meat may contain more calories than regular meat (Webster, 2020). Thus, on a theoretical level, the focus of the paper is to examine how default effects interact with conflicting incentives—that is, whether, why, and when default effects work in contexts with negative price and calorie incentives.

Importantly, our findings so far show that making plant-based meat the default is effective, even when plant-based meat is *more* expensive and has *more* calories than regular meat. From a practical point of view, our results suggest that rather than working towards reducing *dis*incentives (like reducing the price) for plant-based meat, defaults can buffer against conflicting incentives. Shedding light on the interaction of defaults with alternative incentives, our research contributes

to the literature on default effects (Goswami & Urminsky, 2016; Jachimowicz et al., 2019; Johnson & Goldstein, 2003), incentives (Gneezy, 2023; Gneezy et al., 2020) and choice architecture (Johnson, 2021; McKenzie et al., 2018; Thaler & Sunstein, 2008). On a practical level, it helps understand how and when plant-based alternatives can help reduce meat intake.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

DEFAULT EFFECT

Defaults are choice options that are pre-selected and hence "imposed when an individual fails to make a decision" (Johnson & Goldstein, 2003, p.1338). They have been widely shown to effectively change individual decisions (Jachimowicz et al., 2019; Johnson & Goldstein, 2003) and are considered one of the most powerful nudges (Goswami & Urminsky, 2016; He et al., 2021; Johnson & Goldstein, 2003).

There are various reasons why people tend to stick with default options (Goswami & Urminsky, 2016; Johnson & Goldstein, 2003): (1) Inertia: People may stick with default choices due to mere inaction or inertia (Johnson & Goldstein, 2003; Madrian & Shea, 2001; Thaler & Benartzi, 2004), (2) Effort reduction: Defaults help people to reduce the effort in making choices, especially if choosing the non-default option would require effortful cognitive processing (Goswami & Urminsky, 2016), (3) Status quo/Reference point: Defaults can serve as reference points for future choices (Goswami & Urminsky, 2016; Johnson et al., 2007; Kahneman et al., 1991) and be viewed as the status quo or societal norm one does not want to lose (Johnson et al., 2007; Kahneman et al., 1991), (4) Suggested option/Persuasion attempts: When there are default options, people tend to consider the *advantages* of the default option but the *dis*advantages of the alternative option (Goswami & Urminsky, 2016; Steffel et al., 2016), which leads them to interpret

defaults as signaling the preferred or suggested course of action (Johnson & Goldstein, 2003; McKenzie et al., 2006; Steffel et al., 2016).

Making the sustainable option the default option can be an effective way to promote green behaviors and the formation of habits (White et al., 2019). Previous research demonstrated the effectiveness of default options for pro-environmental choices (Berger et al., 2022; Betz et al., 2022). Berger et al. (2022) showed that, defaults prompt consumers to pay more to offset the environmental impact of their flights. In the context of restaurant menus, Betz et al. (2022) demonstrated that making low-carbon emission dishes the default of a menu increases the choice of low-carbon emission dishes by 26.7%. A recent field example of the power of defaults in plant-based diets is New York City's "Greener by Default" initiative. New York City Health + Hospitals made plant-based dishes the default in their menu. This public (non-experimental) initiative apparently encouraged more than half of all eligible patients to choose plant-based options (Greener by Default, n.d.).

Since regular meat is regarded as the "main part" of a dish (Fiddes, 1991; Graça et al., 2019)—that is, the mental default of the dish—making plant-based meat the default instead may reduce feelings of loss aversion for cutting meat and instead instill a sense of loss aversion on the plant-based meat default (Graça et al., 2015). In this project, we experimentally examine how defaults can help consumers reduce their meat consumption and, importantly, compare the effectiveness of default effects to competing incentives focused next.

BUFFERING EFFECT OF DEFAULTS AGAINST INCENTIVES

Besides choice architecture focused above, incentives have been shown to be another powerful element affecting people's behaviors (Gneezy et al., 2020). A key type of incentive is

price incentives, that is, setting lower prices. Discounting products is a common strategy to increase sales (Gupta & Cooper, 1992) as a price decrease typically results in a rise in consumer demand for that product (Runge et al., 2021). Thus, cheaper alternatives tend to be more frequently chosen. Following this logic, if plant-based meat can be offered at a discounted/cheaper price than regular meat, the choice share of plant-based meat would likely increase. The problem is that the current situation is inverse: plant-based meat is generally *more* expensive than regular meat and its price is one of the key barriers why consumers don't switch to plant-based meat (BEUC, 2020; Michel et al., 2021). Thus, there is a *dis*incentive on the plant-based option. Similarly, in some cases, plant-based meat has more calories (Tso & Forde, 2021; Webster, 2020), another typical disincentive on the plant-based option.

In the previous section, we argued that simply making plant-based meat the default would increase its choice share. However, what should we expect when plant-based meat is more expensive or higher in calories than regular meat—two attributes that are easily evaluable for consumers (Hsee, 1998; Hsee & Zhang, 2010)? Will defaults still work? One of the properties of defaults is that they help consumers infer which the normatively suggested products are—especially, when the choice is difficult, or the options are in conflict. Prior research shows that, under difficulty and conflict, defaults likely become even more potent to avoid unwanted outcomes (Broniarczyk & Griffin, 2014). Choosing a meat alternative becomes easier when its calorie or price is lower compared to regular meat, as it is what is expected of a meat alternative (Hoek et al., 2011; Michel et al., 2021). Therefore, opting for the lower-calorie or price meat alternative is in line with consumer expectations, and the default option has a weaker influence in this scenario. However, when the calorie and price of a meat alternative are higher, it creates a conflict with consumer expectations, making the default option more helpful in decision-making.

When plant-based meat is more expensive and contains higher calories, it conflicts with consumers' expectation of meat alternative to be cheaper and contains lower calories than regular meat (Hoek et al., 2011; Michel et al., 2021). This may push producers and retailers to "dump" the price or change the composition of plant-based meat—a costly strategy. However, due to the reasons mentioned above, we suggest that making plant-based meat the default can buffer to some extent against the *dis*incentive of lower prices and calories for regular meat.

H1: Making plant-based meat (vs. regular meat) the default option will increase its choice share.

H2: Making plant-based meat (vs. regular meat) the default option will increase its choice share, even when there are well-evaluable *dis*incentives for the default option.

In other words, we expect a buffer effect of defaults against incentives on regular meat. We test this assumption in two pilots and two main studies—the first three focusing on price incentives and the last study on calorie incentives.

Pilot 1: Price Disincentives

In July 2022, Burger King Austria launched a new campaign "Normal or with meat?". This campaign showcased a plant-based burger as the default option (see Figure 1 left, (*Burger King Österreich Startet Neue Kampagne*, 2022). We used this campaign as stimuli material for our pilot study 1.

Figure 1. *Original 2022 Campaign from Burger King Austria (in Engl. "Normal or with meat?")*

Method

Sample. We collected responses from 808 participants on Prolific Academic. In this and all studies, we only focus on the subset of red meat eaters, which were N = 651 (61.4% female; M_{age} = 40.3 years, Range: 18–77 years).

Design. Pilot 1 followed a 2 (default: meat vs. plant-based burger) x 3 (substitute price: the same vs. less vs. more) between-subject design. In the plant-based default condition, participants saw the original ad that was translated into English (left, Figure 2); in the meat-based default condition, the ad title was reversed (right, Figure 2). Depending on the condition, the price of the default option was either mentioned to be $2 less or $2 more than the alternative while in the "same price condition" no price difference was given.

Figure 2. *Stimuli of Pilot 1*

Condition: Default = Plant-based

Imagine that today you are going to eat at a burger restaurant.
Today's menu features a plant-based burger. You can substitute it with a meat burger.
[The meat burger costs $2 less/more]

Condition: Default = Meat

Imagine that today you are going to eat at a burger restaurant.
Today's menu features a meat burger. You can substitute it with a plant-based burger.
[The plant-based burger costs $2 less/more]

Measures. Participants were asked whether they would choose the plant-based burger or regular meat burger. Our key dependent variable was the choice share for the plant-based burger.

We also collected several exploratory variables related to perceived quality (on a 7-point scale from 1 = " Meat burger is clearly higher quality", 4 = " Both are the same quality", 7 = " Plant-based burger is clearly higher quality"= 7), perceived healthiness (on a 7-point scale from 1 = " Meat burger is clearly healthier", 4 = " Both are equally healthy ", 7 = " Plant-based burger is clearly healthier "= 7), perceived tastiness (on a 7-point scale from 1 = " Meat burger is clearly tastier", 4 = " Both are equally tasty", 7 = " Plant-based burger is clearly tastier "= 7), perceived coolness (on a 7-point scale from 1 = " Meat burger is clearly cooler", 4 = " Both are equally cool", 7 = " Plant-based burger is clearly cooler "= 7), perceived expensiveness (on a 7-point scale from 1 = " Meat burger is clearly more expensive", 4 = " Both are equally expensive ", 7 = " Plant-based burger is clearly more expensive "= 7).

Results

A chi-square test revealed an effect of price on the choice share of plant-based meat. As expected, the choice share of the plant-based burger decreased as the price of the plant-based (vs. meat) burger increased (M>P: 38.3%, M=P: 21.4%, M<P: 12.6%, X^2 (1, N = 649) = 40.393, p = .001).

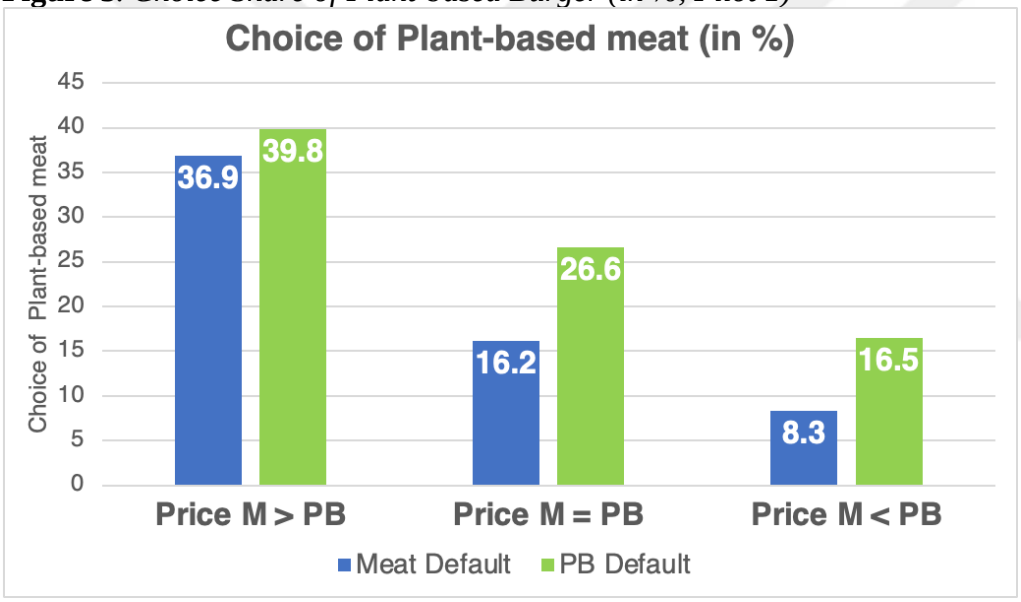
More importantly, there was also a significant effect of the default on the choice of plant-based meat (X^2 (1, N = 649) = 4.617, p = .032). When the plant-based burger was the default, consumers were more likely to choose the plant-based burger (27.3%) than when the meat burger was the default (20.1%).

Next, to examine interaction effects, we ran a logistic regression with default, price, and their interaction term as the independent variables and choice of plant-based meat as the dependent variable. When the plant-based burger is cheaper than the meat burger there is a nonsignificant interaction effect (β = -.504, S.E. = .442, p = .254) while the plant-based burger is more expensive than the meat burger there is a nonsignificant interaction effect (β = .171, S.E. = .541, p = .754). Nevertheless, pairwise chi-square tests showed that the default effect was not significant when the plant-based burger was cheaper (X^2(1, N = 206) =.18, p = .667) but was marginally significant when it was *more* expensive (X^2(1, N = 223) = 3.58, p = .058). In the latter case, the increase in the choice share of the plant-based option was **8.4%** (from 8.3% to 16.7%), see Figure 3. The latter suggests that even when there is a price disincentive on the default option, defaults are still effective and can buffer against that price disincentive. This is obviously only suggestive evidence (the result is marginal, and the interaction term was not significant) and in our next study, we will examine these effects using more controlled stimuli, a larger sample, and a clearer indication of what is meant to be the default choice.

Table 1. *Logistic Regression (Pilot 1)*

	B	S.E.	Wald	df	Sig.	Exp(B)
Default	.627	.337	3.476	1	.062	1.873
Price 1 (PB<M)	1.105	.329	11.314	1	<.001	3.021
Price 2 (PB>M)	-.766	.433	3.128	1	.077	.465
Default*Price 1	-.504	.442	1.301	1	.254	.604
Default*Price 2	.171	.545	.098	1	.754	1.187
Constant	-1.642	.258	40.672	1	<.001	.194

Figure 3. *Choice Share of Plant-based Burger (in %, Pilot 1)*



Note. M = Meat, PB = Plant-based

One explanation for why defaults were still effective when meat was cheaper (last two bars, Figure 1) could be that people just thought the advertised meat is of lower quality when it was cheaper. However, in our exploratory variables, we did not find significant differences between conditions in perceived quality, health, taste, or coolness. In detail, separate 2 (default: meat vs. plant-based burger) x 3 (substitute price: the same vs. less vs. more) ANOVAs showed that there was no significant main effect of default ($F(1,645) = 1.276$, $p = .259$), price ($F(2,645) = 2.229$, $p = .108$), or their interaction ($F(2,645) = 1.243$, $p = .289$) on perceived quality; there

was no significant main effect of default ($F(1,645) = .188$, $p = .665$), price ($F(2,645) = .038$, $p = .963$), or their interaction ($F(2,645) = .115$, $p = .891$) on perceived healthiness; there was no significant main effect of default ($F(1,645) = 1.181$, $p = .278$), price ($F(2,645) = 1.876$, $p = .154$), or their interaction ($F(2,645) = .274$, $p = .761$) on perceived tastiness; there was no significant main effect of default ($F(1,645) = 1.892$, $p = .169$), price ($F(2,645) = .562$, $p = .570$), or their interaction ($F(2,645) = .674$, $p = .510$) on perceived coolness.

However, as expected by the design we used, there was a significant main effect of price on perceived expensiveness ($F(2,645) = 7.285$, $p < .001$). In general, when the price of the substitute was more expensive, participants reported that they believe this product is typically more expensive. Interestingly, there was also a significant main effect of default ($F(1,645) = 7.155$, $p = .008$): the default option (whether regular or plant-based meat) was perceived to typically be less expensive (Note: we do not replicate this effect in our next two studies and hence don't discuss it here further). There was no significant interaction effect on perceived expensiveness ($F(2,645) = .763$, $p = .466$).

Pilot 2: Price Disincentives

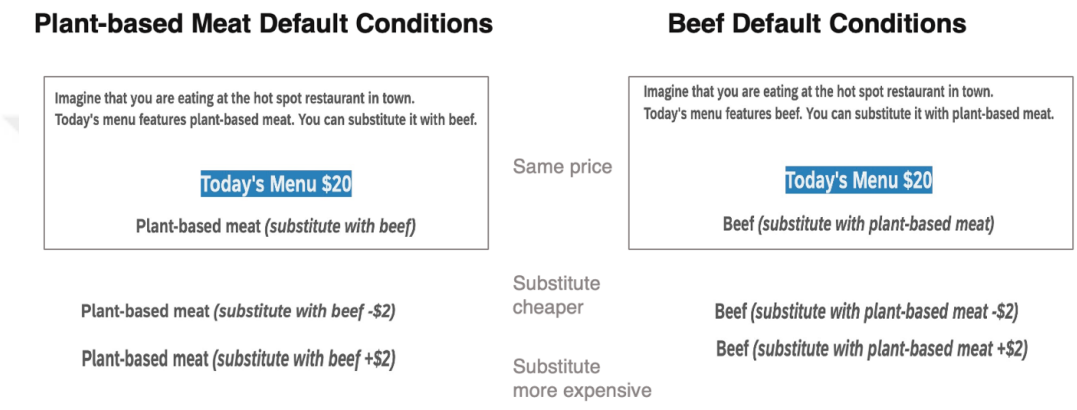
In Pilot 2, we aimed to examine whether the default effect replicated with more controlled stimuli and a clearer indication of what should be the default choice than in the original Burger King ad.

Method

Sample. We collected responses from 812 participants on Prolific Academic of which N=678 revealed as red meat eaters and were used for analysis (63% female: M_{age} = 39.1 years, Range: 18–79 years).

Design. The experiment was again a 2 (default) x 3 (substitute price) between-subject design. Participants were presented with "Today's menu" which either had the plant-based or regular meat as the default and where the default option costs the same or $2 more or $2 less.

Figure 4. *Stimuli of Pilot 2*



Measures. As the key dependent variable, participants were asked whether they would choose the plant-based meat or beef. Our dependent variable was the choice share for plant-based meat. We collected the same exploratory variables related to perceived quality, perceived healthiness, perceived tastiness, perceived coolness, and perceived expensiveness.

Results

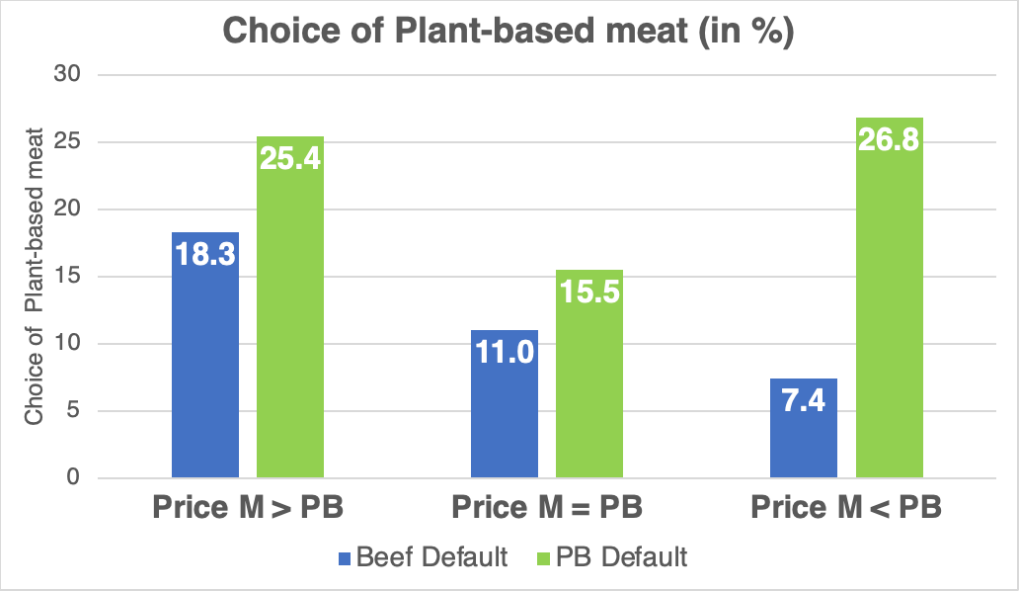
Again, as expected, a chi-square test revealed a significant main effect of the default on the choice of plant-based meat (X^2(1, N = 678) = 12.456, p < .001). As in Pilot 1, we also run a logistic regression, which showed a marginally significant interaction effect (β = 1.117, S.E. = .680, p = .054) when plant-based meat is more expensive than beef and a nonsignificant interaction effect (β = .022, S.E. = .517, p = .966) when plant-based meat is cheaper than beef. Again, pairwise chi-square tests showed that the default effect was not significant when the plant-based meat was cheaper (X^2(1, N = 223) = 1.634, p = .257) but significant when it was

more expensive (X^2 (1, N = 230) = 14.630, p < .001) with an increase in the choice share of **19.3% (7.5% to 26.8%),** see Figure 5. Replicating Pilot 1's results, the latter suggests that especially when beef is cheaper, that is when there is a price incentive on beef, changing the default can buffer against that price incentive.

Table 2. *Logistic Regression Output (Pilot 2)*

	B	S.E.	Wald	df	Sig.	Exp(B)
Default	.395	.399	.980	1	.322	1.485
Price 1 (PB<M)	.597	.394	2.300	1	.129	1.816
Price 2 (PB>M)	-.426	.478	.793	1	.373	.653
Default*Price 1	.022	.517	.002	1	.966	1.023
Default*Price 2	1.117	.580	3.715	1	.054	3.056
Constant	-2.090	.306	46.638	1	<.001	.124

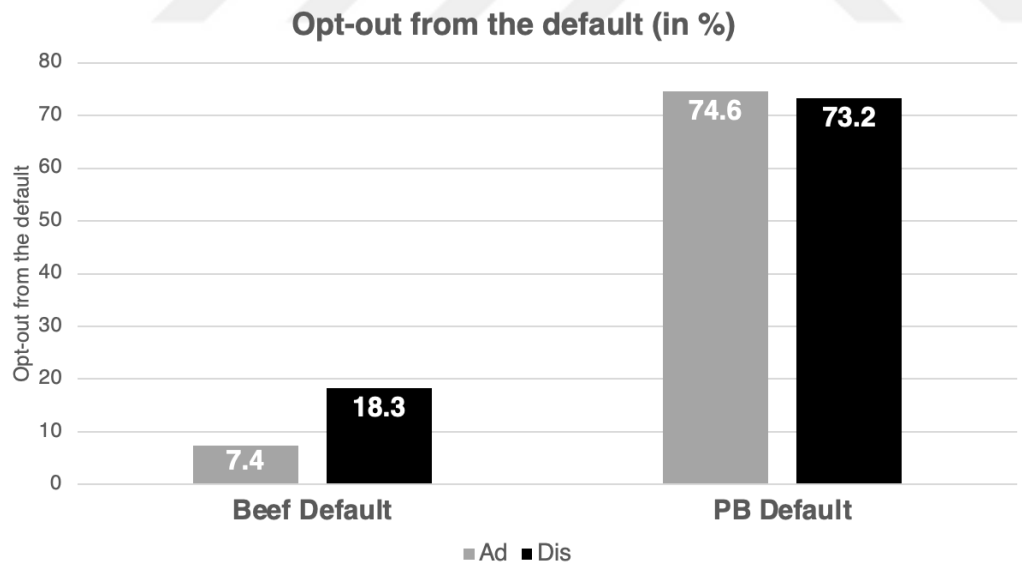
Figure 5. *Choice Share of Plant-based Meat (in %, Pilot 2)*



Note. M = Beef, PB = Plant-based.

Defaults seem to work differently for plant-based versus beef: When beef is the default, opting out from the default is sensitive to price incentives, whereas when plant-based meat is the default not. To explore, we conducted logistic regressions with price incentive (advantaged vs disadvantaged) as the independent variable and opting out from the default as the dependent variable, separate for when beef was the default or plant-based meat was the default. There was a significant positive coefficient for beef (β = 1.023, S.E. = .443, p = 021), that is the first two bars in Figure 6 are significantly upward-sloping, while this is not the case when plant-based meat is the default (β = -.072, S.E. = .296, *p* = 808). The effect of price incentives appears more powerful when beef is the default and less powerful when plant-based meat is the default. Again, suggesting that defaults buffer against price *dis*incentives on the more normative option.

Figure 6. *Choice Share of Opting Out from the Default (in %, Pilot 2)*



Note. PB = Plant-based, Adv= Default has a price advantage, Dis = Default has a price disadvantage.

As in Pilot 1, there were no (or only subtle) differences among the condition in perceived quality, health, taste, or coolness perceptions. As expected, there was no significant main effect of default ($F(1,672) = 1.128$, $p = .289$) or the interaction of the default and the price ($F(2,672) = 1.150$, $p = 317$) on perceived quality. Unexpectedly, the main effect of the price on the quality perception was significant ($F(2,672) = 3.320$, $p = .037$). Again, as expected, there was no significant main effect of default ($F(1,672) = .546$, $p = .460$) or price ($F(2,72) = 1.457$, $p = .234$) on perceived healthiness. However, their interaction effect was marginally significant ($F(2,672) = 2.437$, $p = .088$). There was no significant main effect of default ($F(1,672) = 2.146$, $p = .143$), price ($F(2,672) = 1.416$, $p = .244$), or their interaction ($F(2,672) = .135$, $p = .874$) on perceived tastiness. There was no significant main effect of default ($F(1,672) = .185$, $p = .667$) or price ($F(2,672) = .369$, $p = .691$) on perceived coolness but their interaction was marginally significant ($F(2,672) = 2.585$ $p = .076$).

However, as expected, and as in Pilot 1, there was a main effect of price on perceived expensive ($F(2,672) = 3.499$, $p = .031$). When the price of the substitute was more expensive, it was perceived as being typically more expensive. Neither the main effect of default ($F(1,672) = .460$, $p = .498$) nor the interaction effect were significant ($F(2,672) = 1.970$, $p = .140$).

Study 1: Price Disincentive

Study 1 was pre-registered and aimed to replicate the observed effects with a larger sample and a different population.

Method

Sample. We received 1634 observations of Amazon Mechanical Turk workers via CloudResearch. Based on the preregistration (https://aspredicted.org/TXF_SFF), we excluded

participants who (a) indicate that they don't eat meat, (b) who fail the attention check question ("As per the scenario you read at the beginning of the survey, what was the price of today's menu?"), (c) who have duplicated IDs, (d) who do not consistently answer demographic questions across studies, and (e) whom we suspect to be bots from the open-ended questions. Of our initial sample, we ended up with 1319 participants for analysis after these exclusions (50.5% female; M_{age} = 41.4; Range: 19-90 ages).

Design. The design and stimuli were identical to Pilot 2 except that in the menu we said "regular meat" not "beef" to make the terminology more comparable with "plant-based meat".

Measures. As the key dependent variable, participants were asked whether they would choose the plant-based meat or regular meat. Our dependent variable was the choice share for plant-based meat. We collected the same exploratory variables related to perceived quality, perceived healthiness, perceived tastiness, perceived coolness, and perceived expensiveness.

Results

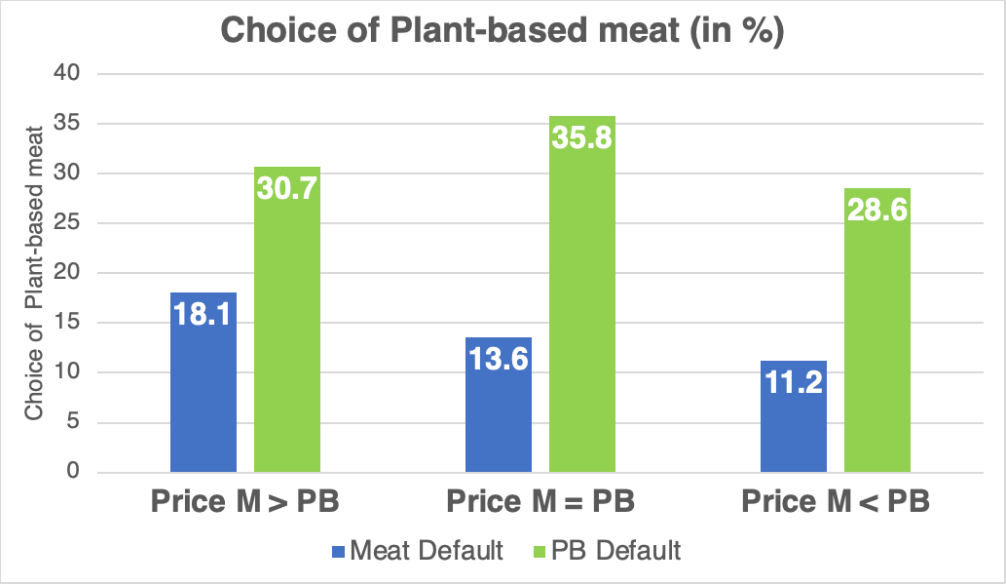
Replicating the results of the pilot study, there was a significant effect of the default on the choice of plant-based meat (X^2(1, N = 1319) = 56.83, p < .001). If the plant-based (vs. regular) meat was the default, the choice share of the plant-based meat was 14.9% higher. As in Pilot 1 and 2, we also run a logistic regression, which showed a marginally significant interaction effect (β = -.604, S.E. = .333, p = .070) when plant-based meat is cheaper than the regular meat and a nonsignificant interaction effect (β = -.148, S.E. = .360, p = .682) when plant-based meat is more expensive than regular meat. Also, the effect of the default replicated in all three price conditions (all three ps < .003). Thus, this means that the core contrast from our previous pilot

replicated: When plant-based meat was more expensive, making it the default increases its choice share by **17.4%** ($p < .001$), see Figure 7.

Table 3. *Logistic Regression Output (Study 1)*

	B	S.E.	Wald	df	Sig.	Exp(B)
Default	1.300	.246	28.003	1	<.001	3.671
Price 1 (PB<M)	.373	.265	1.985	1	.159	1.453
Price 2 (PB>M)	-.186	.297	.394	1	.530	.830
Default*Price 1	-.604	.333	3.283	1	.070	.547
Default*Price 2	-.148	.360	.168	1	.682	.863
Constant	-1.883	.203	86.142	1	<.001	.152

Figure 7. *Choice Share of Plant-based Meat (in %, Study1)*

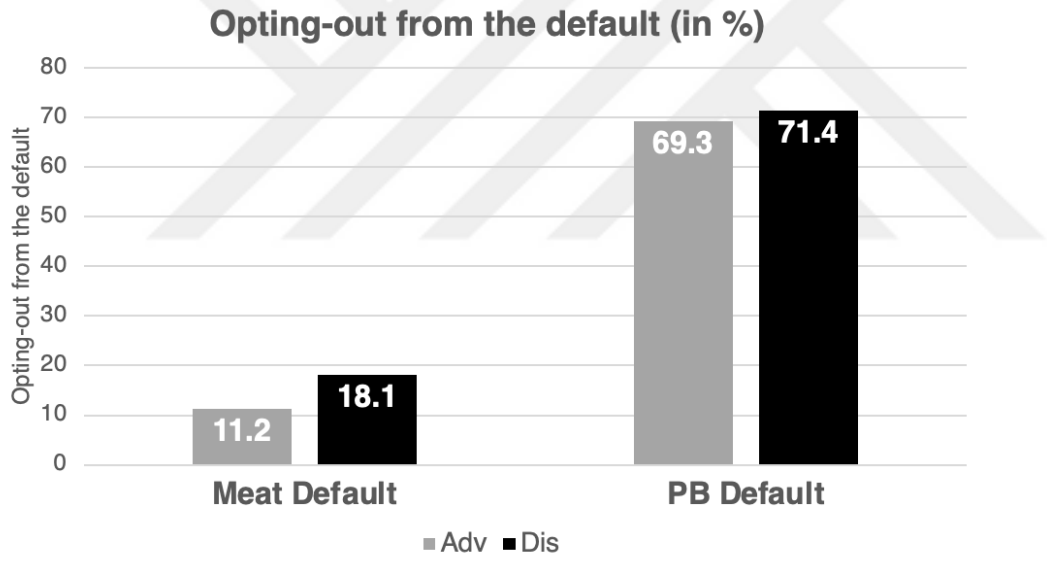


Note. M = Meat, PB = Plant-based.

Again, defaults seem to work differently for plant-based versus regular meat: When regular meat is the default, opting out from the default is sensitive to price incentives, whereas when plant-based meat is the default not. To explore, we conducted logistic regressions with price incentive (advantaged vs disadvantaged) as the independent variable and opting out from

the default as the dependent variable, separate for when regular meat was the default or plant-based meat was the default. There was a significant positive coefficient for regular meat (β = .560, S.E. = .262, *p* = 042), that is the first two bars in Figure 8 are significantly upward-sloping, while this is not the case when plant-based meat is the default (β = .104, S.E. = .210, *p* = 622). The effect of price incentives appears more powerful when regular meat is the default and less powerful when plant-based meat is the default. Again, suggesting that defaults buffer against price *dis*incentives on the more normative option.

Figure 8. *Choice Share of Opting Out from the Default (in %, Study 1)*



Note. PB = Plant-based, Adv= Default has a price advantage, Dis = Default has a price disadvantage.

As in Pilot 1 and 2, there were no (or only subtle) differences among the condition in perceived quality, health, taste, or coolness perceptions. As expected, there was no significant main effect of default ($F(1,1311) = 1.956$, $p = .162$), price ($F(2,1311) = .687$, $p = .503$), or their interaction ($F(2,1311) = 1.138$, $p = .321$) on perceived quality. Again, as expected, there was no

significant main effect of price ($F(2,1311) = .579$, $p = .561$) or the interaction of the default and price ($F(2,1311) = 1.281$, $p = .278$) on perceived healthiness. However, the default effect was marginally significant ($F(1,1311) = 3.191$, $p = .074$). There was no significant main effect of default ($F(1,1311) = 2.203$, $p = .138$), price ($F(2,1323) = .843$, $p = .931$), or their interaction ($F(2,1311)=1.161$, $p =.314$) on perceived tastiness. There was no significant main effect of default ($F(1,1311) =1.104$, $p =.294$) or price ($F(2,1311) =.052$, $p =.950$) or their interaction ($F(2,1311)=.463$, $p = .630$) on perceived coolness. There was no significant main effect of default ($F(1,1311)= 2.566$, $p=.109$) or price ($F(2,1321)= .706$, $p = .494$) or their interaction ($F(2,1311)=.978$, $p =.376$) on perceived open-mindedness.

However, as expected, and as in Pilot 1, there was a main effect of price on perceived expensive ($F(2,1311) = 4.587$, $p = .010$). When the price of the substitute was more expensive, that product was perceived as being typically more expensive. There was no significant main effect of default ($F(1,1311) = 1.363$, $p =.243$). Nevertheless, the interaction of the default and the price did have a significant effect ($F (2,1311) =15.543$, $p < .001$). Only in the condition where plant-based is more expensive, it was perceived to be more expensive as the substitute vs. the default.

Study 2: Calorie Disincentive

Study 2 aimed to examine whether the default effect replicated under another type of easily evaluable disincentive besides price: calorie disincentives.

Method

Sample. We received 1201 observations of Amazon Mechanical Turk workers via CloudResearch. Based on the preregistration (https://aspredicted.org/DS2_KWL), we excluded

participants who (a) indicate that they don't eat red meat, (b) who fail the attention check question ("Please indicate your agreement with the following statement: I love my profession. Please respond with "Strongly agree"), (c) who have duplicated IDs, and (d) who fail the CAPTCHA anti-bot verification task. Of our initial sample, we ended up with 991 participants for analysis (49.3% female; M_{age} = 41.7; Range: 19-79 ages).

Design. The experiment was a 2 (default: regular vs. plant-based meat) x 3 (calorie: plant-based meat more calories vs. less calories vs. no calorie information) between-subject design. In each condition, participants saw 7 different menus (from fast food to fine-dining menus). The order of the menus was counterbalanced (See Figures 9, 10, 11).

Figure 9. *Sample Stimuli of Study 2*

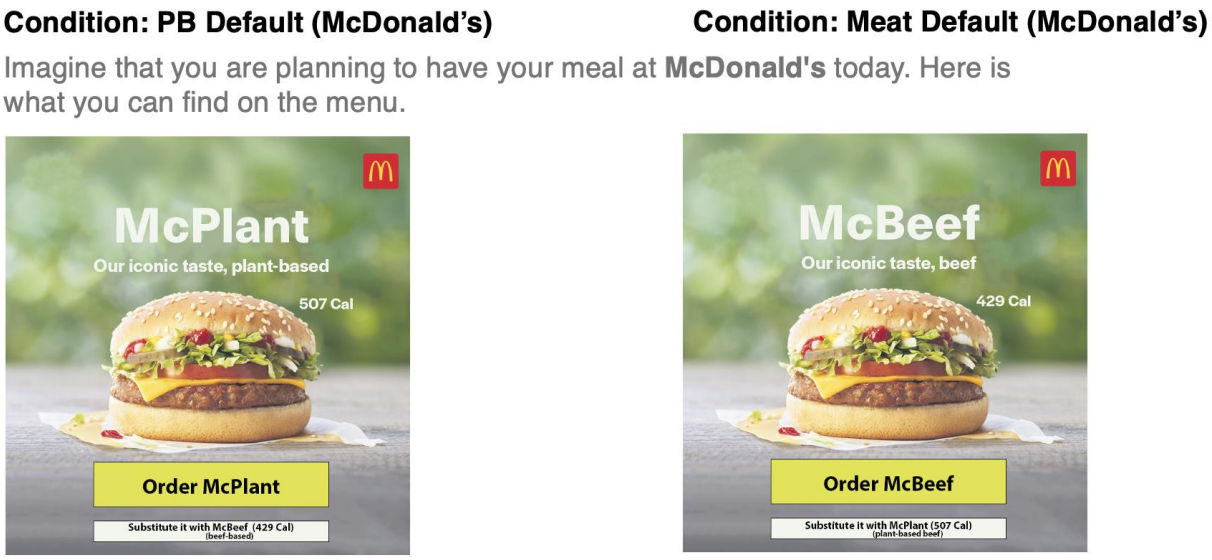
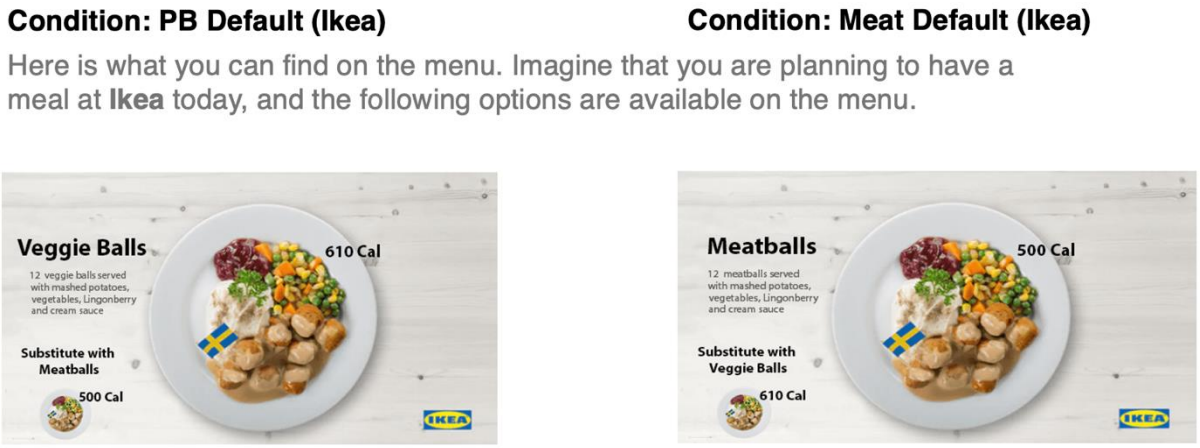


Figure 10. *Sample Stimuli of Study 2*

Figure 11. *Sample Stimuli of Study 2*



Measures. As the key dependent variable, participants were asked whether they would choose the plant-based or regular meat option. Our dependent variable was the choice share for plant-based meat. We collected the same exploratory variables as in Study 1.

Additionally, we asked participants to what extent they care about calorie labels when they decide what to eat.

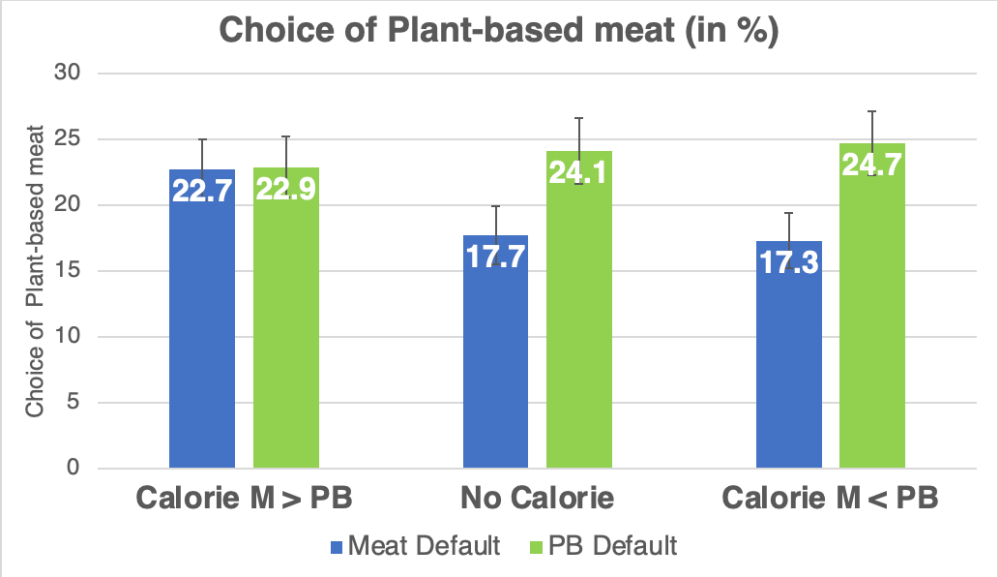
Results

As expected, a clustered chi-square test revealed a significant effect of the default on the choice of plant-based meat (X^2(1, N =991) =26.17, p < .010). Logistic regression with clustered standard errors showed a nonsignificant interaction effect (β = -.371, S.E. = .273, p = .174) when plant-based meat has more calories than regular meat and when plant-based meat has lower calories than regular meat (β = .059, S.E. = .278, p = .829). Yet, pairwise chi-square tests showed that the default effect was not significant when the plant-based meat has lower calories (X^2 (1, N = 334) = .53, p = .707) but significant when it was more expensive (X^2 (1, N = 330) = 18.81, p = .027) with an increase in the choice share of **6.3%** (17.8% to 23.9%), see Figure 12. The results suggest that especially when regular meat had less calories, that is, when there was a calorie disincentive on plant-based meat, changing the default can buffer against that calorie disincentive.

Table 4. Logistic Regression with Clustered Standard Errors *(Study2)*

	B	S.E.	z value	Sig.
Default	.387	.200	1.933	.053
Calorie 1 (PB<M)	.309	.199	1.552	.121
Calorie 2 (PB>M)	-.026	.207	-.128	.897
Default*Calorie 1	-.371	.274	-.356	.175
Default*Calorie 2	.059	.278	-.215	.829
Constant	-1.537	.148	-10.367	<.001

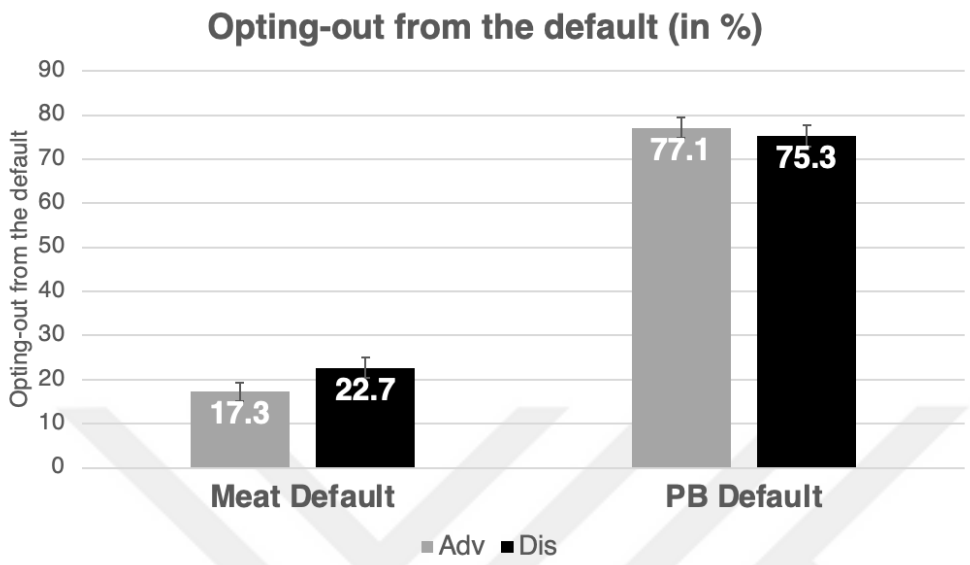
Figure 12. *Clustered Choice Share of Plant-based Meat (in %, Study2)*



Note. M = Meat, PB = Plant-based.

Although the interaction was not significant, defaults seem to work differently for plant-based versus regular meat: When regular meat is the default, opting out from the default is sensitive to calorie incentives, whereas when plant-based meat is the default not. To explore, we conducted logistic regressions with calorie incentive (advantaged vs disadvantaged) as the independent variable and opting out from the default as the dependent variable, separate for when regular meat was the default or plant-based meat was the default. There was a marginally significant positive coefficient for regular meat ($\beta = .335$, S.E. = .196, $p = .087$), that is first two bars in Figure 13 are significantly upward-sloping, while this is not the case when plant-based meat is default ($\beta = -.095$, S.E. = .182, $p = .601$). The effect of calorie incentives appears more powerful when regular meat is the default and less powerful when plant-based meat is the default. Again, suggesting that defaults buffer against calorie *dis*incentives on the more normative option.

Figure 13. *Clustered Choice Share of Opting Out from the Default (in %, Study 2)*



Note. PB = Plant-based, Adv= Default has a calorie advantage, Dis = Default has a calorie disadvantage.

Again, there were no (or only subtle) differences among the condition in perceived quality, health, taste, or coolness perceptions. In more detail, there was no significant main effect of default ($F(1,981) = .486$, $p = .486$), calorie ($F(2, 981) = .659$, $p = .518$), or their interaction ($F(2,981) = 1.477$, $p = .722$) on perceived quality. There was no significant main effect of default ($F(1,981) = .218$, $p = .641$), calorie ($F(2, 981) = .342$, $p = .710$), or their interaction ($F(2,981) = .308$, $p = .735$) on perceived healthiness. There was no significant main effect of default ($F(1,981) = .188$, $p = .665$), calorie ($F(2, 981) = .090$, $p = .914$), or their interaction ($F(2,981) = .974$, $p = .378$) on perceived tastiness. There was no significant main effect of default ($F(1,981) = .257$, $p = .613$) or calorie ($F(2, 981) = .080$, $p = .923$) on perceived coolness. Only their interaction is significant ($F(2,981) = 5.531$, $p = .004$) There was no significant main effect of default ($F(1,981) = .348$, $p = .555$) or their interaction ($F(2,981) = 1.471$, $p = .230$) on perceived expensiveness but there was a significant main effect of calorie ($F(2, 981) = 3.494$, $p = .031$).

There was no significant main effect of default ($F(1,981) = .077$, $p = .781$) or calorie ($F(2, 981) = .393$, $p = .675$) or their interaction ($F(2,981) = 1.322$, $p = .267$) on perceived open-mindedness.

However, as expected, there was a main effect of calories on perceived caring about calorie labels ($F(2, 981) = 6.532$, $p = .002$). People cared more about the calorie labels when plant-based meat has higher calories than regular meat than when regular meat has more calories than plant-based meat. There was no significant main effect of default ($F(1,981) = 1.384$, $p = .240$) and only a marginal interaction effect ($F(2,981) = 2.389$, $p = .092$).

CONCLUSION

Reducing the consumption of meat has been widely recognized as an essential step toward a sustainable future (Ho, 2021; Willett et al., 2019). However, despite the growing awareness, two major obstacles have hindered the adoption of plant-based alternatives: taste and price. Plant-based alternatives are currently priced the same as, or higher than, conventional meat, which makes them less appealing to many consumers (BEUC, 2020; Hoek et al., 2011). Moreover, many meat-eating consumers have long been accustomed to perceiving conventional meat as the “main part” of a dish (Graça et al., 2019; Hoek et al., 2011; Holm & Mohl, 2000). This perception has made it challenging for them to embrace plant-based alternatives, as they may view them as inferior or not substantial enough to replace meat. In response to this challenge, one potential solution is to substitute the "main part" of a dish with equivalent plant-based meat, which can provide a similar taste and texture (Graça et al., 2015).

Our results show that one way to help meat-eaters switch to plant-based meat may be by applying defaults. Our research shows that making plant-based meat the default option can be effective in increasing its choice share, even when there are easily evaluable incentives on the

regular meat open (i.e., when it is cheaper and has lower calories). All four studies documented that defaults lead to a significant increase in the choice of plant-based meat by **8.4%, 19.3%**, **17.4%, and 6.3%** respectively when there was a clear incentive on regular meat.

Shedding light on the interaction of defaults with alternative incentives, our research contributes to the literature on default effects (Goswami & Urminsky, 2016; Jachimowicz et al., 2019; Johnson & Goldstein, 2003), incentives (Gneezy, 2023; Gneezy et al., 2020) and choice architecture (Johnson, 2021; McKenzie et al., 2018; Thaler & Sunstein, 2008). Prior research has shown that defaults are one of the most powerful nudges (Goswami & Urminsky, 2016; He et al., 2021; Johnson & Goldstein, 2003). However, defaults have been typically studied within the area of choice architecture elements. Instead, we show evidence of the strength of defaults when there are competing incentives against the default option. Specifically, we focused on easily evaluable incentives related to price and calories. We show that the effect of defaults still persists under negative price and calorie incentives.

From a practical perspective, our findings demonstrate how the adoption of a sustainable product can be encouraged, especially if getting rid of some of its disincentives (e.g., decreasing its price or changing its composition) isn't possible. In many instances, sustainable products are more expensive than their conventional counterparts (BEUC, 2020; Deloitte, 2022) and sometimes also have more calories (Tso & Forde, 2021; Webster, 2020). Our results show that rather than trying to lower prices or change compositions, defaults can protect against incentives on conventional products. For retailers and producers, it means that instead of discounting (and losing margin) or changing sustainable products, a more cost-effective way can be to change the choice architecture.

There are several limitations of this present set of studies. The first one is it's consisting of lab studies. Future research should incorporate a field experiment to improve its external validity. The second limitation is that it exclusively concentrates on calories and price as easily evaluable incentives. Subsequent research should examine the interaction of default and other easily evaluable incentives. The other limitation is that the results of this study cannot be extrapolated to other countries because only US or UK citizens participants were included in its sample. To further understand the default and incentive effects, a study involving international participants or a sample from other countries might be useful. For these reasons, we are in discussion with field partners for a field study to examine how default effects work in settings of actual disincentives and with a different population.

REFERENCES

Berger, S., Kilchenmann, A., Lenz, O., Ockenfels, A., Schlöder, F., & Wyss, A. M. (2022). Large but diminishing effects of climate action nudges under rising costs. *Nature Human Behaviour*. https://doi.org/10.1038/s41562-022-01379-7

Betz, A.-K., Seger, B. T., & Nieding, G. (2022). How can carbon labels and climate-friendly default options on restaurant menus contribute to the reduction of greenhouse gas emissions associated with dining? *PLOS Climate*, *1*(5), e0000028. https://doi.org/10.1371/journal.pclm.0000028

BEUC. (2020). *One Bite at a Time: Consumers and The Transition to Sustainable Food: Analysis of a Survey of European Consumers on Attitudes Towards SustainableFood*. www.beuc.eu

Broniarczyk, S. M., & Griffin, J. G. (2014). Decision Difficulty in the Age of Consumer Empowerment. In *Journal of Consumer Psychology* (Vol. 24, Issue 4, pp. 608–625). Elsevier Inc. https://doi.org/10.1016/j.jcps.2014.05.003

Bublitz, M. G., Catlin, J. R., Jones, A. C., Lteif, L., & Peracchio, L. A. (2023). Plant power: SEEDing our future with plant-based eating. In *Journal of Consumer Psychology* (Vol. 33, Issue 1, pp. 167–196). John Wiley and Sons Inc. https://doi.org/10.1002/jcpy.1328

Burger King Österreich startet neue Kampagne. (2022, July 13). Vegconomist. https://vegconomist.de/ausser-haus-markt/fast-food-lieferdienste/burger-king-oesterreich/

Deloitte. (2022). *Sustainable 2022 Report*. https://www2.deloitte.com/uk/en/pages/consumer-business/articles/sustainable-consumer.html

Fiddes, N. (1991). *Meat: A Natural Symbol*. Routledge. https://epdf.mx/pdfviewer/web/viewer.html?file=https%3A%2F%2Fepdf.mx%2Fdownload%2Fmeat-a-natural-symbol.html%3Freader%3D1

Gneezy, U. (2023). *Mixed Signals: How Incentives Really Work*. Yale University Press.

Gneezy, U., Kajackaite, A., & Meier, S. (2020). Incentive-Based Interventions. In *The Handbook of Behavior Change* (pp. 523–536). Cambridge University Press. https://doi.org/10.1017/9781108677318.036

Goswami, I., & Urminsky, O. (2016a). When Should the Ask Be a Nudge? The Effect of Default Amounts on Charitable Donations. *Journal of Marketing Research*, *53*(5), 829–846. https://doi.org/10.1509/jmr.15.0001

Goswami, I., & Urminsky, O. (2016b). When Should the Ask Be a Nudge? The Effect of Default Amounts on Charitable Donations. *Journal of Marketing Research*, *53*(5), 829–846. https://doi.org/10.1509/jmr.15.0001

Graça, J., Godinho, C. A., & Truninger, M. (2019). Reducing meat consumption and following plant-based diets: Current evidence and future directions to inform integrated transitions. In *Trends in Food Science and Technology* (Vol. 91, pp. 380–390). Elsevier Ltd. https://doi.org/10.1016/j.tifs.2019.07.046

Graça, J., Oliveira, A., & Calheiros, M. M. (2015). Meat, beyond the plate. Data-driven hypotheses for understanding consumer willingness to adopt a more plant-based diet. *Appetite*, *90*, 80–90. https://doi.org/10.1016/j.appet.2015.02.037

Greener by Default. (n.d.). *Healthcare*. Retrieved November 12, 2022, from https://www.greenerbydefault.com/healthcare

Gupta, S., & Cooper, L. G. (1992). *The Discounting of Discounts and Promotion Thresholds*. https://academic.oup.com/jcr/article/19/3/401/1786726

He, J. C., Kang, S. K., & Lacetera, N. (2021). *Opt-out choice framing attenuates gender differences in the decision to compete in the laboratory and in the field*. *118*, 2108337118. https://doi.org/10.1073/pnas.2108337118/-/DCSupplemental

Ho, S. (2021, October 11). *UK Meat Consumption Drops By 17%, But Bigger Cut Needed to Meet Climate Goals*. https://www.greenqueen.com.hk/meat-consumption-uk-climate-study/

Hoek, A. C., Luning, P. A., Weijzen, P., Engels, W., Kok, F. J., & de Graaf, C. (2011). Replacement of meat by meat substitutes. A survey on person- and product-related factors

in consumer acceptance. *Appetite*, *56*(3), 662–673. https://doi.org/10.1016/j.appet.2011.02.001

Holm, L., & Mohl, M. (2000). The role of meat in everyday food culture: an analysis of an interview study in Copenhagen. *Appetite*, *34*(3), 235–243. https://doi.org/10.1006/appe.2000.0314

Hsee, C. K. (1998). Less is better: when low-value options are valued more highly than high-value options. *Journal of Behavioral Decision Making*, *11*(2), 107–121. https://doi.org/10.1002/(sici)1099-0771(199806)11:2<107::aid-bdm292>3.0.co;2-y

Hsee, C. K., & Zhang, J. (2010). General evaluability theory. *Perspectives on Psychological Science*, *5*(4), 343–355. https://doi.org/10.1177/1745691610374586

Jachimowicz, J. M., Duncan, S., Weber, E. U., & Johson, E. J. (2019). When and why defaults influence decisions: a meta-analysis of default effects. *Behavioural Public Policy*, *3*(02), 159–186. https://doi.org/10.1017/bpp.2018.43

Johnson, E. J. (2021). The elements of choice: Why the way we decide matters. In *Journal of Risk Research* (Issues 11–12). Penguin. https://doi.org/10.1080/13669877.2022.2151764

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

Johnson, E. J., Häubl, G., & Keinan, A. (2007). Aspects of Endowment: A Query Theory of Value Construction. *Journal of Experimental Psychology: Learning Memory and Cognition*, *33*(3), 461–474. https://doi.org/10.1037/0278-7393.33.3.461

Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1991). Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias. *The Journal of Economic Perspectives*, *5*(1), 193–206.

Kildal, C. L., & Syse, K. L. (2017). Meat and masculinity in the Norwegian Armed Forces. *Appetite*, *112*, 69–77. https://doi.org/10.1016/j.appet.2016.12.032

London School of Hygiene & Tropical Medicine. (2021, November 10). *Plant-based alternative food consumption may have doubled in UK over ten years suggests first analysis of its kind*. https://www.lshtm.ac.uk/newsevents/news/2021/plant-based-alternative-food-consumption-may-have-doubled-uk-over-ten-years#:~:text=As%20part%20of%20its%20recommendations,consumption%20of%20plant%2Dbased%20products.

Madrian, B. C., & Shea, D. F. (2001). The Power of Suggestions: Inertia in 401(k) Participation and Savings Behavior. *Quarterly Journal of Economics*, *CXVI*(4). https://academic.oup.com/qje/article/116/4/1149/1903159

McKenzie, C. M. R., Sher, S., Leong, L. M., & Müller-Trede, J. (2018). Constructed Preferences, Rationality, and Choice Architecture. *Review of Behavioral Economics*, *5*(3–4), 337–370. https://doi.org/10.1561/105.00000091

Mckenzie, C. R. M., Liersch, M. J., & Finkelstein, S. R. (2006). Recommendations Implicit in Policy Defaults. *Psychological Science*, *17*(5).

Michel, F., Hartmann, C., & Siegrist, M. (2021). Consumers' associations, perceptions and acceptance of meat and plant-based meat alternatives. *Food Quality and Preference*, *87*. https://doi.org/10.1016/j.foodqual.2020.104063

Runge, J., Levav, J., & Nair, H. S. (2021). *Price Promotions for "Freemium" App Monetization*. https://ssrn.com/abstract=3357275

Steffel, M., Williams, E. F., & Pogacar, R. (2016). Ethically deployed defaults: Transparency and consumer protection through disclosure and preference articulation. *Journal of Marketing Research*, *53*(5), 865–880. https://doi.org/10.1509/jmr.14.0421

Thaler, R. H., & Benartzi, S. (2004). Save More Tomorrow™: Using Behavioral Economics to Increase Employee Saving. In *Journal of Political Economy* (Vol. 112, Issue 1).

Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving Decisions about Health, Wealth, and Happiness.*

Tso, R., & Forde, C. G. (2021). Unintended consequences: Nutritional impact and potential pitfalls of switching from animal- to plant-based foods. In *Nutrients* (Vol. 13, Issue 8). MDPI AG. https://doi.org/10.3390/nu13082527

United Nations Sustainable Development. (n.d.). *Goal 2: Zero Hunger*. Retrieved March 29, 2023, from https://www.un.org/sustainabledevelopment/hunger/

Webster, A. (2020). *Plant-based Meat Alternatives: Are They Healthy?* https://foodinsight.org/plant-based-meat-alternatives-are-they-healthy/

White, K., Habib, R., & Hardisty, D. J. (2019). How to SHIFT consumer behaviors to be more sustainable: A literature review and guiding framework. *Journal of Marketing*, *83*(3), 22–49. https://doi.org/10.1177/0022242919825649

Willett, W., Rockström, J., Loken, B., Springmann, M., DeClerck, F., Wood, A., Jonell, M., Gordon, L. J., De Vries, W., Afshin, A., Chaudhary, A., Herrero, M., Crona, B., Fox, E., Bignet, V., Troell, M., Lindahl, T., Singh, S., & Cornell, S. E. (2019). *Food Planet Health:*

Summary Report of the EAT-Lancet Commission:Healthy Diets From Sustainable Food Systems.