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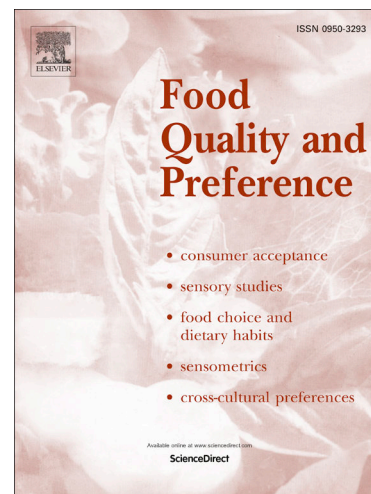
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Food Technology Neophobia as a Psychological Barrier to Clean Meat Acceptance

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Abstract

Laboratory-grown (or “clean”) meat is structurally similar to traditional meat yet comes with several environmental, health, and ethical benefits compared to regular meat. However, while some people are favorable towards clean meat, others are reluctant to engage with it. We tested whether these marked differences in clean meat acceptance are rooted in pre-test differences in fears of novel food technologies (i.e., food technology neophobia) and valuing the naturalness of food products (i.e., food naturalness importance). In three experiments (total $N = 1,169$), participants evaluated dishes labelled as either clean or regular meat (counter-balancing dish labels across participants). The findings (Experiments 1-3) consistently demonstrated that only omnivores higher (but not lower) in food technology neophobia evaluated clean meat dishes more negatively than regular meat dishes. We found no support for the moderating role of food naturalness importance in the evaluation of clean (vs. regular) meat dishes. Experiment 2 also included dishes labelled as plant-based meat, revealing that vegetarians and vegans evaluated clean meat dishes considerably more negatively than plant-based dishes, an effect exacerbated among those higher in food technology neophobia. Finally, Experiment 3 demonstrated that safety concerns, but not naturalness concerns, partly explained why those higher in food technology neophobia evaluated clean meat dishes as less favorable. Taken together, the findings highlight the role of general concerns about the use of new food technology as a psychological barrier to clean meat acceptance.

Keywords: cultured meat; clean meat; meat consumption; neophobia; naturalness; cell-based meat; vegan; omnivore

1. Introduction

By 2050, the global demand for meat is predicted to more than double (Alexandratos & Bruinsma, 2012), despite the scientifically documented environmental, health, and ethical problems of current factory farm practices. Animal agriculture contributes 14.5% of total greenhouse gas (GHG) emissions (Gerber et al., 2013), takes up almost 80% of all arable land (Ritchie, 2017), and is a leading cause of deforestation (Steinfeld et al., 2006). It also poses a serious risk to public health (e.g., concerns over saturated fat, antibiotic resistance, growth hormones, cancer risks, and zoonotic disease risk; e.g., Ferguson, 2010; Jeong et al., 2010; Jones et al., 2013; Walker et al., 2005; Wiebers & Feigin, 2020) as well as ethical challenges for current animal welfare values and norms (e.g., Dhont & Hodson, 2020; Foer, 2009; Singer, 2009).

Scientists have long recognized the pressing need for a global change in dietary habits and shift towards more sustainable technologies to seriously address the climate crisis, as well as the health risks and ethical dilemmas linked to the meat industry (e.g., Godfray et al., 2018; Tilman & Clark, 2015; Willet et al., 2019). However, people are generally reluctant to change their meat consumption habits (e.g., Bastian & Loughnan, 2017; Dhont et al., 2021; Piazza, 2020). Thus, a better understanding of the psychological barriers to consuming meat substitutes is needed. Here we focused on people's perceptions of, and willingness to eat, laboratory-grown meat, also known as *clean meat* (Bryant & Barnett, 2019). More specifically, we examined how general concerns about new food technologies and preferences for natural food products are implicated in people's evaluations of clean meat.

1.1. Clean Meat

Clean meat, also referred to as synthetic, in vitro, or cultured meat, is structurally similar to traditional animal-based meat at the cellular level and is grown in a cell culture (Mattick, Landis, & Allenby, 2015; Post, 2013). The cells develop into muscle tissue, which

can be processed into common meat products such as steaks, burgers, and sausages (Stephens et al., 2018). Leading clean meat companies expect their starter cells to become self-renewing and are transitioning to growth media that are completely animal-free, removing almost all animal welfare concerns (e.g., Memphis Meats, 2020).

Clean meat also presents several environmental and health benefits (e.g., Post, 2012). For instance, Tuomisto and Teixeira de Mattos (2011) projected that clean meat production at an industrial scale will use up to 45% less energy, 78-96% less GHG emissions, 99% less land use, and 82-96% less water use relative to traditionally farmed meat. Moreover, clean meat is grown under laboratory-conditions, which are significantly cleaner and safer than traditional livestock farms, reducing or even eliminating disease risks (Bryant & Barnett, 2020; Post, 2012).

Given these benefits, meat eaters might readily welcome clean meat products. However, this is not yet the case: recent survey data suggests that although a majority of people would indeed be willing to *try* clean meat, fewer people seem to be willing to buy it or regularly eat it (Bryant & Barnett, 2020). Furthermore, those who abstain from eating meat (i.e., vegetarians and vegans) tend to hold more favorable attitudes towards clean meat than omnivores, usually due to the animal-free component, but are less willing to try or buy it than omnivores since they abstain from meat consumption and have adjusted their diet accordingly (Mancini & Antonioli, 2019; Valente et al., 2019; Wilks & Phillips, 2017). Despite its clear advantages over traditional meat, clean meat faces several barriers to be overcome before receiving wide-scale acceptance.

1.2. Psychological Barriers to Clean Meat

Recent research revealed that the *perceived unnaturalness* of clean meat and concerns about its *safety* are two key psychological barriers to clean meat acceptance (Bryant & Barnett, 2018; 2020). Specifically, consumers often describe clean meat as unnatural or fake

and would therefore not eat it (Shaw & Iomaire, 2019; Tucker, 2014; Verbeke et al., 2015). Some find it disgusting, which can be linked to the idea that unnatural products are inherently unethical because of the assumed interference with “natural processes” (Bryant & Barnett, 2018; Laestadius, 2015; Laestadius & Caldwell, 2015). Along similar lines, perceived unnaturalness of clean meat has been associated with lower acceptability of perceived risks of clean meat and reduced willingness to consume it (e.g., Siegrist & Sütterlin, 2017; Siegrist et al., 2018; Wilks & Phillips, 2017).

A related yet distinct psychological barrier to clean meat acceptance concerns safety. Indeed, the idea of growing meat in a laboratory with new technologies can elicit anxiety about potential negative health effects (e.g., Bryant & Dillard, 2019; Gómez-Luciano et al., 2019; Shaw & Iomaire, 2019; Zhang et al., 2020). Nonetheless, some consumers perceive health and safety benefits of clean meat (e.g., Verbeke et al., 2015), or recognize the lower zoonotic disease risk and ethical benefits of clean meat (Wilks & Phillips, 2017).

Taken together, although several studies have highlighted naturalness and safety concerns as psychological barriers to clean meat acceptance, other studies revealed mixed findings, or positive health-related attitudes towards clean meat. To gain more insight into these potential psychological barriers, a more nuanced approach is needed. Specifically, whereas some people are reluctant to engage with clean meat due to its perceived unnaturalness, others consider naturalness unimportant for their food decisions. Along similar lines, whereas some experience high levels of discomfort and fear surrounding new food technologies, others are confident that new technologies are typically safe and scientifically sound. In other words, people widely differ in valuing the naturalness of food products (i.e., food naturalness importance, e.g., Román et al., 2017) and in the extent to which they fear novel food technologies (i.e., food technology neophobia, Cox & Evans, 2008).

Michel and Siegrist (2019) found that importance of food naturalness is associated with lower perceived naturalness of clean meat and lower willingness to eat it. Furthermore, focusing on preferences for natural things in general (not food-specific), Wilks et al. (2019) found no association between naturalness bias and clean meat attitudes. However, neither of these studies compared consumers' acceptance of clean meat relative to regular meat, and thus it remains unclear whether general preferences for food naturalness are associated with more negative evaluations of clean meat relative to regular meat.

Wilks and colleagues (2019) also reported that fear of new foods (i.e., food neophobia) predicted lower willingness to eat clean meat. However, food neophobia expresses people's reactions to ethnic, foreign, and unknown foods rather than reflecting fear of new food *technologies*, which are likely more closely related to opposition to clean meat. Indeed, previous studies showed that food technology neophobia is correlated with a reduced willingness to try foods produced by new technologies such as the use of genetic modification, food irradiation, or nanotechnology (e.g., Evans & Cox, 2006; Evans et al., 2010; Siegrist & Hartman, 2020). To date, no published study has investigated the associations between food technology neophobia and attitudes towards clean meat. Moreover, the previously observed negative association between food naturalness importance and clean meat acceptance might be partly explained by the influence of higher food technology neophobia. The current research addresses this gap in the literature by investigating the roles of both food technology neophobia and food naturalness importance in relation to consumers' evaluations of clean meat relative to regular meat.

1.3 The Present Research

In three experiments, we systematically investigated consumer perceptions of clean and regular meat and the roles of food technology neophobia and food naturalness importance. We asked participants to evaluate dishes, presented as images, in terms of

appeal, expected smell and taste, and how likely they would try the dish. The dishes were either labelled as regular meat or as clean meat. By counter-balancing the labels assigned to each dish across participants, we tested the pure effect of labelling a dish as “regular meat” versus “clean meat”, and thus controlled for what was actually presented in the food images.

We hypothesized that dishes labelled as regular (*vs.* clean) meat would be evaluated more favorably by omnivores (Hypothesis 1). Furthermore, we expected that the strength of the label effect would vary as a function of participants’ levels of food technology neophobia. We thus expect a moderation effect of food technology neophobia, with a stronger label effect expected among those higher (*vs.* lower) in food technology neophobia (Hypothesis 2). Our rationale was that those with higher levels of anxiety about novel food technologies may perceive clean meat as less safe, and thus less appealing than regular meat. Along similar lines, we expected that the strength of the label effect would vary as a function of participants’ levels of food naturalness importance. We thus expect a moderation effect of food naturalness importance, with a stronger label effect expected among those higher (*vs.* lower) on food naturalness importance (Hypothesis 3); our reasoning was that people who value food naturalness more strongly may perceive clean meat as more unnatural, and in turn be less favorable toward it.

Experiment 2 further extends the research scope by including both omnivores and meat-abstainers --vegetarians and vegans, hereafter termed *veg*ns*-- and adds a third, plant-based meat condition. Experiment 3 then turns to the question of *why* clean meat may be evaluated differently than regular meat. Specifically, we tested whether participants’ perceptions of safety and naturalness of clean versus regular meat dishes would partly explain (i.e., mediate) the differences in evaluations between clean meat and regular meat, and particularly for omnivores higher on food technology neophobia or food naturalness importance.

Furthermore, previous research suggests that older people, women, and political conservatives (vs. younger people, men, and political liberals) are less likely to be willing to try clean meat (Wilks et al., 2019). Moreover, individuals who like meat more are also likely to hold more favorable attitudes toward regular meat. Thus, we included age, gender, political ideology, and meat liking as control variables in all three experiments to rule out any confounding effects of these demographic and individual difference variables.

2. Experiment 1

2.1. Methods

2.1.1. Participants. Participants ($N = 302$) were recruited through the crowdsourcing platform Prolific and received financial compensation (£0.77). Retaining only omnivores, 32 participants who identified as vegetarian, vegan, or pescatarian were excluded (final $N = 270$). The sample consisted of 54.9% men and 45.1% women, with a mean age of 30.42 years ($SD_{age} = 10.95$). Most participants were from the EU (45.3%), the UK (27.9%), or the USA (11.4%).

2.1.2. Design and Materials. Participants were presented with the same six food images. Three images showed dishes made with regular meat from farmed animals (i.e., a burger, meatballs, and meat-filled tacos), and three images showed similar dishes made from clean meat (see Online Supplement for all materials).

Critically, to test the effect of *clean meat* versus *regular meat*, while controlling for image content, we manipulated the labels assigned to the dishes. For all participants three dishes were labelled as clean meat and three as regular meat. In the *clean meat* condition, participants were informed that “*The food in these pictures is made from clean meat, which is structurally identical to traditional meat but cultured in the laboratory*” while in the *regular meat* condition, it was stated that “*The food in these pictures is made from regular meat*”.

Furthermore, the dish labels were counterbalanced across participants such that each dish was presented as clean meat to half of the participants, and as regular meat to the other half.

After viewing each image, we asked participants to imagine they had the dish in front of them and to evaluate each dish in terms of appeal (1, *Extremely appealing*; 7, *Extremely repulsive*), smell (1, *Smells extremely good*; 7, *Smells extremely bad*), taste (1, *Tastes extremely good*; 7, *Tastes extremely bad*) and how likely they would be to eat the dish if offered at a buffet (1, *Extremely likely*; 7, *Extremely unlikely*). For each label condition, these four items were averaged into a single score, which was then recoded such that higher scores indicate more favorable evaluations.

2.1.3. Measures. Participants completed the 13-item Food Technology Neophobia Scale (FTN; Cox & Evans, 2008) on 7-point scales (1, *Strongly disagree*; 7, *Strongly agree*; $\alpha = .84$; $M = 4.07$, $SD = 0.88$). This scale measures consumer attitudes towards foods produced using novel technologies (e.g., “New food technologies are something I am uncertain about”).

We measured food naturalness importance with the Natural Product Interest Scale (NPI; Roininen et al., 1999), which assesses attitudes toward unprocessed, natural, and organic foods. The scale consists of 6 items ($\alpha = .76$; $M = 4.29$, $SD = 1.12$; e.g., “I do not eat processed foods, because I do not know what they contain”) completed on 7-point scales (1, *Strongly disagree*; 7, *Strongly agree*).

Participants indicated their political ideology on a 7-point scale (1, *Very liberal*; 7, *Very conservative*; $M = 3.19$, $SD = 1.41$). Meat liking was assessed with three items (Dhont & Hodson, 2014) asking whether they like the taste, look, and smell of meat ($\alpha = .85$; $M = 5.70$; $SD = 1.18$) on 7-point scales (1, *Strongly disagree*; 7, *Strongly agree*).

2.2. Data-Analytic Plan

First, we tested Hypothesis 1 by conducting a univariate ANOVA with dish label (clean vs. regular meat) as the within-subjects factor to examine whether participants evaluated the dishes labelled as regular meat more favorably than dishes labelled as clean meat. Next, we tested Hypotheses 2 and 3, expecting the label-evaluation effect to be stronger for participants scoring higher (vs. lower) on food technology neophobia and naturalness importance, respectively. To this end, we conducted an ANCOVA with label condition as the within-subjects factor, food technology neophobia and food naturalness importance as continuous predictors, as well as their interaction terms with label condition. Age, gender, political ideology, and meat liking were included as control variables (see Online Supplement Table A for results without controls). A significant interaction effect between label condition and food technology neophobia or naturalness importance would indicate that the strength of the label effect varies as a function of participants' levels of technology neophobia or naturalness importance (i.e., the hypothesized moderators).

Furthermore, to decompose and interpret significant interaction effects, we followed up with a moderation analysis for within-subjects designs using the macro MEMORE in SPSS (Montoya, 2019). This analysis allowed us to estimate and probe the label effect on dish evaluation at higher and lower levels of the moderator. Specifically, following conventional standards (Aiken & West, 1991; Montoya, 2019), we probed the label effect plus and minus one standard deviation from the mean of the moderator (i.e., the default option in MEMORE).

2.3. Results and Discussion

The results of the ANOVA testing for differences between label conditions confirmed Hypothesis 1. Dishes labelled as regular meat ($M = 5.42$, $SD = 0.96$) were evaluated more favorably than dishes labelled as clean meat ($M = 5.20$, $SD = 1.02$), $F(1, 269) = 11.94$, $p = .001$, $\eta_p^2 = .043$.

Next, we tested Hypotheses 2 and 3, whereby food technology neophobia and naturalness importance potentially moderate the label-evaluation effect. The results of the ANCOVA analysis revealed a main effect of food technology neophobia, $F(1, 259) = 10.96$, $p = .001$, $\eta_p^2 = .04$ and, as expected, an interaction between food technology neophobia and label condition, $F(1, 259) = 10.38$, $p = .001$, $\eta_p^2 = .039$.¹

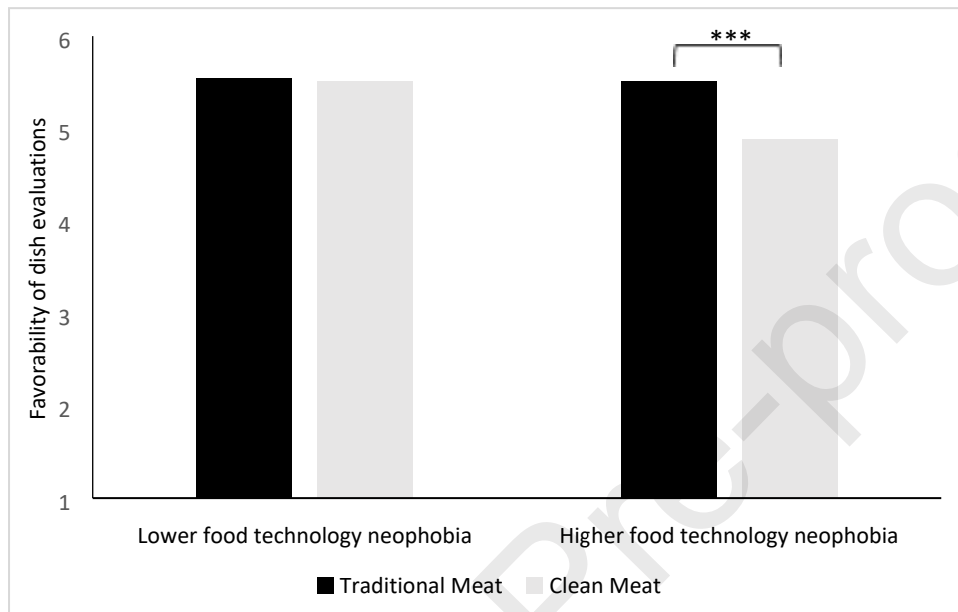
Decomposing and probing the food technology neophobia x label condition interaction, confirmed Hypothesis 2. Specifically, the results showed that only among those higher (but not lower) in food technology neophobia regular (*vs.* clean) meat dishes received more favorable evaluations, $b = 0.42$, $SE = .09$, $t(268) = 4.67$, $p < .001$, 95% CI [0.24, 0.60] and $b = 0.03$, $SE = .09$, $t(268) = -.29$, $p = .77$, 95% CI [-0.15, 0.20], respectively.

With regard to naturalness importance, neither the main effect nor interaction between naturalness importance and label condition were significant, $F(1, 259) = 0.88$, $p = .348$ and $F(1, 259) = 1.58$, $p = .210$. Hence, we did not find support for Hypothesis 3.

¹ Meat liking interacted significantly with label, $F(1, 259) = 11.933$, $p = .001$, $\eta_p^2 = .044$. We also found a significant main effect of meat liking, $F(1, 259) = 22.71$, $p < .001$, $\eta_p^2 = .081$. No significant main or interaction effects of age, gender, or political ideology emerged.

Figure 1.

Evaluations of clean and regular meat dishes at lower levels (at one standard deviation below the mean) and higher levels (at one standard deviation above the mean) of food technology neophobia in omnivores (N = 302, Experiment 1).



Note. *** $p < .001$

In sum, Experiment 1 showed that omnivores exhibited a bias against clean meat dishes yet, this label effect was qualified by a significant moderation by food technology neophobia. Only participants higher, but not those lower, in food technology neophobia evaluated clean (vs. regular) meat dishes less favorably.

3. Experiment 2

Experiment 2 examined evaluations of clean (vs. regular) meat in a sample of both meat eaters and meat abstainers (i.e., vegetarians and vegans). Furthermore, we included a third label condition to compare evaluations of clean meat dishes with both regular meat dishes and plant-based meat dishes. Whereas clean meat is physically analogous to regular

meat, plant-based substitutes are distinct, comprised of plant-based proteins (despite mimicking regular meat products such as sausages and burgers). We expected that omnivores would prefer regular meat over clean meat, and clean meat over plant-based meat (Hypothesis 4a), whereas veg*ns would prefer plant-based meat over clean meat, and clean meat over regular meat (Hypothesis 4b).

We further investigated the moderating roles of food technology neophobia and food naturalness importance. Although plant-based products are not necessarily less processed than regular meat products, consumers may perceive such products as healthier and more natural (Mäkineniemi & Vainio, 2014; Verain et al., 2015). Furthermore, those more interested in food naturalness may also be more inclined to purchase plant-based substitutes, which are oftentimes framed as more natural and sustainable (Tobler et al., 2011). As such, food naturalness importance may prove to be more relevant when comparing evaluations of clean with plant-based (rather than regular) meat dishes.

3.1. Methods

3.1.1. Participants. Participants ($N = 655$) were recruited through opportunity sampling on social media and received no financial compensation for partaking. Retaining only omnivores and veg*ns, 29 participants who identified as pescatarian or “other” were excluded (final $N = 626$). The main sample consisted of 21.8% men and 78.2% women, with a mean age of 36.41 years ($SD_{age} = 16.41$). Of this sample, 455 were omnivores (74.7% women; $M_{age} = 37.47$ years, $SD_{age} = 17.07$) and 171 were veg*n (87.8% women; $M_{age} = 33.35$ years; $SD_{age} = 14.45$). Participants were not asked for their nationality.

3.1.2. Design and Materials. Participants completed the same task as in Experiment 1, but in addition to the six images from Experiment 1 (three regular meat dishes and three clean meat dishes), we included three more images showing similar dishes with plant-based meat (see Online Supplement). Three dishes were labelled as clean meat, three as regular

meat, and three as plant-based meat. We used the same brief descriptions for clean and regular meat as in Experiment 1, while the plant-based meat dishes were described as “*made from plant-based meat alternatives*”.

Critically however, as in Experiment 1, in order to test the effect of dish labels (*clean vs. regular vs. plant-based meat*) while controlling for image content, the label assigned to each dish was counterbalanced such that each dish was presented as clean meat to one third of the participants, as regular meat to another third, and as plant-based meat to another third. After viewing each dish, participants completed the same four evaluative items as used in Experiment 1. For each label condition, these four items were averaged into a single score, which was then recoded such that higher scores indicate more favorable evaluations.

3.1.3. Measures. Food technology neophobia ($\alpha = .83$; $M = 4.19$, $SD = 0.84$) and food naturalness importance ($\alpha = .78$, $M = 4.49$, $SD = 1.25$), were measured as in Experiment 1. We also assessed meat liking ($\alpha = .92$, $M = 4.61$, $SD = 1.97$) and political ideology ($M = 3.25$, $SD = 1.42$) as in Experiment 1.

3.2. Data-analytic plan

First, we investigated the differences in dish evaluations between omnivores and veg*ns by conducting a mixed ANOVA with dish label (*clean vs. regular vs. plant-based*) as the within-subjects factor and diet (*omnivore vs. veg*n*) as the between-subjects factor. After establishing group differences, we proceeded by testing the label effect and the moderating role of food technology neophobia and food naturalness importance in both samples separately.

Specifically, following similar analytical procedures as for Experiment 1, we tested whether omnivores evaluated the dishes differently depending on the label condition by conducting a univariate ANOVA with label as the within-subjects factor. We followed up by

planned contrasts to test each specific comparison, allowing us to test Hypothesis 1 (regular vs. clean meat) and Hypothesis 4a (clean meat vs plant-based meat).

Next, we tested the moderating role of food technology neophobia and food naturalness importance (i.e., testing Hypotheses 2 and 3), by conducting an ANCOVA with label condition as the within-subjects factor, food technology neophobia and food naturalness importance as continuous predictors, as well as their interaction terms with label condition. Again, we included age, gender, political ideology, and meat liking as control variables (See Online Supplement Table A for results without controls). As in Experiment 1, we decomposed and probed significant interaction patterns, using the macro MEMORE in SPSS (Montoya, 2019), probing the effect of label condition on dish evaluation at lower levels (i.e., one standard deviation below the mean) and higher levels (i.e., one standard deviation above the mean) levels of food technology neophobia.

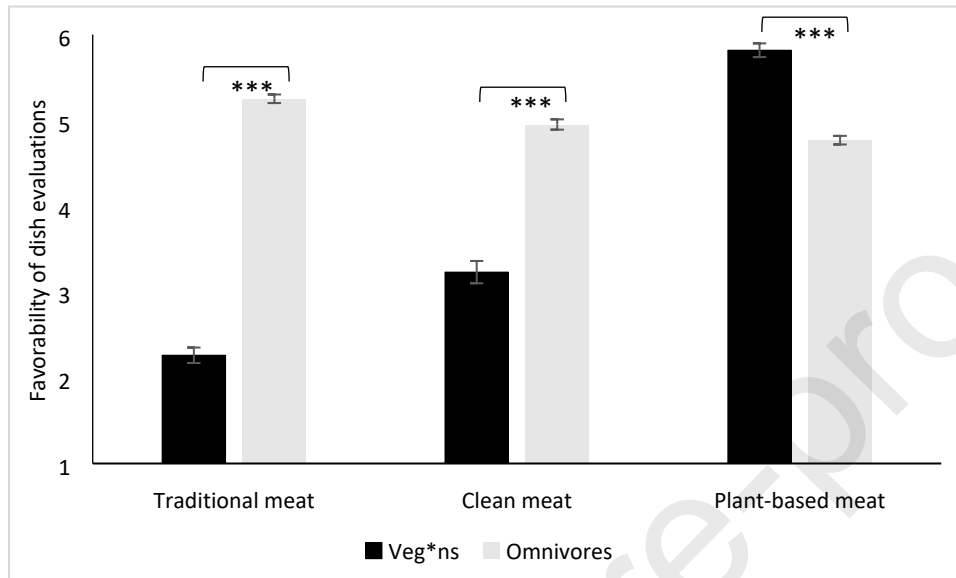
We then followed the same analytical procedures for the veg*n subsample.

3.3. Results

The mixed ANOVA showed main effects of dish label and dietary category, $F(2, 623) = 296.97, p < .001, \eta_p^2 = .49$ and $F(1, 624) = 208.40, p < .001, \eta_p^2 = .25$, respectively (see Figure 2). More importantly, these main effects were qualified by a significant interaction between label and diet, $F(2, 623) = 494.92, p < .001, \eta_p^2 = .61$. As expected, compared to veg*ns, omnivores evaluated regular meat and clean meat dishes more favorably, $F(1, 624) = 809.42, p < .001, \eta_p^2 = .57$, and $F(1, 624) = 194.21, p < .001, \eta_p^2 = .24$, respectively. Plant-based meat received more favorable evaluations from veg*ns than from omnivores, $F(1, 624) = 104.28, p < .001, \eta_p^2 = .14$. Having established these marked differences between dietary groups, we proceeded by testing the moderating role of food technology neophobia and food naturalness importance in both samples separately.

Figure 2.

Evaluations of clean and regular meat dishes for omnivores ($N = 455$) and for vegetarians and vegans (veg*ns; $N = 171$) (Experiment 2).



Note. *** $p < .001$

3.3. Omnivore subsample

As expected, the univariate ANOVA for the omnivores showed that the effect of label was significant, $F(2, 453) = 29.18, p < .001, \eta_p^2 = .11$. Omnivores rated dishes labelled as regular (vs. clean) meat more favorably, $F(1, 454) = 26.24, p < .001, \eta_p^2 = .06$, and rated images labelled as regular (vs. plant-based) meat more favorably, $F(1, 454) = 55.82, p < .001, \eta_p^2 = .11$. Furthermore, omnivores also evaluated dishes labelled as clean (vs. plant-based) meat more favorably, $F(1, 454) = 8.67, p = .003, \eta_p^2 = .02$.

Next, the ANCOVA analysis testing the moderating role of food technology neophobia and food naturalness importance, showed a significant main effect of food technology neophobia, $F(1, 437) = 41.38, p < .001, \eta_p^2 = .09$ and a significant interaction between food technology neophobia and label condition, $F(2, 436) = 10.29, p < .001, \eta_p^2 =$

.05. The main effect of food naturalness importance was also significant, $F(1, 437) = 4.89, p = .028, \eta_p^2 = .01$, as was the interaction between food naturalness importance and label condition, $F(2, 436) = 10.72, p < .001, \eta_p^2 = .05$.²

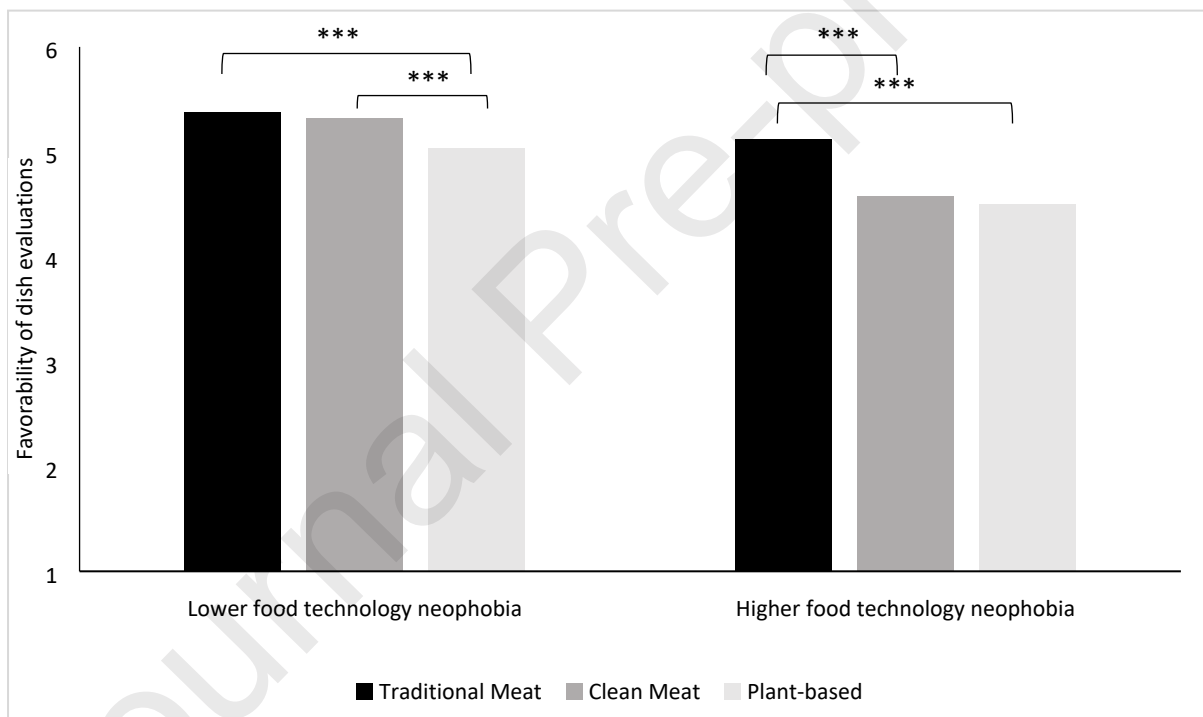
Following the data-analytic plan, we decomposed and probed these interaction patterns. The results are reported in Table 1 and presented in Figure 3, Panel A. Replicating Experiment 1, only omnivores higher (but not lower) on food technology neophobia evaluated clean (*vs.* regular) meat dishes less favorably. Furthermore, although both those higher and lower on food technology neophobia evaluated regular (*vs.* plant-based) meat dishes more favorably, this label effect was significantly stronger for those higher on food technology neophobia. Finally, food technology neophobia did not significantly moderate the difference in evaluations between clean meat and plant-based dishes (see Figure 3 Panel A and Table 1).

With respect to food naturalness importance, we found no moderation effect when comparing regular and clean meat dishes, consistent with Experiment 1. However, food naturalness importance significantly moderated the label effect when comparing clean and regular with plant-based dishes (see Figure 3, Panel B and Table 1). Only participants lower (but not higher) in food naturalness importance preferred dishes labelled as clean and regular meat over dishes labelled as plant-based meat.

² A significant main effect of meat liking emerged, $F(1, 437) = 38.00, p < .001, \eta_p^2 = .08$. Meat liking significantly interacted with label, $F(2, 436) = 17.88, p < .001, \eta_p^2 = .08$. Higher meat liking was associated with stronger label effects for each comparison: regular *vs.* clean meat label, $F(1, 437) = 6.36, p = .012, \eta_p^2 = .01$, regular *vs.* plant-based meat label, $F(1, 437) = 35.77, p < .001, \eta_p^2 = .03$ and clean *vs.* plant-based meat label, $F(1, 437) = 12.08, p = .001, \eta_p^2 = .03$. There were also significant main effects for age, $F(1, 437) = 17.56, p < .001, \eta_p^2 = .039$; political ideology, $F(1, 437) = 5.04, p = .025, \eta_p^2 = .01$. No significant interactions with gender, age, or political ideology emerged.

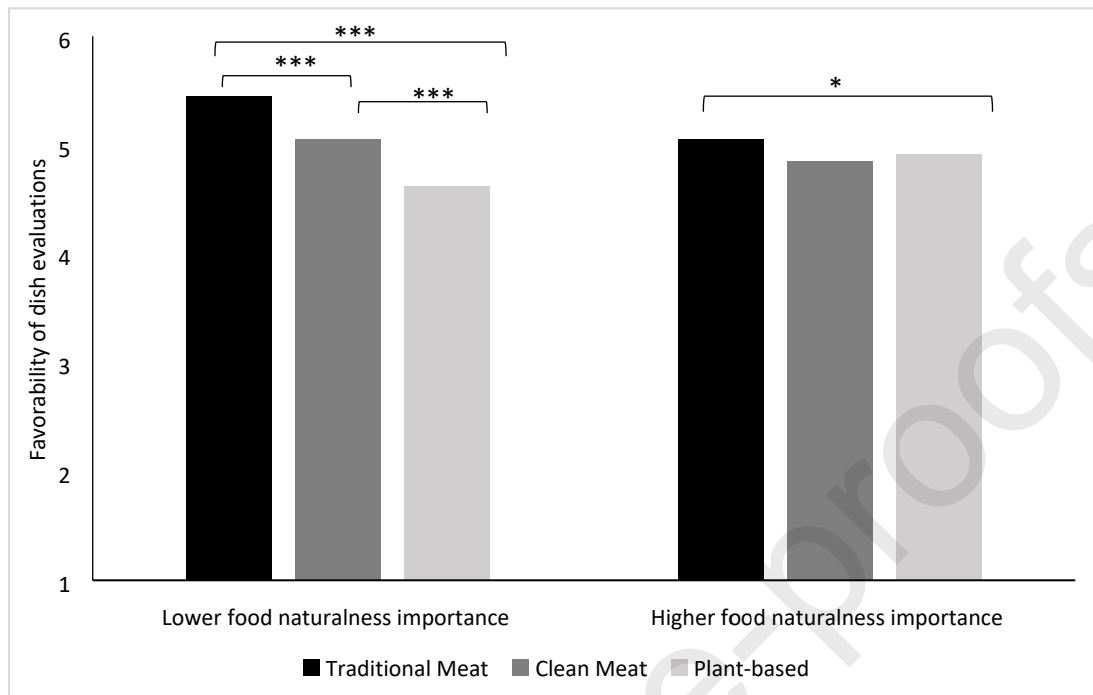
Figure 3.

Evaluations of regular, clean, and plant-based meat dishes lower levels (at one standard deviation below the mean) and higher levels (at one standard deviation above the mean) of food technology neophobia (Panel A) and food naturalness importance (Panel B) (Experiment 2, N = 455 omnivores).

Panel A

*Note. *** $p < .001$*

Panel B



Note. * $p < .05$, *** $p < .001$

Table 1. Results of the moderation analysis in the subsample of omnivores testing the effect of label condition on dish evaluation at lower levels (one standard deviation below the mean) and higher levels (one standard deviation above the mean) of food technology neophobia and food naturalness importance and their respective interactions (Experiment 2, $N = 455$ omnivores).

	Lower food technology neophobia					Higher food technology neophobia					Label X food technology neophobia interaction				
	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>
Regular (<i>vs.</i> clean)	0.06	.08	.68	.497	[-0.10, 0.22]	0.54	.08	6.70	<.001	[0.38, 0.70]	0.32	.08	4.25	<.001	[0.17, 0.47]
Regular (<i>vs.</i> plant-based)	0.34	.09	3.77	<.001	[0.16, 0.52]	0.62	.09	6.84	<.001	[0.44, 0.80]	0.18	.08	2.17	.03	[0.02, 0.35]
Clean (<i>vs.</i> plant-based)	0.29	.09	3.28	.001	[0.12, 0.46]	0.08	.09	.89	.375	[-0.09, 0.25]	-0.14	.08	-1.69	.091	[-0.30, 0.02]
	Lower food naturalness importance					Higher food naturalness importance					Label X food naturalness importance interaction				
	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>
Regular (<i>vs.</i> clean)	0.40	.08	4.79	<.001	[0.23, 0.56]	0.20	.08	2.47	.014	[0.04, 0.37]	-0.08	.05	-1.64	.10	[-0.17, 0.02]
Regular (<i>vs.</i> plant-based)	0.82	.09	9.31	<.001	[0.65, 0.10]	0.14	.09	1.58	.114	[-0.03, 0.31]	-0.28	.05	-5.46	<.001	[-0.38, -0.18]
Clean (<i>vs.</i> plant-based)	0.43	.09	4.97	<.001	[0.26, 0.60]	-0.06	.09	-.74	.46	[-0.23, 0.10]	-0.20	.05	-4.03	<.001	[-0.30, 0.10]

3.4. Veg*n subsample

Turning to the veg*n subsample, the univariate ANOVA showed that veg*ns also evaluated the dishes significantly differently depending on the label, $F(2, 169) = 431.19, p < .001, \eta_p^2 = .84$. As expected, veg*ns evaluated clean (*vs.* regular) meat dishes more favorably, $F(1, 170) = 94.11, p < .011, \eta_p^2 = .34$. They also evaluated plant-based dishes more favorably than regular and clean meat dishes, $F(1, 170) = 866.93, p < .001, \eta_p^2 = .84$ and $F(1, 170) = 389.17, p < .001, \eta_p^2 = .70$, respectively.

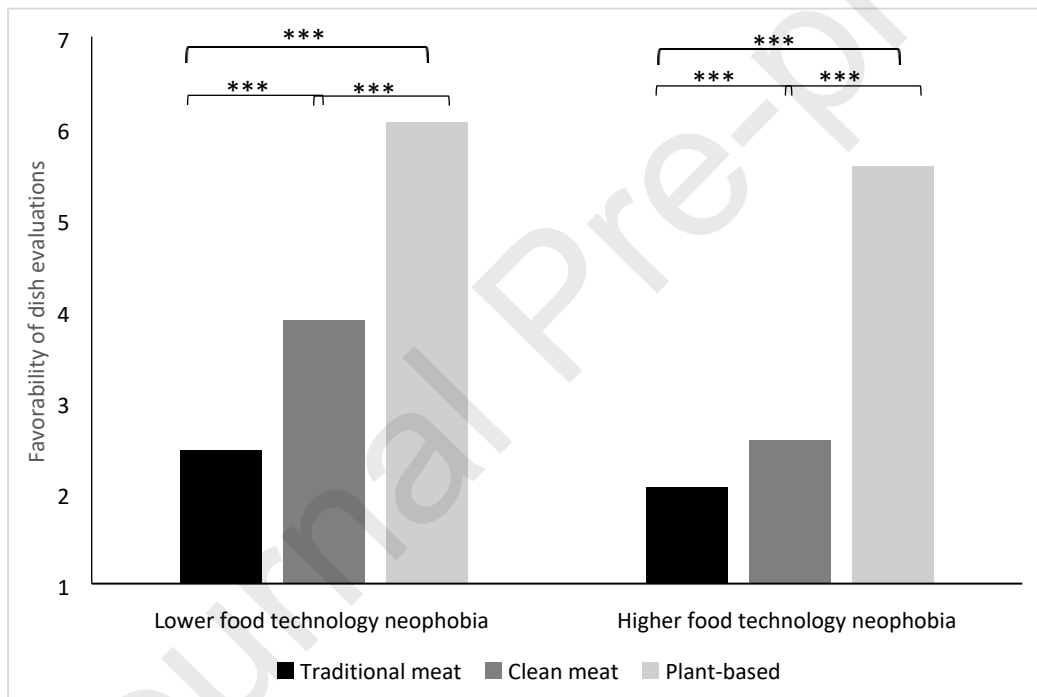
Testing the moderating role of food technology neophobia and naturalness importance in the veg*n subsample showed a significant main effect of food technology neophobia, $F(1, 156) = 17.18, p < .001, \eta_p^2 = .10$, and a significant interaction between food technology neophobia and label condition, $F(2, 155) = 8.34, p < .001, \eta_p^2 = .10$.³ Decomposing the interaction pattern to test the label effect at lower and higher levels of food technology (Table 2 and Figure 4) showed that veg*ns lower on food technology neophobia showed more favorable evaluations for clean (*vs.* regular) meat, with this effect being significantly weaker among veg*ns higher on food technology neophobia. Furthermore, although veg*ns at both higher and lower levels of food technology neophobia evaluated plant-based (*vs.* clean) dishes more favorably, this label effect was significantly stronger among those higher (*vs.* lower) on food technology neophobia.

³ An interaction between meat liking and label condition also emerged, $F(2, 155) = 17.12, p = .005, \eta_p^2 = .18$, and between ideology and label condition, $F(2, 155) = 5.53, p = .005, \eta_p^2 = .07$. Higher meat liking was associated with larger label effects for regular *vs.* plant-based meat, $F(1, 156) = 34.07, p < .001, \eta_p^2 = .18$ and for plant-based *vs.* clean meat, $F(1, 156) = 17.83, p < .001, \eta_p^2 = .10$. More conservative ideology was associated with larger label effects for regular *vs.* plant-based meat $F(1, 156) = 9.97, p = .002, \eta_p^2 = .06$ and for plant-based *vs.* clean meat, $F(1, 156) = 8.16, p = .005, \eta_p^2 = .05$. Furthermore, the main effects of age and meat liking were significant, $F(1, 156) = 5.46, p = .021, \eta_p^2 = .03$, and $F(1, 156) = 50.27, p < .001, \eta_p^2 = .24$ respectively.

The main effect of food naturalness importance and its interaction with label condition were not significant, $F(1, 156) = 0.66, p = .418$ and $F(2, 155) = 0.62, p = .542$.

Figure 4.

Evaluations of clean and regular meat dishes for vegetarians and vegans at lower levels (one standard deviation below the mean) and higher levels (one standard deviation above the mean) of food technology neophobia (Experiment 2, $N = 171$ vegetarians and vegans).



Note. *** $p < .001$

Table 2. Results of the moderation analysis in the sample of vegetarians and vegans testing the effect of label condition on dish evaluation at lower levels (one standard deviation below the mean) and higher levels (one standard deviation above the mean) of food technology neophobia and food naturalness importance and their respective interactions with label condition (Experiment 2, $N = 171$ vegetarians, and vegans).

	Lower food technology neophobia					Higher food technology neophobia					Label X food technology neophobia interaction				
	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>
Regular (<i>vs.</i> clean)	-1.42	.13	-10.65	<.001	[-1.68, -1.16]	-0.52	.13	-3.90	<.001	[-0.78, -0.26]	0.46	.10	4.77	<.001	[0.27, 0.65]
Regular (<i>vs.</i> plant-based)	-3.59	.17	-20.93	<.001	[-3.93, -3.25]	-3.52	.17	-20.53	<.001	[-3.86, -3.18]	0.03	.12	.28	.779	[-0.21, 0.28]
Clean (<i>vs.</i> plant-based)	-2.17	.18	-12.01	<.001	[-2.53, -1.81]	-3.00	.18	-16.61	<.001	[-3.36, -2.65]	-0.42	.13	-3.25	.001	[-0.68, 0.17]

3.5. Discussion Experiment 2

Replicating Experiment 1, omnivores evaluated dishes labelled as regular (*vs.* clean) meat more favorably (Hypothesis 1), yet this was only the case for those higher (not lower) in food technology neophobia (Hypothesis 2). Again, we found no support for the moderating role of naturalness importance in the evaluation of regular (*vs.* clean) meat dishes. However, food naturalness importance did play a role when considering plant-based dishes. Specifically, whereas those lower on food naturalness evaluated dishes labelled as regular and clean meat more favorably than plant-based dishes, no such label effects occurred among those higher on food naturalness importance.

Furthermore, confirming Hypothesis 4a, omnivores evaluated dishes labelled as regular meat more favorably than veg*ns, and veg*ns evaluated dishes labelled as plant-based meat more favorably than omnivores. Within the veg*n sample, plant-based meat was favored over clean meat, which in turn was favored over regular meat, confirming Hypothesis 4b. Furthermore, food technology neophobia (but not food naturalness importance) moderated the label effect of clean meat relative to both regular and plant-based meat with more negative evaluations of clean meat dishes among those higher (*vs.* lower) on food technology neophobia (see Figure 4).

4. Experiment 3

In Experiment 3, we asked *why* omnivores higher on food technology neophobia evaluate clean meat differently than regular meat. Specifically, we measured participants' perceptions of safety and naturalness of the clean and regular meat dishes and tested perceived safety and naturalness as mediators of the interaction effect between label (clean *vs.* regular meat) and food technology neophobia (higher *vs.* lower) on the evaluations of the dishes. Although we measured food naturalness importance in this experiment, we did not

expect that food naturalness importance would play a substantial moderating role based on Experiments 1 and 2.

4.1. Methods

4.1.1. Participants. Participants ($N = 312$) were recruited through the crowdsourcing platform Prolific and received financial compensation (£0.73). Retaining only omnivores, 39 participants who identified as vegetarian, vegan, or pescatarian were excluded (final $N = 273$). The sample consisted of 56.1% men and 43.9% women, with a mean age of 28.19 years ($SD_{age} = 9.36$). Most participants were from the EU (57.4%), the UK (18.7%), and the USA (6.7%).

4.1.2. Design and Materials. The design and procedure were identical to Experiment 1. However, in addition to evaluating clean and regular meat dishes, participants also rated the naturalness and safety of the dishes on a 7-point scale, ranging from 1 (*Looks extremely unnatural*) to 7 (*Looks extremely natural*) and ranging from 1 (*Seems extremely unsafe*) to 7 (*Seems extremely safe*) respectively.

4.1.3. Measures. Food technology neophobia ($\alpha = .83$; $M = 3.99$, $SD = 0.89$) and food naturalness importance ($\alpha = .70$, $M = 4.20$, $SD = 1.11$) were measured as in Experiment 1. We also assessed meat liking ($\alpha = .82$, $M = 6.02$, $SD = 1.00$) and political ideology ($M = 3.13$, $SD = 1.41$) as in Experiment 1.

4.2. Data-analytic plan

First, identical to Experiment 1, we tested whether participants evaluated dishes labelled as regular meat more favorably than dishes labelled as clean meat (i.e., ANOVA). Next, also as in Experiment 1, we tested the moderating role of food technology neophobia and food naturalness importance (i.e., ANCOVA), and for significant interactions we probed the label effect plus and minus one standard deviation from the mean of the moderator.

In the second set of analyses, we included the scores of perceived safety and perceived naturalness in the analyses. First, we tested whether the dishes were evaluated differently in terms of perceived safety and perceived naturalness by conducting univariate ANOVAs with dish label (clean *vs.* regular meat) as the within-subjects factor.

Next, we tested whether the differential perceptions of safety and naturalness for regular versus clean meat explain (i.e., mediate) the effect of dish label on dish evaluation for those higher but not for those lower on food technology neophobia. Specifically, we tested a mediated moderation model for within-subject designs in Mplus (Version 8; Muthén & Muthén, 1998–2011) following the analytic procedures described by Montoya (2018). In other words, we tested the effect of label condition (regular *vs.* clean meat) on perceived safety and naturalness (i.e., the mediators), which in turn were associated with dish evaluation (i.e., the outcome variable). Food technology neophobia was included as a moderator of the label effect on both mediators and the outcome variable. This allowed us to test for the conditional indirect effect of label condition at lower levels (i.e., one standard deviation below the mean) and higher levels (i.e., one standard deviation above the mean) on dish evaluations via perceived safety and naturalness. Age, gender, political ideology, and meat liking were included as control variables. We expected a significant indirect effect of dish label (regular *vs.* clean meat) on dish evaluation via perceived safety or naturalness for those higher but not those lower on food technology neophobia. This would indicate that the less favorable evaluations of clean meat for omnivores higher on food technology neophobia are partly explained because they perceive clean meat to be less safe or less natural (or both) than regular meat.

4.3. Results

4.3.1. Evaluation of Dishes, Food Technology Neophobia and Naturalness Importance

First, the univariate ANOVA testing the label effect replicated the previous experiments. Dishes labelled as regular (*vs.* clean) meat were evaluated more favorably (see Table 3).

Next, further entering food technology neophobia and food naturalness importance as continuous predictors, as well as their interaction terms with label condition, revealed a main effect of food technology neophobia, $F(1, 264) = 6.68, p = .010, \eta_p^2 = .025$, and an interaction between food technology neophobia and label condition, $F(1, 264) = 6.65, p = .010, \eta_p^2 = .025$. Decomposing the moderation effect of food technology neophobia confirmed Hypothesis 2: only those higher but not those lower on food technology neophobia evaluated clean (*vs.* regular) meat less favorably, $b = 0.40, SE = .08, t(271) = 5.16, p < .001, 95\% CI [0.24, 0.55]$ and $b = 0.07, SE = .08, t(271) = .93, p = .35, 95\% CI [-0.08, 0.22]$, respectively.

In line with the previous two studies, the main effect of food naturalness importance and its interaction with label condition were not significant, $F(1, 264) = 0.01, p = .932$ and $F(1, 264) = 0.89, p = .346$, respectively.⁴

4.3.2. Perceived Safety and Naturalness

The ANOVAs examining whether the dishes were evaluated differently in terms of perceived safety and perceived naturalness showed that regular meat was perceived as safer and more natural than clean meat (see Table 3).

⁴ We also found a significant main effect of meat liking, $F(1, 264) = 35.78, p < .001, \eta_p^2 = .12$, and a main effect of age, $F(1, 264) = 4.36, p = .038, \eta_p^2 = .016$.

Table 3. Dish evaluations, perceived safety, and perceived naturalness ratings for each type of meat and results of the ANOVAs testing for differences between conditions (Experiment 3, $N = 312$ omnivores).

	Regular meat	Clean meat	Difference
	$M (SD)$	$M (SD)$	$F(1,272)$
Dish evaluation	5.50 (0.87)	5.26 (0.91)	$F = 18.06, p < .001, \eta_p^2 = .062$
Perceived safety	5.37 (1.06)	5.17 (1.07)	$F = 10.54, p = .001, \eta_p^2 = .037$
Perceived naturalness	4.80 (1.14)	4.65 (1.14)	$F = 4.82, p = .029, \eta_p^2 = .017$

Note. Dish evaluations range from 1 to 7, with higher scores indicating more favorable evaluation. Perceived naturalness was measured on a 7-point scale, ranging from 1 (*Looks extremely unnatural*) to 7 (*Looks extremely natural*). Perceived safety was measured on a 7-point scale, ranging from 1 (*Seems extremely unsafe*) to 7 (*Seems extremely safe*).

The test of the mediated moderation model confirmed that clean (*vs.* regular) meat was evaluated as significantly less safe and less natural, $b = 0.21, SE = .06, p = .001$ and $b = 0.15, SE = .07, p = .026$, respectively, in line with the ANOVA results. With respect to dish evaluations, the results confirmed that clean (*vs.* regular) meat was evaluated as significantly less favorably, $b = 0.13, SE = .04, p = .004$. Furthermore, both mediators (*i.e.*, differential safety and naturalness perceptions) were significantly associated with dish evaluations, $b = 0.41, SE = .05, p < .001$ and $b = 0.16, SE = .05, p = .001$, respectively.

Critically, however, food technology neophobia significantly moderated the label effect on perceived safety, $b = 0.17, SE = .07, p = .025$, but not on perceived naturalness, $b = 0.02, SE = .08, p = .853$. Specifically, those higher in food technology neophobia perceived clean meat as less safe than regular meat, $b = 0.36, SE = .09, p = .001$, whereas no such label effect on perceived safety was found for those lower in food technology neophobia, $b = 0.06, SE = .09, p = .527$. The label effect on perceived naturalness was non-significant for those

both higher and lower in food technology neophobia $b = 0.16$, $SE = .10$, $p = .098$ and $b = 0.13$, $SE = .10$, $p = .166$, respectively.

Consequentially, the findings revealed a significant mediated moderation effect on dish evaluations via perceived safety, $b = 0.07$, $SE = .03$, $p = .031$, but not via perceived naturalness, $b = 0.002$, $SE = .01$, $p = .853$. Estimating the conditional indirect effect of label condition on dish evaluation via perceived safety confirmed that only those higher on food technology neophobia evaluated clean (vs. regular) meat dishes as less favorably, through lower safety perceptions of clean (vs. regular) meat, indirect effect = 0.15, $SE = .04$, $p < .001$. No such indirect effect was found for those lower in food technology neophobia, indirect effect = 0.02, $SE = .04$, $p = .528$.

In sum, Experiment 3 showed that those higher (but not those lower) on food technology neophobia rated clean meat as less safe than regular meat, which further explained (mediated) in part why they evaluated clean meat dishes as less favorable.

5. General Discussion

Three studies demonstrated that on average, omnivores preferred dishes labelled as regular (vs. clean) meat over dishes despite controlling for the objective attractiveness and appeal of the presented dishes by using identical photos across conditions (i.e., counterbalancing the labels). Critically however, this label effect was further qualified by participants' levels of food technology neophobia (Experiments 1-3). Only participants higher, but not those lower, in food technology neophobia felt less favorable toward clean meat as compared to regular meat. Further in line with this finding, safety concerns, but not naturalness concerns, explained (i.e., mediated) why those who express greater resistance against new food technologies are also less willing to try clean meat and exhibit stronger doubts and skepticism about its taste and smell (Experiment 3).

Omnivores also preferred regular meat over plant-based meat (Experiment 2), yet again, this effect was moderated by food technology neophobia such that omnivores higher on food technology neophobia seemed particularly skeptical about the taste and smell of plant-based meat alternatives and were less willing to try such dishes. Moreover, food technology neophobia was also implicated in the evaluation of clean meat among veg*ns (Experiment 2). Indeed, although a strong overall preference for plant-based meat over clean meat was observed among veg*ns, veg*ns higher (vs. lower) on food technology neophobia were much less accepting of clean meat.

We had also reasoned that omnivores who are more concerned about food naturalness would be more negative about clean meat than about regular meat, yet we did not obtain support for this idea. Hence, the role of food naturalness importance is less clear and only played a role when comparing clean meat with plant-based meat among omnivores such that those lower, but not those higher, on food naturalness importance rated regular and clean meat more favorably than plant-based meat.

Taken together, the findings highlight that both for omnivores and veg*ns, concerns about new food technologies rather than general preferences for natural food products are implicated in their evaluations of clean meat. Importantly, by using the same sets of photos of familiar dishes in all conditions, our experimental design is unique compared to past studies, which typically only presented written descriptions of clean meat. Indeed, our design allowed for a direct test of labelling dishes as clean meat compared to regular meat by keeping the visual appearance of the dishes constant between conditions. The use of images also avoids the possible problem that participants can only think of clean meat in abstract terms when reading about clean meat, while they can easily visualize regular meat dishes in concrete terms without photos. By avoiding such confounds, our studies provide convincing evidence

that labelling dishes as clean meat significantly affects people's evaluations of the dish, at least among those higher on food technology neophobia.

5.1. Food Technology Neophobia and Naturalness

Our studies are the first to demonstrate the predictive role of food technology neophobia in the context of clean meat acceptance. Indeed, food technology neophobia has largely been overlooked in previous work on clean meat yet has been shown to be an important predictor for negative attitudes towards foods produced using novel technologies, such as genetic modification, pasteurization, and nanotechnology, and for foods enriched with bioactives (e.g., Kim et al., 2014; Matin et al., 2012; Vidigal et al., 2015). Our experiments extend previous findings by showing that attitudes toward clean meat and its perceived safety can reliably be predicted by concerns about novel food technologies.

The findings also remind us of the effect of a related yet distinct concept. Specifically, Wilks and colleagues (2019) reported that fear of novel foods (i.e., food neophobia) predicted lower willingness to try clean meat. Although food neophobia is relevant in the study of clean meat, food technology neophobia can be considered a more proximal construct, referring to the essence of clean meat, not just as a novel food item, but as a food item produced using novel technologies (e.g., Cox & Evans, 2008). This distinction is important because different types of concerns may underpin fear of novel food and fear of food produced with novel technologies and thus, likely require different strategies for consumer acceptance of clean meat.

Previous work highlighted that naturalness concerns pose a substantial barrier to the acceptance of clean meat (e.g., Siegrist et al., 2018; Siegrist & Sütterlin, 2017), with those who strongly value food naturalness being less willing to eat it (Michel & Siegrist, 2019). However, our studies did not reveal unique effects of naturalness importance when comparing ratings of regular and clean meat. A possible explanation for this discrepancy

could be that previous research designs did not allow for direct comparisons between clean and regular meat, making it difficult to identify the unique psychological barriers to clean meat acceptance. Moreover, although higher perceived naturalness ratings were significantly related to more positive evaluations of the dishes, the difference in naturalness perceptions between the clean relative to the regular meat dishes was rather small, indicating that naturalness concerns are implicated in the evaluations of both types of meat.

5.2. Limitations and Future Directions

Before closing some limitations should be acknowledged. First, we used the term ‘clean’ meat, which tends to be associated with more positive evaluations of the product compared to other labels such as ‘cultured’, ‘in vitro’, or ‘lab-grown’ meat (Bryant & Barnett, 2019; Siegrist et al., 2018). We thus used one of the more positive labels to avoid strong negative effects induced by the label alone. Despite the more positive label, participants higher on food technology neophobia still felt less favorable towards clean meat. However, future research could test the effects of different labels and ways of framing. Using other labels or for instance high-tech framings may lead to even stronger negative evaluations among those higher in food technology neophobia, and potentially also among those lower in food technology neophobia (e.g., Bryant & Barnett, 2019; Siegrist & Sütterlin, 2017). Furthermore, future research could manipulate safety perceptions to test if framing clean meat as safer would have a positive effect on clean meat evaluations and erase the differences in evaluations between clean and regular meat for those high on food technology neophobia.

Relatedly, given our focus on food technology neophobia and naturalness importance we measured perceived safety and naturalness in response to the dishes. However, previous research (e.g., Siegrist et al., 2018) has also identified disgust as a barrier to clean meat acceptance and future research could investigate disgust reactions alongside perceived

naturalness and safety to test whether those higher on food technology neophobia would also show stronger disgust reactions when evaluating clean meat dishes.

The possible effects of framing and providing additional information also suggest that participants who have less knowledge about or are less familiar with the products might be more reactive to those manipulations. With respect to clean meat, those who are more knowledgeable about clean meat might have fewer concerns about possible negative health effects or its nutritional quality (Bryant & Dillard, 2019; Gómez-Luciano et al., 2019; Shaw & Iomaire, 2019; Zhang et al., 2020). Along similar lines, those who are more familiar with plant-based meat alternatives are likely more favorable towards them. We did not measure participants' knowledge of and familiarity with these food products. Therefore, taking into account a wider range of variables (for a review, see Onwezen et al., 2021), including psychological factors (e.g., attitudes and feelings), social-cultural factors (e.g., social norms) as well as product-related attributes (e.g., familiarity, perceived health and ethical benefits) in future research is needed to establish food technology neophobia as a unique predictor of clean meat acceptance.

Lastly, the key findings concerning the comparison between clean and regular meat dishes were consistently found across studies, including in two samples that were fairly balanced in terms of gender (Experiment 1 and 3). However, we only included a condition presenting plant-based meat alternatives in Experiment 2, where the sample constituted a majority of women (74.7%). Hence, it would be valuable to replicate the findings pertaining to plant-based meat using more gender-balanced samples.

5.3. Conclusions

Our experiments provide new insights into consumer perceptions of clean meat by revealing that fears of novel food technologies pose a key psychological barrier to clean meat acceptance. Strategies that focus on reducing anxiety around the use of new technologies and

increasing its perceived safety may go a long way in effectively increasing clean meat acceptance.

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Highlights

- Higher food technology neophobia predicts more negative evaluations of clean (vs. traditional) meat
- Food naturalness less important in predicting attitudes toward clean (vs. traditional) meat
- Safety concerns, but not naturalness concerns, explained negative evaluations of clean meat