Food essentialism is associated with perceptions of plant-based meat alternatives possessing properties of meat-based products

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Abstract

A transition to greater plant-based protein consumption is recognized as a necessity for planetary and human well-being. A critical driver of acceptance of plant-based meat alternatives (PBMAs) is perceived similarity in their sensory and nutritional profiles with conventional animal-based meat. Consumers vary in food essentialism - beliefs that categories of foods have innate and immutable 'essences' that are responsible for their shared properties. Here, we examined whether food essentialism is associated with perceptions that PBMAs share similar properties as the animal-based products they replicate. Participants (N=298) rated two animal-based food items (beef burger and canned tuna) and two corresponding PBMAs (plant-based burger and tuna) on perceived processing, naturalness, nutritiousness, taste (like beef or fish), typical health benefits, and liking. Participants holding higher (vs. lower) food essentialism beliefs rated PBMAs as less processed, more natural, tasting more like beef (plant-based burger only), possessing greater health benefits of the animal-based products, and as more liked (plant-based tuna only). These relationships between food essentialism and perceived food properties were observed more consistently for PBMAs than their animal-based counterparts. Beliefs that food items from a common category, such as beef, share similar essences and properties may extend to PBMAs despite their non-animal origins. Given the challenges in developing PBMAs that adequately replicate the taste, texture, and nutritional properties of meat, targeting intuitions that guide perceived similarities of PBMAs and meat, like food essentialism, may be a promising approach for supporting the protein transition.

1. Introduction

Ensuring the sustainability and security of future food systems requires reduced production and consumption of meat, especially beef. Plant-based meat alternatives (PBMAs) may support transitioning to substantially reduced meat consumption given that they allow substitution rather than removal of conventional and familiar animal meat-based products and cuisines. Plant-based diets dominated by plant and fungal proteins use 96% less land, 99% less water and produce up to 98% less CO_2 (Chapman, 2024b; Saerens et al., 2021). Yet concerns that PBMAs are unnatural or ultra-processed may increase consumer resistance to adopting PBMAs (Onwezen et al., 2021) and risk derailing efforts to shift consumers to more sustainable foods (Chapman, 2024a). These concerns may outweigh the notable sustainability benefits and act as a barrier to consumer adoption of more sustainable diets. Promoting transition to PBMAs requires understanding the barriers to their acceptance by consumers. While many consumer-level expectations and attitudes have been examined as potential drivers of consumer acceptance of alternative protein products, including PBMAs (Giacalone et al., 2022; Onwezen et al., 2021), the reasons for individual variability in these responses remain unclear.

Consumer research has shown that a major barrier to accepting novel PBMA's is they are often perceived as highly processed and unnatural (Siegrist & Hartmann, 2020; Tso et al., 2021). Concerns about the role of food processing's impact on health have also escalated in recent years with the introduction of the NOVA scheme to classify foods (Monteiro et al., 2019), which is a socio-political framework that categorizes food according to the extent of processing irrespective of nutrient profiles or how healthy it is (Chapman, 2024b). Most PBMA's are classified as NOVA 4 and described as 'ultra-processed' (UPF). Characterizing plant-based foods as ultra-processed

risks stigmatizing their consumption and may make lead people to feel that despite being sustainable, meat alternatives are not as natural, nutritious, or healthy as animal-based foods.

We propose that a promising yet overlooked determinant of consumer perceptions and acceptance of PBMAs (and alternative proteins more generally) is the extent to which people believe that human intervention, such as food processing alters the fundamental properties of the original food. Food essentialism is the assumption that categories of foods share innate, immutable, and unseen underlying essences that are responsible for their identity and defining properties (Cheon et al., 2024). For instance, someone with strong food essentialist beliefs may assume that cattle, and the beef products produced from their meat (e.g., steaks, hotdogs, soup stock), share an immutable beef essence. Hence, these products are more likely to be perceived as sharing sensory and nutritional properties associated with beef regardless of how these different beef products have been processed or prepared. Recent studies (Cheon et al., 2024) supported this theory by demonstrating that consumers who hold higher (compared to lower) food essentialist beliefs perceived more processed food items as maintaining more naturalness, nutritiousness, taste, health benefits, and acceptability (liking). Notably, these patterns were found across a diverse range of food categories, including animal products (beef, chicken, fish, and dairy) and plants (carrots, cabbage, orange, peanuts, rice), suggesting that the relationship between essentialism and perceptions of food properties extends across food categories. Another recent study has applied the concept of essentialism to foods and demonstrated that consumers who believe fruits and vegetables have immutable properties were more accepting of misshapen produce (Gomez et al., 2024).

Essentialist beliefs could also guide consumers' perceptions of PBMAs. One possibility is that higher food essentialism is associated with lower perceived similarities between PBMAs

and the meat-based products they imitate, since they are perceived to originate from distinct categories (plants vs. animals) with distinct essences. However, it may instead be more likely that higher food essentialism is associated with *greater* perceived similarities between PBMAs and corresponding meat-based products. Consumers may not be mindful of explicit scientific knowledge that two food items do not originate from the same category when relying on lay intuitions, such as food essentialism. For example, those endorsing higher (compared to lower) food essentialism beliefs perceived orange soda, which may have no orange juice in it, as being more natural and possessing properties of orange (Cheon et al., 2024). If food essentialism is based on assumptions that foods belonging to the same category (e.g., beef steak and beef stock cubes) share similar sensory and nutritional properties due to having the same immutable essence (e.g., beef), then those endorsing greater food essentialism may also be more likely to assume that foods with similar appearance and taste (e.g., meat- and plant-based burgers) are also more likely to share a similar essence despite originating from two distinct categories (e.g., beef and plants).

Support for this prediction comes from research on magical thinking, which describes heuristics that guide beliefs about the world in the absence of, or in contradiction to, scientific knowledge. Specifically, the *law of similarity* of magical thinking represents an intuition in which "appearance equals reality," such that items that resemble one another are assumed to have similar properties and effects (Rozin & Nemeroff, 2002). For instance, this intuition explains why people are reluctant to consume fudge that has been knowingly shaped to resemble feces or consume sugar from a jar knowingly mislabeled as cyanide (Rozin et al., 1986). Recent findings have indicated that the *law of similarity* may be based on beliefs about essences. Products that closely resemble a person by having their photograph integrated on them (e.g.,

115 napkins, candy) are perceived to share that individual's essence to a greater extent than products
116 that bear only their names (Wu et al., 2024). Likewise, appearance may also be assumed to equal
117 reality for PBMAs among perceivers who tend to rely on essentialist assumptions about food.
118 Such individuals may be more likely to expect that PBMAs that have been processed to look and
119 taste like a specific meat-based product share similar essences and properties as the meat-based
120 product.

121 Perceived or expected similarities between alternative protein products and the meat-
122 based products they imitate have been identified as an important driver of acceptance of
123 alternative proteins (Giacalone et al., 2022). Taste is considered one of the most influential
124 determinants of consumers' willingness to adopt alternative proteins (Onwezen et al., 2021), such
125 that some advocate that efforts to promote adoption of PBMAs should prioritize increasing their
126 sensory similarities to meat over their ethical appeal (Hoek et al., 2011). Research with focus
127 groups in multiple countries has suggested that expectations and concerns related to taste may be
128 a major barrier to consuming plant-based meat substitutes, like demand for these products to
129 have similar tastes and textures as meat, and having more natural flavors (e.g., less tastes of
130 additives) (Weinrich, 2018). Lower consumption of PBMAs is also associated with greater
131 demand for these products to have similar sensory characteristics (e.g., taste, texture, smell) of
132 meat (Hoek et al., 2011).

133 In addition to similar sensory attributes, consumers' expectations that PBMAs are as
134 nutritious as traditional meat products may also influence PBMA acceptance. For example,
135 regular meat consumers (compared to vegetarians and vegans) believe that eating meat is healthy
136 and is a necessary component of human diets (Piazza et al., 2015). To consume a meat substitute
137 product regularly, consumers demand that its nutritional profile resemble that of the original

animal product. This includes having high levels of protein and healthy attributes like low calories and high vitamins and minerals (Hoek et al., 2011). Thus, the perception that PBMAs share similar nutritive and stereotypical health benefits as meat may also increase their acceptance. If food essentialism contributes to the belief that foods that look and taste alike have shared essences, then individuals who maintain stronger food essentialism beliefs may also perceive PBMAs as sharing more of the sensory, nutritional, and acceptable properties of traditional meat-based products that they imitate.

Present Study

Here, we tested whether individuals' beliefs in food essentialism are associated with their perceptions of PBMAs, and also whether individuals perceive that PBMAs are similar to their meat-based counterparts. We hypothesized that participants that hold higher food essentialism beliefs will perceive PBMAs as possessing higher levels of properties associated with the meats they imitate (Hypothesis 1). Specifically, we predict that those endorsing higher (vs. lower) food essentialism will rate PBMAs as being less processed, more natural, more nutritious, tasting more like the target meat, retaining more stereotypical health properties associated with the target meat, and as more likable.

Second, we hypothesized that food essentialism will be a stronger determinant of perceived properties of an unfamiliar PBMA product compared to a more familiar PBMA product (Hypothesis 2). Lay theories like essentialism may be relied on more when individuals lack prior knowledge in a domain. For instance, lower nutrition knowledge is associated with greater endorsement of food essentialism (Cheon et al., 2024). Consumers who are not familiar with a novel PBMA may rely more on food essentialism to inform their judgments of the food.

In the present study, participants evaluated two separate PBMA products that differed on familiarity; plant-based burgers (Impossible Burger, Impossible Foods) and plant-based tuna (Vuna, Nestle). Plant-based burgers were more familiar since they had been advertised and sold in the local market for longer, while plant-based tuna was not readily available in the local market at the time of this study.

2. Methods

2.1. Participants

Three hundred Singaporean adults were recruited for an online survey from the community by the market/consumer research company Dynata. The original recruitment consisted of 471 participants. A total of 171 participants were excluded from analyses due to: incomplete surveys (16), suspicious responses like straight-lining Likert scale ratings, especially those involving reverse-coded questions (143), completing the survey faster than 10 minutes (9), and other reasons (e.g., refusing to consent to the survey) (3). Two additional participants were excluded from analyses due to being outliers for having high Food Essentialism Survey scores. This left a final analytic sample of 298 participants (145 females, 243 Chinese, 23 Malay, 18 Indian, 14 'other' race; Mean Age=42, SD Age=12). Power analysis for a mixed 2 (high or low essentialism) x 2 (plant- or meat-based burger) x 2 (plant- or meat-based tuna) mixed ANOVA assuming a small-to-medium effect size of f= .15, alpha of .05, power of .80, and assumed correlation between repeated measures of .50 revealed a required estimated sample size of 264 participants (Faul et al., 2009). This research was approved by the institutional review board of a Singaporean university.

184 *2.2. Procedures and Measures*

185 Data for the present study came from the same study described in Study 2 of Cheon, Tan,
186 & Forde (2024), which sought to test whether food essentialism was associated with the
187 perception of more highly processed foods as retaining more of their natural properties. Detailed
188 descriptions of the procedures and battery of measures in the online survey is covered in that
189 article.

190 After providing informed consent, participants were presented with images food items
191 from 5 different food categories: orange, fish, beef, napa cabbage, and peanut. Food images were
192 modified so that any text on their packages (for pre-packaged items) that could influence ratings
193 of the food's properties were digitally removed, such as claims about naturalness or nutritional
194 content. Each food category consisted of 7 food items with increasing levels of processing (e.g.,
195 ranging from sashimi to fish fingers for the category of fish). Items within each food category
196 were presented one-by-one in a randomized order and each item was rated on the following
197 properties using a 100-point visual analogue scale: nutritiousness (*How nutritious is this food?*),
198 naturalness (*How natural is this food?*), degree of processing of the food (*How processed is this*
199 *food?*), how much the food "tastes" like the category (*How much does this food taste like fish?*),
200 a stereotypical health property of the category (i.e., *How good is this food for heart health?*),
201 familiarity (*How familiar are you with this food?*), and liking of the food (*How much do you like*
202 *this food?*). After rating all the food items, participants completed the same ratings for a
203 supplemental food item from the categories of beef and fish, which represented PBMAs. The
204 PBMA items were labeled as plant-based beef and plant-based tuna, and featured images of a
205 hamburger with the logo of *Impossible Burger* (Impossible Foods) pinned to the bun and a jar of
206 *Vuna* (Nestle), respectively (Figure 1).

Following the ratings of food items, participants completed the Food Essentialism Scale (FES), which measures individual differences in assumptions of foods as having innate and immutable essences that may provide food its functional characteristics (Cheon et al., 2024). Participants rated 8 items that assess the extent to which a fundamental and unique property of food ('nutritiousness') is innate and unchangeable using a 6-point Likert scale (ranging from "strongly disagree" to "strongly agree"). Higher values on the composite average score indicate higher food essentialism beliefs (Mean=3.07, SD=.80, α=.81).

2.3. Analysis Plan

Pearson correlations were used to examine associations between FES scores and ratings of plant- and meat-based versions of beef and tuna. A 2 Burger (Plant-based or Meat-based) x 2 Tuna (Plant-based or Meat-based) repeated ANOVA was conducted on familiarity ratings to determine: whether participants were less familiar with plant-based tuna compared to plant-based burger, and 2) whether participants were generally less familiar with plant-based meat products compared to their conventional meat-based counterparts.

Primary analyses were conducted using a 2 Essentialism (Low or High) x 2 Burger (Plant-based or Meat-based) x 2 Tuna (Plant-based or Meat-based) mixed ANOVA on ratings of nutritiousness, naturalness, processing, taste, stereotypical health property, and liking with essentialism as a between-subjects variable, and burger and tuna as within-subjects variables. Low (M= 2.45, SD=.58, range=1.00 to 3.13) and high (M= 3.68, SD=.44, range=3.25 to 5.00) classification on essentialism was determined based on median split of FES ratings. Prior studies examining the relationship between FES scores and perceptions of more highly processed foods retaining more natural properties demonstrated similar results and conclusions regardless of

whether participants were dichotomized into low or high food essentialism based median split or if FES scores were used as a continuous variable (Cheon et al., 2024). Although our primary analyses testing Hypothesis 1 could be conducted with a series of t-tests comparing ratings of PBMAs between low and high essentialism groups, we used the 2x2x2 ANOVA to explore other relationships between essentialism and food types on the ratings.

3. Results

Pearson correlations between FES scores and ratings of plant- and meat-based versions of burgers and tuna are presented in Table 1. Overall, food essentialism was associated with lower perceived processing and higher perceived naturalness of PBMAs. Food essentialism was also associated with lower ratings of meat-based burgers and tuna tasting like beef and fish, respectively. Finally, food essentialism was associated with higher familiarity with plant-based tuna, but lower familiarity with meat-based burgers and tuna.

The 2x2 ANOVA on familiarity ratings revealed a main effect of burger, $F(1, 297)= 37.85$, $p < .001$, $\eta p^2= .11$, main effect of tuna, $F(1, 297)= 250.53$, $p < .001$, $\eta p^2= .46$, and an interaction of burger and tuna, $F(1, 297)= 40.70$, $p< .001$, $\eta p^2= .12$. As expected, participants were less familiar with plant-based tuna (M= 36.12, SD= 29.28) compared to plant-based burger (M= 49.79, SD= 28.66), $t(297)= -8.14$, $p< .001$, $d= .47$, but did not differ in familiarity between meat-based tuna ($M= 69.84$, $SD= 23.02$) and burger ($M= 70.43$, $SD= 26.58$), $t(297)= -.41$, $p= .68$, $d= .02$ (Figure 3).

Full results for the 2x2x2 mixed ANOVA to test our hypotheses are summarized in Table 2 and illustrated in Figure 3. For perceived processing, we observed no significant main effects

or interactions, except a main effect of essentialism. Those endorsing higher (vs. lower) essentialism rated the foods as less processed (Table 2). Notably, those endorsing higher (vs. lower) essentialism perceived lower processing of plant-based burger, $t(296) = -2.47$, $p = .01$, $d = .29$ (Figure 3A), and plant-based tuna, $t(296) = -2.28$, $p = .03$, $d = .26$ (Figure 3B). However, there were no significant differences in perceived processing of meat-based burger and tuna between those endorsing higher vs. lower essentialism, $p > .05$.

For naturalness ratings, there was a main effect of tuna, with plant-based tuna rated as less natural than meat-based tuna (Table 2). There was also a main effect of essentialism, such those endorsing higher (vs. lower) essentialism rated the foods as more natural. Notably, those endorsing higher (vs. lower) essentialism perceived greater naturalness of plant-based burger, $t(296) = 2.41$, $p = .02$, $d = .28$, and plant-based tuna, $t(296) = 2.64$, $p = .009$, $d = .31$. Those endorsing higher (vs. lower) essentialism also rated meat-based burger as more natural, $t(296) = 2.13$, $p = .03$, $d = .25$, although there was no difference between the essentialism groups on perceived naturalness of meat-based tuna, $t(296) = .80$, $p = .43$, $d = .09$ (Figure 3C & 3D).

For nutritiousness ratings, there was a main effect of burger, such that plant-based burger was rated as more nutritious than meat-based burger (Table 2). There was also an interaction of burger and tuna, such that meat-based tuna ($M = 59.27$, $SD = 21.81$) was rated as more nutritious than meat-based burger ($M = 50.29$, $SD = 26.25$), $t(297) = 6.45$, $p < .001$, $d = .53$. Yet there was no significant difference in nutritiousness ratings of plant-based tuna ($M = 52.95$, $SD = 23.78$) and plant-based burger ($M = 54.68$, $SD = 23.70$), $t(297) = -1.26$, $p = .21$, $d = -.10$ (Figure 3E & 3F).

For ratings of whether the food tastes like the meat it is derived from (beef or fish), there were main effects of burger and tuna, such that the meat-based versions of these foods were rated to taste more like beef and fish, respectively (Table 2). There was also an interaction of tuna and

essentialism, such that those endorsing higher essentialism rated meat-based tuna as tasting less like fish than those holding lower essentialism scores, $t(296) = -2.81$, $p = .005$, $d = .23$, while there was no difference in ratings of plant-based tuna as a function of essentialism, $t(296) = 1.39$, $p = .17$, $d = .11$ (Figure 3G & 3H).

For stereotypic health properties, there was a main effect of tuna, such that meat-based tuna ($M = 56.91$, $SD = 19.74$) was rated to be better for heart health than plant-based tuna ($M = 47.72$, $SD = 22.88$) (Table 2). There was also an interaction of tuna and essentialism, such that those endorsing higher (vs. lower) essentialism rated plant-based tuna as being better for heart health, $t(296) = 2.01$, $p = .045$, $d = .22$ (Figure 3I & 3J). Although there was no significant interaction of burger and essentialism, those endorsing higher (vs. lower) essentialism also rated plant-based burger as being better for building muscle mass, $t(296) = 2.03$, $p = .04$, $d = .24$. However, there was no difference between essentialism groups on ratings of these stereotypical health properties of meat-based tuna, $t(296) = .70$, $p = .49$, $d = .08$, and meat-based burger, $t(296) = .63$, $p = .53$, $d = .07$.

Finally, for liking ratings, there was a main effect of burger and fish, such that meat-based versions of these foods were liked more than plant-based versions (Table 2). There was also an interaction of fish and essentialism, such that those endorsing higher (vs. lower) essentialism liked plant-based tuna more, $t(296) = 2.57$, $p = .01$, $d = .30$, but there were no differences in liking of meat-based tuna as a function of essentialism, $t(296) = -.92$, $p = .36$, $d = .11$ (Figure 3K & 3L).

4. Discussion

We tested whether food essentialism is a determinant of consumer expectations and acceptance of PBMAs. Overall, we found support for Hypothesis 1, such that participants who

297 endorsed higher (vs. lower) food essentialism beliefs were more likely to perceive PBMAs as
298 less processed, more natural, more liked (for plant-based tuna), and retaining more stereotypical
299 health properties of their meat-based counter parts. However, we did not observe differences
300 across all rated food properties for PBMAs based on food essentialism, such as on perceived
301 nutritiousness or whether they taste like the meats they imitate. This suggests that food
302 essentialism may only inform certain expectations and perceptions of PBMAs. This may be due
303 to beef burgers and canned tuna not being typically considered as highly nutritiousness foods or
304 having tastes that are not adequately replicated by other products. Thus, their plant-based
305 alternatives may not have been expected to express these properties even if they are assumed to
306 share a similar essence as their meat-based counterparts.
307 Overall, we did not observe support for Hypothesis 2, which predicted that food
308 essentialism would be a stronger determinant of perceptions of a relatively unfamiliar PBMA.
309 Although participants in our sample were less familiar with plant-based tuna (*Vuna*) compared to
310 plant-based burger (*Impossible Burger*), there were similar patterns of responses to the food
311 properties of these PBMAs despite differences in participants scores on food essentialism.
312 However, those endorsing higher (vs. lower) food essentialism reported greater liking of plant-
313 based tuna, a pattern that was not observed for plant-based beef. It is possible that food
314 essentialism may play a greater role in influencing acceptance of relatively unfamiliar PBMAs,
315 but not expectations about their specific sensory or nutritional properties. The overall support for
316 Hypothesis 1 in the context of a broader lack of differences in how plant-based beef and tuna was
317 evaluated based on food essentialism suggests that food essentialism may generally be predictive
318 of judgments and attitudes towards PBMAs regardless of familiarity.

We observed another notable, yet non-hypothesized, relationship between food essentialism and perceptions of the foods. The tendency for those endorsing higher (vs. lower) food essentialism beliefs to rate foods as less processed, more natural, tasting like the meats they represent, possessing stereotypical health properties, and as acceptable were more consistently observed for both PBMAs compared to their meat-based counterparts (see Table 2). This result may be due to lower consumer familiarity with PBMAs overall compared to traditional meat products, which may be contributing to greater reliance on lay beliefs and intuitions, such as food essentialism when evaluating PBMAs.

A limitation of the current study is examination of only two PBMA products. However, we varied the two products such that they imitated two distinct types of meat (beef and fish), suggesting that our findings may be generalizable to PBMAs more broadly rather than limited to a specific type of PBMA. Another limitation is the cross-sectional nature of our findings. Future studies should apply designs that can establish causal influences of food essentialism on judgments and acceptance of alternative proteins, such as experimentally manipulating food essentialism or using longitudinal approaches to test whether consumers reporting higher food essentialism are indeed more likely to adopt alternative proteins into their diet over time. We also did not apply corrections for multiple comparisons, so our results should be interpreted with caution. However, our conclusions are based on the consistently observed trends of those endorsing high food essentialism rating PBMAs as retaining more properties of the meats they imitate (except naturalness and taste).

A transition in protein consumption to prioritize alternative- over animal-based proteins has been acknowledged as an important step for achieving multiple societal goals, such as ensuring sustainability and security of foods systems, and improving both human and planetary

well-being (Aiking & de Boer, 2020). Prior research has demonstrated that food essentialism is associated with perceptions of highly processed food products retaining more of the properties associated with natural foods they were derived from (Cheon et al., 2024). Our current findings show that food essentialism extends to informing judgments and acceptability of not only processed foods, but also PBMAs. A major driver of consumer acceptance of PBMAs are similarities in their perceived sensory and nutritional properties with traditional meat products (Giacalone et al., 2022; Onwezen et al., 2021). Our findings that higher food essentialism beliefs are associated with greater perceptions of PBMAs sharing these properties with their meat-based counterparts demonstrates the potential promise and impact of food essentialism as a consumer-level determinant of the acceptability of PBMAs. Such consumer-level factors are especially important as targets for future intervention, given the immense challenges and complexities associated with developing PBMAs that adequately capture the texture, taste, and nutritional profiles of meat (Giacalone et al., 2022). Future research should examine whether food essentialism may influence perceptions and acceptance of other alternative protein products and technologies that are not plant-based, such as cultured meat or products based on insect or fungal proteins.

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Table 1. Numbers represent Pearson correlation coefficients for the relationship between Food Essentialism Scale (FES) scores and ratings of perceived properties of plant- and meat-based burger and tuna. Stereotypic refers to stereotypic healthy property of the food (burger: good for building muscle mass; tuna: good for heart health). *p <= .05, **p < .01.

	Plant-Based Burger	Plant-Based Tuna	Meat-Based Burger	Meat-Based Tuna
Processing	-.19**	-.15**	-.02	-.11*
Naturalness	.14*	.19**	.08	.03
Nutritiousness	-.01	.07	.05	-.03
Tastes like	-.02	.08	-.11*	-.19**
Stereotypic	.03	.06	-.02	-.08
Liking	-.01	.13*	-.11	-.08
Familiarity	.01	.25**	-.20**	-.19**

Table 2. Results of 2 Essentialism (Low or High) x 2 Burger (Plant-based or Meat-based) x 2 Tuna (Plant-based or Meat-based) mixed ANOVAs on ratings of perceived nutritiousness, naturalness, processing, taste, stereotypical health property, and liking. *$p < .05$, **$p < .01$

	Essentialism	**Burger**	**Burger x Essentialism**	**Tuna**	**Tuna x Essentialism**	**Burger x Tuna**	**Burger x Tuna x Essentialism**
Processing	$F(1, 296) = 5.53$ $\eta p^2 = .018$*	$F(1, 296) = 1.05$ $\eta p^2 = .004$	$F(1, 296) = .51$ $\eta p^2 = .002$	$F(1, 296) = 2.19$ $\eta p^2 = .007$	$F(1, 296) = 2.61$ $\eta p^2 = .009$	$F(1, 296) = .60$ $\eta p^2 = .002$	$F(1, 296) = 1.12$ $\eta p^2 = .004$
Naturalness	$F(1, 296) = 7.08$ $\eta p^2 = .023$**	$F(1, 296) = .87$ $\eta p^2 = .003$	$F(1, 296) = .73$ $\eta p^2 = .002$	$F(1, 296) = 14.2$ $\eta p^2 = .046$**	$F(1, 296) = 1.87$ $\eta p^2 = .006$	$F(1, 296) = .49$ $\eta p^2 = .002$	$F(1, 296) = 1.39$ $\eta p^2 = .005$
Nutritiousness	$F(1, 296) = 1.32$ $\eta p^2 = .004$	$F(1, 296) = 12.12$ $\eta p^2 = .039$**	$F(1, 296) = .49$ $\eta p^2 = .002$	$F(1, 296) = .64$ $\eta p^2 = .002$	$F(1, 296) = .06$ $\eta p^2 = <.001$	$F(1, 296) = 31.85$ $\eta p^2 = .097$**	$F(1, 296) = 2.92$ $\eta p^2 = .010$
Taste Like	$F(1, 296) = .18$ $\eta p^2 = .001$	$F(1, 296) = 6.20$ $\eta p^2 = .021$*	$F(1, 296) = .06$ $\eta p^2 = <.001$	$F(1, 296) = 141.17$ $\eta p^2 = .323$**	$F(1, 296) = 6.30$ $\eta p^2 = .021$*	$F(1, 296) = 1.37$ $\eta p^2 = .005$	$F(1, 296) = 2.85$ $\eta p^2 = .010$
Stereotypic	$F(1, 296) = 2.08$ $\eta p^2 = .007$	$F(1, 296) = 2.19$ $\eta p^2 = .007$	$F(1, 296) = .73$ $\eta p^2 = .002$	$F(1, 296) = 52.25$ $\eta p^2 = .150$**	$F(1, 296) = 5.74$ $\eta p^2 = .019$*	$F(1, 296) = .71$ $\eta p^2 = .002$	$F(1, 296) = .73$ $\eta p^2 = .002$
Liking	$F(1, 296) = .33$ $\eta p^2 = .001$	$F(1, 296) = 23.51$ $\eta p^2 = .074$**	$F(1, 296) = 1.62$ $\eta p^2 = .005$	$F(1, 296) = 118.13$ $\eta p^2 = .285$**	$F(1, 296) = 9.00$ $\eta p^2 = .029$**	$F(1, 296) = 1.40$ $\eta p^2 = .005$	$F(1, 296) = .66$ $\eta p^2 = .002$

Figure 1. Images of animal- and plant-based meat stimuli that were compared on participants' ratings of food properties. Text on the packaging that may unduly influence ratings of food properties were removed. Removed text includes, "100% wild caught," "tastes like tuna," and nutrition information.

Meat-based burger

Meat-based tuna

Plant-based burger

Plant-based tuna

Figure 2. Mean familiarity ratings for plant-based and meat-based burger and tuna products. The sample reported lower familiarity for plant-based tuna compared to plant-based burger, and lower overall familiarity for plant-based products compared to conventional meat-based counterparts. Error bars represent standard error. $^{**}p < .01$.

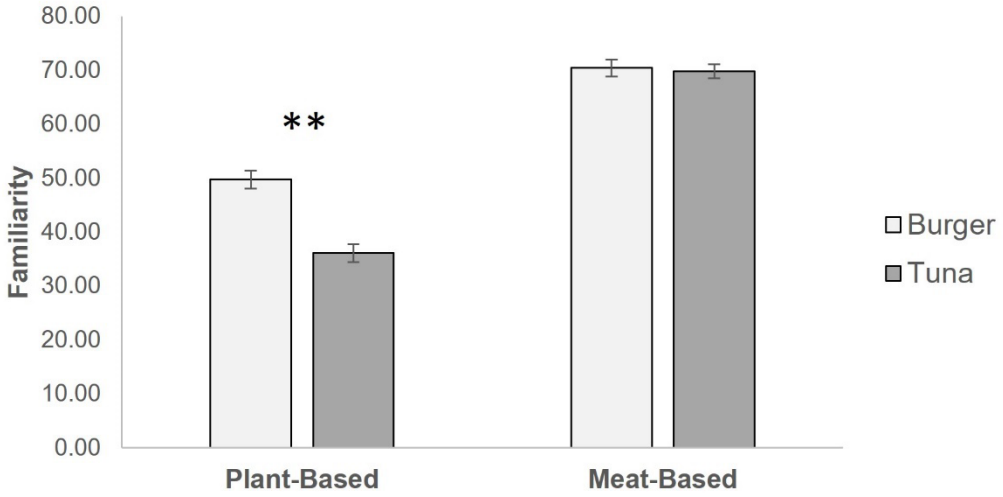

Figure 3. Comparisons between participants endorsing lower (light bars) and higher (dark bars) essentialism on mean ratings of properties of plant- and meat-based burgers (left column) and tuna (right column). Numbers within bars represent mean (standard deviation) ratings. Error bars represent standard error. *$p < .05$, **$p < .01$.