The impact of environmental messages on consumer responses to plant-based meat: Does language style matter?

Abstract

The recent surge of plant-based menu items offers new opportunities for individuals who want to join the fight against climate change. However, it is unknown whether environmental awareness will affect consumer responses to these new foods, and if so, what interventions will be more effective in increasing such awareness. We conducted two studies to fill this gap. Study 1 shows that perceived association between meat consumption and climate change influences consumer attitudes toward plant-based meat products as well as their purchase intention. These effects are fully mediated by perceived effectiveness of plant-based meat as a mitigating strategy. Study 2 further examines the role of language style in conveying the environmental impact of meat consumption and promoting plant-based meat alternatives. Findings reveal that figurative (vs. literal) language leads to higher level of visualization, which enhances affective reactions and perceived effectiveness of plant-based meat in combating climate change, thus resulting in more favorable consumer responses.

Keywords

Plant-based meat, environmental awareness, message communication, language style, visualization

1. Introduction

"*Much of the world is focused on limiting global warming to no more than 1.5 degrees above preindustrial levels. To make that happen, we need to achieve net-zero emissions in the food and land sectors. Plant-based alternatives to conventional meat, eggs, and dairy have a big role to play in achieving those goals.*"

—— Bruce Friedrich, executive director at The Good Food Institute

In recent years, the new generation of plant-based meat products is gaining popularity and appearing on the menus of major restaurant chains such as Burger King, Del Taco, Starbucks, and White Castle. Going beyond the traditional vegetarian foods (e.g., veggie-burgers) of the past, these new plant-based meats are designed to mimic the sensory properties of animal meat including taste, texture, smell, and appearance. According to Statista (2021), the market value of plant-based meat worldwide is estimated to increase from $11.1 billion in 2019 to 35.5 billion by 2027. In the United States, the plant-based meat category witnessed a 45% growth in sales in 2020 (Good Food Institute, 2021), however, there is still a lot of uncertainty about consumers' preferences for these meat alternatives (Van Loo, Caputo, & Lusk, 2020). While industry reports claim that plant-based foods are now mainstream (e.g., 98% of US consumers who buy plant-based meat also buy animal meats; Neilsen, 2019), academic studies indicate that consumers are hesitant to choose plant-based meat alternatives over conventional meat (Slade, 2018; Van Loo et al., 2020). Despite the rapid expansion of plant-based menu items, there is scant research investigating how to increase consumer acceptance of these novel products (Ye & Mattila, 2021).

As mentioned in the opening quote, there is an increasing global focus on combating climate change and reaching net-zero emissions. The introduction of plant-based meat alternatives in the marketplace is likely to provide an opportunity for individuals to make their own contribution to the planet. It is estimated that food production accounts for 20–25% of human greenhouse gas emissions, with animal production accounting for a large portion of that footprint (Tilman & Clark, 2014). Compared with conventional animal-based proteins, production of plant-based alternatives releases much less greenhouse gas emissions (e.g., one-eighth of the CO_2 equivalent per kilogram for chicken, one-twelfth for beef, and one-ninth for pork; BCG, 2021). Research suggests that a shift toward more plant-based diets could result in a large reduction of food carbon footprint (Ginn & Lickel, 2020; Scarborough et al., 2014). Van Loo et al. (2020) is one of the first to investigate U.S. consumers' preferences for new burger alternatives in grocery stores. They found a small positive effect of providing sustainability information on consumers' choice of plant-based meat, but the underlying mechanism was not examined (Van Loo et al., 2020). More recently, Ye and Mattila (2021) compared the effectiveness of three advertising appeals (e.g., taste, health, and social) in making plant-based menu items more attractive. Their results revealed that highlighting social benefits (e.g., good for environment and animal welfare) is more effective than taste or health appeals due to enhanced positive feelings of doing good (Ye & Mattila, 2021). However, it is not clear whether the effect was driven by animal welfare or environmental harm considerations since they combined the two in their stimuli.

More importantly, prior research suggests that there is low public awareness on the environmental impact of meat eating (de Boer et al., 2016; Tobler, Visschers, & Siegrist, 2011; Vanhonacker et al., 2013). However, it is unclear whether the awareness gap explains consumer responses to plant-based meat products, and if so, what interventions would be more effective in

resolving this gap and generating desirable consumer outcomes. We conducted two studies to answer these questions. In Study 1 we show that environmental awareness (e.g., perceived association between meat consumption and climate change) is significantly linked to consumers' attitude toward plant-based meat alternatives as well as their purchase intention. Moreover, the positive effect of environmental awareness was fully mediated by perceived effectiveness of plant-based meat as a mitigating strategy. In Study 2 we examined message framing (e.g., addressing the environmental impact of livestock production and promoting plant-based meat alternatives), with a particular focus on different language styles. The results show that figurative (vs. literal) language leads to a higher level of visualization, which increases perceived effectiveness of plant-based meat in combating climate change, thus resulting in more favorable consumer responses (e.g., attitude and behavioral intention). In addition to this cognitive path, the increased visualization elicited by figurative language also generates strong affective reactions, which in turn, contribute to favorable consumer outcomes.

2. Literature review

2.1 Environmental knowledge and consumer responses to meat alternatives

According to the Knowledge Structure Model (Frick, Kaiser, & Wilson, 2004; Kaiser & Fuhrer, 2003), different forms of knowledge (e.g., system knowledge, action knowledge, and effectiveness knowledge) influence people's general conservation and ecological behaviors. Although environmental knowledge alone may not be sufficient to motive behavioral change (Schultz, 2002), it is evident that general environmental knowledge is one of the strongest predictors of pro-environmental actions (see a meta-analysis by Bamberg & Moser, 2007). In the specific domain of climate change and global warming, previous research has documented the effect of knowledge about the general causes of global warming on people's intention to perform

behaviors that mitigate global warming (Bord, O'Connor, & Fisher, 2000; Whitmarsh, 2009). Given that specific knowledge of behaviors that mitigate climate change may lead to stronger intention to perform relevant behaviors (Gardner & Stern, 2008), recent work has started to investigate the impact of knowledge in various behavioral domains (Ginn & Lickel, 2020; Truelove & Parks, 2012). For example, Truelove and Parks (2012) found that the impact of cars on global warming was well recognized by US college students while the relative impact of meat eating was underestimated.

The production of meat and other animal-based products is linked to high environmental impact and climate change (Hedenus, Wirsenius, & Johansson, 2014). It is estimated that global livestock production is responsible for around 14.5% of global greenhouse gas emissions (Bailey, Froggatt, & Wellesley, 2014). Thus, reducing meat consumption is one of the most impactful choices people can make to reduce their carbon footprint (Wynes & Nicholas, 2017). However, the recognition of livestock as a significant contributor to climate change is still low compared to other sectors (e.g., transportation, heating and cooling in buildings; Bailey et al., 2014). Previous research shows that consumers have low awareness of the environmental impact of meat eating (de Boer et al., 2016; Vanhonacker et al., 2013). As a result, meat reduction is often overlooked as a climate change mitigation strategy in comparison to less impactful behaviors (e.g., comprehensive recycling, changing household lightbulbs; Truelove & Parks, 2012; Wynes & Nicholas, 2017). More importantly, perceived effectiveness of environmental mitigation strategies is linked to intention to change the corresponding behaviors (Bailey et al., 2014; de Boer et al., 2016). Therefore, educating consumers and closing the awareness gap is important.

By closely mimicking the sensory properties of meat such as appearance, taste and texture, plant-based meat products aim to satisfy meat-eaters (Good Food Institute, 2021). However, previous studies suggest that people are hesitant to choose plant-based meat alternatives (vs. conventional meat) (Slade, 2018; Van Loo et al., 2020). Several barriers have been identified, including food neophobia, meat attachment, unfamiliarity, and lower sensory attractiveness (Bryant et al., 2019; Hoek et al., 2011; Hwang et al., 2020). In this study, we suggest that perceived environmental impact of meat consumption will also play a role in consumer responses to plant-based meat products. Specifically, we propose that people who are aware of meat consumption as a contributor to climate change will demonstrate more positive responses to plant-based meat products. When people recognize the environmental impact of meat, they are more likely to perceive meat alternative products as an effective way to mitigate climate change.

H1. Perceived association between meat consumption and climate change has a positive impact on (a) consumers' attitude toward plant-based meat products and (b) their purchase intention.

H2. The above effects are mediated by perceived effectiveness of plant-based meat products in combating climate change.

Next, we consider the impact of message framing in increasing consumers' awareness of the environmental impact of meat consumption. Specifically, we examine how language style might influence the effectiveness of such communications.

2.2 Language style and persuasion

Figurative and literal language are two commonly used language styles in marketing communications. While literal language refers to the use of words solely by their defined or primary meanings, figurative language employs various linguistics techniques (e.g., simile,

metaphor, word play, or hyperbole) to convey additional connotations beyond that of their literal meaning (Fogelin, 1988; Wu et al., 2017). For example, “livestock production is heating up the planet” is more figurative and metaphoric compared to the literal statement “livestock production is contributing to global warming”.

Previous research shows mixed findings regarding the comparative effectiveness of literal versus figurative language style, depending on the specific communication context (Chang & Yen, 2013; Choi, Liu, & Mattila, 2019; Kronrod & Danziger, 2013; Wu et al., 2017). For example, in the brand advertising setting, Chang and Yen (2013) show that ads with (vs. without) metaphors led to more favorable attitudes toward the advertised brand. In the online review context, Kronrod and Danziger (2013) demonstrate that consumer reviews written in figurative (vs. literal) language resulted in more favorable attitudes in hedonic consumption contexts. In contrast, Wu et al. (2017) find that figurative language doesn't offer significant advantages in terms of persuasive power. Specifically, online reviews written in figurative (vs. literal) language led to less favorable attitudes when the review was posted by a non-expert (Wu et al., 2017). In the service encounter context, Choi et al. (2019) reveal that the use of figurative (vs. literal) language results in less favorable consumer responses to human service agents due to decreased credibility perceptions. Taken together, these findings indicate that while figurative (vs literal) language is sometimes more effective in inducing positive feelings such as pleasure and enjoyment, it can diminish message persuasiveness due to lower perceived credibility.

Extending previous work, we examine the effectiveness of figurative versus literal language in a different communication context – promoting plant-based meat alternatives. Drawing from the dual-processing theories (e.g., elaboration likelihood model; Petty & Cacioppo, 1986), persuasion and attitude change can be achieved via two pathways: the central route involves

thoughtful cognitive thinking and systematic assessment of relevant information, while the peripheral route relies on simple cues or heuristic inferences. In communication research, there is growing evidence showing that persuasion is the result of cognitive and affective processes (Banerjee & Greene, 2012; Dillard & Shen, 2005; Kim, Baek, & Choi, 2012; Nabi, 2002). Accordingly, we argue that figurative (vs. literal) language will influence consumer responses through both affective (more heuristic) and cognitive (more systematic) routes. Moreover, we propose imageability or visualization, referring to the ability of a stimulus to evoke mental imagery (Lee & Qiu, 2009), as a key factor in the process. Compared to literal language, figurative language is more metaphoric, creative, and affect-laden (Phillips & McQuarrie, 2009; Choi et al., 2019). It is reasonable to suggest that figurative (vs. literal) language will evoke more mental stimulation relevant to the message content. Previous research has documented the effect of mental imagery on positive emotions, subsequently leading to more favorable attitudes and behavioral intention (Lee & Qiu, 2009; Yoo & Kim, 2014). Following this logic, we predict that figurative (vs. literal) language will produce favorable affective responses via enhanced visualization, thus contributing to favorable consumer responses. This is also consistent with linguistic literature suggesting that figurative language induces positive affect such as pleasure and enjoyment (Chang & Yen, 2013; Kronrod & Danziger, 2013).

On the other hand, previous research suggests that climate change and global warming are relatively abstract concepts for lay consumers (Spence, Poortinga, & Pidgeon, 2012; White et al., 2019; Whitmarsh, 2009). Since literal language uses more factual and scientific statements (e.g., referring to certain amount of greenhouse gas emissions), it might be less effective in improving people's understanding of the abstract subject matter. Instead, figurative language employs various linguistics techniques to achieve a more nuanced understanding (Fogelin, 1988; Wu et

al., 2017). For example, when communicating the environmental benefits of eating less meat, referring to how many highway miles can be eliminated tends to be more concrete and easier to visualize, compared to directly referring to the amount of greenhouse gas emission saved. Previous research suggests that the visualization process involves high elaboration processing, including sensory representations (images) of nonverbal information in working memory (Goossens, 2000; MacInnis & Price, 1987). Therefore, mental stimulation by figurative language should contribute to a better understanding of meat consumption's environmental impact, and thus, enhance perceived effectiveness of plant-based meat alternatives as a mitigating strategy. This will further lead to more desirable consumer responses since perceived effectiveness has been linked to corresponding behavioral intention (Bailey et al., 2014; de Boer et al., 2016).

Taken together, we propose the following:

H3. Figurative (vs. literal) language will lead to (a) higher level of visualization, (b) more favorable affective responses, and (c) higher level of perceived effectiveness of plant-based meat products in combating climate change.

H4. Figurative (vs. literal) language will indirectly increase (a) consumer attitude and (b) behavioral intention through the serial mediation effect of visualization and affective responses.

H5. Figurative (vs. literal) language will indirectly increase (a) consumer attitude and (b) behavioral intention through the serial mediation effect of visualization and perceived effectiveness of plant-based meat products in combating climate change.

3. Study 1

The objective of Study 1 is to investigate the role of perceived association between meat consumption and climate change in driving consumers' attitudes toward plant-based meat products and behavioral intention (H1 & H2).

3.1 Method

A total of 120 US adults, recruited through Amazon's Mechanical Turk (Mturk), participated in the study for a small monetary payment. Mturk is a widely used online platform that enables researchers to collect data conveniently with sufficient quality (Buhrmester et al., 2018; Paolacci et al., 2010). We also employed attention check questions to ensure data quality. Eleven participants were removed due to attention check failures, leaving a final sample size of 109. Eighty-nine percent of the respondents were between the ages of 18 and 49, 70% were male, 79% had a four-year college degree, and 65% earned more than $50,000 annually.

Participants completed a survey including two parts. In the first part, following previous research (Truelove & Parks, 2012; Ginn & Lickel, 2020), participants rated 5 behaviors (e.g., driving your car, not recycling, eating meat, eating non-local food, flying in airplanes) on the extent to which such behaviors contribute to climate change on a scale from 1 (Negligible impact) to 7 (Very major impact). Perceived association between meat consumption and climate change was the focal independent variable in this study. The other four behaviors were included to eliminate possible demand effects. In the second part, participants were first given a brief description of plant-based meat products, and then responded to questions regarding their attitudes toward plant-based meat products (e.g., 1 = negative/bad/unfavorable, 7 = positive/good/favorable; α = 0.93) and purchase intention (e.g., "How likely are you to buy plant-based meat products in the future?"; adapted from Luttrell, Teeny, & Petty, 2021; α = 0.91). Next, they were asked to indicate to what extent they think buying more plant-based meat products is an effective way of

combating climate change (1=Not effective at all, 7=Highly effective; adapted from de Boer et al., 2016; Ginn & Lickel, 2020). Finally, participants completed demographic questions and were thanked for their participation.

3.2 Results

We conducted an initial examination of correlations among the variables. The results show that both consumer attitudes and purchase intention were positively correlated with perceived association between meat consumption and climate change ($r = 0.29$, $p = .002$, for attitudes; $r = 0.42$, $p < .001$, for purchase intention) and perceived effectiveness of plant-based meat products in combating climate change ($r = 0.58$, $p < .001$, for attitudes; $r = 0.61$, $p < .001$, for purchase intention). Subsequent linear regression analyses reveal that perceived association had a significant effect on attitudes ($b = 0.26$, $t = 3.15$, $p = .002$) and purchase intention ($b = 0.44$, $t = 4.85$, $p < .001$). However, after adding perceived effectiveness as the second predictor in the model, perceived effectiveness was the only significant predictor ($b = 0.55$, $t = 6.32$, $p < .001$, for attitudes; $b = 0.58$, $t = 6.01$, $p < .001$, for purchase intention) and the effect of perceived association became insignificant ($p = 0.89$ for attitudes; $p = 0.10$ for purchase intention).

To further test the indirect effect of perceived association on consumer responses through perceived effectiveness, we conducted mediation analyses using the bootstrapping approach (Model 4; Hayes, 2017). Perceived association between meat consumption and climate change was the independent variable, perceived effectiveness of plant-based meat products in combating climate change was the mediator, and consumers' responses to plant-based meat products (e.g., attitudes or purchase intention) was the dependent variable. These analyses showed a significant positive indirect effect of perceived association through perceived effectiveness on attitudes

toward plant-based products (b = 0.27, SE = 0.07, 95% CI = [0.135, 0.425]) as well as purchase intention (b = 0.285, SE = 0.07, 95% CI = [0.146, 0.437]).

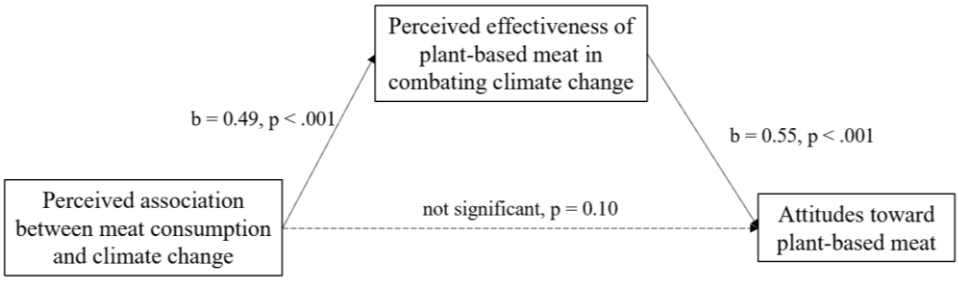

Figure 1. Mediation model for attitude

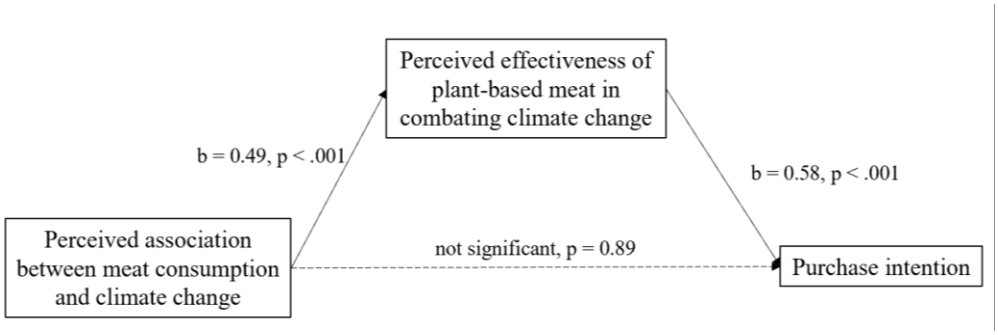

Figure 2. Mediation model for purchase intention

3.3 Discussion

Findings from Study 1 demonstrate the relationships among perceived association between meat consumption and climate change, perceived effectiveness of plant-based meat in combating climate change, and consumer responses to plant-based meat products. Specifically, perceived association between meat consumption and climate change has a positive impact on consumer attitude toward plant-based meat alternatives as well as purchase intention. Moreover, such effects were fully mediated by perceived effectiveness of plant-based meat in combating climate change.

In Study 2, we further examine the effectiveness of language styles in conveying the environmental impact of meat consumption and promoting plant-based meat alternatives.

4. Study 2

4.1 Method

This study utilized a single-factor, between-subjects design (language type: figurative vs. literal). Participants were randomly assigned to one of the two experimental conditions. A total of 100 US adults, recruited from Mturk, participated in the study for a small monetary payment. Nighty-four percent of the respondents were between the ages of 18 and 49, 62% were male, 71% had a four-year college degree, and 53% earned more than $50,000 annually.

Participants were asked to evaluate an advertisement highlighting the environmental impact of livestock production and advocating plant-based meat as an alternative solution. The ad message was written either in a literal language or a figurative language. In the literal language condition, the message stated: "*Global livestock production accounts for 14 percentage of all greenhouse gas emissions. If every person in the US replaced beef with plant-based meat for one meal per week, it would reduce 2.5 billion pounds of greenhouse gas emissions.*" In the figurative language, the statements in the message were: "*MEAT IS HEAT. Global livestock production is heating up the planet even more severely than the entire transportation sector. If every person in the US replaced beef with plant-based meat for one meal per week, it would be like taking 12 million cars off the road.*" The message content was designed based on real messages used on plant-based meat producers' websites and social media platforms. Please see Appendix for our experimental stimuli.

Attitude toward the ad was measured with a three-item, 7-point bipolar scale adapted from Sarial-Abi and Ulqinaku (2020) (e.g., 1 = negative, 7 = positive; $\alpha = 0.97$). Behavioral intention was captured by three items (e.g., "How likely are you to reduce your beef consumption in the future?", "How likely are you to buy plant-based meat products in the future?"; $\alpha = 0.93$; adapted from Ginn & Lickel, 2020). Following Pham and Avnet (2004), we used a three-item, 7-point bipolar scale to measure affective responses to the ad (e.g., 1 = not catchy, 7 = catchy; $\alpha = 0.85$). Visualization was measured by three items adapted from Lee and Qiu (2009) (e.g., "I could easily visualize how much environmental impact is derived from livestock production and meat consumption"; $\alpha = 0.91$). Perceived effectiveness of plant-based meat in combating climate change was captured using the same measure as in Study 1. Since previous research suggests that language style might influence credibility perceptions (Choi et al., 2019), we capture perceived message credibility via three items from Pham and Avnet (2004) (e.g., 1 = not believable, 7 = believable; $\alpha = 0.92$). Involvement was measured via two items adapted from Lee and Aaker (2004) (e.g., "I was paying a lot of attention when reading the ad message."; $\alpha = 0.83$). Language style manipulation asked participants to rate the language used in the ad (e.g., 1 = very figurative/very metaphorical, 7 = very literal/very factual; adapted from Wu et al., 2017).

4.2 Results

We first checked the effectiveness of the language style manipulation. The results show that participants in the figurative (vs. literal) language condition rated the ad message as less literal/more figurative ($M_{figurative} = 4.96$, $M_{literal} = 5.72$; $t(98) = 2.428$, $p = 0.02$) and less factual/more metaphorical ($M_{figurative} = 5.12$, $M_{literal} = 5.86$; $t(98) = 2.311$, $p = 0.02$). These results indicate that our manipulations were successful.

We then examined whether language type influences visualization, affective responses, perceived effectiveness, message credibility, and involvement. The results show that the ad message evoked higher levels of visualization in the figurative (vs. literal) language condition ($M_{figurative} = 4.89$, $M_{literal} = 4.14$; $t(98) = 2.204$, $p = 0.03$). Langue type also had a significant effect on affective responses to the ad and perceived effectiveness of plant-based meat in combating climate change. Specifically, participants in the figurative language condition demonstrated more positive affective responses ($M_{figurative} = 5.00$, $M_{literal} = 4.27$; $t(98) = 2.196$, $p = 0.03$) and rated plant-based meat products as more helpful in combating climate change ($M_{figurative} = 5.20$, $M_{literal} = 4.46$; $t(98) = 2.157$, $p = 0.03$). There was no difference in perceived message credibility ($M_{figurative} = 5.19$, $M_{literal} = 5.11$; $t(98) = 0.257$, $p = 0.80$) and involvement level ($M_{figurative} = 5.97$, $M_{literal} = 5.97$; $t(98) = 0.00$, $p = 1.00$). Thus, we exclude perceived credibility and involvement as cofounds. Taken together, H3 is supported.

To test H4 and H5, we conducted mediation analyses using the bootstrapping approach (Model 81; Hayes, 2017). In the two models, attitude and behavioral intention were each specified as the dependent variable (Y). Language style (figurative vs. literal language) served as the independent variable (X), while visualization (M1), affective responses (M2), and perceived effectiveness (M3) were the three mediating variables. Consistent with our predictions, the indirect effects via the affective path (e.g., the casual link of visualization → affective responses) were significant for both attitude ($b = 0.18$; $SE = 0.12$, 95% CI = [0.016, 0.463]) and behavioral intention ($b = 0.24$, $SE = 0.14$, 95% CI = [0.015, 0.550]). Furthermore, the indirect effects via the cognitive path (e.g., the casual link of visualization → perceived effectiveness) were also significant for both attitude ($b = 0.24$, $SE = 0.13$, 95% CI = [0.030, 0.520]) and behavioral intention ($b = 0.23$,

SE = 0.13, 95% CI = [0.023, 0.515]). No other indirect effect path was found significant in the two models. Therefore, H4 and H5 were supported.

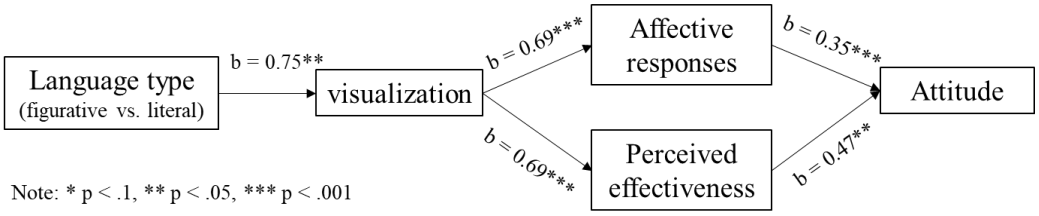

Figure 3. Mediation model for attitude

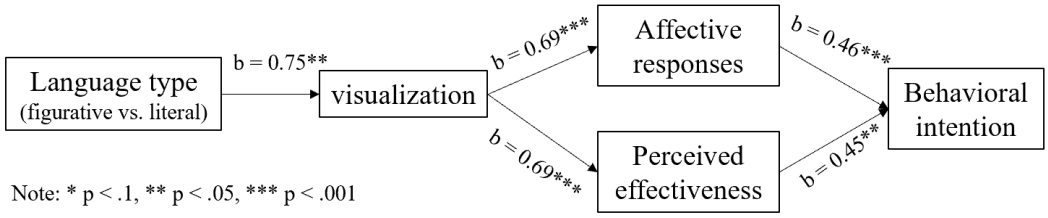

Figure 4. Mediation model for behavioral intention

4.3 Discussion

Findings from Study 2 demonstrate that figurative (vs. literal) language resulted in significantly higher levels of visualization, stronger affective responses, and higher perceived effectiveness. The PROCESS results show that the language style effect functions simultaneously through affective and cognitive routes. Via affective path, figurative (vs. literal) language indirectly increases attitude and behavioral intention through the serial mediation effect of visualization and affective responses. Via cognitive path, figurative (vs. literal) language indirectly increases attitude and behavioral intention through the serial mediation effect of visualization and perceived effectiveness.

5. General discussion

Reducing meat consumption is one of the most impactful consumption choices people can make to reduce their carbon footprint, yet it is often overlooked as a climate change mitigation strategy (de Boer et al., 2016; Wynes & Nicholas, 2017). The recent surge of plant-based meats and menu items offers new opportunities for individuals who want to join the fight against climate change. However, there are still many unexplored factors that might affect consumers' preferences for these new foods (Bryant et al., 2019). It is unknown whether and how environmental awareness may play a role. To fill this gap, we conducted a survey showing that perceived association between meat consumption and climate change influences consumer attitudes toward plant-based meat products as well as their purchase intention. These effects were mediated by perceived effectiveness of plant-based meat in combating climate change.

Study 2 further investigated how to design environmental messages that promote plant-based meat products. Specifically, we considered the role of language style and employed an experimental design. Our findings reveal that figurative (vs. literal) language led to higher levels of visualization, which enhanced both affective responses and perceived effectiveness of plant-based meat in combating climate change. More importantly, we show that language style had significant indirect effects on consumer responses simultaneously through cognitive (visualization → perceived effectiveness) and affective (visualization → affective responses) mechanisms. These results indicate that perceived effectiveness and affective responses act as parallel mediators.

5.1 Theoretical contributions

This research extends prior research on meat substitutes by examining the role of environmental awareness and language style on message framing. The existing literature on plant-based alternatives largely focuses on the effect of individual-level factors (e.g., health awareness, food

neophobia and meat attachment) and product-related factors (e.g., availability, price, and brand) on consumer acceptance (Bryant et al., 2019; Hoek et al., 2011; Hwang et al., 2020; Slade, 2018; Van Loo et al., 2020). Yet, the role of marketing communications and message framing has received less attention. While recent research suggests that highlighting social benefits in advertising increases consumer preferences for plant-based dishes, it is not clear whether the effects are due to animal welfare or environmental concerns (Ye & Mattila, 2021). By investigating the role of environmental awareness (i.e., perceived effectiveness of plant-based meat in combating climate change), our study findings enrich our understanding of the psychological mechanisms driving consumer responses to plant-based meat products and indicate the importance of consumer education. Prior studies suggest that strategically designed messages can influence attitudes and behaviors in the context of environmental sustainability including energy consumption, water use, and recycling (Goldstein, Cialdini, & Griskevicius, 2008; Steinhorst, Klöckner, & Matthies, 2015; White, MacDonnell, & Dahl, 2011), yet it remains unclear how to best design messages to benefit consumer acceptance to plant-based meats. We add to this stream of research by examining a novel factor, language style, in environmental messaging to effectively bridge consumers' awareness gap.

Our findings add to the existing literature on language style and persuasion by investigating both cognitive and affective mechanisms. Recent work in the context of online reviews and service encounters demonstrates a backfiring effect of figurative language in terms of its persuasive power (Wu et al., 2017) or credibility perceptions (Choi et al., 2019). In our study figurative language enhanced mental imagery, and consequently, led to an enhanced awareness of the environmental impact (e.g., higher perceived effectiveness of plant-based meat in combating climate change). This finding is consistent with studies showing that cognitive elaboration is

stimulated by the processing of metaphorical messages (Kim et al., 2012; McQuarrie & Mick, 1999). By employing metaphors that can increase and deepen content-related thoughts, figurative language helps consumers better understand the message content involving a relatively abstract construct (e.g., climate change and global warming; Spence et al., 2012; White et al., 2019). On the other hand, previous research in advertising shows that figurative language can elicit positive feelings towards the advertised stimuli and result in more favorable attitudes and purchase intention (Chang & Yen, 2013; Phillips & McQuarrie, 2009). Consistent with such findings, we show that environmental messages written in figurative (vs. literal) language resulted in positive affective outcomes due to elicited visualization and mental stimulation. Taken together, the current research adds new empirical evidence to support the dual system of persuasion (Banerjee & Greene, 2012; Dillard & Shen, 2005; Kim et al., 2012; Nabi, 2002).

Finally, we contribute to the hospitality literature by responding to the recent surge of plant-based meat products on restaurant menus. While producers of plant-based meat alternatives have started to communicate environment benefits to consumers[1][2], there is scant research investigating the impact of such messages. Our studies provide empirical evidence on the role of environmental awareness in consumer responses to plant-based meat products. Moreover, our findings show the advantages of using figurative (vs. literal) language in environmental messages. Previous hospitality studies have examined the effect of message framing on consumer responses to restaurants' sustainability practices, including timing of the message and benefit framing (Olavarria-Key et al., 2021; Zhang et al., 2021). We add to this stream of research by revealing language style as another influential factor.

[1] https://impossiblefoods.com/sustainable-food
[2] https://twitter.com/BeyondMeat/status/1397233850179366914

5.2 Practical implications

The findings of this research suggest that practitioners wishing to promote plant-based alternatives should recognize the importance of educational content as well as the role of language style in framing such messages. Research suggests that the environmental impact of plant-based alternatives production is significantly lower compared to conventional resource-intensive livestock production (Tilman & Clark, 2014). For example, a life cycle assessment of the Beyond Burger (a leading plant-based meat product in the U.S.) shows that a plant-based patty generates 90% less greenhouse gas emissions and requires 46% less energy. To effectively communicate environmental benefits of plant-based meat to consumers, practitioners may consider using figurative language. For example, compared to a factual statement "global livestock accounts for 14% of all greenhouse gas emissions", a metaphoric expression "global livestock is heating up the planet" is likely to make the environmental impact of meat more vivid. Also, instead of directly stating that the amount of greenhouse gas emissions can be eliminated by replacing meat with plant-based alternatives, more figurative language helps to visualize such outcomes (e.g., "…like taking [number] cars off the road", "…equivalent to charging you phone for [number] months").

There is an increasing agreement among experts and policy-makers on the effectiveness of eating less meat in mitigating global climate change (Hedenus et al., 2014; Stehfest et al., 2009). However, research suggests that consumers still have low awareness of the environmental impact of meat eating (de Boer et al., 2016; Vanhonacker et al., 2013) and communicating information on the link between animal meat production and climate change appears to be challenging (Skamp, Boyes, & Stanisstreet, 2013). Our findings suggest that figurative language may offer a potential solution in facilitating the process. Although the present research focused on plant-

based meat products, the study findings can provide insights into communicating other sustainability practices adopted by hospitality businesses. For example, recently restaurant chains such as Chipotle[3] and Panera[4] began to provide food carbon footprint information of their menu items. Restaurant managers could consider using more figurative expressions to help consumers better understand the environmental outcomes of their food choices.

5.3 Limitations and future research

The current paper has several limitations, which grant opportunities for future research. First, we measured perceived association between meat consumption and climate change using a single item adopted from previous research (de Boer et al., 2016; Ginn & Lickel, 2020). While there is evidence showing that a single-item measure can have acceptable psychometric properties and high predictive validity (Bergkvist & Rossiter, 2007), it is worthwhile to further validate the study findings using multiple-item measures and other analysis techniques with a larger sample. Second, we focused on the effect of language style in an advertisement that conveys the environmental impact of meat consumption and promotes plant-based alternatives. It would be interesting to examine the role of language style in other communication contexts, such as introducing the production process of meat alternative innovations. Would figurative language make such communications less technical and more interesting? How might figurative language ease consumers' resistance to novel food technologies (Zheng, Bolton, & Alba, 2019)? Third, future research should examine whether the language style effect might be moderated by contextual and personal factors. For instance, the relative effectiveness of figurative versus literal language might depend on the message source (Choi et al., 2019; Wu et al., 2017). Future work

[3] https://www.fastcompany.com/90567802/is-your-burrito-bad-for-the-environment-chipotle-has-a-tool-for-that
[4] https://www.restaurantbusinessonline.com/food/panera-start-labeling-foods-low-carbon-footprints

could investigate if the language style effect differs for-profit versus non-profit organizations when communicating environmental messages to the public. In addition, since consumers may have distinct personal beliefs regarding meat consumption and climate change, it would be meaningful to examine if the language style effect is conditioned by consumer segments. Finally, future research should consider collecting field data to demonstrate the effect of language style in natural settings. For example, plant-based meat producers (e.g., Beyond Meat and Impossible Burger) are communicating the associated environmental benefits via social media platforms. It would be interesting to examine how language styles may influence consumers' actual engagement behaviors.

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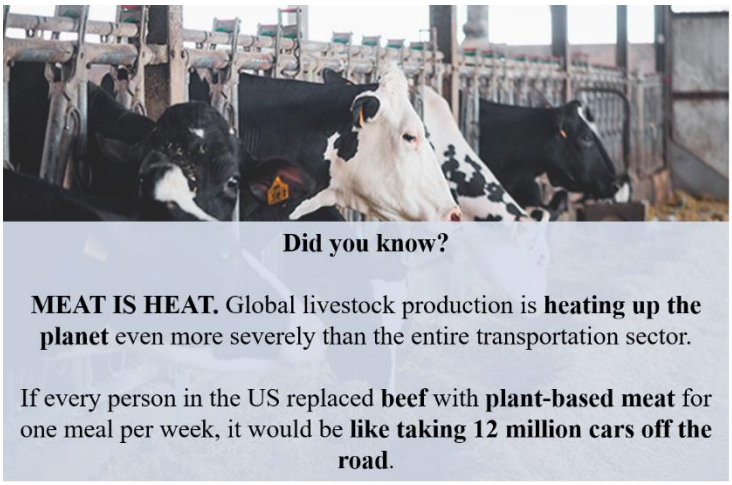
Appendix

Study 2 stimuli

Literal language condition



Figurative language condition