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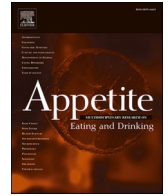
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Conservative consumer disinterest in plant-based meat: A problem of message incongruence

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ABSTRACT

The drive to encourage consumers to reduce animal meat protein has resulted in a substantial market for plant-based meat products. Despite willingness and acceptance among certain sectors of the population, there remains a large proportion of consumers unwilling to try plant-based meat. Through the lens of political ideology and applying message congruence theory, we demonstrate that current message framing is incongruent to conservative consumers in the USA. A pre-test ($n = 262$), using political ideology to predict willingness to try plant-based meat, revealed a significant effect such that conservatives were significantly less likely to want to learn about plant-based meat or to try it. A content analysis ($n = 82$) of press releases from a major plant-based meat company highlights that plant-based meat is promoted based on three key benefits: taste, health and the environment. Finally, in an experiment, conservative participants ($n = 200$) were randomly assigned to view an advertisement for a plant-based meat company that either cited environmental benefits or did not. Results demonstrate the presence of incongruence in messaging, where environmental benefits are shown to be less effective for conservative leaning consumers.

1. Introduction

The human population is anticipated to increase from 7.6 to 9.8 billion by 2050. To provide a healthy and sustainable diet for this global population, the UN recommends a substantial reduction in red meat consumption, which should be replaced with a more plant-based dietary approach (United Nations, 2022, pp. 11–12). Studies supporting this position show the environmental and human health benefits of reducing animal meat and dairy intake (Willett et al., 2019; Crippa et al., 2021). Currently, global red meat consumption is almost four times recommended levels, with people consuming around 39 kg annually where a maximum of 10 kg is desirable (Willett et al., 2019). Regarding the environmental impact of livestock production, the food sector accounts for 26% of total greenhouse gas emissions (Crippa et al., 2021). Nations around the world are developing strategies to address greenhouse gas emissions with the EU setting an ambitious 55% net reduction by 2030 from 1990 levels. Decreasing global meat consumption is one important way that emissions can be reduced (Tucker, 2014). Against this backdrop, innovations in food technology have accelerated in the last

decade, resulting in a new alternative meat market, which focuses on imitation of animal meat (Joshi & Kumar, 2015), with products composed of pulses, algae, insects, plant-based proteins and cultured meat (Onwezen et al., 2021).

Despite sustained growth for several years, the plant-based meat market has experienced plateau and decline in recent years (Ignaszewski, 2022). This trend is due to several reasons such as supply chain issues and high price point in comparison to animal meat. More pressing than these strategic concerns, however, are the consumer driven reasons for resistance to this product market. Young et al. (2022) suggest that for the 53% of American consumers who have not bought or tried plant-based meat, may be doing so out of resistance to a product that they view as “woke”¹ or liberal and culturally mismatched to their value set. Thus, plant-based meat could be construed as a politically contentious product which may have varying levels of appeal depending on political orientation. Political ideology is defined as “a socially shared system of beliefs” (Jost, 2017, p. 168), often derived from psychological needs and values around managing risk and uncertainty and interestingly is correlated to a variety of consumer behaviors. There is potential

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¹ Woke has several meanings in popular culture (Alfonseca, 2022). The Young et al. (2022) report is using it in the context of a pejorative phrase reflecting left-wing or liberal values.

for plant-based meat to be less appealing to conservative consumers based on a mismatch of political ideology and product perceptions. Across a number of domains we see political ideology affecting consumer behavior including: desire for luxury products (Kim et al., 2018); variety seeking (Fernandes & Mandel, 2014); sustainability (Kidwell et al., 2013); understanding local food preference (Wilks & Phillips, 2017); and willingness to purchase plant-based burgers (Slade, 2018). Key to optimizing communication based on ideological differences is to ensure that the communication content matches the consumer's values.

Regarding dietary preferences, an established trend in the literature shows that animal meat consumption patterns divide across ideological lines with right leaning (vs. left leaning) consumers more likely to eat animal meat (e.g., Allen & Hung Ng, 2003; Dhont & Hodson, 2014). Cultural references and press insights suggest a similar trend is emerging in the plant-based meat market, with conservative consumers potentially more reluctant to consume plant-based meat partly due to its liberal connotations (Young et al., 2022).

Drawing on the political ideology and message congruence literature, we posit that the emphasis on environmental benefits of these products may be causing a roadblock to conservative consumers who do not wish to identify environmental concerns as part of their consumption identity. The issue of climate change and environmental concern became an ideological issue during the 1990s. With increasing partisanship in many Western democracies, this issue has become more embedded: environmental concern is regarded as a left-wing ideological issue (Dunlap & McCright, 2008).

The remaining article is structured as follows: first, background literature on political ideology and its relationship to food consumption; followed by an outline of the message congruence and benefits literature where we build a case supporting the premise that relying on environmental benefits to promote plant-based meat deters conservative consumers from becoming interested due to incongruent value connotations. Empirically we then present a pre-test showing willingness to purchase plant-based meat according to ideological preferences, followed by a content analysis of a plant-based company's press releases, before confirming our hypotheses with an experiment and general discussion.

1.1. Political ideology

As a personality orientation, political ideology holds predictive capability in relation to behavior (Jost, 2006) and interestingly purchase decisions, which are seemingly unrelated to politics (Jung & Mittal, 2020). Jost (2017) clarifies the binary grouping of individuals on a unidimensional scale: to the left, liberal and to the right, conservative. This approach allows for understanding the divergence across four bases: personality, cognitive processing style, motivation, values, and neuro and physiological functions. Regarding personality, liberals tend to exhibit higher levels of openness to new experiences and compassion while conservatives exhibit conscientiousness, orderliness and politeness as leading traits (Jost, 2017; Furnham & Horne, 2022). The higher openness traits of liberals (Furnham & Horne, 2022) are reflected in cognitive processing styles where there is more tolerance for ambiguity alongside a higher need for cognition. The tendency of liberals is to favor greater equality through challenging the status quo, which is a product of a more reflective, deliberate and analytical processing style (Stern et al., 2013). This tendency is in contrast to conservatives whose conscientiousness and need for order manifest in valuing patriotism and tradition which translates into processing styles that tend to be less flexible while cognitively relying on heuristics as key decision aids (Kimmelmeier, 2010). Typically, conservatives are motivated to maintain the status quo and engage in more utilitarian consumption decisions (Watkins et al., 2016).

Political ideology is salient in the food context (Halkier, 2016) with numerous studies embracing this value set as a basis to understand food behaviors. Political ideology applies as a segmentation variable to

understand the market for local food preference (Witzling & Shaw, 2019); to understand attitudes towards in vitro meat (Wilks & Phillips, 2017); to determine attitudes and behaviors towards meat consumption (e.g., Dhont & Hodson, 2014; Hodson & Earle, 2018), and conversely to examine abstention to meat in the form of adopting vegetarian or vegan diets (Allen et al., 2000; Dietz et al., 2010; Pfeiler & Egloff, 2018; Wrenn, 2017). More specifically, political ideology has been used to determine willingness to purchase plant-based burgers with liberals more likely than conservatives to purchase alternative meat products (Slade 2018).

There are numerous factors that can explain conservatives' reluctance to consume plant-based products. In this research, we focus on the communication of benefits and how they are misaligned with the values of conservatives.

1.2. Message congruence

Developing communications content that resonates with consumers is a powerful, persuasive tool in affecting behavior change. How information is framed and its subsequent impact on people's attitudes and behaviors has been investigated across disciplines, including psychology, behavioral economics, political science and sociology. Across these disciplines, researchers find message congruency to be a strong predictor of positive outcomes such as attitude and behavioral change (Boeuf, 2019; Kidwell et al., 2013). Congruence refers to aligning the persuasive message with the characteristics of the message recipient. For example, Fisher et al. (2008) examine fund raising behaviors to find that they increase when messages are framed around helping others, as opposed to helping the self. When messages are congruent, recipients process the content more easily, which results in more positive evaluations (Cesario & Higgins, 2008; Gallagher & Updegraff, 2012; Hirsh et al., 2012).

Research examining political ideology and consumer behavior shows the importance of matching benefits espoused with politically held ideological values. For example, Kidwell, Farmer, and Hardesty (2013) exposed liberals and conservatives to either an individualizing or binding appeal to persuade participants to recycle. Results indicated that recycling intentions were higher for liberals when they were exposed to individualizing appeals and higher for conservatives when they received binding appeals. Septianto et al. (2019) conceptualized congruence in a completely different way, finding that gain frames are good matches for liberals and loss frames are better for conservatives when viewing an anti-counterfeit advertisement. In their review article, Jung & Mittal (2020) highlight the importance of identity-congruent consumption, where individuals will seek to preserve their self-concept by engaging in consumption that is aligned with their values (Oyserman & Schwarz, 2017). Consequently, when messaging or indeed brands and products are misaligned with ideological values, consumer resistance or disengagement can potentially be the result. Evidence of this phenomenon is seen in the energy efficiency market, as Gromet et al. (2013) show, conservative consumers are less likely to purchase energy efficient light bulbs when marketing communication promotes environmental concerns as opposed to receiving no message. Similarly, when promoting home solar panels, conservative consumers engaged in the market when the utilitarian properties were salient (i.e., this product will save you money) compared to the environmental benefits of the technology, which appeals to liberal consumers (Mooney, 2015).

1.3. Message benefits

Identifying the appropriate message frame and benefits forms a crucial element in the successful execution of a communications campaign. Social marketing campaigns focused on encouraging pro-environmental behavior, often combine message appeal benefits together such as highlighting environmental and economic attributes in order to resonate with a broad audience. In contrast, van den Broek et al. (2017) demonstrate the effectiveness of developing tailored messages

that align with consumer values rather than combined appeals. Further support for tailored messages that are congruent with consumer values is offered across a spectrum of pro-environmental contexts including: wastewater by-products (Judge et al., 2021); animal meat consumption (Graham & Abrahamse, 2017); aquatic invasive species (Golebie & van Ripper, 2022) and minimalist lifestyles (Herziger et al., 2020).

Furthermore, when the message frame and benefits align with the psychological characteristics of the consumer then message congruence can be achieved (Aaker & Maheswaran, 1997; Mann et al., 2004; Uskul et al., 2009). The importance of message congruence is realized in its downstream effect on processing fluency. Congruent content is processed more easily by consumers, which results in more positive evaluations of the content (Reber et al., 1998). A positive evaluation could be represented in a variety of ways including ‘curiosity’ and ‘interest’ in the content, as our study proposes. Curiosity is a relevant concept as alternative meat represents an innovation in food technology (Sha & Xiong, 2020); therefore, consumer knowledge of the products is more likely to be incomplete. Loewenstein (1994) describes curiosity as representing a gap in knowledge or understanding. If individuals desire to close this gap, then curiosity acts as a motivational driver to engage in a behavior that resolves this deficit state (Wang & Huang, 2018). Following the conceptualization by Hill et al. (2016), we regard curiosity as a temporary motivational state rather than activating a personality trait. A congruent message should be easily understood, potentially leading to a rise in curiosity, further impacting downstream behaviors such as showing ‘interest in the advertisement’ (Menon & Soman, 2002). Regarding the outcome of ‘interest’; when evaluating online advertising, content effectiveness is often measured when high engagement occurs through mechanisms such as clicks, likes, comments and shares (Calder et al., 2009).

While the ultimate goal of consumer based persuasive messaging is to drive purchase behavior, it is not always realistic to expect a complex decision behavior like food to occur in a linear fashion, from ad exposure to purchase (see Symmank et al. (2017) for a systematic review of food choice). The complexity of food decision making is captured in the interdisciplinary DONE framework (Determinants of Nutrition and Eating behavior), (Stok et al., 2017), which comprises four factors: individual, interpersonal, policy and environment. Our aim is to understand at an individual level, the willingness of conservative consumers to consider learning more about novel plant-based protein through developing ad content that resonates due to a congruent tailored message approach.

1.4. Present study contributions

The aims of this research are threefold (i) to establish a relationship between political ideology and desire to try or learn about plant-based meat (study 1, pre-test study), (ii) to analyze plant-based meat company press releases to evidence the message benefits currently promoted (study 2, content analysis study) and (iii) to test different message benefits to determine the optimal messaging for persuading conservative consumers established as being most reluctant to purchase plant-based meat (study 3, experimental study). We therefore propose the following hypotheses:

H1. Plant-based meat advertisements that exclude environmental benefits (vs include) will result in more curiosity and interest in the advertisement in conservative participants.

H2. Plant-based meat advertisements that exclude environmental benefits (vs include) will indirectly impact interest in the advertisement through curiosity in conservative participants.

Actioning these hypotheses across our empirical studies, we establish that conservative consumers (vs liberals) are less interested in trying plant-based meat products. Current company promotion content focuses on the environment, taste, and health benefits of plant-based meat. We

offer a way to optimize communication content of plant-based meat benefits by demonstrating the value incongruence of environmental based messaging directed to conservative consumers.

2. Pre-test

2.1. Methods and materials

The purpose of our pre-test was to establish a relationship between political ideology and desire to purchase plant-based meat. Prior to data collection ethical approval was obtained from Babson College, USA Institutional Review Board (IRB) with informed consent obtained from all participants. We recruited 262 participants using Prolific, a website with a diverse workforce, where researchers can post surveys for workers to complete for monetary rewards. The recruitment materials stated the study was about dietary preferences. Participants were each awarded \$1.00 for completing the survey. The survey was limited to participants in the United States.

Regarding demographics, the gender distribution of our sample ($n = 262$) is 47% male, 50% female and 3% trans male, trans female, gender queer, or other. Participant age range distribution is: 20% 18–24, 33% 25–34, 25% 35–44, 11% 45–54, and 11% over 55. Thirty-five percent of participants had a four-year degree or more.

Participants were told the researchers were interested in learning about their thoughts on plant-based meat products and were asked to report their willingness to learn about and try these products using three items adapted from Sundar and Kalyanaraman's (2004) behavioral intentions toward the product scale. Items included: “I am curious about plant-based meat products,” “I would like more information about plant-based meat products” and “I would like to try plant-based meat products” on a 1 (strongly disagree) to 7 (strongly agree) scale.

Political ideology was measured using seven items adapted from Mehrabian (1996). Example items included “I can never see myself voting to elect a right-wing candidate” and “I am politically more liberal than conservative.” All items were answered on a 1 (strongly disagree) to 7 (strongly agree) scale.

2.2. Results and discussion

Data were analyzed using IBM Statistical Package for the Social Science (SPSS) version 25. Results show that political ideology significantly predicted willingness to try plant-based meat ($R^2 = 0.12$, $F(1, 261) = 35.08$, $p < .001$). Conservatives were less interested in plant-based products ($B = -0.46$, $p = .001$) than liberals.

These results are in line with previous work that demonstrates conservative consumers' reluctance to try plant-based meat (e.g., Slade, 2018). This finding gives further credence to the notion that plant-based consumer desires differ based on political ideology, which can be used as a segmentation variable when developing targeted and tailored communication campaigns.

3. Content analysis

3.1. Methods and procedure

In the plant-based meat category, a variety of message benefits could be optimized, as the products have several internal and external attributes that may appeal to different types of consumers. To understand what approach commercial companies are currently taking, we analyzed a company's press releases to identify categories of benefits currently promoted. The global market value of plant-based meat was estimated at 10.11 billion US dollars in 2022 (Statista, 2022) with Beyond Meat noted as the most recognizable brand in the meat substitute category (Wunsch, 2022). Due to its high consumer recognition and presence in the plant-based meat market we chose Beyond Meat using the website www.beyondmeat.com to access 90 press releases (dated from January

2, 2018 to October 24, 2022); of these 82 related to plant-based meat products and were therefore selected for inclusion in our analysis. Press releases were coded according to three common themes identified in the promotion of plant-based meat: taste, health and the environment.

3.2. Results

Data were analyzed using IBM Statistical Package for the Social Science (SPSS) version 25. Descriptive statistics show that 84% of press releases mention taste, 62% health and 55% highlight an aspect of environmental concern.

3.3. Discussion

The sensory nature of food consumption means taste is a universally appealing benefit to highlight. Regarding health, a range of studies show how both liberals and conservatives show concern for personal health. In one study conservative interest in personal health is supported by their political orientation, one that promotes taking personal responsibility (Chan, 2019); while other studies show the personality trait of conscientiousness as underpinning better health outcomes in conservatives (Fatke, 2017). Liberal consumer interest in health behavior is reflected in the high numbers of liberals adopting a vegetarian diet (Pfeiler & Egloff, 2018) which is motivated by concerns around animals, health and the environment (Nezlek & Forestell, 2020). Given this backdrop we believe both taste and health benefits will appeal to conservative consumers.

The perceived benefit of the environment however, may in fact be counterproductive when trying to attract more conservative consumers. The issue of environmental concern and climate change is politically polarized, with Republican party policies moving towards an anti-environmental stance following the 1992 ‘Earth Summit’ held in Rio de Janeiro. At that time, US conservatives interpreted environmentalism as a threat to national sovereignty and economic power (Jacques et al., 2008). Since then, successive Republican party leaders have supported an anti-environmental stance that has endured for several decades (Hultgren, 2018).

4. Experiment

4.1. Methods

4.1.1. Participants

A total of 200 participants who had not previously tried plant-based meat completed the survey. Sixty-four percent identified as male (36% as female). Participant ages range as follows: 11% 18–24, 24% 25–34, 24% 35–44, 21% 45–54, and 20% were over 55. Most participants had a four-year degree or more (48%).

Prior to data collection ethical approval was obtained from Babson College, USA Institutional Review Board (IRB) with informed consent obtained from all participants. As in the pre-test, we recruited participants using Prolific. The recruitment materials stated that the purpose of the study was to evaluate an advertisement for a plant-based meat product, and participants were each awarded \$1.00 for completing the survey. The survey was limited to participants in the United States who identified as conservative and had never tried plant-based meat.

We applied the MedPower app (Kenny, 2017) to estimate the sample size required to observe an indirect effect of advertisement condition on advertisement interest via curiosity. We specified small-to-medium relations ($r = 0.20$) between advertisement and curiosity (path a) and a large relationship ($r = 0.50$) between curiosity and advertisement interest (path b). A small direct association ($r = 0.04$) of advertisement and advertisement interest (path c) was specified. We based the effect size estimates for advertisement condition on curiosity (path a) and advertisement interest (path c) on meta-analytic research reporting small-to-medium effects ($r = 0.20$; Joyal-Desmarais et al., 2022),

squaring the indirect effect as suggested by Kenny (2017). The effect size estimates for curiosity on interest were based on meta-analytic research reporting larger effect sizes ($r = 0.50$; Tang et al., 2022). The MedPower analysis showed that a sample size of 193 is sufficient to achieve 80% power of detecting a significant effect (alpha set to 0.05). Relying on these parameters, we recruited 200 participants to account for possible exclusions and to compensate for dropouts.

4.1.2. Measures

While we only recruited participants who self-identified as ‘conservative’ (as registered on their Prolific profile), we wanted to confirm participants’ ideology. Therefore, we included a one item political ideology scale that asked participants where they would place themselves from (1) liberal to (9) conservative.

We have two dependent variables: curiosity and interest. To measure curiosity participants indicated to what extent they agreed with: ‘the post made me curious about the plant-based meat product,’ ‘I am eager to learn more about plant-based meat,’ and ‘I am interested in discovering more about plant-based meat’ on a 1 (strongly disagree) to 7 (strongly agree) scale. Cronbach’s alpha was .98; these items were adapted from Hill et al. (2016). Our second key dependent variable is interest in the advertisement. Participants responded to seven items adapted from Jin (2004) on a 1 (extremely unlikely) to 5 (extremely likely) scale. These items included: like this post, comment on this post, follow this brand on social media, click the ‘learn more’ button on the post, visit the company’s website, and research plant-based products. Cronbach’s alpha was .95.

4.1.3. Procedure

After providing informed consent, participants were prompted with additional information about the study: ‘This study is about plant-based meat products. These products are made from plant proteins such as pea, wheat and soy and are designed to mimic animal meat products in how they look and taste.’ They were then informed they would be viewing two Facebook posts for a brand-new plant-based meat product that has not yet been released to consumers. Participants were asked to review the advertisements and answer the subsequent questions. They were then randomly assigned to either an ‘Environmental Benefit Present’ or ‘Environmental Benefit Absent’ condition (see Fig. 1).

Regarding the stimuli, in both conditions participants saw two advertisements for a hypothetical plant-based meat company ‘Alternative Meat Co.’ We chose to include two images in each condition to create a more realistic social media experience for participants as most advertisements on Facebook and Instagram include multiple images. The advertisements in both conditions highlight the health and taste benefits of choosing to eat plant-based meat. The ‘Environmental Benefit Present Condition’ also included an additional benefit related to helping the planet. As a comprehension check, after viewing the advertisements participants were asked ‘after viewing the post for plant-based meat, please describe some of the benefits of eating plant-based meat.’ Responses were reviewed to confirm all participants had read the advertisements.

4.2. Results and discussion

Data were analyzed using IBM Statistical Package for the Social Science (SPSS) version 25. The mean score on the political ideology item was 7.43 ($SD = 1.31$), confirming participants identified as conservative. It was hypothesized that conservative participants would react more positively to the advertisement when the environmental benefit was not presented. The hypotheses tested were two-sided. A multivariate ANOVA was marginally significant for advertisement interest ($F(1, 191) = 3.99, p = .047$) and significant for curiosity ($F(1, 191) = 6.49, p = .012$) such that conservative participants in the ‘environmental benefit absent’ condition reported higher advertisement interest ($M = 2.65, SD = 1.23$) and curiosity ($M = 4.24, SD = 2.01$) than those in the

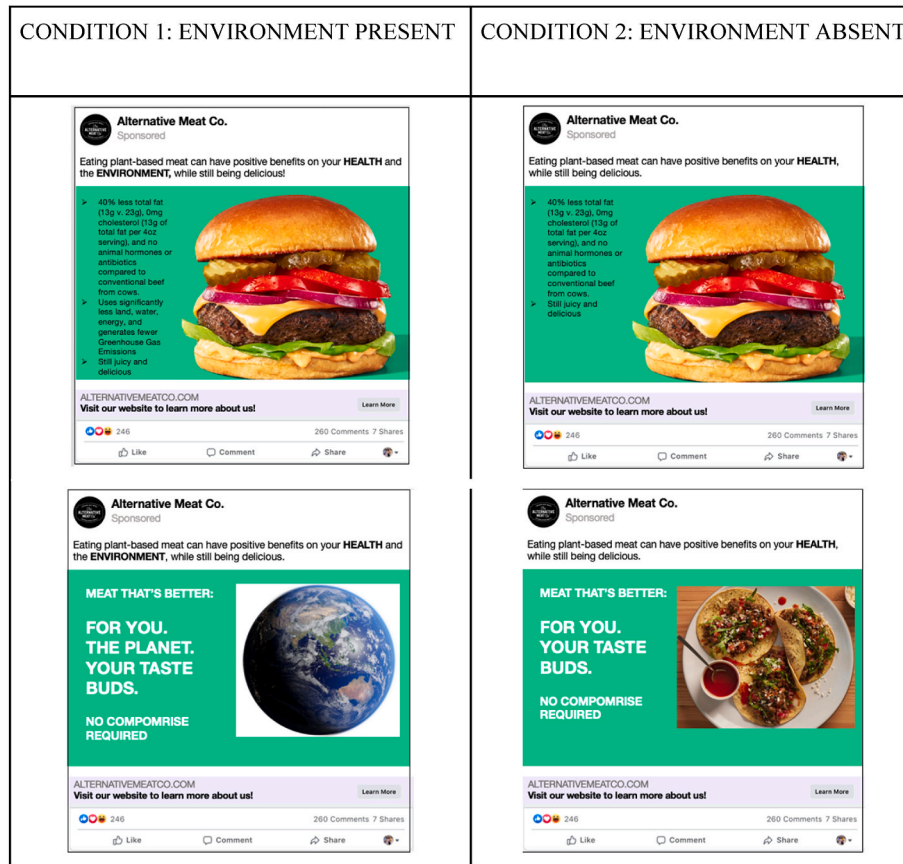


Fig. 1. Stimuli for study 3 “Environmental Benefit Present” or “Environmental Benefit Absent”.

“environmental benefit present” conditions ($M_{AdInterest} = 2.30$, $SD_{AdInterest} = 1.21$; $M_{Curiosity} = 3.47$, $SD_{Curiosity} = 2.15$). See Figs. 2 and 3 for visualization of these results.

An advertisement condition variable was created and coded as “1” for the “benefit absent” and “2” for “benefit present” conditions (see Fig. 4). Using the mediation procedures outlined by Hayes (2013) and the associated PROCESS macro, the indirect effect of advertisement condition on advertisement interest through curiosity was examined. The procedure indicated a nonsignificant direct path between advertisement condition and interest in the advertisement ($b = 0.06$, $t(189) = 0.90$, $p = .371$) and a significant path between advertisement condition

and curiosity ($b = -0.76$, $t(189) = -2.55$, $p = .012$). Curiosity influenced advertisement interest directly and significantly ($b = 0.54$, $t(189) = 32.80$, $p < .001$). Finally, mediation by curiosity was confirmed with a bootstrapped estimate. Using 10,000 bootstrap samples, the procedure indicated a significant indirect effect of advertisement condition on interest in the advertisement through curiosity ($b = -.41$, $p = .011$). The 95% confidence interval for this effect was smaller than zero (-0.74 , -0.10).

These results are in line with previous work that finds support for matching an advertisements’ message to the political ideology of the participant (Gromet et al., 2013; Kidwell, Farmer & Hardesty, 2013) and have important implications for the plant-based meat market that we describe below.

5. General discussion

The output from this research contributes to the growing literature on consumer behavior towards plant-based meat. Across three studies involving a pre-test, secondary data content analysis and an experiment, we demonstrate that political ideology offers an insightful psychographic basis to segment the plant-based meat population, with conservative consumers unlikely to embrace this protein source based on its current message framing. We specifically make three unique contributions: first, our results support the idea that conservative consumers (vs liberals) may be less likely to try plant-based meat and are generally less interested in it; second, we evaluate the message framing adopted by a large plant-based meat company to determine the categories of benefits promoted to persuade consumers to engage with the product. We find that taste, health and the environment are the main message content frames adopted. Third, through an experimental study design we find that message framing based on the environment is incongruent for conservative consumers. In fact, this framing may result in a barrier to

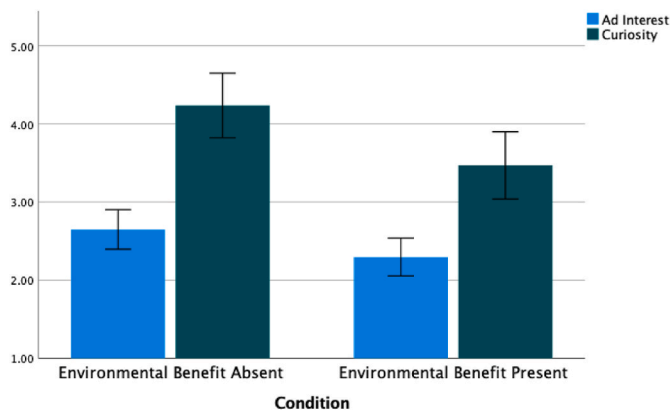


Fig. 2. Multivariate ANOVA comparing “Environmental Benefit Present” or “Environmental Benefit Absent” conditions on Advertisement Interest and Curiosity (Study 3).

Note. Error bars indicate 95% CI.

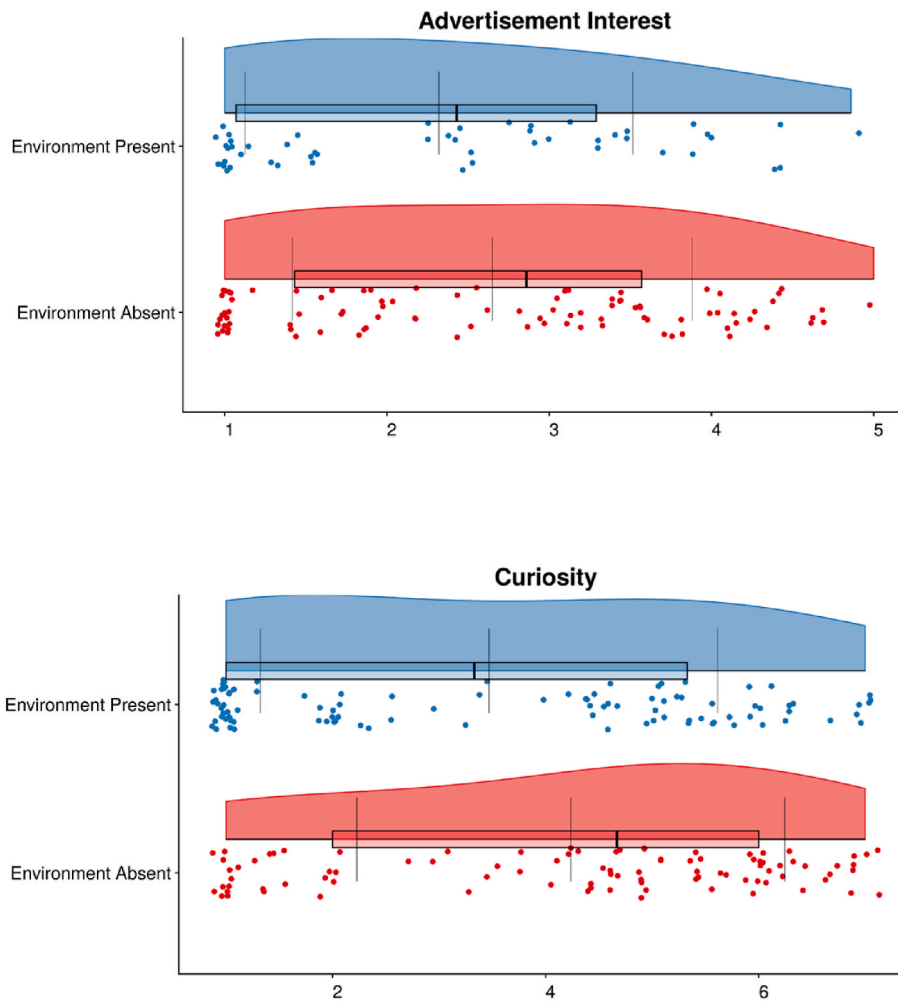


Fig. 3. Raincloud Plots with boxplots for Advertisement Interest and Curiosity (Study 3).
 Note. The raincloud plot represents the distribution of the responses on advertisement interest and curiosity by condition (Allen, Poggiali, Whitaker, & Marshall, 2019) and was created using the Raincloud Shiny App (<https://gabrifc.shinyapps.io/raincloudplots/>). Error bars indicate standard deviations.

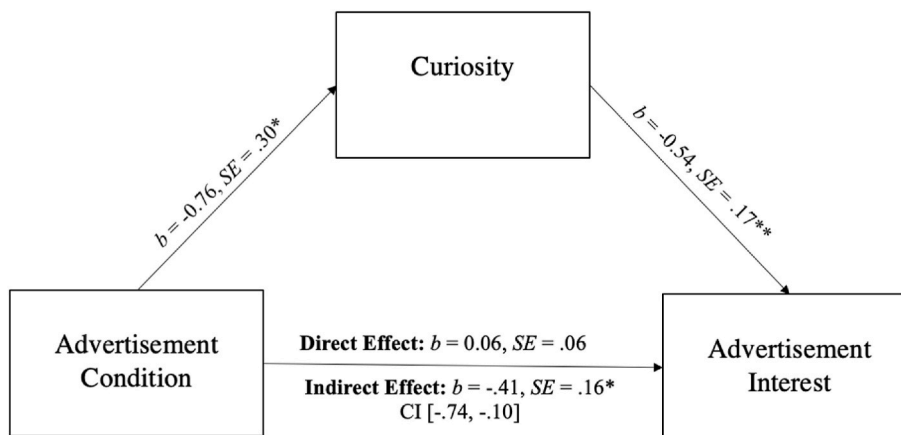


Fig. 4. Mediation model for the prediction of advertisement interest (study 3).

curiosity and interest in social media advertising content.

5.1. Conservative consumer attitudes

The current study adds to the discourse surrounding eating preferences across ideological categories. Previous work established a link

between conservative consumer values and food choices with Ruby (2012) demonstrating the association between eating animal meat with conservative ideological values. Furthermore, Milfont et al. (2021) add that conservative men are less likely than female liberals to transition from a meat to non-meat diet. In the synthetic and plant-based burger market, Slade (2018) established conservative reluctance to purchase

alternative burgers in a hypothetical choice experiment. While the conservative preference for eating meat and reluctance to adopt a vegetarian diet are established, our study contributes to the plant-based meat dialogue revealing an underlying reason why some conservative consumers may hold negative attitudes towards plant-based meat products: these attitudes could be formed through incongruent messages that simply do not resonate with a conservative consumer's value set. This outcome is problematic, as the plant-based meat market is no longer targeted to vegetarian or niche consumer groups; rather, the general population of omnivores are the target audience (Slade, 2018). Given this new positioning, our study adds an important insight showing that for the general omnivorous population, plant-based meat is unappealing to a large segment of conservative leaning consumers, which is partly attributable to advertising messaging that is incongruent. Furthermore, recent sales of plant-based meat have shown a plateau and decline. Young et al. (2022) suggest that this decline can be explained by three key factors: the higher cost of plant-based meat compared to animal meat, consumer confusion around the products' health properties and the perceived cultural resistance of 53% of consumers, some of whom regard plant-based meat as "woke." Connecting plant-based meat products to a liberal ideology compliments the work of (Slade, 2018) who claim omnivores link meat substitutes to vegetarianism which has a downstream connection to femininity, earthiness, and liberalism.

5.1.1. The importance of message congruence

Persuasive messaging plays an important role in shaping attitudes and subsequent behavioral choices. This study focuses on tailoring persuasive message appeals in the plant-based meat market using political ideology as a key moderating trait. The lens of political ideology offers a way to understand how peoples' worldview is expressed and influenced through their attitudes and behaviors. Congruent messages, which are tailored to resonate with an individual's psychological characteristics, in particular political ideology, are shown to have strong persuasive appeal (Kidwell et al., 2013); similarly, when messages are incongruent the result is a rejection of the message or appeal (Gromet et al., 2013). To understand message framing approaches in the plant-based meat market, we conducted a content analysis of a leading plant-based meat company's press releases. Taste, health and the environment form the key message content areas of the press releases. While this messaging may be effective for some consumers, our empirical study shows that in order to reach a wider proportion of the omnivore market, messaging with an environmental frame may in fact backfire for conservative consumers.

Our experimental study shows that using the environment as a message benefit when promoting plant-based meat may be acting as a barrier to conservative consumers' positive attitude formation. This reaction may be explained through the established body of research highlighting the efficacy of persuasive messaging when it is congruent with individual differences (e.g., Dodoo & Wen, 2019; Kivetz, 2005; Latimer et al., 2008). For example, Latimer et al. (2008) found that messages promoting physical activity that were congruent with participants' regulatory focus led to greater physical activity and positive feelings than non-congruent messages. The same findings emerge for studies examining message-political ideology congruence: congruence is more effective for changing attitudes and behaviors than incongruency (Kidwell, Farmer, & Hardesty, 2013; Septianto, Northey, and Dolan, 2019; van Esch et al., 2021). In our study, we find that when message content is congruent with ideological beliefs, curiosity in the advertisement is increased, which has a downstream effect on social media engagement behavior as people become more interested in the advertisement and want to learn more. Conversely, when the message content is incongruent with ideological beliefs there is a decline in curiosity and interest behavior.

Recognizing the complexity of food choice behavior via models such as the DONE framework, it is unrealistic to expect a consumer to move from a state of having never tried a novel food product to advance

straight to purchasing the product simply via exposure to a piece of advertising content. However, what is realistic is to expect exposure to advertising content to result in some advancement in the decision process. The hierarchy of effects model supports this reasoning, where exposure to advertising content is expected to result in a series of cognitive, affective and behavioral responses. The commonly applied AIDA (awareness, interest, desire, action) funnel illustrates the process of consumers moving from a state of being exposed to a brand or product generating awareness, through stages of learning and generating desire before taking action (for a review of hierarchy of effects models see, Barry & Howard, 1990). For those conservative leaning consumers who do have an interest in reducing their meat consumption or want to try a plant-based meat product, generating interest and desire are key. A message that is congruent with their political ideology is more likely to result in these positive outcomes than messages that are incongruent. Regarding the benefits that the message is based on, Vonk & Weiper (2022) suggest that positioning meat substitutes as a "technological victory of humans over nature" may appeal more to conservative leaning consumers. This approach takes a more creative interpretation of plant-based meat benefits compared to the three key benefits of taste, health and environment that are currently promoted by leading companies. Perhaps a combination of greater creativity in message base (Vonk and Weiper, 2022) alongside the approach of message congruence advocated for in the current study could lead to a meaningful change in consumer behavior.

5.2. Managerial outcomes

In order to reach those conservative consumers, who may have an interest in plant-based meat, it is recommended that messages are tailored to the political ideology of the target market; message content that is based on environmental concerns is more incongruent for conservative consumers and may act as a barrier to moving forward in the decision process. To overcome this, market segmentation tools could be optimized to identify the political affiliation of the target group with message content designed around the benefits of taste and health (excluding the environment) directed towards conservative consumers. To isolate consumers based on political ideology market research companies and advertising agencies can employ a suite of micro-targeting tools. In some instances, consumers may overtly display their political affiliation through icons or text in their social media profiles and this information can be used to isolate those groups. Less overt political affiliation can be inferred through tools that optimize the human digital footprint that is left behind by social media activity and online browsing. Companies including IBM StatSocial, Microsoft Azure Cognitive Services engage in a form of micro-targeting that identifies people's psychological profile based on their online activity (e.g., social media likes, purchases made online, tweets) (Matz et al., 2020). Meaning for example, a conservative consumer could be targeted using a series of reflective behaviors such as choice of news outlet or brand choice through expressing opinions online. Market research shows the partisan nature of news consumption in the US, with outlets like Fox and ABC News attracting conservative consumers while CNN and MSNBC have a more liberal leaning audience (Ross, 2020). Similarly, many brands such as Wrangler, Levis, Chick-fil-A, GMC and Coors have seen their consumer base consolidate around political identities (Kapner and Chinni, 2019). These preferences offer insight into the political identity of consumers online which can be used as part of a social listening strategy to identify consumers according to their political affiliation. Using this type of information alongside a geographic information system (GIS) can allow businesses to build an accurate picture of their consumer demographic meaning tailored message campaigns can be delivered to targeted groups of consumers that have more likelihood of resonating as they should be relevant to their interests and values (Ross, 2020).

5.3. Limitations and future research

The research presented here has some limitations and has also stimulated proposed ideas for future research directions. The first limitation is in the experimental study, which was designed to capture dependent variables, including curiosity and interest in the advertisement but did not capture actual food decision behavior. While purchase of a plant-based meat product is the ultimate end goal for plant-based meat companies, the study design presented in this research was aimed at an earlier stage of the consumer decision funnel. Achieving message congruence with appropriate framing has great potential to influence positive attitude formation, which in turn can lead to positive behavior such as curiosity, interest in advertisement content and finally purchasing of plant-based meat products. Furthermore, the role of consumer resistance as a dependent variable, could be an interesting future research direction, representing a counterpoint to the role of curiosity. The second limitation regards the sample; this study was restricted to US based consumers. Future research could examine other politically polarized countries to understand if the same communication barriers exist. Furthermore, our study focused on political ideology as a key identity marker. Future research could experiment with identity priming. If another identity (not political ideology) is more salient in the moment when advertising content is presented, will this affect consumer response to the environmental stimuli? For example, if consumers are in a future-oriented or long-term mindset as a parent, would the environmental framing be a more attractive benefit. This type of study could be designed to determine if there is a moderator or boundary condition around the role of environmental framing in the plant-based meat context. Finally, the focus of this research was on conservative consumer responses to tailored message benefits. It would be interesting to examine message framing in the context of liberal consumers to determine which tailored messaging approach would appeal to liberal consumers and encourage greater market growth from a more positively disposed consumer group. Furthermore, given the sample limitation of conservative consumers only, we cannot rule out the possibility that the effects found in our experiment (environmental benefits are unappealing) would not apply to liberal consumers. While literature suggests liberals are generally supportive of pro-environmental causes (Dunlap & McCright, 2008), we would expect liberals to respond well to environmental messaging around plant-based meat however, we cannot confirm or refute this.

5.4. Conclusion

The purpose of this study was to optimize marketing communications messaging of plant-based meat benefits to conservative consumers. Prior research revealed a connection between a consumers' political ideology and their food decision behavior; less clear was the underlying reasons why conservative leaning consumers may be reluctant to participate in the plant-based meat market. In our pre-test we first confirm the notion that conservative consumers (vs liberals) may be less likely to try plant-based meat and are generally less interested in it. To understand why this may be the case we examined how plant-based meat messaging is currently framed to consumers by analysing company press releases. We establish that taste, health and the environment are the key message frames that are used. An experimental study reveals that message framing based on the environment is incongruent for conservative consumers meaning that this type of messaging could be a barrier to curiosity and interest in social media advertising content. Ultimately, we hope that the results of this research will support researchers in understanding further the complexities of plant-based meat consumption and help practitioners to consider more relevant message frames to appeal to conservative consumers.

Author contributions

The work presented represents a research collaboration where both authors contributed equal effort. The second author (KHC) took a lead on the experimental design, data collection and analysis. The first author (JAY) wrote all sections of the manuscript and the second author provided feedback and revisions. Both authors read and approved the final manuscript.

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Ethics statement

The ethics approval of the current study was given by Babson College, USA before any data collection was started. All participants gave informed consent before taking part in the study.

Data

Data is available at the open science framework website <https://osf.io/p68r7/>

Declaration of competing interest

The authors have no competing interests to declare.

Data availability

Data is available at the open science framework website <https://osf.io/p68r7/>

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References

- Aaker, J. L., & Maheswaran, D. (1997). The effect of cultural orientation on persuasion. *Journal of Consumer Research*, 24(3), 315–328. <https://academic.oup.com/jcr/article-abstract/24/3/315/1800198>.
- Alfonseca, K. (2022). November 14). What does “woke” mean and why are some conservatives using it? ABC News. <https://abcnews.go.com/Politics/woke-conservatives/story?id=93051138>.
- Allen, M., Poggiali, D., Whitaker, K., & Marshall, T. R. (2019). Kievit. *RA Raincloud plots: A multi-platform tool for robust data visualization*. *Wellcome Open Research*, 4, 63.
- Allen, M. W., & Hung Ng, S. (2003). Human values, utilitarian benefits and identification: The case of meat. *European Journal of Social Psychology*, 33(1), 37–56. <https://doi.org/10.1002/ejsp.128>
- Allen, M. W., Wilson, M., Ng, S. H., & Dunne, M. (2000). Values and beliefs of vegetarians and omnivores. *The Journal of Social Psychology*, 140(4), 405–422. <https://doi.org/10.1080/00224540009600481>
- Barry, T. E., & Howard, D. J. (1990). A review and critique of the hierarchy of effects in advertising. *International Journal of Advertising*, 9(2), 121–135. <https://doi.org/10.1080/00224540009600481>
- Boeuf, B. (2019). Political ideology and health risk perceptions of food. *Social Science & Medicine*, 236, Article 112405. <https://doi.org/10.1016/j.socscimed.2019.112405>
- van den Broek, K., Bolderdijk, J. W., & Steg, L. (2017). Individual differences in values determine the relative persuasiveness of biospheric, economic and combined appeals. *Journal of Environmental Psychology*, 53, 145–156. <https://doi.org/10.1016/j.jenvp.2017.07.009>
- Calder, B. J., Malthouse, E. C., & Schaedel, U. (2009). An experimental study of the relationship between online engagement and advertising effectiveness. *Journal of Interactive Marketing*, 23(4), 321–331. <https://doi.org/10.1016/j.intmar.2009.07.002>
- Cesario, J., & Tory Higgins, E. (2008). Making message recipients “feel right”. *Psychological Science*, 19(5), 415–420. <https://doi.org/10.1111/j.1467-9280.2008.02102.x>

- Chan, E. Y. (2019). Political orientation and physical health: The role of personal responsibility. *Personality and Individual Differences*, 141, 117–122. <https://doi.org/10.1016/j.paid.2019.01.005>
- Crippa, M., Solazzo, E., Guizzardi, D., Monforti-Ferrario, F., Tubiello, F. N., & Leip, A. (2021). Food systems are responsible for a third of global anthropogenic GHG emissions. *Nature Food*, 2(3), 198–209. <https://doi.org/10.1038/s43016-021-00225-9>
- Dhont, K., & Hodson, G. (2014). Why do right-wing adherents engage in more animal exploitation and meat consumption? *Personality and Individual Differences*, 64, 12–17. <https://doi.org/10.1016/j.paid.2014.02.002>
- Dietz, T., Frisch, A. S., Kalof, L., Stern, P. C., & Guagnano, G. A. (2010). Values and vegetarianism: An exploratory analysis. *Rural Sociology*, 60(3), 533–542. <https://doi.org/10.1111/j.1549-0831.1995.tb00589.x>
- Doodoo, N. A., Wen, J., & Taylor, J. (2019). A path to mitigating SNS ad avoidance: Tailoring messages to individual personality traits. *Journal of Interactive Advertising*, 19(2), 116–132. <https://doi.org/10.1080/15252019.2019.1573159>
- Dunlap, R. E., & McCright, A. M. (2008). A widening gap: Republican and democratic views on climate change. *Environment: Science and Policy for Sustainable Development*, 50(5), 26–35. <https://doi.org/10.3200/ENVT.50.5.26-35>
- van Esch, P., Cui, Y., Gina, & Jain, S. P. (2021). The effect of political ideology and message frame on donation intent during the COVID-19 pandemic. *Journal of Business Research*, 125, 201–213. <https://doi.org/10.1016/j.jbusres.2020.12.040>
- Fatke, M. (2017). Personality traits and political ideology: A first global assessment. *Political Psychology*, 38(5), 881–899. <https://doi.org/10.1111/pops.12347>
- Fernandes, D., & Mandel, N. (2014). Political conservatism and variety-seeking. *Journal of Consumer Psychology: The Official Journal of the Society for Consumer Psychology*, 24(1), 79–86. <https://doi.org/10.1016/j.jcps.2013.05.003>
- Fisher, R. J., Vandenbosch, M., & Antia, K. D. (2008). An empathy-helping perspective on consumers' responses to fund-raising appeals. *Journal of Consumer Research*, 35(3), 519–531. <https://doi.org/10.1086/586909>
- Furnham, A., & Horne, G. (2022). Personality and demographic correlates of political ideology. *Personality and Individual Differences*, 186, Article 111320. <https://doi.org/10.1016/j.paid.2021.111320>
- Gallagher, K. M., & Updegraff, J. A. (2012). Health message framing effects on attitudes, intentions, and behavior: A meta-analytic review. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, 43(1), 101–116. <https://doi.org/10.1007/s12160-011-9308-7>
- Golebie, E. J., & van Riper, C. J. (2022). Enhancing aquatic invasive species outreach through values-framed messages. *Environmental Communication*, 1–20. <https://doi.org/10.1080/17524032.2022.2156574>
- Graham, T., & Abrahamse, W. (2017). Communicating the climate impacts of meat consumption: The effect of values and message framing. *Global Environmental Change: Human and Policy Dimensions*, 44, 98–108. <https://doi.org/10.1016/j.gloenvcha.2017.03.004>
- Gromet, D. M., Kunreuther, H., & Larrick, R. P. (2013). Political ideology affects energy-efficiency attitudes and choices. *Proceedings of the National Academy of Sciences of the United States of America*, 110(23), 9314–9319. <https://doi.org/10.1073/pnas.1218453110>
- Halkier, B. (2016). *Consumption challenged: Food in medialisised everyday lives*. Routledge. <https://www.taylorfrancis.com/books/mono/10.4324/9781315573755/consumption-challenged-bente-halkier>
- Hayes, A. F. (2013). Mediation, moderation, and conditional process analysis. *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*, 1, 20.
- Herziger, A., Berkessel, J. B., & Steinnes, K. K. (2020). Wean off green: On the (in) effectiveness of biospheric appeals for consumption curtailment. *Journal of Environmental Psychology*, 69, Article 101415. <https://doi.org/10.1016/j.jenvp.2020.101415>
- Hill, K. M., Fombelle, P. W., & Sirianni, N. J. (2016). Shopping under the influence of curiosity: How retailers use mystery to drive purchase motivation. *Journal of Business Research*, 69(3), 1028–1034. <https://doi.org/10.1016/j.jbusres.2015.08.015>
- Hirsh, J. B., Kang, S. K., & Bodenhausen, G. V. (2012). Personalized persuasion: Tailoring persuasive appeals to recipients' personality traits. *Psychological Science*, 23(6), 578–581. <https://doi.org/10.1177/0956797611436349>
- Hodson, G., & Earle, M. (2018). Conservatism predicts lapses from vegetarian/vegan diets to meat consumption (through lower social justice concerns and social support). *Appetite*, 120, 75–81. <https://doi.org/10.1016/j.appet.2017.08.027>
- Hultgren, J. (2018). Those who bring from the earth: Anti-environmentalism and the trope of the white male worker. *Ethics, Policy & Environment*, 21(1), 21–25. <https://doi.org/10.1080/21550085.2018.1447902>
- Ignaszewski, E. (2022). A deeper dive into plant-based meat sales in 2021." *the good food institute* (blog). March 24, 2022 <https://gfi.org/blog/a-deeper-dive-into-plant-based-meat-sales-in-2021/>.
- Jacques, P. J., Dunlap, R. E., & Freeman, M. (2008). The organisation of denial: Conservative think tanks and environmental scepticism. *Environmental Politics*, 17(3), 349–385. <https://doi.org/10.1080/09644010802055576>
- Jin, H. S. (2004). Compounding consumer interest. *Journal of Advertising*, 32(4), 29–41.
- Joshi, V. K., & Kumar, S. (2015). Meat Analogues: Plant based alternatives to meat products-A review. *International Journal of Food and Fermentation Technology*, 5(2), 107. https://www.researchgate.net/profile/Satish_Kumar94/publication/305317336_Meat_Analogues_Plant_based_alternatives_to_meat_products-A_review/links/5787c35008aef56ebcb51f1f/Meat-Analogues-Plant-based-alternatives-to-meat-products-A-review.pdf
- Jost, J. T. (2006). The end of the end of ideology. *American Psychologist*, 61(7), 651.
- Jost, J. T. (2017). The marketplace of ideology: "Elective affinities" in political psychology and their implications for consumer behavior. *Journal of Consumer Psychology: The Official Journal of the Society for Consumer Psychology*, 27(4), 502–520. <https://doi.org/10.1016/j.jcps.2017.07.003>
- Joyal-Desmarais, K., Scharmer, A. K., Madzlan, M. K., See, J. V., Rothman, A. J., & Snyder, M. (2022). Appealing to motivation to change attitudes, intentions, and behavior: A systematic review and meta-analysis of 702 experimental tests of the effects of motivational message matching on persuasion. *Psychological Bulletin*, 148(7–8), 465–517. <https://doi.org/10.1037/bul0000377>
- Judge, M., de Hoog, O., Perlaviciute, G., Contzen, N., & Steg, L. (2021). From toilet to table: Value-tailored messages influence emotional responses to wastewater products. *Biotechnology for Biofuels*, 14(1), 79. <https://doi.org/10.1186/s13068-021-01931-z>
- Jung, J., & Mittal, V. (2020). Political identity and the consumer journey: A research review. *Journal of Retailing*, 96(1), 55–73. <https://doi.org/10.1016/j.jretai.2019.09.003>
- Kapner, S., & Chinni, D. (2019). Are your jeans red or blue? Shopping America's partisan divide. *Wall Street Journal*. November 19, 2019 <https://www.wsj.com/articles/are-your-jeans-red-or-blue-shopping-americas-partisan-divide-115741857777>.
- Kemmelmeier, M. (2010). Authoritarianism and its relationship with intuitive-experiential cognitive style and heuristic processing. *Personality and Individual Differences*, 48(1), 44–48. <https://doi.org/10.1016/j.paid.2009.08.012>
- Kenny, D. A. (2017). *MedPower: An interactive tool for the estimation of power in tests of mediation* ([Computer software]).
- Kidwell, B., Farmer, A., & Hardesty, D. M. (2013). Getting liberals and conservatives to go green: Political ideology and congruent appeals. *Journal of Consumer Research*, 40(2), 350–367. <https://doi.org/10.1086/670610>
- Kim, J. C., Park, B., & Dubois, D. (2018). How consumers' political ideology and status-maintenance goals interact to shape their desire for luxury goods. *Journal of Marketing*, 82(6), 132–149. <https://doi.org/10.1177/0022242918799699>
- Kivetz, R. (2005). Promotion reactance: The role of effort-reward congruity. *Journal of Consumer Research*, 31(4), 725–736. <https://doi.org/10.1086/426606>
- Latimer, A. E., Williams-Piehot, P., Katulak, N. A., Cox, A., Mowad, L., Higgins, E. T., & Salovey, P. (2008). Promoting fruit and vegetable intake through messages tailored to individual differences in regulatory focus. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, 35(3), 363–369. <https://doi.org/10.1007/s12160-008-9039-6>
- Loewenstein, G. (1994). The psychology of curiosity: A review and reinterpretation. *Psychological Bulletin*, 116(1), 75–98. <https://doi.org/10.1037/0033-2909.116.1.75>
- Mann, T., Sherman, D., & Updegraff, J. (2004). Dispositional motivations and message framing: A test of the congruency hypothesis in college students. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, 23(3), 330–334. <https://doi.org/10.1037/0278-6133.23.3.330>
- Matz, S. C., Appel, R. E., & Kosinski, M. (2020). Privacy in the age of psychological targeting. *Current Opinion in Psychology*, 31, 116–121. <https://doi.org/10.1016/j.copsyc.2019.08.010>
- Mehrabian, A. (1996). Relations among political attitudes, personality, and psychopathology assessed with new measures of libertarianism and conservatism. *Basic and Applied Social Psychology*, 18(4), 469–491.
- Menon, S., & Soman, D. (2002). Managing the power of curiosity for effective web advertising strategies. *Journal of Advertising*, 31(3), 1–14. <https://doi.org/10.1080/00913367.2002.10673672>
- Milfont, T. L., Satherley, N., Osborne, D., Wilson, M. S., & Sibley, C. G. (2021). To meet, or not to meet: A longitudinal investigation of transitioning to and from plant-based diets. *Appetite*, 166, Article 105584. <https://doi.org/10.1016/j.appet.2021.105584>
- Mooney, C. (2015). Want to get conservatives to save energy? Stop the environmentalist preaching. *Washington Post*. (Accessed 12 February 2015).
- Nezlek, J. B., & Forestell, C. A. (2020). Vegetarianism as a social identity. *Current Opinion in Food Science*, 33, 45–51. <https://doi.org/10.1016/j.cofs.2019.12.005>
- Onwezen, M. C., Bouwman, E. P., Reinders, M. J., & Dagevos, H. (2021). A systematic review on consumer acceptance of alternative proteins: Pulses, algae, insects, plant-based meat alternatives, and cultured meat. *Appetite*, 159, Article 105058. <https://doi.org/10.1016/j.appet.2020.105058>
- Oyserman, D., & Schwarz, N. (2017). Conservatism as a situated identity: Implications for consumer behavior. *Journal of Consumer Psychology: The Official Journal of the Society for Consumer Psychology*, 27(4), 532–536. <https://doi.org/10.1016/j.jcps.2017.08.003>
- Pfeiler, T. M., & Eglolf, B. (2018). Examining the "Veggie" personality: Results from a representative German sample. *Appetite*, 120, 246–255. <https://doi.org/10.1016/j.appet.2017.09.005>
- Reber, R., Winkielman, P., & Schwarz, N. (1998). Effects of perceptual fluency on affective judgments. *Psychological Science*, 9(1), 45–48. <https://doi.org/10.1111/1467-9280.00008>
- Ross, C. (2020). Mapping consumer preferences for certain brands. *WhereNext Magazine*, 28, 2020. January <https://www.esri.com/about/newsroom/publications/wherenext/mapping-consumer-preferences-for-certain-brands/>.
- Ruby, M. B. (2012). Vegetarianism. A blossoming field of study. *Appetite*, 58(1), 141–150. <https://doi.org/10.1016/j.appet.2011.09.019>
- Septianto, F., Northey, G., & Dolan, R. (2019). The effects of political ideology and message framing on counterfeiting: The mediating role of emotions. *Journal of Business Research*, 99, 206–214. <https://doi.org/10.1016/j.jbusres.2019.02.059>
- Sha, L., & Xiong, Y. L. (2020). Plant protein-based alternatives of reconstructed meat: Science, technology, and challenges. *Trends in Food Science & Technology*, 102, 51–61. <https://doi.org/10.1016/j.tifs.2020.05.022>
- Slade, P. (2018). If you build it, will they eat it? Consumer preferences for plant-based and cultured meat burgers. *Appetite*, 125, 428–437. <https://doi.org/10.1016/j.appet.2018.02.030>

- Statista. (2022). *Market revenue of plant-based meat worldwide from 2016-2027 [Consumer market outlook]*. <https://www-statista-com.ezproxy.is.ed.ac.uk/forecasts/877369/global-meat-substitutes-market-value>.
- Stern, C., West, T. V., Jost, J. T., & Rule, N. O. (2013). The politics of gaydar: Ideological differences in the use of gendered cues in categorizing sexual orientation. *Journal of Personality and Social Psychology, 104*(3), 520–541. <https://doi.org/10.1037/a0031187>
- Stok, F. M., Hoffmann, S., Volkert, D., Boeing, H., Ensenauer, R., Stelmach-Mardas, M., Kiesswetter, E., Weber, A., Rohm, H., Lien, N., Brug, J., Holdsworth, M., & Renner, B. (2017). The DONE framework: Creation, evaluation, and updating of an interdisciplinary, dynamic framework 2.0 of determinants of nutrition and eating. *PLoS One, 12*(2), Article e0171077. <https://doi.org/10.1371/journal.pone.0171077>
- Sundar, S., & Kalyanaraman, S. (2004). Arousal, memory and impression-formation effects of animation speed in web advertising. *Journal of Advertising, 33*(1), 7–17.
- Symmank, C., Mai, R., Hoffmann, S., Stok, F. M., Renner, B., Lien, N., & Rohm, H. (2017). Predictors of food decision making: A systematic interdisciplinary mapping (sim) review. *Appetite, 110*, 25–35. <https://doi.org/10.1016/j.appet.2016.11.023>
- Tang, X., Renninger, K. A., Hidi, S. E., Murayama, K., Lavonen, J., & Salmela-Aro, K. (2022). The differences and similarities between curiosity and interest: Meta-analysis and network analyses. *Learning and Instruction, 80*, Article 101628.
- Tucker, C. A. (2014). The significance of sensory appeal for reduced meat consumption. *Appetite, 81*, 168–179. <https://doi.org/10.1016/j.appet.2014.06.022>
- United Nations. (2022). *World population projected to reach 9.8 billion in 2050. billion in 2100 | United Nations*. Retrieved June 22, 2022, from <https://www.un.org/en/desa/world-population-projected-reach-98-billion-2050-and-112-billion-2100>.
- Uskul, A. K., Sherman, D. K., & Fitzgibbon, J. (2009). The cultural congruency effect: Culture, regulatory focus, and the effectiveness of gain- vs. loss-framed health messages. *Journal of Experimental Social Psychology, 45*(3), 535–541. <https://doi.org/10.1016/j.jesp.2008.12.005>
- Vonk, R., & Weiper, M. L. V. (2022). Meat and interpersonal motives: The case of self-enhancement. *The Journal of Social Psychology, 1*. <https://doi.org/10.1080/00224545.2022.2132369>. –13.
- Wang, C., & Huang, Y. (2018). I want to know the answer! Give me Fish'n'Chips!": The impact of curiosity on indulgent choice. *Journal of Consumer Research, 44*(5), 1052–1067.
- Watkins, L., Aitken, R., & Mather, D. (2016). Conscientious consumers: A relationship between moral foundations, political orientation and sustainable consumption. *Journal of Cleaner Production, 134*, 137–146. <https://doi.org/10.1016/j.jclepro.2015.06.009>
- Wilks, M., & Phillips, C. J. C. (2017). Attitudes to in vitro meat: A survey of potential consumers in the United States. *PLoS One, 12*(2), Article e0171904. <https://doi.org/10.1371/journal.pone.0171904>
- Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., Jonell, M., Clark, M., Gordon, L. J., Fanzo, J., Hawkes, C., Zurayk, R., Rivera, J. A., De Vries, W., Majele Sibanda, L., ... Murray, C. J. L. (2019). Food in the anthropocene: The EAT–lancet commission on healthy diets from sustainable food systems. *The Lancet, 393*(10170), 447–492. [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4)
- Witzling, L., & Shaw, B. R. (2019). Lifestyle segmentation and political ideology: Toward understanding beliefs and behavior about local food. *Appetite, 132*, 106–113. <https://doi.org/10.1016/j.appet.2018.10.003>
- Wrenn, C. L. (2017). Trump veganism: A political survey of American vegans in the era of identity politics. *Societies, 7*(4), 32. <https://doi.org/10.3390/soc7040032>
- Wunsch, Nils-Gerrit (2022). *Beyond meat inc – statistics and facts* statista. December, 2022 https://www-statista-com.ezproxy.is.ed.ac.uk/topics/6016/beyond-meat-inc/#topicHeader_wrapper.
- Young, S., Baker, B., Cook, J., & Upadhyaya, J. (2022). *Plant-based meat gets a reality check*. September 27. Deloitte Insights; Deloitte <https://www2.deloitte.com/us/en/insights/industry/retail-distribution/future-of-fresh-food-sales/plant-based-meat-sales.html>.