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Tasty or sustainable? Goal conflict in plant-based food choice

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ABSTRACT

Marketers and policymakers navigate an evolving landscape where an increasing number of consumers are willing to consider the environmental impacts of meat consumption and shift towards plant-based proteins. This trend is exemplified by the increasing number of individuals who identify as flexitarians, preferring plant-forward diets though still consuming meat. Nevertheless, consumers juggle the conflicting desire for healthy and sustainable choices with the enjoyment of tasty food, which varies across contexts. Consequently, determining the appropriate framing for plant-based meat alternatives — when to emphasize health and sustainability or taste — poses a challenge not adequately addressed by previous research. This study delves into the nuanced impact of modifying goal salience by tailoring product attribute frames to align with contextual consumer goals, offering insights into engaging consumers with plant-based alternatives. These findings reveal that aligning a hedonic attribute frame with an active hedonic goal significantly enhances product engagement. Conversely, introducing a sustainability attribute frame in the presence of an active hedonic goal adversely influences taste expectations, leading to a decline in intentions to engage with the product. These insights offer valuable guidance for navigating the complexities of sustainable food choices and underscore the need to align messaging strategies with consumers' active goals.

1. Introduction

The over-consumption of animal-based foods is a significant contributor to climate change and can lead to negative health consequences. Addressing these challenges necessitates a fundamental shift toward plant-based diets. Consumers are aware of this and profess a willingness to reduce their meat intake (de Boer & Aiking, 2022; Hielkema & Lund, 2021), primarily based on health, sustainability, and ethical grounds (Bublitz et al., 2023). This is reflected in the growing number of individuals identifying as flexitarians — those who choose to reduce or limit their meat consumption in favor of plant-forward options, particularly in the younger generations (Mascaraque, 2021). Yet, when it comes to food choice, these consumption goals compete with other goals, such as the desire for tasty food (Liu & Haws, 2023). This poses a challenge for plant-based meat alternatives (PBMAs) that are associated with inferior taste to their meat counterparts (Michel et al., 2021; Vural et al., 2023). It will therefore be important for producers to formulate tasty PBMAs, but also for marketers and policy makers to position these products in a way that promotes consumer liking. Positioning plant-based foods as tasty or indulgent, by emphasizing their positive sensory properties, has been found to bolster their perceived allure (Papies et al., 2023; Turnwald & Crum, 2019) leading to heightened consumer interest and choice (Reinholdsson et al., 2023; Turnwald et al., 2017; Turnwald & Crum, 2019). However, certain studies have noted variable success rates in achieving these outcomes (Bacon & Krpan, 2018; Hielkema et al., 2022). Alternatively, focusing on sustainability or health plays into PBMAs' key strengths but may fail to convince consumers about the expected taste. While interventions focusing on sustainability appeals have demonstrated increased attractiveness or general preference (Erhard et al., 2023; Van Loo et al., 2020), others have yielded mixed results (Giezenaar et al., 2024; Piester et al., 2020). As these promotional strategies appear to be conflicting, there is likely no one-size-fits-all approach, and deciding when to employ each remains uncertain for producers and marketers of these products.

We aim to resolve this conflict by proposing a goal-conflict perspective on PBMA promotion. Integrating research streams on goal framing (Lindenberg & Papies, 2019; Lindenberg & Steg, 2007), food intuitions (e.g., Lazzarini, Zimmermann, Visschers, & Siegrist, 2016; Gonzales et al., 2023; Raghunathan et al., 2006), and goal conflict (Belei et al., 2012; Shah et al., 2002), we argue that frame effectiveness

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depends on its match with salient consumption goals and product-specific intuitions. Our integrative framework allows precise predictions about the conditions under which an attribute frame will be more or less effective. In so doing, we qualify previous findings that support either hedonism-based or health/sustainability-based framing strategies. Specifically, we demonstrate that different attribute framings (hedonic, health, and sustainability) influence consumer perceptions based on the goal context, with a particular focus on the crucial role of taste expectations, PBMA's Achilles heel. Our research delves into the mechanisms influencing expected taste of plant-based alternatives under various conditions, aiming to contribute valuable insights beyond traditional approaches.

From a practical perspective, our integrative framework offers guidance to both marketers and policy makers aiming to facilitate PBMA consumption. Policy interventions typically revolve around education on healthy and sustainable diets, and so too do the advertising campaigns of many PBMAs, operating on the rational cognitive level. Despite these efforts, unhealthy and unsustainable diets persist, indicating the shortcomings of traditional approaches. We suggest an alternate strategy that intuitively addresses goal conflict by aligning goal frames, offering a fresh perspective on promoting plant-based alternatives.

2. Theoretical framework

2.1. Categorization and expectation formation

Consumers tend to categorize foods into vices (hedonic food) and virtues (functional food) (Wertenbroch, 1998) and form performance expectations based on these categories. When we see an ice cream next to a frozen yogurt, for example, we will likely categorize them as relative vice and virtue, respectively (Wertenbroch, 1998), and may form an expectation that the ice cream is tastier, because of the well-documented "unhealthy = tasty" intuition (Raghunathan et al., 2006). Unlike ice cream, PBMAs are often considered virtue foods (Jahn et al., 2021). Consequently, they are commonly associated with sustainability and healthfulness even when considering variations in nutritional profiles and the highly processed nature of some meat-mimicking products (Gonzales et al., 2023; Ketelings et al., 2023). Interestingly, consumers perceive PBMAs to be healthier because of the broad conversation on health risks stemming from meat consumption (He et al., 2020). Additionally, they often employ a "sustainable = healthy" intuition in their food choices (Lazzarini, Zimmermann, Visschers, & Siegrist, 2016), which contributes to health perceptions. The robustness of healthfulness perceptions around PBMAs extends beyond their actual nutritional profiles, suggesting the presence of a health halo (Gonzales et al., 2023).

A downside of these favorable inferences is the expectation that PBMAs have inferior taste than their meat counterparts. Based on the "unhealthy = tasty" intuition that posits an inverse relationship between hedonic and functional attributes in food (Raghunathan et al., 2006), strong health perceptions surrounding PBMAs may contribute to negative taste expectations, even among those who have never tasted them before. The impact of sustainability perceptions on taste is less clear, and it is plausible that sustainability indirectly signals inferior taste through its connection with healthfulness. Ethical food claims, aligned with these intuitions, have been shown to negatively influence expected taste (Giezenaar et al., 2024; Schuldt & Hannahan, 2013; Stremmel et al., 2022), while simultaneously, sustainable attributes may trigger a cognitive bias known as the "virtue halo" or "eco-label effect," leading to more favorable judgments about overall product qualities, including taste (Sörqvist et al., 2015).

Concluding, there is robust evidence that consumers perceive PBMAs as both highly sustainable and healthy. It is these very benefits, however, that may backfire on taste expectation formation. Research suggests that taste expectations play a pivotal role in food choice, and they may trump sustainability and health perceptions (European Commission, 2020). Because intuitions like the one associating healthful food with inferior taste tend to change slowly, marketers and policy makers interested in facilitating plant-based diets need to find ways to promote PBMAs beyond the traditional trope of appealing to moral values. We argue that well-tailored goal frames may serve as an effective method to improve perceptions of poor taste associated with PBMAs.

2.2. Goal framing

While consumers form expectations on foods' healthfulness, taste, and sustainability based on categorization, marketers can proactively promote one of these aspects. In the US, for example, nearly all meat analogs boast some nutritional claim (Lacy-Nichols et al., 2021), illustrated by Morning Star's claims of lower fat percentages than beef. Concurrently, eco-labels have gained widespread adoption, and range from certified sustainability labels such as USDA Organic to industry-led labels such as Quorn's carbon footprint label. Examples of advertising slogans used by companies to promote plant-based alternatives are showcased in Table 1.

Labels and claims can highlight a specific eating goal, and by way of salience-effects, these activated goals frame attention, influence attitudes, and direct goal-oriented behavior (Lindenberg & Steg, 2007). The hedonic goal frame represents the desire for indulgent, satisfying foods, often triggered by "vice foods" like ice cream or in fast-food settings (Maehle, Iversen, Hem, & Otnes, 2015). Functional goal frames relate to improving own resources, such as finances or health (Lindenberg & Steg, 2007). The moral goal frame is driven by individual moral principles and ethical considerations regarding right and wrong (Lindenberg & Steg, 2007; Onwezen, 2023).

Behavioral interventions for promoting sustainable food choices often do not give prominence to the hedonic goal frame; instead, they emphasize the significance of moral goal frames, highlighting the collective aspect over individualistic goals like the functional or hedonic goal frame. This practice seems justified as studies reveal that emphasizing the hedonic goal frame can be counterproductive in promoting sustainable food choices. For instance, in a study manipulating goal

Table 1
Advertising Slogans for Plant-Based Alternatives.

Brand	Advertising Claim/Slogan
Moral/functional attribute frames	
Like Meat (United States)	*"Guilt free."*
Planted (Germany)	*"Eat better for climate protection."*
Just Egg (United States)	*"Plants don't get the flu."*
Daring (United States)	*"Chicken is broken."*
Beyond Steak (United States)	*"Now cheesesteaks are good for you."*
Sunfed (New Zealand)	*"Nutrient dense. High performance nutrition."*
Hedonic attribute frames	
Morning Star Farms (United States)	*"Say hello to big, bold flavor."*
Tofurky (United States)	*"Yum for all."*
Tyson Foods (United States)	*"100 % delicious. 0 % compromise."*
Beyond Burger (United States)	*"Now even meatier."*
Gardein (Canada)	*"Finally, a plant-based burger that looks, cooks, smells, and satisfies like real meat."*
The Vegetarian Butcher (Netherlands)	*"Irresistibly tasty."*
Combined attribute frames	
Quorn (United States)	*"They're delicious and are kind to the planet's resources too. Win Win."*
Hungry Planet (United States)	*"When passion for the delicious meets an appetite for a just world."*
THIS (United Kingdom)	*"High in protein, waay lower in saturated fat than meat, yet FULL of flavour."*

framing to influence consumer choices of organic tomatoes, a hedonic goal frame heightened the significance of the tomato's superficial appearance but did not improve overall preference for organic products (Thøgersen & Alfinito, 2020). Another study revealed that individuals expressed lower intentions to purchase sustainable groceries when the hedonic goal frame was more salient (on vacation) compared to less salient (at home) (Doran et al., 2022). These findings underscore the crucial role of fostering a sense of responsibility and moral obligation towards society and our collective future in driving the transition towards sustainable food systems (Bauer et al., 2021; Siegrist & Hartmann, 2019; White et al., 2019).

However, the growing prevalence of flexitarians, a sustainability-minded consumer segment unwilling to compromise on taste, has led to an upsurge in marketing PBMAs with a focus on taste (European Union's Horizon 2020 research and innovation programme, 2021). Beyond Meat's CEO, Ethan Brown, recognizes the strategic potential of empowering consumers to associate sustainability with fulfilling their taste preferences, a concept he terms "hedonistic altruism" (Gelles, 2021). Acknowledging this, there is an opportunity to promote consumption of individual sustainable products by strategically repositioning through a hedonic frame. Notably, taste-focused labels and indulgent descriptions have been found to better promote individual plant-based dishes than a control condition, or health-focused or vegetarian descriptors (Bacon & Krpan, 2018; Erhard et al., 2023; Piester et al., 2020; Turnwald & Crum, 2019).

2.3. A goal-conflict perspective of eating goals and goal framing

The previous discussion indicates that consumers form both favorable (e.g., superior health and sustainability) and unfavorable (e.g., inferior taste) expectations about PBMAs, and that attempts at promoting any of these aspects do not yield consistent results. We argue that, in order to resolve this issue, we need to fully consider the individually active eating goals and their interplay with category-based expectations and goal framing. Specifically, the lack of consensus on how to best frame PBMAs may be due, in part, to the varying active goals in consumers' minds during consumption situations. For example, when consumers have a hedonic goal actively guiding their choices, confronting a sustainability frame introduces societal concerns, shifting the focus from individual pleasure-seeking to the broader, collective well-being. Goal conflict arises when multiple competing goals are simultaneously active, often leading to aversive states that consumers seek to resolve by reducing consumption of conflicting foods or avoiding information that causes perceived hedonic loss (Belei et al., 2012; Ramanathan & Williams, 2007). This aligns with humans' self-regulatory capacity to navigate goal conflict through goal shielding — a process where individuals focus on one primary goal at a time while inhibiting alternate goals (Shah et al., 2002). If an active hedonic goal is shielded, for example, moral appeals will necessarily become less effective, implying that promoting a "best of both worlds" product is not always optimal (Belei et al., 2012). The consideration of goal conflict and goal shielding thus sheds light on the found inefficacy of a previous attempt to promote plant-based choices by combining hedonic and moral frames (Reinholdsson et al., 2023).

To reduce goal conflict, a direct approach is to align product attribute frames directly with active goals. When a hedonic goal is active, for example, conflicting health and sustainability frames should be less effective than a matching hedonic frame. This is particularly true for taste expectations. We anticipate that a matching hedonic frame will enhance the perceived taste more effectively than a health attribute frame, given that health cues may inadvertently signal inferior taste (Raghunathan et al., 2006). Additionally, we anticipate that the hedonic attribute frame will outperform a sustainability attribute frame in enhancing taste expectations. This anticipation stems from the potential for sustainability cues to inadvertently imply inferior taste via an association with healthfulness, which is commonly associated with lower taste expectations. Consequently, we formulate our first set of hypotheses:

H1a: When a hedonic goal is active, a health (vs. hedonic) attribute frame will decrease taste expectations of PBMAs.

H1b: When a hedonic goal is active, a sustainability (vs. hedonic) attribute frame will decrease taste expectations of PBMAs.

When a health goal is active, though, it is the hedonic frame that creates goal conflict, while health appeals avoid it. Using health appeals is not without its own challenges, however. Despite the lack of goal conflict in the case of a goal-frame match, a very salient health signal may limit the effect on expected tastiness due to the "unhealthy = tasty" intuition (Raghunathan et al., 2006). Nonetheless, we expect some positive effect of goal conflict avoidance, albeit small, in the case of an active health goal paired with a health-framed attribute, meaning that the negative effect described in H1a could become a negative-yet-small effect.

To circumvent the undesired taste inference when health is a primary concern, an alternative framing that avoids triggering the "unhealthy = tasty" intuition while minimizing goal conflict can be utilized, such as a sustainability attribute frame. The evident "sustainable = healthy" intuition indicates that health and sustainability goal frames are in alignment (Lazzarini et al., 2016), and do not produce goal conflict when both are made salient. In such a state, the sustainability attribute frame may impart positive perceptions of taste by way of the "virtue halo" effect, which may even fully balance out the advantage of hedonic framing. Therefore, we propose:

H2a: When a health (vs. hedonic) goal is active, the negative effect of a health (vs. hedonic) attribute frame on taste expectations will be mitigated.

H2b: When a health (vs. hedonic) goal is active, the negative effect of a sustainability (vs. hedonic) attribute frame on taste expectations will be offset.

In a similar vein, when consumers are focused on a sustainability goal, a hedonic frame will evoke conflict when health and sustainability attribute frames will not. Importantly, goal shielding implies that an active sustainability goal may dampen the impact of the "unhealthy = tasty" intuition. Consequently, a sustainability goal paired with a health attribute frame may have the same expected taste implications as a hedonic frame. A sustainability frame, because of the goal-frame match and lack of any undesirable intuition – clearing the way for a strong "virtue halo" effect – may even lead to better taste expectations than the hedonic frame when paired with a conflicting goal. We thus hypothesize:

H3a: When a sustainability (vs. hedonic) goal is active, the negative effect of a health (vs. hedonic) attribute frame on taste expectations will be offset.

H3b: When a sustainability (vs. hedonic) goal is active, the negative effect of a sustainability (vs. hedonic) attribute frame on taste expectations will be reversed.

Lastly, we expect taste expectations to mediate the effects of framing and goal activation on product engagement. The mediating role of taste expectations is rooted in the repeatedly found relevance of taste in food decision making (European Commission, 2020; Smeding et al., 2023) as well as the strong category-based sustainability and health inferences that are likely to withstand any framing attempts. Put formally:

H4: Through taste expectations, framing and goal activation influence product engagement.

3. Methods

3.1. Data collection

A total of 743 American participants were recruited from the online panel provider Prolific. Prior to data collection, the study procedure was reviewed by the Ethics Committee at the university of the first author, and subsequently received ethical approval. All participants provided

informed consent before participation in this study. Participants who did not complete the entire questionnaire were excluded from the analysis. Individuals who failed the attention check were prematurely terminated in the survey flow, resulting in incomplete responses and their subsequent exclusion from data analysis. Furthermore, participants adhering to a meat restricting diet (per self-report in a post-task survey question) were paid but excluded to avoid priming vegetarian food choices (no explicit mention of meat or plant-based foods was made during the recruitment process for the same reason). After these exclusions (~9%), 678 participants remained.

The sample consisted of 47.9 % women, 48.8 % men, and 3.3 % non-binary or preferred not to say. The mean age was 37.9 years (SD = 14.2). Most (87.6 %) participants reported following an omnivorous diet, followed by flexitarians (12.4 %). Regarding the highest level of education, 0.9 % preferred not to say or reported some high school or less, 15.8 % reported high school or GED, 26.3 % reported some college, but no degree, 10.5 % reported an associates or technical degree, 32.3 % reported a bachelor's degree, and 14.3 % reported a graduate or professional degree.

3.2. Study design

This study employed a 3 (attribute frame: hedonic vs. healthy vs. sustainable) × 4 (active goal: hedonic vs. healthy vs. sustainable vs. none) between-subjects design. Participants were randomly assigned to a goal activation condition via a writing prompt asking them to reflect on how either a hedonic, health, or sustainability goal is important in their own lives, e.g., "Please write at least two sentences indicating why it is personally important for you to enjoy life and take pleasure in what you eat." For completeness, a control condition was included in which no goal was activated; participants were prompted to reflect on a neutral topic (see Appendix A for a complete list of goal activation prompts). This prompt was adapted from the goal priming technique administered by Bryksina (2020).

Following this task, individuals were asked to imagine that they were at a restaurant they regularly visit, and a new dish was on offer. The dish (plant-based chicken nuggets) was presented in an image under the title "Veggie nuggets – Made with whole soybeans" and displayed on a white plate with neutral background (see Fig. 1 and Appendix B for a complete list of all framed stimuli). Participants were randomly assigned to one of the three attribute frames, i.e., the product was labeled as either a tasty, healthy, or sustainable choice. The main dependent variable was product engagement (participants' intentions to recommend, try, and purchase the product).

In selecting the stimuli, we aimed to choose a plant-based product that replaces a universally familiar meat product. The ubiquity of the chicken nugget and availability of plant-based alternatives to the chicken nugget made this product a good example.

3.3. Measures

Taste, health, and sustainability expectations were measured on 7-point Likert-scales from "not tasty/healthy/sustainable" to "tasty/healthy/sustainable", each with a single item, i.e., "How tasty/healthy/sustainable would you rate this food?".

Fig. 1. Plant-based nugget stimulus.

Product engagement was measured with three items: "How likely would you be to recommend this food to a friend?", "How likely would you be to give this food a try?", and "How likely would you be to order this food?". These items were adapted from established measures of behavioral intentions to try (Pelchat & Pliner, 1995; Sucapane et al., 2021), recommend (Mediano Stoltze et al., 2021), and purchase (Mediano Stoltze et al., 2021) products that have been shown to predict the adoption of novel and healthy foods. Together, willingness to purchase and recommend have been used as complementary measures to evaluate behavioral intentions to engage with food products (Mediano Stoltze et al., 2021). Answers were provided on a slider scale from 0 to 100, where participants could select values at discrete 10-point intervals (e.g., 0, 10, 20, etc.). Anchor words "extremely unlikely", "neither likely nor unlikely", and "extremely likely" helped define these points.

To verify the unidimensionality of these items, a maximum-likelihood factor analysis was conducted. The analysis confirmed that all three items significantly loaded onto a single factor, with loadings of 0.848, 0.880, and 0.965, explaining 80.9 % of the variance, which supports the items' strong association with a single underlying construct of product engagement. The Cronbach's alpha of our three product engagement items was 0.92, indicating a high level of internal consistency.

Familiarity with plant-based meat alternatives was measured with a single item, "How frequently do you eat plant-based meat alternatives?", and possible answers were "never", "rarely", "one to three times a month", "one to four times a week" or "everyday or almost everyday", and "multiple times a day". This scale was modeled after an item developed by Lea and Worsley (2001).

Belief in intuitions were measured on 7-point Likert-scales from "strongly agree" to "strongly disagree" with statements on the belief that foods that are unhealthy = tasty, sustainable = healthy, unsustainable = tasty. Belief in the unhealthy = tasty intuition was measured with the item taken from Raghunathan et al. (2006) ("Food that is unhealthy generally tastes better"). Secondarily, we included an item with the reverse formulation of this belief: "Food that is healthy is generally not tasty". Belief in the other intuitions were measured with items mirroring this structure. These questions were asked together with questions on belief in other intuitions (such as healthy foods are expensive) to make the intent of these questions less obvious to the participant.

Socio-demographics were measured at the end of the survey, at which point all participants were asked to verify their age, gender, dietary preference, and highest level of education.

Attention check. An attention check was included in the survey (i.e., "To show that you are paying attention, please select the "neither agree nor disagree" option as your answer").

3.4. Data analysis

We descriptively examine belief in intuitions and conduct a model-free examination of product attributes before conducting hypothesis testing. To test our conceptual model, we conducted a moderated mediation analysis with 10,000 bootstrap samples (see Model 7 in Hayes, 2018). Indicator coding was used for the independent variable to estimate the effect of a health and sustainability framing compared to a hedonic framing. Likewise, indicator coding was used for the moderator to estimate the effect of the activation of health and sustainability goals, as well as the control condition (i.e., no active goal), compared to an active hedonic goal. An active hedonic goal was set as the reference level rather than the control to allow for assessment of goal conflict.

4. Results

4.1. Belief in intuitions

We assessed participants' endorsement of intuitions to ensure alignment with the concept of an inherent conflict between taste and health, as well as taste and sustainability. Furthermore, we sought to confirm the participants' adherence to the belief in the synergy between health and sustainability. MANOVA results revealed no significant multivariate effect of goal activation ($F(12, 1995) = 1.41$, $p = 0.155$), frame type ($F(8, 1328) = 0.89$, $p = 0.520$), or their interaction ($F(24, 2664) = 0.54$, $p = 0.965$) concerning these beliefs. On aggregate, participants expressed a robust belief in the intuition that unhealthy foods are tasty, as indicated by an above-neutral mean rating on the 7-point Likert scale ($M = 5.04$, $SD = 1.46$, $Mdn = 5$) and a left-skewed distribution (see Fig. 2). Conversely, the reverse formulation (i.e., healthy foods are not tasty) received average ratings below the neutral point ($M = 3.46$, $SD = 1.63$, $Mdn = 3$). Moreover, the correlation of these two items was 0.64 indicating a moderate association. Lastly, participants expressed a belief in the "sustainable = healthy" intuition ($M = 4.82$, $SD = 1.33$, $Mdn = 5$) and held a nearly neutral stance towards the belief that unsustainable foods are tasty ($M = 4.25$, $SD = 1.38$, $Mdn = 4$).

4.2. Model-free evidence

On average, the veggie nugget received ratings above the "neutral" benchmark for healthiness ($M = 4.65$, $SD = 1.57$) and sustainability ($M = 4.89$, $SD = 1.47$). In contrast, participants expected the veggie nugget to be less tasty than the "neutral" benchmark on a 7-point scale ($M = 3.46$, $SD = 1.60$). This pattern is in line with our prediction of category-based expectation formation that is further influenced by intuitions. Table 2 additionally shows means and standard deviations of attribute ratings across conditions. An initial inspection reveals that taste expectations vary across conditions, while health and sustainability expectations do not. For example, taste expectations are highest in an aligned hedonic goal-frame condition but also an aligned sustainability goal-frame condition ($Ms = 3.92$ and 3.84, respectively). By contrast, taste expectations are lower in a hedonic goal-sustainability frame as well as sustainability goal-hedonic frame condition ($Ms = 3.20$ and 3.50, respectively). In a next step, we will examine this pattern in detail.

4.3. Hypotheses testing

To jointly examine the influence of attribute framing, the moderating role of active goals, and the mediating role of taste expectations, we use moderated mediation analysis with 10,000 bootstrap samples (see PROCESS model 7; Hayes, 2018). We present results for a model with gender (female = 1), age, and unfamiliarity with PBMAs as covariates but present results without covariates in Appendix C. Notably, consideration of covariates does not affect the interpretation of results.

4.3.1. Taste expectations

Compared to the baseline condition characterized by an active hedonic goal, health goal activation is not associated with taste expectations ($b = -.30$, $SE = 0.28$, $t = 1.10$, $p = 0.273$). Sustainability goal activation has a negative, marginally significant effect on taste expectations ($b = -.50$, $SE = 0.29$, $t = 1.69$, $p = 0.092$), and a neutral goal decreases taste expectations, compared to a hedonic goal ($b = -.72$, $SE = 0.27$, $t = 2.67$, $p = 0.008$). As expected, a health (vs. hedonic) attribute frame is associated with decreased taste expectations ($b = -.64$, $SE = 0.27$, $t = 2.41$, $p = 0.016$). Similarly, a sustainability (vs. hedonic) attribute frame is associated with decreased taste expectations as well ($b = -.61$, $SE = 0.28$, $t = 2.18$, $p = 0.030$). These findings support our hypotheses that a health attribute frame (**H1a**) and a sustainability attribute frame (**H1b**) decrease taste expectations when contrasted with a hedonic frame. In other words, a hedonic frame more effectively increases taste expectations of PBMAs than a health or sustainability frame when consumers have an active hedonic goal.

In terms of moderation, significant interaction effects are found between the health frame and sustainability goal activation ($b = 1.09$, $SE = 0.40$, $t = 2.74$, $p = 0.006$) as well as the sustainability frame and sustainability goal activation ($b = 1.16$, $SE = 0.41$, $t = 2.85$, $p = 0.005$). A spotlight analysis indicates that when a sustainability goal is active, the negative effects of the non-hedonic frames on taste expectation are mitigated. Specifically, and in support of **H3a**, a health (vs. hedonic) attribute frame is no longer associated with decreased taste expectations ($b = 0.45$, $SE = 0.30$, $t = 1.52$, $p = 0.130$). For the sustainability (vs. hedonic) attribute frame, the positive effect is even marginally significant ($b = 0.56$, $SE = 0.30$, $t = 1.86$, $p = 0.063$), indicating a reversal as predicted in **H3b**. Fig. 3 displays these effects.

Although we also find non-significant differences in taste expectations between healthy/sustainable (vs. hedonic) frames when a health goal is active (health frame: $b = -.11$, $SE = 0.29$, $t = 0.37$, $p = 0.708$; sustainability frame: $b = -.22$, $SE = 0.28$, $t = 0.77$, $p = 0.441$), the

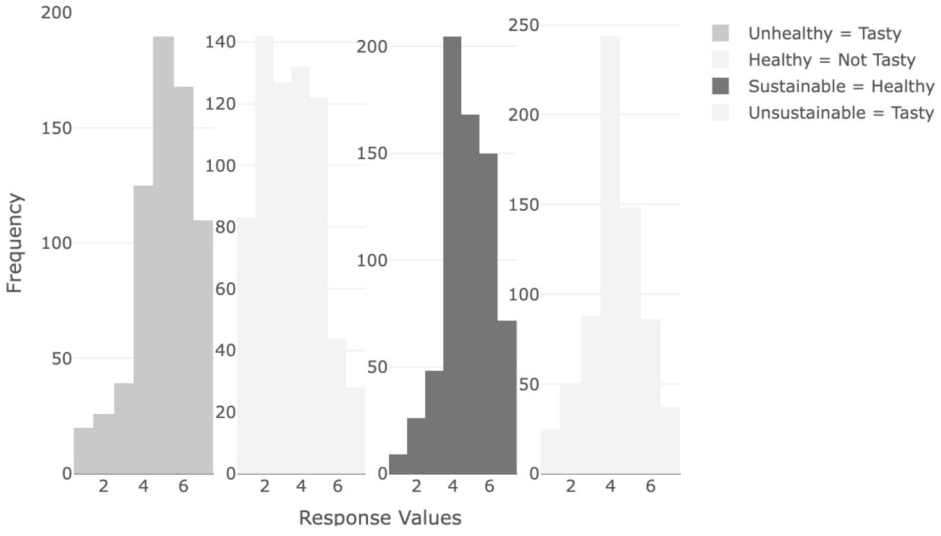

Fig. 2. Distribution of belief in intuitions.
Note. Response values were provided on 7-point Likert scales.

Table 2
Means (M) and Standard Deviations (SD) for Taste, Health, and Sustainability Expectations and Product Engagement by Experimental Condition.

	Taste Expectations		Health Expectations		Sustainability Expectations		Product Engagement	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Full Sample	3.46	1.60	4.65	1.57	4.89	1.47	3.66	2.89
Hedonic Goal								
Hedonic Goal x Hedonic Frame (N = 62)	3.92	1.58	4.87	1.44	5.05	1.48	4.50	2.98
Hedonic Goal x Health Frame (N = 65)	3.20	1.52	4.65	1.60	4.75	1.45	3.21	2.61
Hedonic Goal x Sust. Frame (N = 54)	3.20	1.76	4.78	1.77	5.00	1.78	3.40	2.97
Health Goal								
Health Goal x Hedonic Frame (N = 57)	3.46	1.69	4.72	1.74	4.84	1.33	3.54	2.70
Health Goal x Health Frame (N = 50)	3.48	1.50	4.58	1.26	5.08	1.10	3.95	2.62
Health Goal x Sust. Frame (N = 57)	3.35	1.58	4.68	1.45	4.81	1.62	3.49	2.93
Sustainability Goal								
Sust. Goal x Hedonic Frame (N = 46)	3.50	1.64	4.39	1.86	4.76	1.65	3.73	3.06
Sust. Goal x Health Frame (N = 57)	3.89	1.55	4.84	1.60	4.91	1.52	4.27	2.75
Sust. Goal x Sust. Frame (N = 56)	3.84	1.53	4.66	1.55	5.18	1.40	4.21	2.96
Neutral Goal								
Neutral Goal x Hedonic Frame (N = 60)	3.20	1.71	4.45	1.62	4.75	1.60	3.34	3.18
Neutral Goal x Health Frame (N = 53)	2.87	1.57	4.68	1.58	4.66	1.33	2.60	2.74
Neutral Goal x Sust. Frame (N = 61)	3.56	1.37	4.44	1.40	4.92	1.32	3.62	2.84

Note. Product engagement was measured as average intentions to recommend, try, and order the product.

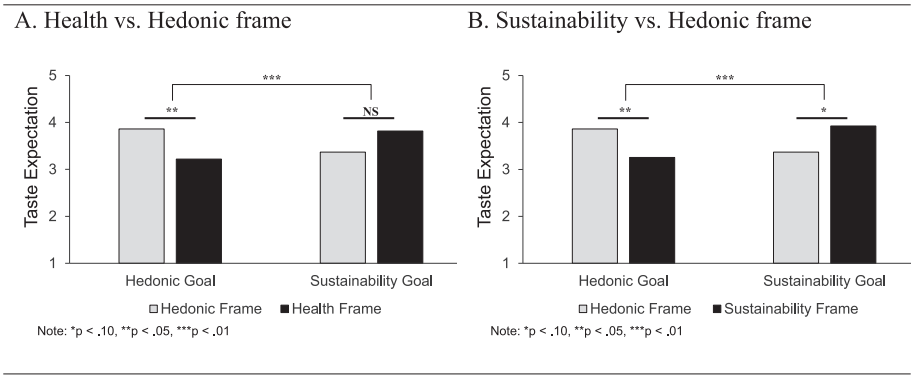

Fig. 3. Moderating effects of frame and goal on taste expectations.

mitigations are too small to indicate significant interactions (health frame: b = 0.53, SE = 0.39, t = 1.35, $p = 0.177$; sustainability frame: b = 0.39, SE = 0.40, t = 0.99, $p = 0.325$). Thus, the hypotheses that a health (vs. hedonic) goal would mitigate the negative effect of a health attribute frame (**H2a**) and offset the negative effect of a sustainability attribute frame (**H2b**) on taste expectations are rejected.

The interaction between a health (vs. hedonic) frame and neutral goal activation is non-significant as well (b = 0.50, SE = 0.39, t = 1.28, $p = 0.2020$). By contrast, we find a positive and significant interaction between a sustainability (vs. hedonic) frame and neutral goal activation (b = 1.01, SE = 0.39, t = 2.58, $p = 0.010$). The latter finding indicates that when a neutral goal is active, hedonic and sustainability frames are equally effective when it comes to influencing taste expectations of PBMAs (b = 0.40, SE = 0.27, t = 1.47, $p = 0.143$).

4.3.2. Health and sustainability expectations

In terms of health and sustainability expectations, no direct effects or interactions are observed (all $ps > 0.08$), except for reduced expectations among consumers with little PBMA familiarity (health expectation: b = −.43, SE = 0.13, t = 3.24, $p = 0.001$; sustainability expectation: b = −.55, SE = 0.12, t = 4.46, $p < 0.001$).

4.3.3. Indirect effects

Through taste expectations, non-hedonic attribute framing has a negative indirect effect on product engagement when a hedonic goal is active (health frame: $b = -.81$, SE = 0.33, 95 % CI [−1.469, −0.182];

sustainability frame: $b = -.77$, SE = 0.37, 95 % CI [−1.498, −0.052]). These results support **H4:** framing and goal activation influence product engagement intentions through taste expectations. When a sustainability goal is active, however, the negative indirect effects are mitigated, as indicated by significant indices of moderated mediation (health frame: index of moderated mediation = 1.38, SE = 0.49, 95 % CI [0.424, 2.367]; sustainability frame: index of moderated mediation = 1.47, SE = 0.52, 95 % CI [0.462, 2.491]). All remaining indirect effects and indices of moderated mediation are non-significant. Fig. 4A presents the moderated mediation results comparing the health attribute frame to the hedonic frame, and Fig. 4B presents the results for the sustainability frame versus the hedonic frame. Table 3 summarizes the full moderated mediation results.

5. Discussion

Our study explores the ongoing discourse surrounding the most effective approach to encourage consumers to transition towards more plant-based diets. A seemingly clear-cut tactic that avoids the need for a paradigm shift involves directly replacing traditional meat with more sustainable PBMAs that resemble meat. Conventional wisdom suggests emphasizing the sustainability benefits of these products, as they clearly outperform meat in this regard. Indeed, life cycle analyses indicate PBMAs are responsible for only a fraction of the carbon emissions, ranging from less than 2 to 14 times lower compared to traditional meat sources (Shanmugam et al., 2023). Following this logic, many producers currently adopt this strategy in their marketing of these products. Proponents of a potentially underutilized alternate strategy recommend highlighting taste instead (Turnwald et al., 2017; Turnwald & Crum, 2019). Our research sheds light on this debate by providing a nuanced understanding of the optimal strategy for promoting PBMAs. Specifically, we show that the effects of framing meat alternatives are contingent on active consumer goals; notable given that salient goals vary across consumption settings (Boland et al., 2013; Onwezen, 2023; Thøgersen & Alfinito, 2020).

Although consumers generally have positive preconceptions about the sustainability and healthiness of PBMAs, they hold much lower expectations for taste (e.g., Ketelings et al., 2023; Vural et al., 2023). Our findings are in line with this; participants in this study consistently rated taste below the neutral point. Moreover, taste expectations emerged as a significant mediator, influencing the impact of active goals and attribute framing on intentions to recommend, try, and purchase the product. In contrast, health and sustainability expectations did not mediate this relationship, likely due to participants' already robust positive perceptions in these domains, indicating limited room for meaningful improvement in their perception. Conversely, the consistently low taste perceptions indicate a greater potential for improvement within this product category. Our findings also resonate with Mai and Hoffmann (2015) affirming that taste perceptions exert a more substantial influence on food decisions than healthiness expectations. The authors attribute this distinction to taste perceptions relying on implicitly processed sensory evaluations, while health perceptions involve higher-order rational processing.

To enhance taste perceptions, it is evident that food manufacturers must improve product formulations. Nonetheless, it will also be important for marketers to be mindful of how these products are framed, especially considering the context and salient goals of consumers. Failure to do so may elicit goal conflict, where hedonic desires compete with health or sustainability goals, ultimately dampening taste expectations and deterring consumers. At first glance, using hedonic frames to bolster expected taste might seem straightforward. Using descriptive labels has been found to impart a positive halo around other food categories and has been suggested as a good tactic to introduce novel foods (Wansink et al., 2005). In some cases, hedonic labelling has effectively increased vegetarian food choice (Bacon & Krpan, 2018; Turnwald et al., 2017; Vennard et al., 2019) and improved feelings of enjoyment after eating vegetarian foods (Turnwald & Crum, 2019). Hedonic descriptors may also be a way to mitigate feelings of disgust that some consumers associate with meat alternatives (Michel et al., 2021). Still, there's the potential to leverage the sustainability halo effect, which imparts

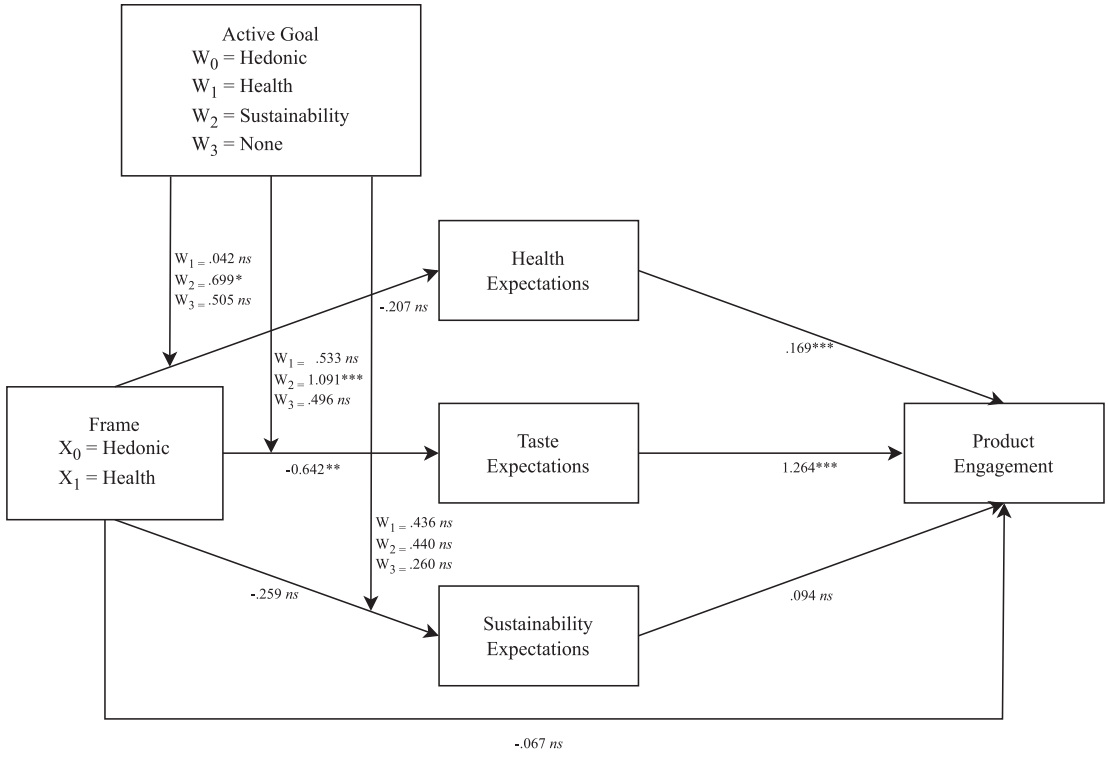

Fig. 4A. Parameter estimates for hedonic vs. health frame.
Note. *** p < 0.01, ** p < 0.05, * p < 0.10.

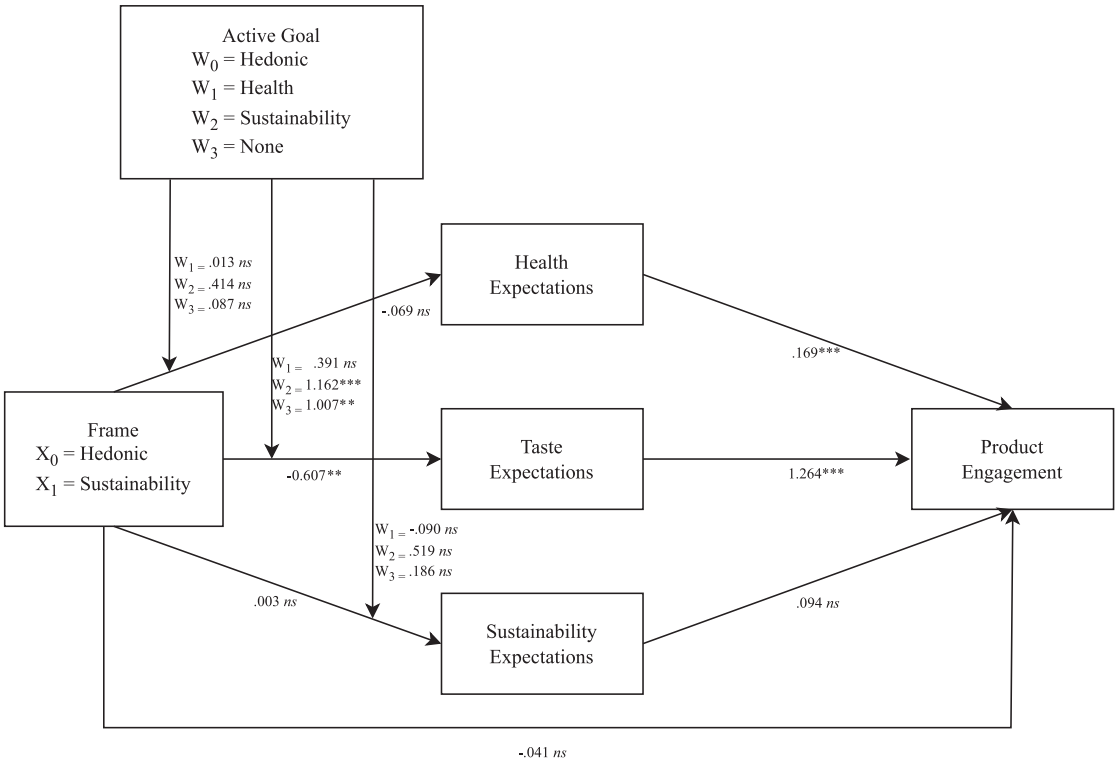

Fig. 4B. Parameter estimates for hedonic vs. sustainability frame.
Note. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 3
Results of the Moderated Parallel Mediation Analysis.

	Indirect Effect via Expected Taste				Indirect Effect via Expected Health				Indirect Effect via Expected Sustainability			
	EST	SE	CI Lower	CI Upper	EST	SE	CI Lower	CI Upper	EST	SE	CI Lower	CI Upper
Hedonic Goal												
Health Frame	**−0.811**	**0.330**	**−1.469**	**−0.182**	−0.035	0.051	−0.154	0.053	−0.024	0.032	−0.099	0.027
Sust. Frame	**−0.767**	**0.368**	**−1.498**	**−0.052**	−0.012	0.053	−0.129	0.088	0.000	0.033	−0.070	0.074
Health Goal												
Health Frame	−0.137	0.375	−0.857	0.606	−0.028	0.053	−0.134	0.080	0.017	0.029	−0.034	0.085
Sust. Frame	−0.274	0.383	−1.010	0.491	−0.009	0.054	−0.123	0.097	−0.008	0.031	−0.074	0.059
Sust. Goal												
Health Frame	0.569	0.365	−0.134	1.288	0.083	0.065	−0.026	0.229	0.017	0.035	−0.046	0.100
Sust. Frame	0.702	0.369	−0.029	1.416	0.058	0.063	−0.055	0.200	0.049	0.043	−0.019	0.148
Neutral Goal												
Health Frame	−0.184	0.379	−0.939	0.542	0.050	0.055	−0.050	0.174	0.000	0.030	−0.064	0.063
Sust. Frame	0.505	0.341	−0.174	1.169	0.003	0.049	−0.100	0.099	0.018	0.030	−0.034	0.088

Notes: EST = Mediation effect, SE = Bootstrapped standard error, the CIs are the bootstrapped 95 % confidence intervals. For the independent variable, hedonic frame was coded as the reference level. Significance is indicated by CIs that do not cover zero; these values are bolded. Covariates age, gender, and familiarity with PBMAs were included but are not shown for simplicity.

perceptions of better taste, especially when goal conflict is minimal (Sörqvist et al., 2015). Our research underscores that hedonic attribute frames are most effective when consumers primarily seek a hedonic experience. However, the same framing paradoxically (marginally) decreases taste expectations when individuals approach the product with a salient sustainability goal frame.

While existing literature often focuses on identifying individual consumer orientations with regards to plant-based foods (e.g., Graça et al., 2019; Hielkema & Lund, 2021; Lemken et al., 2019; Malek et al., 2019; Van Loo et al., 2017), our study emphasizes situational goal frames that vary across contexts within individuals. Notably, existing studies demonstrate goal frames differ by setting, e.g., while on vacation or at home (Thøgersen & Alfinito, 2020) and time of day (Boland et al., 2013). Relatedly, other studies demonstrate variations in the assessment of PMBAs concerning naturalness, tastiness, healthiness, and appropriateness across different contexts, such as during special occasions (Elzerman et al., 2013) or when served as part of a meal versus used as an ingredient (Possidónio et al., 2021). Our study contributes to existing literature on goal framing by assessing the interaction between active goals and product attribute framing, identifying areas of goal conflict between the two, as well as contributes to the debate on how to best promote PBMAs.

For marketers, it will be helpful to identify the goal frames elicited in their specific context to choose how to best frame plant-based products and avoid goal conflict. We expand upon the concept of "hedonic utilitarianism," as suggested by Beyond Meat's CEO (Gelles, 2021). Instead of simultaneously promoting both health and taste aspects, focused communication should be tailored to the prevailing goal context. For instance, ideal framing strategies may differ between fast-food and health-food retailers, the produce section and the snack aisle in grocery stores, or fine and casual dining establishments, given the differing goal frames these contexts elicit. Consider the frozen section in grocery stores where ready-made PBMAs are often placed alongside indulgent items like frozen French fries and pizzas, signaling associations with convenience and taste – characteristics commonly associated with vice foods. While labels emphasizing nutritional aspects like "protein-rich," "high in fiber," and "low in saturated fat" are common for frozen PBMAs, a more effective strategy might be to reserve such descriptors for plant-based products located in the refrigerated aisle alongside virtuous foods like tofu and hummus. Instead, employing hedonic descriptors like "delicious" or "crunchy" may better align with consumer expectations in the frozen section.

For public health officials, tailoring public service announcements around plant-based diets to suit the target situation is important. For example, our findings suggest Veganuary, a campaign that encourages people to try a vegan lifestyle for the month of January, is well-situated during the time of year when many individuals are motivated by health and ethical goals as part of their New Year's resolutions. As part of this campaign, promoting the health benefits of plant-based diets alongside the ethical considerations of reducing animal consumption can be highly effective. Conversely, the holiday season preceding January presents an opportune moment to promote plant-based foods for their hedonic properties. For instance, sharing vegan holiday cookie recipes can capitalize on the festive spirit and appeal to individuals seeking indulgent treats. However, it is also crucial to recognize that eating motives differ across countries due to varying food-related challenges. In regions where food scarcity is prevalent, eating motives will differ significantly from those where nutrient-poor foods are abundant (Liu & Haws, 2023).

Regardless of situation, a challenge lies in aligning hedonic cues with favorable alternatives to ensure that the hedonic appeal promotes more sustainable choices rather than inadvertently encouraging less desirable ones, in accordance with the recommendations of Steg, Bolderdijk, Keizer, and Perlaviciute (2014). Lastly, increasing public awareness that healthy and sustainable foods can be tasty too may bridge the perception gap and reconcile pleasure and sustainable food choices. For example, initiatives like Taste for Life in Denmark, which promotes Epicurean eating (i.e., taking pleasure in food and drink), underscore this approach to culinary pleasure (Schneider, 2021).

6. Limitations and future research

This study, while offering valuable insights, is not without its limitations. First and foremost, the findings may not be entirely generalizable to all PBMAs. Our investigation centered on a specific fast-food product, namely a chicken nugget alternative, which lends itself to a hedonic eating experience. At the same time, the product used in this study contained whole soybeans, which may influence health perceptions compared to more processed alternatives made from soy isolates. Consequently, these results may be more pertinent to products that share similar attributes or consumer perceptions and may not represent the full spectrum of plant-based alternatives, including products perceived to be "utilitarian" in nature, such as tofu. Another limitation lies in the hypothetical nature of the study, as it primarily assessed participants' intentions rather than their actual behaviors. Therefore, the translation of these intentions into real consumer behavior would require further investigation and real-world experimentation. Finally, it is important to note that this study took place exclusively in the United States. Prior research has demonstrated that the impacts of sensory-oriented labeling can differ among countries with distinct cultural philosophies on the pleasures of food (Chandon & Cornil, 2022).

For future research, it is important to investigate the dynamic interactions between active goals and other prevalent labels within this product category, including "plant-based", "meat-free", "vegan", and "vegetarian". Current research lacks a consensus on consumer preference for these descriptors, with some studies suggesting a positive gain-framing approach like "plant-based" (highlighting what consumers gain) over negative loss-framing labels like "vegan", "vegetarian", and "meat-alternative" (emphasizing the absence of meat) (Carvalho et al., 2022; Sucapane et al., 2021). Conversely, other studies indicate a preference for "vegetarian" or "vegan" labels (Rosenfeld et al., 2022). This variability in preferences may be attributed to salient consumption goals, suggesting the need for further investigation. Further studies may explore how other relevant goal frames, such as animal welfare, interact with various attribute frames. Additionally, future research should consider conducting actual taste tests to explore potential disparities between expected and actual taste perceptions, unraveling the intricacies of how hedonic claims function in this context. Examining these differences could offer a more comprehensive understanding of how hedonic frames operate in shaping consumer preferences for PBMAs.

7. Conclusion

Our study underscores the importance of understanding and effectively managing the interplay between consumer goal frames, taste perceptions, and product attribute framing in the context of plant-based alternatives. Taste perceptions emerge as a critical factor influencing consumer behavior, acting as a pivotal mediator between active goals and attribute framing. The consistent emphasis on taste as a top priority for consumers underscores the need for the food industry to address and enhance the taste profiles of plant-based alternatives. Strategic product formulations and framing approaches, aligned with the varied consumer goal frames, can bridge the existing gap and drive greater acceptance. Both the food industry and public health initiatives stand to benefit from these insights. Leveraging a nuanced understanding of consumer behavior and preferences, stakeholders can work towards creating a more sustainable and appealing future for plant-based choices.

CRediT authorship contribution statement

Ainslee Erhard: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Steffen Jahn:** Writing – review & editing, Methodology, Investigation, Formal analysis, Conceptualization. **Yasemin Boztug:** Writing – review & editing, Supervision, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendices. Supplementary data

Supplementary data to this article can be found online at https://doi.

org/10.1016/j.foodqual.2024.105237.

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