The sustainability liability revisited: Positive versus negative differentiation of novel products by sustainability attributes

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\textbf{A B S T R A C T}

In response to a growing consumer trend towards meat reduction and more plant-based diets, the food industry develops meat-reduced food innovations, such as blended products which replace part of their meat with plant-based ingredients. These products are usually promoted as being more sustainable than existing products. However, it is not clear whether sustainability attributes are used by consumers to positively or negatively differentiate these novel products from existing ones. We investigated these two possibilities in two studies. In Study 1, we tested in an online survey whether positive sustainability attributes of novel food products generally affect purchase intentions in a positive or negative way, mediated by taste expectations. In Study 2, we investigated in a field study in a restaurant the choice of a novel blended meat product versus a classic product. In particular, we tested whether the blended meat product is more likely to share positive attributes with a classic alternative than negative attributes and might therefore lack the power of positive differentiation. The results of Study 1 show a positive differentiation by sustainability when taste attributes are equal compared with a classic product. However, Study 2 demonstrates that the mechanisms of a negative differentiation might attenuate these positive effects, because positive hedonic attributes of the novel blended meat product more likely apply also to the classic product than the negative attributes.

\textbf{1. Introduction}

In response to a growing consumer trend of reducing meat-consumption and more plant-based diets (von Massow, Weersink, De Laporte, & Kelly, 2019), the food industry developed food innovations posing more sustainable alternatives to existing popular (fast-)food products. In particular, \textit{blended products} replace part of the meat of traditionally meat-based products with plant-based ingredients (Campbell, 2020; Lang, 2020). This allows consumers to reduce their meat consumption without foregoing their preferred kind of food. For example, the company Raised & Rooted sells beef burger patties blended with pea proteins (Raised & Rooted, 2021). Moreover, in an annual competition, called the Blended Burger Project, restaurant chefs compete in creating meat-mushroom blended burger recipes (James Beard Foundation, 2021).

Typically, these novel products are advertised as being more sustainable than their classical counterparts with the aim to establish a positive differentiation from already known products. But prior research is inconclusive as to whether positive sustainability attributes are beneficial or even harmful for how consumers perceive the novel products. On the one hand, some findings support a positive differentiation by sustainability attributes. Indeed, sustainability is valued by many consumers and segmentation in marketing addresses ethical standards in many different product categories (Trudel & Cotte, 2008).

In addition, sustainability cannot only be positively valued in itself, but a plethora of research suggests that consumers also associate sustainability attributes with good taste (Grunert, Bredahl, & Brunso, 2004; Napolitano, Caporale, Carlucci, & Monteleone, 2007; Napolitano, Girolami, & Braghiieri, 2010; Thorslund, Sande, Aaslyng, & Lassen, 2016). In line with this reasoning, researchers have found that sustainability attributes have the potential to positively influence taste expectations and purchase intentions of food products (Napolitano et al., 2007; O’Rourke & Ringer, 2016; Silva, Bioto, Efraim, & Queiroz, 2017).

On the other hand, there are conflicting findings suggesting a negative differentiation of novel products by sustainability attributes. For example, acceptance for meat substitutes, which are associated with substantially lower emissions than actual meat, is only moderate to low (Elzerman, Hoek, van Boekel, & Luning, 2011; Hartmann & Siegrist,
Also, consumers often show resistance towards innovative food products in general (Heidenreich & Kraemer, 2016) and may therefore be reluctant to try novel sustainable foods.

In addition, difficulties for novel food products might originate from basic mechanisms of differentiation. First, even if consumers associate sustainability with positive taste attributes, it is not clear whether these inferred taste attributes are distinct from what consumers expect of average products in the respective category. Second, it is possible that some consumers associate sustainability with negative taste attributes which are then used to differentiate the novel, more sustainable food alternative from existing ones. The first doubt about a positive differentiation is supported by recent research on the differentiation principle (Florack, Koch, Haasova, Kunz, & Alves, 2021) which suggests that a) choice alternatives often have the same positive attributes but distinct negative attributes and b) positive attributes of novel choice options are often neglected when they are similar to attributes existing options already possess. If novel sustainable food products taste similar compared with existing alternatives, this might not be a good starting point for a powerful positive differentiation.

A further doubt arises from the idea that the sustainability of products might be used as a cue for worse taste by consumers (Luchs, Naylor, Irwin, & Raghunathan, 2010; Mai, Hoffmann, Lasarov, & Buh, 2019), very much like healthiness can be a cue for worse taste (Raghunathan, Naylor, & Hoyer, 2006). Hence, research on whether sustainability attributes are more likely to lead to a positive or negative differentiation of novel food products is inconclusive. The objective of the present research therefore is to test the two opposing possibilities that sustainability attributes might contribute either to a positive or a negative differentiation of novel products. In Study 1, we examined in an online survey whether, in general, positive sustainability attributes of novel food products affect purchase intentions in a positive or negative way, mediated by taste expectations. In Study 2, we investigated in a field study in a restaurant the choice of a novel blended meat product against a less sustainable classic alternative. In particular, we tested whether the blended meat alternative is more likely to share positive attributes with a classic alternative than negative attributes and might therefore lack the power of positive differentiation. Data and analyses files for both studies are available on Mendeley data under this link: https://data.mendeley.com/datasets/j2wpp8mppb/1; doi: https://doi.org/10.17632/j2wpp8mppb.1. The results of Study 1 show the positive differentiation by sustainability when taste attributes are equal compared with a classic product. However, Study 2 demonstrates that the mechanisms of a negative differentiation might nearly offset these positive effects, because the novel blended meat product more likely shares its positive hedonic attributes than its negative attributes with a classic alternative option.

2. Theoretical background

Novel food products are often promoted as being similar in taste to, but more sustainable than their familiar alternatives, with the aim to establish a positive differentiation from existing products. Prior research is inconclusive as to whether this strategy might succeed. Some studies indicate that sustainability attributes might indeed be used for a positive differentiation of novel products, because first, many consumers value sustainability in products (Trudel & Cotte, 2008) and second, they may use sustainability as a cue for better taste (Grunert et al., 2004; Napolitano et al., 2007; Napolitano et al., 2010; Thorshlund et al., 2016).

The assumed anticipation of a better taste of sustainable meat products is mainly based on the idea that consumers expect that high-quality meat is produced when producers support the well-being of humans, animals, and nature. Accordingly, consumers view animal welfare as a cue for higher quality in food and a means to achieve a better taste (Thorshlund et al., 2016), and they have been found to expect higher quality and are willing to pay more for meat products with increased animal welfare standards (Grunert et al., 2004; Napolitano et al., 2007, 2010). Moreover, information about sustainability might generate positive feelings in consumers which reinforce positive taste experiences beyond inferred quality expectations. Indeed, researchers found that positive affect mediated the positive effects of fair-trade labels on products on consumers’ taste experiences (Lotz, Christandl, & Fetchenbauer, 2013; Tang et al., 2016).

As taste is one of the most important drivers for purchase intentions (Buhrau & Ozturk, 2018; Honkanen & Frewer, 2009; Kourioumiotis et al., 2016), it is reasonable to assume that the effects of sustainability on taste expectations translate to purchase intentions. In line with this assumption, in a field study, sustainability information of products on a shopping website was positively related to purchase intentions for some users (O’Rourke & Ringer, 2016). Similarly, in an experimental study, consumers indicated higher purchase intentions as well as sensory acceptance for chocolate when it had a sustainability label than when it had no label (Silva et al., 2017).

Blended products, which we focus on in Study 2 of the present research, have as well been found to be rated higher in hedonic properties than other meat products in a taste test (Spencer & Guinard, 2018). Also, replacing parts of the meat in products with mushrooms has been found to enhance their flavor (Myrdal Miller et al., 2014). Accordingly, consumers report a rather high acceptance of meat-mushroom blended products (Lang, 2020). It is therefore reasonable to argue that sustainability attributes – including those of blended products, which are directly related to taste – have the potential to positively differentiate novel from familiar products. We will refer to this notion that consumers use sustainability attributes to positively differentiate novel products as the “positive differentiation model”. If this model applies, we expect that sustainability attributes positively impact purchase intentions for novel products in part indirectly via increased taste expectations, which positively impact purchase intentions in itself (see Fig. 1).

Although the positive differentiation model appears convincing, there is also evidence suggesting that consumers might use sustainability attributes for a negative differentiation of novel products from familiar ones. We will refer to this possibility as the “negative differentiation model”.

Even if consumers infer positive taste attributes from sustainability attributes of a novel product, they might not use them to differentiate the novel product, because they are not different from the taste attributes of already known products. In general, objects, including food products, have been found to be similar to other objects with regard to their positive attributes, whereas they are mostly differentiated by their negative attributes. This phenomenon is known in research as the common good phenomenon (Alves, Koch, & Unkelbach, 2017a, 2018) and stems from aspects of the information ecology, which is the distribution of information in the environment. In essence, positive and negative information is asymmetrically distributed in the environment in two ways: First, positive attributes are more frequent than negative attributes and second, positive attributes are more similar to one another.
than negative attributes (Alves et al., 2017a, 2018). Due to this asymmetrical distribution of positive and negative information, objects, including food products, more likely have the same positive but different negative attributes. In one recent study (Florack et al., 2021) for example, consumers indicated a standard and novel, healthier burger to have more positive than negative attributes in common. Thus, if consumers use sustainability attributes as a cue for positive taste attributes, it is likely that the same taste attributes likewise apply to already known products and are not useful in differentiating a novel product.

We further argue that the common good phenomenon should be stronger for the novel product than for the classic product. We suppose that the positive attributes of the novel product are less distinct than the positive attributes of the classic product. Our reasoning is derived from research on the pioneering advantage (Carpenter & Nakamoto, 1989; Kardes & Kalyanaram, 1992). This research suggests that a product which entered the market first (the pioneer) sets the evaluation standard to which later entrants are compared, because consumers shift their preferences toward attributes of the pioneering product. This means that a later encountered product is unlikely to be perceived as distinct to the pioneer on superior attributes. It might, at most, have positive attributes that the pioneer has as well. Hence, according to the pioneering advantage, the classic product defines the ideal attributes according to which all subsequent products are evaluated.

Importantly, a strong common good effect would mean that the novel product loses its power of positive differentiation. According to the differentiation principle, positive attributes of novel objects are often ignored when they also apply to familiar objects (Alves, Koch, & Unkelbach, 2018). The differentiation principle states that when comparing two objects that were encountered at different points in time, individuals focus on the distinct attributes of the novel object that differentiate it from existing ones, whereas they “cancel out” attributes it shares with existing objects (see also Bruine de Bruin & Keren, 2003; Houston, Sherman, & Baker, 1989; Mantel & Kardes, 1999). Accordingly, in the study by Florack et al. (2021), consumers evaluated a novel product according to its unique attributes while ignoring attributes it shared with the standard product. When a novel product had the same positive and different negative attributes than a classic product, consumers expected it to be less tasty and indicated lower purchase intentions than when it had the same negative and different positive attributes. Thus, if inferred positive taste attributes of a novel sustainable product overlap with those of already known products, consumers might ignore them and instead focus on the distinguishing attributes of the novel sustainable product, which are more likely to be negative.

Another risk for a negative differentiation by sustainability attributes is based on the finding that sustainability can negatively affect how consumers perceive other product attributes that in turn affect product preference. In particular, consumers have been found to apply an ethical¹ = less strong intuition (ELSI; Mai et al., 2019), that is, they intuitively believe that sustainable products are less strong on other dimensions, like effectiveness, durability and also taste. Sustainability is associated with gentleness, safety and healthiness whereas a lack of sustainability is associated with product strength, durability and power (Luchs et al., 2010). Moreover, if sustainable products are also associated with healthiness (as suggested by Luchs et al., 2010), this could trigger a healthy = less tasty heuristic (Raghunathan et al., 2006), contributing to worse taste expectations of sustainable products. In line with this, Lang (2020) found that consumers expect meat-mushroom blended products to be more sustainable and healthier, but less tasty than classic products.

Even if sustainability attributes do not evoke negative taste expectations, they might not suffice to increase purchase intentions for a product. Maehle, Iversen, Hem, and Otten (2015) found that hedonic attributes like taste are more influential in consumer choice than healthiness and environmental friendliness. According to a study on assessment and acceptance of meat-mushroom blended products, consumers rank sustainability as the least important reason for trying these products (Lang, 2020). Similarly, in a survey by the International Food Information Council Foundation (IFIC), US consumers reported taste as the most important (86%) and sustainability as the least important (27%) driver for their purchase decisions (IFIC, 2019). Taken together, sustainability might be a less important criterion for product purchase decisions than tastiness (see also Buhrau & Ozturk, 2018; Honkanen & Frewer, 2009; Kouroumouaki et al., 2016). Therefore, it is as well plausible that sustainability attributes mainly influence consumer judgments and choice indirectly, via taste expectations. If the negative differentiation model applies, we expect consumers to indicate lower purchase intentions for a more sustainable product, indirectly via reduced taste expectations, which still positively impact purchase intentions in itself (see Fig. 2).

Taken together, there are theoretical arguments as well as research evidence supporting positive but also negative effects of sustainability attributes on the perception and choice of novel products. Based on these inconclusive findings, the goal of the present research is to test whether consumers use sustainability attributes for a positive or a negative differentiation of novel products.

3. Study 1: positive versus negative differentiation by sustainability attributes

In Study 1, we tested whether a differentiation of a novel food product with sustainability attributes has a positive or negative effect on purchase intentions, mediated via taste expectations. In an online experiment, we manipulated whether a novel burger was superior to a classic burger with regard to taste (taste differentiation) or sustainability attributes (sustainability differentiation) or equally good (control condition), and measured consumers’ purchase intentions, expected tastiness and perceived sustainability for both burgers. Given that sustainability attributes of novel products hold both the potential for a positive differentiation as well as the risk of a negative differentiation, we propose a nondirectional hypothesis for the influence of sustainability attributes on taste expectations and purchase intentions in Study 1:

H1a. Distinct positive sustainability attributes of a novel product affect taste expectations and purchase intentions compared with the control condition.

H1b. The effect of sustainability attributes on purchase intentions is mediated by taste expectations.

¹ In Luchs et al. (2010, p.19), the term “ethical” refers to benefits for society (e.g. fair labor conditions, animal welfare) and the environment (e.g., recycling, avoiding pollution). In our paper, we refer to these attributes as “sustainable”.

Fig. 2. The negative differentiation model.
3.1 Method

In the online questionnaire, consumers were presented with ostensible expert reviews of a “classic” and a “novel” burger, regarding their taste and sustainability in production. In the two experimental conditions, the novel burger had more positive reviews than the classic burger, either referring to taste experience (taste differentiation condition) or sustainability criteria (sustainability differentiation condition). In a third condition, the classic and novel burger had exactly the same attributes (control condition). For both burgers, we measured purchase intention, tastiness expectation and perceived sustainability as dependent variables. We additionally measured consumers’ consciousness for sustainable consumption (CSC; Balderjahn et al., 2013; Ziesemer, Peyer, Klemm, & Balderjahn, 2016) in order to control for its possible influence on the results.

3.1.1 Participants and design

A sample of German consumers participated in the study, recruited via an online access panel. We aimed for a sample of \( N = 180 \) participants to obtain sufficient statistical power (\( > 0.80 \)) to detect medium-sized effects (\( \eta^2 = 0.06 \) in the present design (Cohen, 1992)). During data collection, we screened out participants who did not eat meat, were on a diet or failed an attention check item (Abby & Melny, 2017). The questionnaire was completed by 193 participants. After data collection, we excluded seven participants with zero variance in their responses, indicating that they merely “clicked through” the questionnaire. Our final sample consisted of 186 participants, with 53.2% identifying as female, 46.2% as male and 0.5% as other. The mean age of our sample was 56.87 (SD = 13.35) and mean body mass index (BMI) was 28.12 (SD = 6.23). Participants were randomly assigned to the sustainability differentiation, taste differentiation or control condition of the between-subjects design.

3.1.2 Materials and procedure

In the online questionnaire, we presented participants with reviews of two burgers, without pictures. Participants were first asked to imagine that a group of experts for sensors and food production had evaluated a “classic” burger regarding its taste experience as well as sustainability in production. They saw twelve expert reviews for the classic burger, subsequently on separate pages. On each page, participants saw the name of the burger along with a review, formulated in one sentence. For example: “Classic burger – An expert for food production evaluated the taste experience for the classic burger. Again, instead of the three negative taste attributes, the novel burger had three additional positive taste attributes as well as three negative attributes which the classic burger did not have (The company promotes the training of young, innovative farmers; The pastures of the cattle are sustainably managed; The meat comes from farms on which the calves are raised with their dams). Conversely, in the taste differentiation condition, the six reviews regarding the sustainability attributes of the novel burger were exactly the same as for the classic burger. Also, the three positive reviews regarding taste attributes were the same as for the classic burger. Again, instead of the three negative taste attributes, the novel burger had three additional positive taste attributes which the classic burger did not have (The meat is particularly juicy; The burger looks very appealing; The ingredients of the burger are perfectly matched). In the control condition, the twelve reviews for the novel burger were exactly the same as those for the classic burger. That is, the novel burger either was presented to be superior to the classic burger with regard to sustainability or taste, or as equally good as the classic burger. For an overview of the valence and type of attributes of both burgers in the different conditions, see Table 1.

Again, participants indicated their purchase intention for the novel burger (Cronbach’s alpha = .99), rated its expected tastiness (Cronbach’s alpha = .96) and perceived sustainability in production (Cronbach’s alpha = .99), using the same scales as for the classic burger. At

### Table 1

| Type and valence of attributes of the novel and classic burger in the experimental conditions (Study 1). |
|---|---|---|---|---|
| | Classic burger | Novel burger | Sustainability differentiation | Taste differentiation |
| All conditions | Control condition | | | |
| taste sustain. | taste sustain. | taste sustain. | taste sustain. | taste sustain. |
| + | + | + | + | + |
| + | + | + | + | + |
| + | + | + | + | + |
| + | + | + | + | + |
| - | - | - | - | - |
| - | - | - | - | - |
| Note. \( + \) = positive attribute; \( - \) = negative attribute; \( * \) distinct attribute of the novel burger.
the end of the questionnaire, we assessed participants’ consciousness of sustainable consumption (CSC), using the German translation of the CSC scale (Ziesemer et al., 2016). In particular, we administered the two three-item subscales referring to the ecological dimension of CSC (e.g., “How important is it to you personally that a product is manufactured in a climate-friendly way?”) and the social dimension (e.g., “How important is it to you personally that the human rights of employees are respected in the production of a product?”). All items were answered on a 7-point horizontal scale (1 = not important at all; 7 = very important) and constitute a single dimension of consciousness for sustainable consumption (Cronbach’s alpha = .94). Afterwards, participants provided demographic information and were fully debriefed.

3.2. Results

3.2.1. Effects of condition on purchase intentions

Our main question was whether purchase intentions for the novel burger would be higher or lower in the sustainability differentiation condition compared with the control condition (H1a). Purchase intentions for the classic burger should not differ between conditions, because it was always the same. We tested our hypothesis with a mixed ANOVA, with purchase intention as the dependent variable, burger type (classic vs. novel) as the independent variable, condition (taste differentiation vs. sustainability differentiation vs. control) as the between-subject factor. Analyses included pairwise comparisons between conditions based on estimated marginal means, using Bonferroni corrections.

The conditions had different effects on purchase intentions for the classic than the novel burger, as indicated by a significant interaction between burger type and condition (see Fig. 3), $F(2, 183) = 17.87, p < .001, \eta_p^2 = 0.16$. Purchase intentions for the classic burger did not differ between conditions, $F(2, 183) = 1.05, p = .35, \eta_p^2 = 0.01$, but the conditions had significant effects on purchase intentions for the novel burger, $F(2, 183) = 13.31, p < .001, \eta_p^2 = 0.13$. Purchase intentions for the novel burger were higher in the sustainability differentiation condition ($M = 4.58; SD = 1.84$) than in the control condition ($M = 2.96; SD = 1.69$), $p < .001$. Also, purchase intentions for the novel burger were higher in the taste differentiation condition ($M = 4.19; SD = 1.97$) than in the control condition ($M = 2.96; SD = 1.69$), $p = .001$. Purchase intentions for the novel burger did not differ significantly between the taste and the sustainability differentiation condition, $p = .74$.

Thus, results corroborate H1a and are in favor of the positive differentiation model. Distinct positive sustainability attributes of a novel product increased purchase intentions to the same extent as taste attributes. Moreover, a significant main effect of burger type indicated that participants’ purchase intentions were overall higher for the novel burger ($M = 3.88; SD = 1.95$) than the classic burger ($M = 3.27; SD = 1.79$), $F(1, 183) = 49.75, p < .001, \eta_p^2 = 0.21$.

To control for the possible influence of consciousness for sustainable consumption (CSC), we conducted the same mixed ANOVA as before, but including CSC as a covariate. The interaction between burger type and condition remained significant, $F(2, 182) = 19.03, p < .001, \eta_p^2 = 0.17$, whereas the main effect of burger type was no longer significant, $F(1, 182) = 0.38, p = .54, \eta_p^2 = 0.002$.

3.2.2. Effects of condition on tastiness expectations

Next, we tested whether tastiness expectations for the novel burger were higher or lower when it was presented as more sustainable than equally good as the classic burger. At any rate, we expected higher tastiness expectations for the novel burger when it was presented as tastier than equally good as the classic burger. We conducted the same mixed ANOVA as before, but with tastiness expectations instead of purchase intentions for the burgers as the dependent variable. Again, the presentation of the novel burger had different effects on the taste expectations of the classic and novel burger, as indicated by a significant interaction between burger type and condition, $F(2, 183) = 13.73, p < .001, \eta_p^2 = 0.13$. Tastiness expectations for the classic burger did not differ between the conditions, $F(2, 183) = 2.14, p = .12, \eta_p^2 = 0.02$, whereas the novel burger were significantly higher in the sustainability differentiation condition ($M = 5.77; SD = 2.56$) than in the control condition ($M = 4.34; SD = 2.28$), $p = .01$. Also, tastiness expectations for the novel burger were higher in the taste differentiation condition ($M = 6.58; SD = 2.65$) than in the control condition, $p < .001$, whereas the difference between the sustainability and taste differentiation conditions was not significant, $p = .23$. Moreover, participants indicated overall higher tastiness expectations for the novel burger ($M = 5.53; SD = 2.66$) than the classic burger ($M = 4.80; SD = 2.46$), as indicated by the significant main effect of burger type, $F(1, 183) = 34.59, p < .001, \eta_p^2 = 0.16$. That is, results are again in line with the positive differentiation model.

3.2.3. Effects of condition on perceived sustainability

We expected participants to indicate higher sustainability perceptions for the novel burger when it was presented as more sustainable compared with both tastier and identical to the classic burger. We therefore conducted a mixed ANOVA with burger type and condition as independent variables and perceived sustainability as dependent variable. Again, a significant interaction between burger type and condition indicated different effects of our manipulation depending on which burger was judged, $F(2, 183) = 57.20, p < .001, \eta_p^2 = 0.39$. Sustainability ratings for the classic burger did not differ between conditions, $F(2, 183) = 0.39, p = .68, \eta_p^2 = 0.004$, but ratings for the novel burger differed significantly from each other between all three conditions, $F(2, 183) = 50.83, p < .001, \eta_p^2 = 0.36$. Sustainability of the novel burger
was judged higher in the sustainability differentiation condition ($M = 5.20; SD = 1.35$) compared with both the taste differentiation ($M = 3.39; SD = 1.53$), $p < .001$, and the control condition ($M = 2.66; SD = 1.43$), $p < .001$. Sustainability ratings for the novel burger were also higher in the taste differentiation than in the control condition, $p = .01$.

### 3.2.4. Mediating effects through tastiness expectations

According to the positive differentiation model, sustainability attributes may have led to higher tastiness expectations for the novel burger, which in turn led to increased purchase intentions (H1b). To test this assumption, we conducted a mediation model using the PROCESS macro for SPSS (Version 3.3; Hayes, 2017). The model contained the condition (taste differentiation vs. sustainability differentiation vs. control) as categorical independent variable, tastiness expectations for the novel burger as mediator and purchase intentions for the novel burger as outcome variable. Because condition was a three-level predictor, there were two indirect effects of condition on purchase intention via tastiness expectations, one for the comparison between the control versus sustainability differentiation condition and another for the comparison between the control versus the taste differentiation condition. The indirect effect of the comparison between the control and the sustainability differentiation condition was $0.88, SE = 0.27$, 95% CI [0.35; 1.40], indicating mediation. Importantly, tastiness expectations did not fully mediate the effect of the sustainability differentiation versus control condition on purchase intentions, as indicated by a significant direct effect of condition on purchase intention, $b = 0.73$, $t(182) = 3.97$, $p < .001$. The second indirect effect of the comparison between the control and the taste differentiation condition on purchase intentions via tastiness expectations was $1.38$, $SE = 0.29$, 95% CI [0.83; 1.94] and the direct effect of the condition on purchase intentions was not significant, $p = .39$, indicating full mediation. A summary of the model, including path coefficients, is displayed in Figs. 4 and 5.

### 3.3. Discussion

The findings of Study 1 support our proposed positive differentiation model. Consumers indicated higher purchase intentions as well as tastiness expectations for a novel burger when it was presented as more sustainable than a classic burger compared with when both burgers were presented with the same attributes. Moreover, the positive effect of sustainability attributes was partially mediated by tastiness expectations. It seems participants inferred a better taste from the fact that the novel, sustainable than a classic burger compared with when both burgers were presented with the same attributes. Moreover, the positive effect of sustainability attributes is distinct (Alves et al., 2017a; Florack et al., 2021). This might as well apply to positive taste attributes that are evoked by sustainability attributes. Moreover, anticipation of taste because of sustainability might play a less important role when consumers can really experience the taste and smell of food products. This is particularly relevant for blended meat products as a special type of products advertised to be more sustainable, because they taste differently than their classic alternatives (Guinard et al., 2016; Myrdal Miller et al., 2014). Hence, it is necessary to examine whether, in a real consumption context with a blended meat product, the common good phenomenon might offset the positive differentiation we observed in Study 1.

### 4. Study 2: the common good phenomenon as opponent of positive differentiation

In Study 2, we tested whether the common good phenomenon can be observed in a real taste trial with a blended meat burger in a restaurant and whether it can dilute the positive differentiation by sustainability. In detail, we asked participants to taste a classic burger and a novel, more sustainable blended meat burger and describe each burger with positive and negative attributes. Afterwards, participants indicated which of the two burgers they would rather order. Based on prior research on the common good phenomenon (Alves et al., 2017a; Florack et al., 2021), we expected:

- **H2.** Consumers perceive positive attributes to apply to both products more often than negative attributes.

Based on the idea that the classic product defines the ideal attributes based on which all following products are evaluated (Carpenter & Nakamoto, 1989; Kardes & Kalyanaram, 1992), we assumed a stronger common good effect for the novel product than for the classic product. Therefore, positive attributes should be more likely shared than negative attributes for the novel product, but this effect should be reduced for the classic product:

- **H3.** Consumers perceive positive (negative) attributes of the novel, more sustainable product more likely (less likely) to be shared with the classic alternative than vice versa.

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**Fig. 4.** Results of the mediation model of the comparison between the sustainability differentiation and control condition on purchase intentions via tastiness expectations (Study 1).
Because of the sustainable positioning of the novel product, we expect Hypotheses 2 and 3 to mainly apply to hedonic attributes (e.g., taste experiences) and not to functional attributes (e.g., sustainability). The differentiation between hedonic and functional attributes is more general than a focus on sustainability and taste. We considered this differentiation as important to allow participants to mention a broad range of attributes. Also, previous research has shown that hedonic and functional characteristics of products impact choice differently (Maehle & Kardes, 1992; Romero & Biswas, 2016). Hence, we hypothesized:

H4. The effects predicted in H2 and H3 are stronger for hedonic than for functional attributes.

A strong common good effect would mean that the novel product has a fundamental disadvantage and might be less likely chosen by consumers. However, this disadvantage might be counteracted by the order in which the burgers are tasted. Research has shown that such comparison effects can be reduced by changing the typical order of presentation and considering the novel product first (Florack et al., 2021; Kardes & Kalyanaram, 1992; Romero & Biswas, 2016). Hence, we hypothesized:

H5. Consumers more likely choose the novel product when they taste it before than after the classic product.

4.1. Methods

Study 2 was a tasting experiment, conducted in a burger restaurant. Participants tasted a sample of a classic cheeseburger and a meat-mushroom blended burger, positively differentiated by sustainability attributes. The tasting order of the burgers varied between participants. For each burger, they provided three positive and three negative hedonic attributes and three negative and three positive functional attributes. They rated the intensity of their positive and negative feelings towards the burgers regarding the respective hedonic and functional attributes. Afterwards, they indicated for each attribute whether it applied to only one or both burgers. Participants then rated each burger on tastiness and indicated which of the two burgers they would rather order.

4.1.1. Participants and design

Sixty-three participants were recruited via the university’s laboratory administration system for behavioral sciences and earned course credits (2 h) for participation. Only participants who ate meat, were not on a diet, and had no food allergies were eligible for the study. The sample size was limited, due to time and space restrictions in the restaurant the study was conducted in. No participant had to be excluded from the analyses, resulting in a sample of 63, with 47.6% women, a mean age of 22.21 (SD = 3.76) and a mean body mass index (BMI) of 22.12 (SD = 4.23). Participants were randomly assigned to the tasting order conditions (classic or novel burger first) of the between-subjects design.

4.1.2. Materials and procedure

The taste experiment was conducted in a burger restaurant on one afternoon, in five experimental sessions with up to 13 participants each. For the taste samples, the restaurant provided miniatures of a classic and a sustainable meat-mushroom blended burger, complete with bun, patty and toppings. Upon arrival at the restaurant, participants were seated at one of two tables of six or seven people. Participants on one table tasted the classic burger first and then the sustainable burger (classic first condition), whereas the order was reversed for the other table (sustainable first condition). Each participant received a booklet with the questionnaires and detailed instructions, as well as a glass of water. After giving written informed consent, they were instructed to drink three sips of water, or until they were no longer thirsty. They then received their first taste sample. In the classic first condition, the first taste sample was a classic cheeseburger. We gave participants clear written instructions for tasting to assist them in generating positive and negative hedonic attributes. They were asked to first look at the burger, then smell it, take a bite, perceive the mouthfeel, then chew on it and perceive the flavor, and eventually to swallow and perceive the aftertaste. They also received a text description of the burger, to assist them in generating positive and negative functional attributes.

They were asked to write down three positive and three negative attributes for the burger regarding the consumption experience (i.e., hedonic attributes) they would use to describe the burger to another person. We told them that these attributes could for instance refer to sensory impressions and aspects of pleasure. Afterwards, they were asked to provide three positive and three negative attributes regarding functional aspects. We explained functional aspects as being any advantage or disadvantage for the participants, their fellow humans or the environment, for instance, regarding ingredients, production, personal costs or savings or the product’s relevance for personal values and goals. Next right to each blank space where participants wrote down an attribute, there was a checkbox question asking whether the respective attribute applied to just one or both burgers. The right edge of the sheet had been folded in and participants were asked not to unfold it so they could not see these questions yet.

After writing down all the attributes, participants rated the intensity
of the positive and negative hedonic attributes they generated for the burger. Concretely, we asked them: “Please take another look at all the positive (negative) aspects you named for the classic cheeseburger in terms of consumption experience. If you had to judge them together, how positive (negative) would your feelings about the classic cheeseburger be in relation to these aspects overall?” They indicated the intensity of their feelings on a scale from 1 = Very weakly positive (negative) to 11 = Very strongly positive (negative). Afterwards, they rated the intensity of the positive and negative functional attributes they generated for the burger with the same answer scales. That is, participants answered four questions asking the positive and negative intensity of the hedonic and functional attributes of the burger, using the same scales.

Then, participants were asked to take a 3-min break and again drink three sips of water or to drink until they were no longer thirsty. In the following, they received a taste sample of the sustainable burger. They received the same instructions for tasting and naming three positive and three negative hedonic and three positive and three negative functional attributes, along with a text description of the sustainable burger. They again rated the intensity of the positive and negative hedonic and functional attributes they generated for the sustainable burger, with the same items as before. In the sustainable first condition, the procedure was exactly the same, but participants first tasted and described the sustainable burger, and then the classic cheeseburger.

After having tasted and described both burgers and rating the intensity of the positive and negative attributes, participants were asked to browse back to the pages where they had written down the attributes for the burgers and unfold the right edge of the sheets. Thereupon, they saw the questions asking whether each attribute applied to one or both burgers, which they were now asked to answer. Next, participants were asked how tasty they judged each burger, with answer options Not tasty at all, Less tasty, Rather tasty, Very tasty. Finally, participants were asked which of the two burgers they would rather order and indicated their choice by ticking the checkbox next to the respective burger.

4.2. Results

4.2.1. Preliminary analyses

We expected the classic burger to be perceived as superior in terms of hedonic attributes and the sustainable burger to be perceived as superior in terms of functional attributes. To test this assumption, we calculated a repeated measures ANOVA with the intensity of attributes as outcome and burger type (classic vs. novel), attribute valence (positive vs. negative), and attribute dimension (hedonic vs. functional) as three within-subject factors. A significant three-way interaction, F(1, 62) = 18.98, p < .001, η² = .23, indicated that the relative strength of the burgers’ attributes varied with the attribute valence and dimension. Consumers rated the classic burger as stronger in positive hedonic attributes (M = 8.60; SD = 1.54) than the sustainable burger (M = 7.86; SD = 1.93), p = .004, and weaker in negative hedonic attributes (M = 4.68; SD = 2.38) than the sustainable burger (M = 5.37; SD = 2.30), p = .03. Conversely, they rated the sustainable burger as marginally significantly stronger in positive functional attributes (M = 7.89; SD = 2.22) than the classic burger (M = 7.33; SD = 2.13), p = .05, and weaker in functional negative attributes (M = 4.32; SD = 2.25) than the classic burger (M = 5.08; SD = 2.57), p = .02. Furthermore, across burger type and attribute dimension, positive attributes were overall perceived as stronger (M = 7.92; SD = 1.40) than negative attributes (M = 4.86; SD = 1.70), F(1, 62) = 86.83, p < .001, η² = .58. Across burger type and attribute valence, hedonic attributes were perceived as stronger (M = 6.63; SD = 0.94) than functional attributes (M = 6.15; SD = 1.15), F(1, 62) = 9.28, p = .003, η² = 13.2.

4.2.2. Frequency of shared positive versus negative attributes

We hypothesized that consumers would perceive more of their generated positive than negative attributes to apply to both burgers (the common good phenomenon; H2), especially hedonic attributes of the novel burger (H3, H4). We tested our hypotheses with a generalized linear mixed model (McCulloch & Neuhaus, 2005). The fixed predictors were the burger type (classic vs. novel), the valence of the generated attribute (positive vs. negative) and the attribute dimension (hedonic vs. functional). The dependent variable was whether the attribute applied to only one or to both burgers.

Results indicate a general common good effect (H2), that is, positive attributes were overall more likely shared (62.0%) than negative attributes (56.3%), F(1, 1480) = 6.81, p = .01. Contrary to H3, the common good effect did not depend on the burger type, F(1, 1480) = 1.30, p = .26, but supporting H4, there was a significant three-way interaction between attribute dimension, burger type and valence, F(3, 1480) = 11.47, p < .001 (see Fig. 6). In case of the novel burger, positive hedonic attributes were more likely shared (68.6%) than negative hedonic attributes (47.6%), F(1, 312) = 14.30, p = .001, whereas functional attributes were less likely to be shared (44.3%) than negative functional attributes (58.3%), F(1, 421) = 8.40, p = .004. For the classic burger, the effect of attribute valence was not moderated by dimension, F(1, 747) = 1.83, p = .18. That is, the common good phenomenon applied especially to hedonic, but not to functional attributes of the novel burger. Hence, the novel burger was differentiated by its negative hedonic and positive functional attributes.

4.2.3. Influence of burger type tasting order, and distinct attributes on choice2

First, we tested whether the sustainable burger was chosen less often than the classic burger. A binomial test indicated that this was not the case; the sustainable burger was chosen about equally likely (52%) as the classic burger (48%), p = .90. Then, we tested whether the order in which participants tasted the burgers had an effect on choice (H5), by means of a logistic regression of choice on tasting order (classic vs. sustainable burger first). In the analysis, we additionally included the differences in the distinctiveness of attributes between the burgers. We expected that the novel burger would be chosen less often, the more negatively distinct it was with respect to the classic burger. Therefore, we first calculated distinctiveness indices, separately for positive and negative hedonic and functional attributes, by subtracting the number of shared attributes of the novel burger from the number of shared attributes of the classic burger.

The logistic regression model showed a significant main effect of tasting order, Wald = 15.35, 95% CI (1.66, 141.63), indicating that the novel, sustainable burger was chosen about equally likely (52%) as the classic burger (48%). The fixed predictors were the burger type (classic vs. novel), the valence of the generated attribute (positive vs. negative) and the attribute dimension (hedonic vs. functional). The dependent variable was whether the attribute applied to only one or to both burgers.

Results indicate a general common good effect (H2), that is, positive attributes were overall more likely shared (62.0%) than negative attributes (56.3%), F(1, 1480) = 6.81, p = .01. Contrary to H3, the common good effect did not depend on the burger type, F(1, 1480) = 1.30, p = .26, but supporting H4, there was a significant three-way interaction between attribute dimension, burger type and valence, F(3, 1480) = 11.47, p < .001 (see Fig. 6). In case of the novel burger, positive hedonic attributes were more likely shared (68.6%) than negative hedonic attributes (47.6%), F(1, 312) = 14.30, p = .001, whereas functional attributes were less likely to be shared (44.3%) than negative functional attributes (58.3%), F(1, 421) = 8.40, p = .004. For the classic burger, the effect of attribute valence was not moderated by dimension, F(1, 747) = 1.83, p = .18. That is, the common good phenomenon applied especially to hedonic, but not to functional attributes of the novel burger. Hence, the novel burger was differentiated by its negative hedonic and positive functional attributes.

2 Three participants did not indicate their choice, therefore the sample size for the analyses in this section was 60.
In Study 2, we found that the common good phenomenon (Alves et al., 2017a; Florack et al., 2021) works against a positive differentiation of a novel, sustainable product. We found that the common good phenomenon applied only to hedonic, but not functional attributes of a novel product. Hence, the novel product was differentiated negatively by its hedonic, but positively by its functional attributes. However, a stronger distinctiveness in positive functional attributes was not directly connected with product choice. Consumers chose the novel burger the more often, the more positively and the less negatively distinct it was from the classic burger with regard to its hedonic attributes, whereas functional attributes were not related to choice. Thus, the common good phenomenon poses a challenge for novel products and could undermine the positive differentiation by sustainability attributes in a real consumption situation. However, the sustainable burger was chosen more often when it was tasted before the classic burger. This finding corresponds to the assumption of the differentiation principle (Florack et al., 2021) that consumers are more likely to consider the shared positive (taste) attributes of a novel product when focusing on it first.

**4.3. Discussion**

In Study 2, we found that the common good phenomenon (Alves et al., 2017a, 2017b) corresponds to the assumption of the differentiation principle (Florack et al., 2021) that consumers are more likely to consider the shared positive (taste) attributes of a novel product when focusing on it first.

**5. General discussion**

In response to a growing consumer trend of reducing meat-consumption and more plant-based diets (von Massow et al., 2019), the food industry developed various more sustainable alternatives to existing food products, including blended products which replace part of their meat with plant-based ingredients (Campbell, 2020; Lang, 2020). The usual marketing strategy is to promote these products as being equally tasty as but more sustainable than existing products. So far, it was not clear whether sustainability attributes are used for a positive or even negative differentiation by consumers. Therefore, we investigated these two possibilities in two studies. In favor of the positive differentiation account, we found in Study 1 that distinct sustainability advantages positively influenced purchase intentions for a novel product. The higher purchase intentions were driven in part by higher tastiness expectations for the novel product when it was presented as more sustainable.

In addition, we found in Study 2 that, in a real consumption situation, the positive differentiation by sustainability attributes might be diluted by the common good phenomenon (Alves et al., 2017a; Alves, Koch, & Unkelbach, 2017b). In reality, the positive hedonic (i.e., taste) attributes of a sustainable product likely also apply to an existing product and are therefore insufficient for a positive differentiation. In Study 2, the novel burger was indeed perceived as similar to the classic burger regarding hedonic, but positively distinct regarding functional attributes. However, distinct functional attributes, like sustainability, were not connected to choice, only distinct hedonic attributes were. Consumers more likely chose the novel burger, when it was more strongly distinct than the classic burger regarding its positive hedonic attributes. Conversely, they less likely chose it when it was more strongly distinct regarding negative hedonic attributes. It seems that in a real consumption situation, differences in hedonic attributes were more important to consumers than differences in functional attributes. This corresponds to prior research findings that when consumers taste a novel product, credence qualities that cannot be directly assessed, like sustainability, become less important than experience attributes that can be directly perceived by consumers (Grunert, 2005; Torquati, Tempesta, Vecchiato, & Venanzi, 2018).

Study 2 shows the fundamental challenge for the novel, sustainable product: The common good phenomenon (Alves et al., 2017a, 2017b). According to the common good phenomenon, objects in general have more positive attributes in common, whereas it is mostly negative information that helps distinguish between objects. In Study 2, we found that consumers overall perceived positive attributes of the two burgers to apply to both burgers more often than negative attributes. However, for the novel product, we found the common good phenomenon to only apply to both burgers more often than positive attributes. Consumers perceived positive hedonic (i.e., taste) attributes of the novel burger to also apply to the classic burger, whereas negative hedonic attributes were perceived as distinct for the novel burger. The positive taste attributes of the sustainable product were therefore at most similar to those of the classic product and thus not sufficient for a positive differentiation.

The missing positive differentiation is especially problematic for a novel product when it is encountered after the classic product. In Study 2, the novel burger was chosen more likely when it was tasted before rather than after the classic burger. Assumingly, consumers then elaborated on its positive shared taste attributes and used them to inform their choice. This is in line with research findings on the differentiation principle (Florack et al., 2021), according to which shared attributes are considered for a first encountered object or product, whereas shared attributes of later encountered objects or products are cancelled out (see also Hodges, 1997; Houston et al., 1989; Kardes & Sanbonmatsu, 1993).

We found no evidence for a stronger common good effect for novel products, as we would have predicted from the pioneering advantage (Carpenter & Nakamoto, 1989; Kardes & Kalyanaram, 1992). It is conceivable that the common good effect is not affected by the pioneering advantage, as we found in Study 2. However, it has to be considered that Study 2 was a field study, conducted in a modern and stylish restaurant. Possibly, the classic burger in this specific restaurant was not perceived as the kind of burger which defines the standards as it would have been in a traditional burger restaurant. Further research is needed to draw a robust conclusion.

An important limitation of our study is that we did not conduct a...
blind taste test, but participants knew whether they tasted the classic or meat-mushroom blended burger. We cannot conclude that the positioning of the burger had a causal effect on taste experiences which is independent from taste experiences based on the actual composition of ingredients. Future studies might test whether consumers’ perceptions of the burgers’ functional attributes are causally related to taste experiences in a blind taste test.

Another limitation is that we investigated the effects of sustainability attributes and the common good phenomenon only with burger products. We used burgers as stimuli because the burger industry recently introduced various novel, healthier alternatives such as the Beyond Burger (Beyond Meat, 2019) and burgers are the most preferred format for consuming meat-mushroom blended products (Lang, 2020). Moreover, reducing meat consumption is considered one of the main environmental goals (Popkin, 2009) and the market value for meat substitutes is growing steadily (Shahbandeh, 2020). Future research might explore whether the common good phenomenon occurs in taste tests of different kinds of blended meat products and products advertised as being more sustainable than existing alternatives.

Furthermore, this study exclusively examined sustainability and taste as drivers of product choice, but there are various other factors driving food decisions, such as healthiness, mood, familiarity and price (Stepoje, Pollard, & Wardle, 2013). We focused on sustainability and taste, because recently many novel products entering the market are advertised by their sustainability attributes and because there is conflicting evidence about the connection between sustainability and taste (Grunert et al., 2004; Lucsh et al., 2010; Mai et al., 2019; Napolitano et al., 2007, 2010; Thorslund et al., 2016). Future research might explore how different food attributes of novel products in combination affect consumer perceptions and choice.

In addition, future research might focus on the link between sustainability effects and health inferences, and the implications for taste expectations. Some consumers use sustainability attributes to make inferences about the healthiness of food. For example, consumers may hold the belief that meat is healthier when produced under circumstances that support animal welfare (Grunert, 2005) or when the use of medications in animal feed is restrained (Thorslund et al., 2016). An interesting question is to what extent sustainability affects taste expectations independently from health inferences. In the present studies, the findings contradict a simple “sustainability means healthy and healthy means less tasty” intuition of consumers, because sustainability attributes did not lead to a decrease of tastiness expectations and experiences. However, a stronger focus on the healthiness-related aspects of sustainability might evoke the application of an unhealthy = tasty belief in certain contexts (Raghunathan et al., 2006), whereas in other contexts, the association of sustainability and health might be less relevant and no negative effects of sustainability on taste occur. Eventually, sustainability aspects could even amplify positive health – taste associations (Haasova & Florack, 2019; Kunz, Florack, & Haasova, 2020). For instance, animal welfare might be used as a cue for both increased health and taste, reinforcing a positive healthy = tasty belief.

5.1. Practical implications

Lately, many novel products have entered the market with a focus on meat-reduction and sustainability. So far, it was not clear whether the promotion of sustainability is helpful or harmful for these novel products. Our research findings suggest that specific sustainability attributes can positively influence purchase intentions for novel products, via increased taste expectations. However, this effect could be diluted in a real consumption situation, in which taste matters more than other attributes.

The negative effect of a missing positive differentiation could be counteracted by changing the tasting order of the products. For example, to increase sales of a sustainable product, restaurant staff could organize product tastings and let their costumers taste the sustainable product before a classic product. More importantly, however, marketing managers should try to achieve a positive differentiation of novel products on hedonic attributes. Instead of promoting mainly the environmental benefits of sustainable products, they should instead focus on the unique and superior taste and consumption experience they provide. For example, a meat-mushroom blended burger might be advertised not as tasting just as good as meat, but even better than meat.

Author contributions

Author A. Florack and author S. Kunz designed and conducted Study 1. Author H. Alves provided the theoretical background for Study 2. Authors A. Florack and I. Campuzano designed and authors I. Campuzano and S. Kunz conducted Study 2. S. Kunz analyzed the data, while all authors were involved in data interpretation. S. Kunz wrote the first draft of the manuscript, and all authors contributed to and have approved the final manuscript. All authors had full access to the study data.

Funding

This research received funding for the conduction of Study 2 by a grant from the University of Vienna to the third author.

Ethical statement

The present studies were conducted in accordance with the Declaration of Helsinki (revised 1983) and local guidelines of the Faculty of Psychology, University of Vienna. In each study, participants were informed about its aim and confidentiality of the data collection, and gave their consent to participate. Participants could also withdraw at any time during the studies. The studies were approved by the Institutional Review Board (IRB) of the University of Vienna (Approval number: 2020/S/011).

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