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When innovation backfires: Preference for predictability moderates the spillover of functional food ambivalence to the entire parent category☆

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ABSTRACT

The present research extends findings on when and why consumers (fail to) adopt innovative food products by showing that consideration or consumption of such products (functional foods) can backfire when they entail an inherent and incompatible trade-off between healthiness and naturalness. Four experiments, examining consumers' willingness to buy, try, and actually consume such foods, show that this trade-off yields a sense of ambivalence that spills over from single product exemplars to negatively affecting (unrelated members of) the parent category of functional foods. However, this effect is not invariant across consumers. Ironically, it is more pronounced for consumers that tend to be more open to novel experiences and also more open to ambivalent feelings to occur—consumers with lower levels of the Preference for Predictability. Implications for marketing practice are discussed.

1. Introduction

Yogurt fortified with probiotics, mineral water enriched with selenium, or skimmed milk with added dextrin. Have you recently purchased any of these (or other) novel "functional foods"? If you did not, then you are not alone. Despite popular belief, the global market for these products—until recently heralded as key innovations in the (food) market (e.g., Bigliardi & Galati, 2013; Menrad, 2004; Puhakka, Valve, & Sinkkonen, 2018)—is slowing down and actually declining in several parts of the world (NeutraceuticalsWorld, 2017; Siegrist, Shi, Giusto, & Hartmann, 2015; see also Mascaraque, 2017; Robinson, 2014).

With the present research, we aim to demonstrate that a possible reason for this reluctance in adoption may be that functional foods—food items engineered to include specific novel ingredients to improve one's (physical) health or reduce the risk of disease (Barauskaite et al., 2018; Choi & Reid, 2016; Diplock et al., 1999; Laros & Steenkamp, 2005; Van Kleef, van Trijp, & Luning, 2005)—are a specific instance of a food innovation that carries an inherently incompatible trade-off that may spur a sense of *ambivalence* (e.g., Cacioppo & Berntson, 1994; Cornil, Ordabayeva, Kaiser, Weber, & Chandon, 2014; Van Harreveld, Nohlen, & Schneider, 2015). Moreover, we propose that this experienced ambivalence may backfire and spill over to hurt (unrelated members of) the entire parent category. Finally, we suggest that this spillover may be particularly pronounced for consumers that are more sensitive to such ambivalence.

2. Conceptual background and hypotheses development

2.1. Innovative food products may induce ambivalence

While previous research has shown that novel product attributes sometimes have a positive effect on consumers' product evaluation and choice (e.g., Arts, Frambach, & Bijmolt, 2011; Carpenter, Glazer, & Nakamoto, 1994; Kardes, Kalyanaram, Chandrashekaran, & Dornoff, 1993; Nowlis & Simonson, 1996, Posavac, Sanbonmatsu, Kardes, & Fitzsimons, 2004; Zhang & Markman, 1998), other studies suggest that attribute evaluations may also negatively affect preference and choice (cf., Brown & Carpenter, 2000; Kardes, Posavac, & Cronley, 2004; Simonson, Nowlis, & Simonson, 1993). We propose that such negative effects are particularly likely for specific types of innovative

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products—those where the innovative attribute is not perceived as unequivocally positive but instead triggers a sense of conflict due to an inherently incompatible trade-off. And this negative effect may not be limited to the product *per se* but may spill over to negatively affect responses to the entire parent category of which the focal product serves as an exemplar.

We use functional foods as a case in point. More specifically, research on the perceived healthiness of food products indicates that consumers expect health to associate with "all-natural", non-processed food (e.g., Devcich, Pedersen, & Petrie, 2007; Gineikiene, Kiudyte, & Degutis, 2017; Frewer, Scholderer, & Lambert, 2003). However, the perception of functional foods as *engineered* foods violates these consumer expectations (Ares & Gámbaro, 2007; Berry, Burton, & Howlett, 2017; Cardello, 2003; Devcich et al., 2007; Hingston & Noseworthy, 2018). Consequently, because novel functional foods contain ingredients that are promising (and sometimes delivering) health benefits on the one hand, but are also engineered, processed, and artificial on the other, consumers may be faced with a situation where the same ingredient may simultaneously elicit opposing, incompatible evaluations of both positive and negative valence. Hence, consumers being exposed to a functional food exemplar (considering or actually consuming one) may experience *ambivalence*—a simultaneous experience of positive and negative evaluations towards the same object, that is typically (although not always) experienced as aversive, provoking a sense of tension, indecision, and conflict (Cacioppo & Berntson, 1994; Newby-Clark, McGregor, & Zanna, 2002; Priester & Petty, 1996; Otnes, Lowrey, & Shrum, 1997; Pang, Keh, Li, & Maheswaran, 2017; Thompson, Zanna, & Griffin, 1995; Ruth, Brunel, & Otnes, 2002; Van Harreveld, Van der Pligt, & de Liver, 2009; Wang, Batra, & Chen, 2016; for a review, see Van Harreveld et al., 2015). Thus, building on the proposition of an inherent incompatibility between the claimed healthiness of functional foods on the one hand and their man-made, engineered, and artificial nature on the other, we expect that:

H1. Compared to regular foods, consumers considering or actually consuming functional foods will experience higher levels of ambivalence.

2.2. Functional food ambivalence may spill over to the entire parent category

Can the experience of a specific instance of functional food ambivalence spill over beyond that specific exemplar, and hurt consumer responses toward the entire parent category of functional foods? In this paper, we will define responses toward the parent category as the willingness to buy, try or consume from the parent category as a whole, or any of its members specifically. This spillover phenomenon is less well documented than the spillover from a parent category to a single exemplar of that category (see Posavac, Sanbonmatsu1, Seo, & Iacobucci, 2014; Votolato & Unnava, 2006). Yet, research on overgeneralization by Osherson, Smith, Wilkie, Lopez, and Shafir (1990, see also Joiner & Loken, 1998) strongly suggests this possibility. More specifically, Osherson et al. (1990) labeled this tendency to (over) generalize from a single exemplar to a parent category the "inclusion fallacy" (see also Kardes et al., 2004; Shafir, Smith, & Osherson, 1990; Holyoak & Nisbett, 1988; Thagard & Nisbett, 1982). This literature suggests that the phenomenon is most likely: 1. when the key attributes of the exemplar are perceived as typical and salient; 2. when there is limited perceived variability among exemplars, and 3. when consumers do not have an established knowledge schema, i.e. when the encountered exemplar is seen as novel (Osherson et al., 1990). Under these conditions, exemplar evaluations might spill over to a parent category, but will not go beyond the lowest level category that can be inferred from the exemplar. These conditions map well onto functional foods since they are mostly positioned based on their functional ingredient (Diplock et al., 1999; Siró, Kápolna, Kápolna, & Lugasi, 2008), thus creating attribute typicality and salience. This also reduces perceived variability to one main source of variance—the functional ingredient. Moreover, they are frequently seen as novel (Carillo et al., 2013; Urala, Schutz, & Spinks, 2011) so consumers do not have an established knowledge schema for them. The inclusion fallacy would thus predict a spillover (generalization) from the single functional food exemplar to the parent category of functional foods (the lowest level parent category to be inferred from the exemplar), but not to the category of regular foods.

This process dovetails with what Oakley, Duhachek, Balachander, and Sriram (2008) term 'singular judgment'—the isolated processing of a stimulus, due to the absence of an existing schema (see also Posavac et al., 2004). Because there is no schema stored in memory on comparison points, reference brands, or a parent category, novel functional foods products will by necessity be perceived as the most prototypical representatives of a category (Carpenter & Nakamoto, 1989; Fennis & Stroebe, 2021; Kardes & Kalyanaram, 1992; Kardes et al., 1993). As a result, the evaluation of the most salient attribute (the functional ingredient) will not only strongly affect perception and choice of the specific product exemplar, but will also spill over and determine how the parent category (functional foods) will be evaluated.

Thus, this reasoning implies that to the extent that the functional food exemplar induces ambivalence due to the inherent evaluative incompatibility of the inferences associated with its main attribute, this ambivalence toward the exemplar may produce ambivalence toward the parent category and its members, which may spill over to negatively affect parent category responses as defined above. Interestingly, as research by Ueckermann, Hermann, Wentzel, and Landwehr (2010) suggests, this phenomenon may be particularly likely for new products with hybrid, ambiguous or incongruent attributes. Thus, in line with these and other inferential models (Evangelidis & van Osselaer, 2019; Simonson, 1989; see also Hsee & Leclerc, 1998), we propose:

H2. Ambivalence toward the exemplar may produce ambivalence toward the parent category, which may spill over to negatively affect parent category responses.

2.3. The moderating role of preference for predictability

Hypotheses 1 and 2 state that exposure to a novel functional food exemplar triggers a sense of ambivalence, which may be transferred to the entire parent category of functional foods. However, this process—to the extent that it exists— will likely not be equally pronounced for everyone. Rather, a novel product like functional food will only produce ambivalence when the mixed reactions come to mind readily, which may not always be the case (Larsen, 2007). It thus makes sense to assume that the process is *conditional* and will be more pronounced for consumers that are particularly likely to "pick up" on such ambivalence. We propose that individual differences in the desire for expectation-congruent, secure and stable situations and objects, that are epistemically consistent and unchallenged, may moderate the elicitation and/or spillover of ambivalence. Such individual differences are reliably captured by the Preference for Predictability construct (Kruglanski & Webster, 1996; Roets, Kruglanski, Kossowska, Pierro, & Hong, 2015). We propose two—competing—hypotheses for how consumers' Preference for Predictability might qualify these effects. The first hypothesis is conceptually more straightforward than the second, and thus, the intuitively more compelling one. That is, while exposure to functional foods may induce undifferentiated ambivalence, any negative spillover on category responses will be stronger for consumers *high* in the Preference for Predictability since these consumers might experience this ambivalence as more aversive than low Preference for Predictability consumers. Hence, the first hypothesis reads:

H3. The spillover on parent category responses from exposure to functional food exemplars will be stronger for consumers *high* in the Preference for Predictability.

However, a more in-depth analysis of the literature also suggests a second, competing hypothesis. Note that ambivalence captures a sense of conflict as a function of the parallel juxtaposition of incongruent, opposing evaluations elicited by a novel product. It may be that to experience such ambivalence in the first place requires a certain level of openness to novelty, expectation violation, and epistemic incongruence that high Preference for Predictability consumers might block or preclude due to their tendency for epistemic 'seizing' and 'freezing' (see Roets et al., 2015; Kruglanski & Webster, 1996). Indeed, research by Fernbach, Darlow, and Sloman (2010) suggests that—in line with this seizing and freezing— engaging in predictive reasoning (a chronic tendency for high but not low Preference for Predictability individuals) reduces sensitivity to alternative, potentially incongruent perceptions, and possibilities. If so, then experiencing ambivalence, and hence also its spillover, might be higher for *low*, rather than high Preference for Predictability consumers. This would be in line with findings suggesting that low Preference for Predictability is associated with less bias due to pre-existing attitudes when forming judgments (Dijksterhuis, Van Knippenberg, Kruglanski, & Schaper, 1996), and a general receptivity to novel and unpredictable situations and objects (Kardes, Fennis, Hirt, Tormala, & Bullington, 2007; Webster & Kruglanski, 1997). Note that *openness* to epistemic incongruence does not equate with *embracing* it—"allowing" for the experience of ambivalence does *not* necessarily imply positively evaluating it, but merely refraining from premature seizing or freezing, and being sensitive to alternative perceptions and possibilities (Roets et al., 2015). This yields competing Hypothesis 4:

H4. Ambivalence from exposure to functional food exemplars and its spillover on parent category responses will be stronger for consumers *low* in the Preference for Predictability.

Hence, H3 and H4 both assume that the Preference for Predictability will moderate the impact of exposure to functional food exemplars on parent category responses. However, they differ in two respects: 1. the direction of that moderation and 2. where in the full causal sequence it takes place. First, H3 holds that the impact of exposure to functional foods is stronger for consumers *high* in the Preference for Predictability and H4 holds that this effect is stronger for consumers *low* in this trait. Second, in a full conditional process model, while both hypotheses assume a conditional indirect effect, H3 holds that the Preference for Predictability would moderate the impact of ambivalence toward the parent category (mediator 2) on parent category responses (the outcome), while H4 holds that Preference for Predictability would moderate the impact of exposure to a functional food exemplar (the antecedent) on ambivalence toward that exemplar (mediator 1; see Fig. 1 for a summary of all hypotheses).

3. The present research

We examined the empirical support for our hypotheses in four experiments, conducted both online and in the lab, including both undergraduate students and "real consumers", focusing on different novel functional food products that were either merely considered or actually consumed (see Table 1 for an overview of hypotheses and the extent of empirical support across all studies). Moreover, we assessed a range of different ensuing category-related consumer responses including willingness to buy and try functional food products, and their actual consumption.

In Experiment 1, we examine whether exposure to a specific functional food exemplar affects parent category responses, i.e., the

Table 1
Summary of empirical support for hypotheses per study.

Hypothesis	Exp. 1	Exp. 2A	Exp. 2b	Exp. 3
H1: Compared to regular foods, consumers merely considering or actually consuming novel functional foods will experience higher levels of ambivalence	Not tested	Supported	Not tested	Supported
H2: Ambivalence toward the exemplar may produce ambivalence toward the parent category, which may spill over to negatively affect parent category responses.	Not tested	Not tested	Not tested	Supported
H3: The spillover on category responses from exposure to functional food exemplars will be stronger for consumers *high* in the Preference for Predictability	Not supported	Not supported	Not supported	Not supported
H4: Ambivalence from exposure to functional food exemplars and its spillover on parent category responses will be stronger for consumers *low* in the Preference for Predictability.	Supported	Supported	Supported	Supported

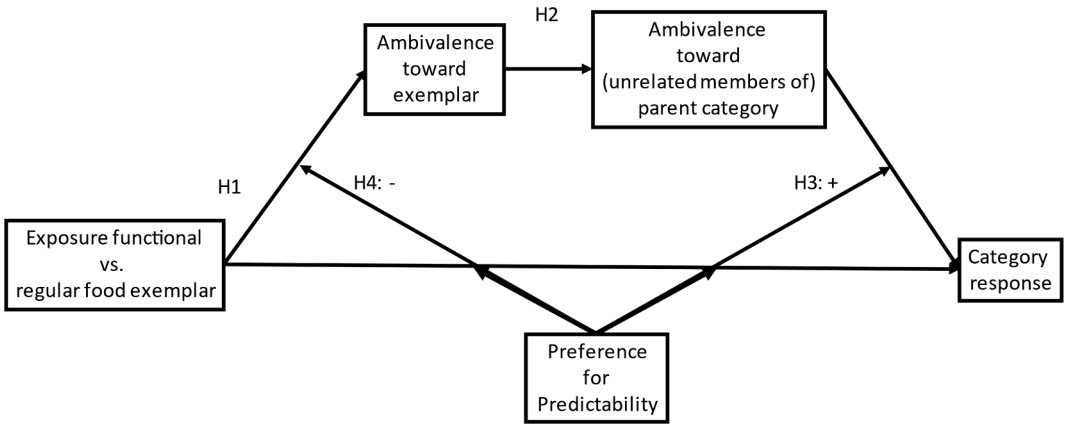


Fig. 1. Summary of Hypotheses.

willingness to buy from the parent category (as implied by H2), and we assess initial support for H3 and H4 examining whether any effects on parent category responses are moderated by the Preference for Predictability and if so, how. Experiments 2A and 2B then build on the findings using a "causal chain approach" (Spencer et al., 2005). More specifically, if the negative impact of functional food exposure on parent category responses is indeed caused by conflicting evaluative inferences about the healthiness and artificiality of the innovative food ingredient, then by implication any exposure-induced ambivalence and any ensuing negative effects should be reduced or even attenuated if the focal ingredient that brings the health benefit is presented as being naturally present, rather than engineered and artificially added. Experiment 2A directly tests this assumption using a manipulation that keeps the particular health-related ingredient constant yet highlights that it is either artificially added or naturally present in the product. This study tests the impact of this manipulation on ambivalence (as per H1). Experiment 2B then assesses whether this same manipulation also affects parent category responses, i.e., the willingness to try products from the parent category of functional foods (as implied by H2). Moreover, both studies aim to find converging evidence for the moderating role of consumers' Preference for Predictability, assessing further support for H3 or H4. Finally, in Experiment 3, we use "real" consumers and we bridge the "intention-behavior gap" (Fennis, Adriaanse, Stroebe, & Pol, 2011) by moving from willingness to buy and trial intentions to actual, overt consumer behavior, both concerning exposure to an actual, functional food exemplar (which is actually tasted) as well as any ensuing category-related responses (actually consuming an unrelated member from the same parent category). In this study, we test the full (moderated) sequence of spillover effects, thus simultaneously testing H1, H2, H3, and H4 in one single study and so aim to replicate, extend, and integrate the various findings. Thus, as per H1, we explicitly test whether exposure to a functional food exemplar (compared to its regular counterpart) produces higher levels of ambivalence toward that exemplar and whether (and if so, how) that effect is moderated by the Preference for Predictability (as per H3 and H4). In turn, as per H2, this study also assesses whether any (conditional) effect on exemplar ambivalence (mediator 1) affects ambivalence towards an unrelated member of the parent category of functional foods (mediator 2) and whether that, in turn, spills over to negatively affect the willingness to consume this unrelated member. In addition, in this study, we examine the extent to which other associations than conflicting evaluations between healthiness and naturalness can account for the effects and whether the "neighboring" constructs of need for order, decisiveness, closemindedness, and discomfort with ambiguity (Webster & Kruglanski, 1997) yield similar results as the Preference for Predictability.

3.1. Measurement, sampling, and power considerations

In this research, we measure *subjective*, rather than *objective*, ambivalence (Van Harreveld et al., 2015), because the former directly taps into the extent to which the consumer feels torn between both sides of the attitude object and thus actually experiences a conflict or incongruence, whereas the latter merely records the simultaneous existence of positive and negative associations, but without capturing the psychological salience of a conflict. More importantly, the literature converges that subjective and objective ambivalence frequently correlate only modestly, if at all (e.g., Armitage & Arden, 2007), that measures of objective ambivalence are sometimes psychometrically challenged (Ullrich, 2012; Ullrich, Schermelleh-Engel, & Böttcher, 2008), and that subjective ambivalence is a stronger predictor of emotion, cognition and behavior than objective ambivalence (e.g., Lipkus, Green, Feaganes, & Sedikides, 2001; Newby-Clark et al., 2002; see Van Harreveld et al., 2015 for an extended discussion).

For all studies, except Experiment 3, we used convenience sampling, aimed at maximizing statistical power within the limits of practical feasibility given the available financial means or the labs where the data were collected (i.e., collecting as many observations as possible given our budget or given the allotted lab time). For each study, we performed a sensitivity analysis using *G*Power* (Faul, Erdfelder, Buchner, & Lang, 2009) to assess the actual power of our studies. Based on a pilot study and recent research on ambivalence (Van Harreveld et al., 2014), we expected small to medium effect sizes. The results of these sensitivity analyses showed that, for all studies, we obtained adequate power to detect effects of $f^2 = 0.076$ or larger, which is in line with the pilot results, and results of previously reported studies on ambivalence.

4. Experiment 1

Experiment 1 aimed to assess whether exposure to a functional food exemplar (compared to its regular counterpart) would negatively affect responses to the parent category (as implied by H2). Moreover, this study tests whether any effects found would be moderated by consumers' Preference for Predictability (cf. Kruglanski & Webster, 1996), and if so, how, thus providing initial support for H3 and H4.

4.1. Method

4.1.1. Design and participants

One hundred undergraduate students from a European business school (*Mage* = 20.74, *SD* = 1.27, 50.0% self-ascribed female) participated in a lab study in exchange for partial course credit. Participants were randomly assigned to conditions and asked to imagine a shopping scenario where they were given a coupon to buy a new (unbranded) milk. The study employed a single factor (type of food exemplar: regular vs. functional) between-participants design with individual differences in the Preference for Predictability as a measured continuous predictor.[1]

4.1.2. Procedure

We adapted the procedure outlined by Karmarkar and Bollinger (2015). Participants were randomly assigned to either the regular food exemplar condition or the functional food exemplar condition. More specifically, after introducing the study, all participants were asked to imagine doing their regular shopping and were told they would be offered a 2 Euro coupon which they could spend on a new (unbranded) milk, offered in the promotions section (a store area where discounts and new product promotions are advertised, often using promotion materials that have been developed specifically for this purpose, cf. De Pelsmacker, Geuens & Van Den Bergh, 2017). In the functional food exemplar condition, the milk was presented as enriched with dextrin, which helps to control weight and yields a feeling of satiety, whereas this ingredient and information were absent in the regular food exemplar condition (see Supplemental Materials for the stimulus materials).

4.1.3. Measures

After reading the shopping scenario, and hence after all participants were either exposed to the regular food exemplar (the regular milk) or the functional food exemplar (the milk with added dextrin), we introduced all participants to the parent category of functional foods, described as "foods with added ingredients that have beneficial effects on bodily functions and help to improve a state of health and well-being. For example, water with extra added minerals or vitamins or yogurt with extra added bifid bacteria" (based on Diplock et al., 1999; see also Laros & Steenkamp, 2005). After this, to measure parent category responses, we assessed consumers' willingness to buy products from the parent category of functional foods (so *not* the specific exemplar considered earlier) using a three-item scale based on Putrevu and Lord (1994): *It is very likely that I will buy functional food products, I will purchase functional*

[1] Note: All studies included additional items that were included for exploratory purposes. Since they were not focal to the present investigation, we did not analyze these data.

food the next time I need food products, I will definitely try functional food products (1 = totally disagree, 7 = totally agree; $M = 4.04$, $SD = 1.60$, Cronbach's $\alpha = 0.87$; see Supplemental Materials for means and standard deviations as a function of experimental manipulations for all outcome variables for all studies). Finally, we measured individual differences in the Preference for Predictability using a four-item measure adapted from Katsikeas, Auh, Spyropoulou, and Menguc (2018), Roets et al. (2015). and Kruglanski and Webster (1996). Example items include: *I dislike unpredictable situations* and *I do not enjoy the uncertainty of going into a new situation without knowing what might happen* (1 = totally disagree, 7 = totally agree). We averaged the scores on the items to arrive at an overall index of Preference for Predictability with lower scores indicating lower levels of this preference ($M = 4.20$, $SD = 1.35$, Cronbach's $\alpha = 0.76$).

4.2. Results and discussion

Given the continuous nature of our moderator, we used regression analysis with Hayes' (2018) PROCESS macro (Model 1, using 5000 bootstraps) to analyze the data. Thus, we regressed overall willingness to buy from the parent category of functional foods on the type of food exemplar (dummy coded, the regular milk condition being the reference category), Preference for Predictability (mean-centered), and their interaction.

While the effect of Preference for Predictability was non-significant ($B = 0.01$, $SE = 0.12$, $t < 1$), this analysis yielded a significant and negative effect of the type of food exemplar on category responses, as implied by H2 ($B = -0.34$, $SE = 0.15$, $t(96) = -2.25$, $p = .027$). This effect indicated that, compared to the regular milk (the regular food exemplar), exposure to the milk with added dextrin (the functional food exemplar) negatively affected parent category responses, i.e., the overall willingness to buy products from the parent category of functional foods. Importantly, the interaction between the type of food exemplar and Preference for Predictability proved to be significant and qualified this effect of the type of food exemplar ($B = 0.32$, $SE = 0.12$, $t(96) = 2.75$, $p = .007$).

Additional simple slopes analyses to probe the interaction showed that exposure to a functional food exemplar predicted lower levels of willingness to buy products from the parent category of functional foods only among participants who scored *low* on the Preference for Predictability (evaluated at −1 *SD* from the mean; $B = -0.77$, $SE = 0.22$, $p = .001$). For participants with a *high* Preference for Predictability (evaluated at + 1 *SD* from the mean), this effect was attenuated and consideration of a functional food exemplar did not affect willingness to buy from the parent category ($B = 0.08$, $SE = 0.22$, $t < 1$).

In sum, these results are in line with implications from H2. In addition, the results support H4, but not H3, in showing that the impact of functional food exposure on category-related responses is more pronounced for consumer *low*, rather than *high* in the Preference for Predictability.

5. Experiment 2A

The previous findings show that considering a functional food exemplar may reduce consumers' buying intentions with regard to the parent category. Moreover, these effects are conditional and more pronounced for consumers with *lower* levels of the Preference for Predictability. The present and following studies extend these findings by testing the main assumptions underlying our hypotheses using a causal chain approach (cf. Spencer et al., 2005). That is, if exposure to a functional food exemplar induces ambivalence and this ambivalence is indeed a function of conflicting assumptions about the healthiness of the novel food ingredient on the one hand, and its artificiality on the other, then by implication any ensuing ambivalence and negative parent category effects should be attenuated if the novel ingredient is presented as being naturally present, rather than engineered and artificially added. Moreover, this manipulation allowed us to rule out as an alternative explanation that it is the mere presence of any (as opposed to no) ingredient that accounts for the previous findings.

We will use this manipulation in the present experiment to assess whether it affects experienced ambivalence toward the exemplar, moderated by consumers' Preference for Predictability (testing H1 and H3/H4).

5.1. Method

5.1.1. Design and participants

This online study used a heterogeneous sample of 207 participants ($M_{age} = 25.78$, $SD = 8.471$, 68.5% self-ascribed female, 29.5% male, 1.9% other), including undergraduate students as well as individuals with other backgrounds. Participation was voluntary. The study employed a design with type of ingredient (artificially added vs. naturally present) as a between-participants factor and individual differences in the Preference for Predictability as a measured continuous predictor.

5.1.2. Procedure

Participants were randomly asked to imagine one of two experimental scenarios on doing their regular shopping. At the entrance of a shopping center, they were offered a bottle of new still mineral water. In the natural ingredient condition, the still water was presented as a "natural mineral water containing 40 mg of naturally occurring magnesium which comes from the depths of springs". In the artificial ingredient condition, the still water was presented as "a purified and carefully filtered mineral water containing an extra added 40 mg of magnesium which comes from our health and nutrition lab". In both conditions, the ingredient was described as follows: "magnesium helps to build bones, enables nerves to function, and is essential to the production of energy from food". To strengthen the manipulation, we asked all participants to write about the product and its ingredients using 3 to 5 sentences.

5.1.3. Measures

We assessed subjective ambivalence towards the mineral water using the measure developed by Priester and Petty (1996; 2001), rating the extent to which the words *mixed*, *conflicted* and *indecision* described their feelings toward the water on a 6-point rating scale, where 0 means "do not harbor this feeling", 1 means "slightly" and 5 "extremely". We averaged the scores on these items to create an ambivalence measure with higher scores indicating higher levels of experienced ambivalence toward the water ($M = 2.86$, $SD = 1.31$, Cronbach's $\alpha = 0.85$). We also measured participants' Preference for Predictability using the eight-item scale developed by Roets and Van Hiel (2007; see also Webster & Kruglanski, 1994; $M = 3.84$, $SD = 0.78$, Cronbach's $\alpha = 0.76$).

5.2. Results and discussion

5.2.1. Preliminary analysis

To assess how our manipulated conditions performed, we analyzed the sentences written down after participants were exposed to the respective conditions using both a qualitative and a more quantitative approach. Qualitatively, we explored the use of words indicative of the conditions to which participants were assigned. In both conditions, participants typically acknowledged the main ingredient, magnesium (e.g., "I think that magnesium is very important so I should buy it" [typos corrected throughout]), and its potential health benefits, using words such as 'health' 'healthy', 'good', 'interested' and 'interesting' (e.g., "Sounds interesting. Seems like a healthy product to me"; "It is probably a good product").

In line with the manipulation, in the natural ingredient condition, participants typically used words such as 'natural', (e.g., "It should be good for you because it's all natural"), 'normal' (e.g., "Healthy, fresh, normal") and 'regular' ("I think it is a natural regular good product

which is being offered") to describe the water. In contrast, in the artificial ingredient condition, participants made references to words such as 'supplement' (e.g., "A product that has extra nutrition supplements in it, is not natural"), 'artificial' (e.g., "I might be worried about the fact that the nutrients came from the 'lab', as it sounds a bit artificial"), 'added' (e.g., "Added magnesium probably won't do me any harm, but it won't do me any good either"), 'additional' (e.g., "I am a bit confused why still water has to contain magnesium because I am thinking of water as being all natural without needing additional ingredients") and 'extra' ("Extra magnesium sounds good, but I don't know if it is actually good").

A more quantitative follow-up analysis used the program Linguistic Inquiry and Word Count (LIWC; Pennebaker, Boyd, Jordan, & Blackburn, 2015). We used the 2015 version of the text-analysis program that assigns words to word categories based on accumulated dictionaries. These categories also assess various psychological variables, such as positive and negative emotions, or the extent of cognitive processing (Pennebaker et al., 2015). Given that ambivalence captures the simultaneous experience of positive and negative evaluations, but is typically experienced as aversive (e.g., Van Harreveld et al., 2015), we choose to use the program to gauge the extent to which our manipulations induced positive and negative emotions. We used word categories that represent positive emotions (e.g., good, like, happy, hope) and negative emotions (e.g., bad, hate, hurt). Each category is represented by percentages that are calculated by counting the number of words belonging to a specific word category and then dividing this number by word count (Pennebaker et al., 2015). To examine whether our manipulation elicited differences in categories measuring positive and negative emotions, we used an independent samples *t*-test. The results indicate that the artificial ingredient condition resulted in (marginally) more negative emotions-related words than the natural ingredient condition ($t(180) = 1.85$, $p = 0.066$; $M_{artficial} = 1.33$, $SD_{artficial} = 4.72$, $M_{natural} = 0.39$, $SD_{natural} = 1.51$). In contrast, we did not find significant differences of exposure to the artificially added (vs. natural) ingredient on positive emotions-related words ($t(180) = 1.14$, $p = 0.256$, $M_{artficial} = 9.06$, $SD_{artficial} = 9.39$, $M_{natural} = 11.12$, $SD_{natural} = 14.19$). These results map well onto the ambivalence construct. As expected, the key ingredient and its health benefit appear to yield similarly positive emotions in both conditions, but its artificiality in the artificial ingredient condition induces more negative emotions compared to the natural ingredient condition.

5.2.2. Target analysis

Similar to the previous study, we used Hayes' (2018) PROCESS macro (Model 1, using 5000 bootstrap samples) with subjective ambivalence as criterion and type of ingredient (dummy coded, the natural ingredient condition being the reference category), Preference for Predictability (mean-centered) and their interaction as predictors. While the effect of Preference for Predictability was not significant ($B = 0.27$, $SE = 0.16$, $t(203) = 1.67$, $p = .097$), the analysis yielded a significant effect of type of ingredient on ambivalence, in line with H1 ($B = 0.39$, $SE = 0.18$, $t(203) = 2.23$, $p = .027$). This effect indicated that the mineral water containing the artificial ingredient induced more ambivalence than the water containing the same ingredient, but naturally present. In addition, the interaction between type of ingredient and Preference for Predictability proved to be significant ($B = -0.71$, $SE = 0.23$, $t(203) = -3.11$, $p = .002$). Additional simple slopes analyses to probe the interaction supported H4 by showing that exposure to the artificial ingredient (compared to the natural ingredient) induced higher ambivalence but only among participants with a *low* Preference for Predictability (evaluated at −1 *SD* from the mean; $B = 0.94$, $SE = 0.25$, $p = .0002$). For participants with a *high* Preference for Predictability (evaluated at + 1 *SD* from the mean), this effect was attenuated and exposure to the artificially added (vs. natural) ingredient did not affect ambivalence ($B = -0.16$, $SE = .25$, $p = .527$, n.s.).

Hence, in Experiment 2A we showed that, in line with H1, considering a novel functional food exemplar (i.e., containing an ingredient yielding both health benefits, as well as being artificially added) will induce higher levels of ambivalence compared to its regular counterpart (i.e., the product containing the same ingredient with similar health benefits, but being naturally present). However, in line with the results from the previous study and H4, this ambivalence is observed particularly among those consumers that show a baseline openness to incongruent, possibly conflicting perceptions, i.e., consumers with low levels of the Preference for Predictability.

The next studies will build on these results. Experiment 2B aims to show that the same manipulation used presently will negatively affect parent category-related responses (as implied by H2) and examines whether any negative effects on parent category responses are conditional on the Preference for Predictability (as per H3/H4). Finally, Experiment 3 tests all hypotheses simultaneously by using a similar manipulation. This study aims to show that exposure to a functional food exemplar induces ambivalence toward that exemplar (as per H1), which will affect ambivalence toward an unrelated member of the parent category of functional foods, in turn spilling over to affect the consumption of that parent category member (as per H2). Moreover, in Experiment 3, we will again assess the role of Preference for Predictability to find converging evidence favoring either H3 or H4.

6. Experiment 2B

In Experiment 2B we use the same manipulation to extend the previous findings by showing that exposure to a novel functional food exemplar containing an artificially added ingredient (compared to its natural counterpart) may also negatively affect parent category-related responses. In addition, this study aims to find converging evidence for the moderating role of Preference for Predictability. Finally, we assess the robustness of our findings by zooming in on a different parent category-related dependent variable: the general willingness to try and adopt products from the parent category.

6.1. Method

6.1.1. Design and participants

The experiment was conducted at a European business school lab. We used a sample of 133 undergraduate students ($M_{age} = 20.52$, $SD = 1.14$, 55.6% self-ascribed female) that participated in exchange for partial course credit. The study employed the same design as Experiment 2A with type of ingredient (artificially added vs. naturally present) as a between-participants factor and individual differences in the Preference for Predictability as a measured continuous predictor.

6.1.2. Procedure

We used the same scenarios and instructions as in the previous study. Hence, as part of a study on consumer values and beliefs, participants were randomly asked to imagine one of two experimental scenarios on doing their regular shopping and being offered either a bottle of new still mineral water presented either as "a natural mineral water containing 40 mg of naturally occurring magnesium which comes from the depths of springs" (the natural ingredient condition) or "a purified and carefully filtered mineral water containing an extra added 40 mg of magnesium which comes from our health and nutrition lab" (the artificially added ingredient condition). In both conditions, the ingredient was described as follows: "magnesium helps to build bones, enables nerves to function, and is essential to the production of energy from food". To strengthen the manipulation, we again asked all participants to write about the product and its ingredients using 3 to 5 sentences.

6.1.3. Measures

We used a three-item willingness to try scale, adapted from Aqueveque (2016) as an alternative dependent variable capturing trial and adoption intentions toward the entire parent category of functional foods. Sample items include "*If somebody gives me a functional food*

product, I will try it" and "*Overall, I am very interested in trying functional food products"* (1 = totally disagree, 7 = totally agree, $M = 5.09$, $SD = 1.23$, Cronbach's $\alpha = 0.74$).

As in Experiment 1, we also measured participants' Preference for Predictability using the four-item scale ($M = 3.73$, $SD = 1.14$, Cronbach's $\alpha = 0.65$).

6.2. Results and discussion

6.2.1. Preliminary analysis

Similar to Study 2A, we analyzed the sentences participants wrote down after being exposed to the respective conditions, both qualitatively and quantitatively. Qualitatively, we again explored the use of words indicative of the conditions to which participants were assigned. Similar to the previous study, in both conditions, participants used words to acknowledge the presence of the main ingredient, magnesium (e.g., "I think magnesium is good" [typos corrected throughout]), and its potential health benefits, using words such as 'minerals', 'health', 'healthy', and 'good' (e.g., "This new mineral water seems to be very healthy"; "Magnesium is good for health so I would take it").

In line with the manipulation, in the natural ingredient condition, participants typically used words such as 'natural' (e.g., "Also I think that it's good that there is some naturally occurring magnesium because it helps to build bones"; "I like this product. It is natural, without added flavors. This water is good for health and should be tasty"), 'benefits' (e.g., "Well the description sounds good, knowing that the product will bring benefits to me I would be interested in it"), and 'beneficial' ("This product might be beneficial for my health") to describe the water. In contrast, in the artificially added ingredient condition, participants made references to words such as 'supplement' (e.g., "I'd rather go to the drugstore and buy food supplements with magnesium or something like that"), 'added' (e.g., "I'm afraid about the quality of extra added magnesium, because it is from a lab, and it can be a chemical thing, but if they can prove that it is ok, then ok"), and 'additional' (e.g., "If many ingredients are put in, there is a chance of additional substances, which could be not so well").

A quantitative follow-up analysis similar to Experiment 2A, using the LIWC text analysis program (Pennebaker et al., 2015) paralleled the results reported previously. We assessed positive and negative emotions as a function of our manipulation. The independent samples *t*-test indicates that the artificial ingredient condition yielded more negative emotions-related words than the natural ingredient condition ($t(131) = 2.19$, $p = 0.03$; $M_{artficial} = 0.85$, $SD_{artficial} = 2.04$, $M_{natural} = 0.21$, $SD_{natural} = 0.80$). In contrast, we did not find significant differences of exposure to the artificially added (vs. natural) ingredient on positive emotions-related words ($t(131) = 1.30$, $p = 0.196$, $M_{artficial} = 6.24$, $SD_{artficial} = 4.82$, $M_{natural} = 7.36$, $SD_{natural} = 5.06$). These results are in line with the previous findings and support the performance of our manipulation.

6.2.2. Target analysis

Similar to the previous studies, we used Hayes' (2018) PROCESS macro (Model 1, using 5000 bootstrap samples) with willingness to try the parent category as criterion and type of ingredient (dummy coded, the natural ingredient condition being the reference category), Preference for Predictability (mean-centered) and their interaction as predictors. Neither the effect of Preference for Predictability ($B = 0.06$, $SE = 0.10$, $t < 1$), nor of type of ingredient was significant ($B = -0.30$, $SE = 0.22$, $t(129) = -1.38$, $p = .170$). However, the interaction between type of ingredient and Preference for Predictability again proved to be significant ($B = 0.44$, $SE = 0.19$, $t(129) = 2.34$, $p = .021$). Additional simple slopes analyses to probe the interaction again confirmed H4 and showed that exposure to the artificial ingredient (compared to the natural ingredient) induced a lower willingness to try products from the parent category, but only among participants with a low Preference for Predictability (evaluated at −1 *SD* from the mean; $B = -0.80$, $SE = 0.31$, $p = .010$). For participants with a high Preference for Predictability (evaluated at + 1 *SD* from the mean), this effect was attenuated and exposure to the artificially added (vs. natural) ingredient did not spill over to affect willingness to try products from the parent category ($B = 0.20$, $SE = 0.30$, $p = .500$, n.s.).

Hence, in Experiment 2b**,** using the same causal chain approach (Spencer et al., 2005), we showed that the overall willingness to try products from the parent category proves to be a function of the perception of a specific exemplar of these products that includes a healthy ingredient that is artificially added, rather than naturally present, moderated by the Preference for Predictability. Thus, we found that ambivalence-inducing functional foods (as per Experiment 2A) may negatively affect category responses among low, but not high Preference for Predictability consumers, thus supporting H4.

7. Experiment 3

Experiment 3 aimed to replicate, extend, and integrate the findings of the previous studies. We aimed to demonstrate the robustness of the previous results by relying on "real" consumers (rather than undergraduate student participants). Moreover, we extended the "playing field" of our reasoning from evaluations and perceptions of novel functional foods to actual, overt consumer behavior (food and beverage intake), both concerning exposure to an actual (functional) food product as well as any ensuing category-related responses. We used the same causal chain approach (Spencer et al., 2005) as in Experiment 2A and 2b and included an alternative measure of ambivalence, enabling us to find converging evidence for the viability of the approach.

In a full moderated mediation model, we tested all hypotheses. That is, in an integrated model we tested whether novel exemplar-induced ambivalence (as per H1) may spill over to (another member of) the parent category of functional foods (as per H2) and whether these effects will be conditional on consumers' Preference for Predictability (as per H3 and H4). This yields a test of a comprehensive conditional serial mediation model where exposure to a specific functional food exemplar with an artificially added (vs. naturally present) ingredient (the antecedent) affects experienced ambivalence towards this exemplar (mediator 1, ME1), which in turn increases subjective ambivalence towards another unrelated member from the parent category of functional foods (mediator 2, ME2) and spills over to negatively affect ensuing responses toward that unrelated category member—actual overt consumption of this other, unrelated member from the functional foods category (the consequence). This allows us to test H1 and H2.

The pattern of the previous Experiments supports H4 rather than H3, implying that openness to epistemic incongruence (intrinsic to a *low* Preference for Predictability) does not necessarily imply positively evaluating it, but merely refraining from premature seizing or freezing (Roets et al., 2015; Webster & Kruglanski, 1994). Hence, the results for Experiment 2A suggest that the Preference for Predictability would moderate the relationship between exposure to the specific functional food exemplar (the IV) and experienced ambivalence towards this innovative exemplar item (ME1), such that the impact of exposure to products that represent an incompatible trade-off between healthiness and naturalness on ambivalence is more pronounced for consumers *low* in the Preference for Predictability. We also aim to rule out alternative models where the moderation affects the ME1-ME2 link and where the moderation affects the ME2 – DV link. Furthermore, we test a competing explanation, addressing the possibility that our spillover effects on category-related responses stem not from differential ambivalence but from differential attributions of healthiness and trust linked to the (functional) ingredient. In addition, we also test whether the spillover effects of ambivalence are particular to another member of the same parent category (as per H2) or also generalize to its regular (i.e., non-functional) counterpart.

7.1. Method

7.1.1. Design and participants

The experiment was conducted at a European business school lab. We used a sample of 220 general population consumers of various ages, recruited from a professional research agency panel (*Mage* = 27.43, *SD* = 12.94, 55.7% self-ascribed female). Similar to the previous experiment, we used a design with type of ingredient (artificially added vs. naturally present) as a between-participants factor and individual differences in the Preference for Predictability as a measured continuous predictor. For our two mediators, we measured experienced ambivalence towards the exemplar (mediator 1, ME1) and subjective ambivalence towards another unrelated member from the parent category of functional foods (mediator 2, ME2). As our DV, we assessed the actual consumption of this other, unrelated functional food product and its regular counterpart.

7.1.2. Procedure

As part of a study on consumer values and beliefs, participants were randomly assigned to one of the two conditions and were informed that we aimed to study consumer opinions concerning newly manufactured products. In each cubicle, we placed a closed small white unmarked box and a glass containing approximately 150 ml. of still water. First, participants were asked to taste and evaluate the water. In line with the previous study, in the natural ingredient condition, the still water was presented as a "natural water, perfected by nature", containing "15 mg of potassium naturally occurring in the spring." In the artificially added ingredient condition, the still water was presented as "water perfected by state of the art technology" and containing "15 mg of added potassium that comes from our [i.e., the (unidentified) manufacturing company's] health and nutrition lab." In both conditions, the ingredient was described as follows: "potassium is useful in fighting fatigue, it helps regulate fluid balance and enables nerves to function."

Next, participants were asked to open the white box. In it were two types of wheat crackers (each 20 g.) of similar visual appearance and taste. To prevent any confounds, we randomly presented one type of crackers as a new functional food manufactured by another company (than the one that was responsible for the water) and enriched with plant sterols, presented as "an ingredient to help maintaining normal, healthy cholesterol levels and reducing the risk of heart disease". The other type of crackers was presented as regular wheat crackers. Participants were asked to taste the crackers and were invited to eat as much or as little of them as they wished without any additional instructions (e.g., to detect any differences between the two types).

7.1.3. Measures

To rule out that the previous results were attributable to the specific measures used, we relied on a thought listing procedure (cf. Petty & Cacioppo, 1986) to assess subjective ambivalence. After having tasted the new mineral water, participants were asked to write down their thoughts and feelings about this product in 5 to 7 sentences. Two judges independently rated these thoughts and feelings on the extent to which they were reflective of ambivalent, incongruent, conflicting, and juxtaposing cognitions and emotions by counting the number of references to words such as "mixed", "unclear", "difficult to decide", and "difficult to believe". Interrater reliability was assessed using the intraclass correlation coefficient, and was satisfactory: $r = 0.92$, $p < .001$, 95% *CI* [0.861, 0.947]. The total number of references to conflicting thoughts and feelings (range: 0 to 8, $M = 1.46$, $SD = 1.70$) served as a measure of subjective ambivalence.

During the cracker tasting, we measured ambivalence towards the crackers with added plant sterols ($M = 2.50$, $SD = 1.46$, Cronbach's $\alpha = 0.89$), and ambivalence towards the regular crackers ($M = 2.20$, $SD = 1.33$, Cronbach's $\alpha = 0.88$) using the same subjective ambivalence measure as in Experiment 2A (Priester & Petty, 1996, 2001). The coded measure of subjective ambivalence towards the water correlated significantly with the Priester and Petty (1996, 2001) measure of subjective ambivalence towards the functional crackers ($r = 0.17$, $p = .01$), suggesting conceptual convergence between the two measures of ambivalence (see Supplemental Material for correlations between variables for all studies).

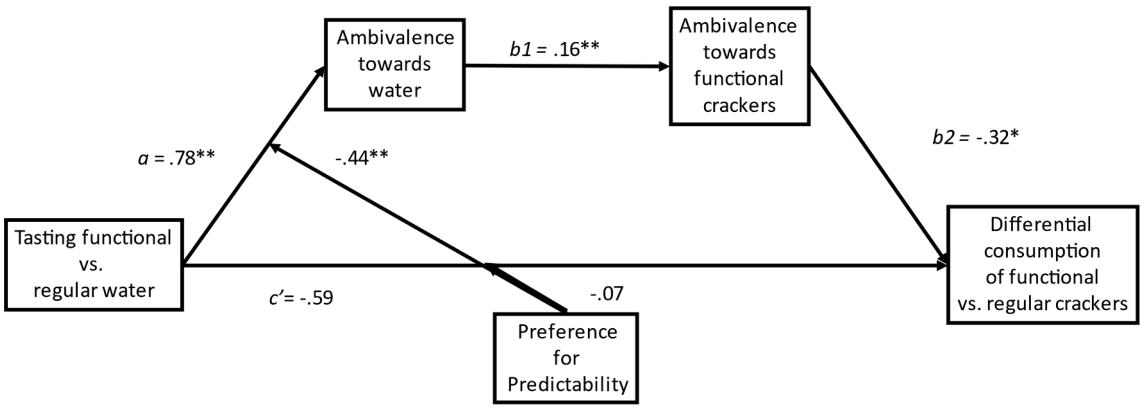
As a measure of consumption, we weighed the amount of grams consumed of the functional crackers ($M = 7.71$ g, $SD = 5.22$ g,) and of the regular crackers ($M = 7.33$ g, $SD = 5.16$ g). The difference score (in grams) between the amount of functional crackers and regular crackers consumed served as our key dependent measure of parent category-related response —actual consumption of the functional food product as compared to its regular counterpart ($M_{difference} = 0.38$ g, $SD = 2.69$ g).

Finally, we also measured the Preference for Predictability using the validated, seven items Preference for Predictability Scale ($M = 4.47$, $SD = 1.05$, Cronbach's $\alpha = 0.72$; Kruglanski, Webster, & Klem, 1993; Webster & Kruglanski, 1994). In addition, we measured four 'neighboring constructs' of the Preference for Predictability as they are listed in the Need for Cognitive Closure scale: need for order (ten items, $M = 4.50$, $SD = 1.01$, Cronbach's $\alpha = 0.81$), closemindedness (eight items, $M = 3.22$, $SD = 0.79$, Cronbach's $\alpha = 0.63$); decisiveness (seven items, $M = 3.55$, $SD = 1.24$, Cronbach's $\alpha = 0.87$), and discomfort with ambiguity (seven items, $M = 4.83$, $SD = 0.81$, Cronbach's $\alpha = 0.59$).

7.2. Results and discussion

To test the full model described above that was informed by previous literature (Joiner & Loken, 1998; Kardes et al., 2004; Oakley et al., 2008; Osherson et al., 1990; Shafir et al., 1990) as well as the results of the previous experiments, we checked the list of model options provided in Hayes (2018), and selected model 86 as the one that integrally tests the proposed causal relations captured by H1, H2, and H3 vs. H4 (see Table 1). Hence, we ran a moderated serial mediation analysis using Hayes' (2018) PROCESS model 86 using 5.000 boot-strapped samples. The analysis showed that the index of the full moderated serial mediation model was significant as the 95% confidence interval excluded zero (index: 0.02, 95% *CI* [0.0001; 0.0674]).

We observed that tasting a functional food exemplar—mineral water with an artificially added ingredient—led to more ambivalent thoughts and feelings about the mineral water (ME1) than tasting the water with the same ingredient present naturally, thus supporting H1 (path *a*: $B = 0.78$, $SE = 0.22$, $t(216) = 3.52$, $p = .001$). Moreover, similar to Experiment 2A, the Preference for Predictability moderated this impact of type of ingredient on ambivalence towards the water, supporting H4 (ME1; $B = -0.44$, $SE = 0.21$, $t(216) = -2.09$, $p = .038$). In line with H4, additional simple slopes analyses revealed that the effect of tasting mineral water with an artificially added (as opposed to naturally present) ingredient on ambivalence towards the water (ME1) was only significant for consumers with a *low* Preference for Predictability (evaluated at – 1 *SD* from the mean, $B = 1.24$; $SE = 0.31$, 95% *CI* [0.6265, 1.8660], but not for consumers with a *high* Preference for Predictability (evaluated at + 1 *SD* from the mean, $B = 0.31$; $SE = 0.31$, 95% *CI* [-0.3037, 0.9331]). Furthermore, in line with H2, these ambivalent thoughts and feelings (ME1), spilled over to predict subjective ambivalence towards another, unrelated member from the parent category of functional foods (crackers enriched with plant sterols (ME2); path *b1*: $B = 0.16$, $SE = 0.06$, $t(217) = 2.67$, $p = .008$). In turn, subjective ambivalence towards another product from the functional foods category predicted difference scores in eating (the outcome), such that ambivalence *decreased* consumption of functional crackers as compared to regular crackers (path *b2*: $B = -0.32$, $SE = 0.13$, $t(216) = -2.39$, $p = .018$). In line with H1, and H2, when controlling for the conditional indirect effect via both types of ambivalence (ME1 and ME2) the impact of type of ingredient (path *c'*: $B = -0.59$, $SE = 0.37$, $t = -1.59$, $p = .11$, n.s.) shrunk to non-significance. In line with H3 and H4, this also rendered the interaction between type of ingredient and Preference for Predictability on difference scores in eating non-significant ($B = -0.07$, $SE = 0.35$, $t = -0.20$, $p = .84$, n.s., see



*Notes: *p<.05,**p<.01; all coefficients unstandardized*

Fig. 2. Spillover of functional vs. regular water-induced ambivalence on differences in functional vs. regular cracker consumption as a function of Preference for Predictability (Experiment 3).

Fig. 2).

Moreover, the full conditional indirect effect of tasting a functional food (IV) via ME1 and ME2 on differences in eating functional vs. regular crackers (DV) was only significant for consumers with a *low* Preference for Predictability, in line with H4 (-0.06, 95% *CI* [-0.1532; -0.0047]), but not for consumers with a *high* Preference for Predictability (-0.01, 95% *CI* [-0.0576; 0.0110], again supporting H4.

7.2.1. Testing alternative explanations

As indicated, we assessed the competing explanation addressing the possibility that our spillover effects on category-related ambivalence stem not from ambivalence evoked by exemplars but from the attribution of healthiness and trust linked to the (functional) ingredient. To this end, two judges again independently rated thoughts and feelings related to the perceived healthiness of the mineral water (1 = very unhealthy, 4 = neutral, 7 = very healthy) and general trust in the water (1 = not trusted at all, 4 = neutral, 7 = very well trusted). Interrater reliability was satisfactory for perceived healthiness: $r = 0.86$, $p < .001$, 95% *CI* [0.793, 0.903] and for general trust in the water: $r = 0.83$, $p < .001$), 95% *CI* [0.746, 0.880]. The perceived healthiness was equivalent between the mineral water with the natural ($M_{natural} = 4.51$, $SD = 1.75$) and the artificially added ingredient ($M_{artificial} = 4.27$, $SD = 1.85$; $p = .323$) paralleling the qualitative findings reported for Experiments 2A and 2B, while moderation by the Preference for Predictability was non-significant ($B = 0.15$, $SE = 0.23$, $t(216) = 0.64$, $p = .523$). Similarly, general trust in the mineral water was equivalent between the mineral water with the natural ($M_{natural} = 4.60$, $SD = 1.83$) and the artificially added ingredient ($M_{artificial} = 4.15$, $SD = 1.87$; $p = .072$), and moderation with the Preference for Predictability was again non-significant ($B = 0.16$, $SE = 0.24$, $t(216) = 0.69$, $p = .49$). Thus, we conclude that perceived healthiness and general trust in the product cannot account for the effects we reported.

Next, we also tested the alternative moderated serial mediation models, i.e., where the moderation does not affect the IV – ME1 link, but the ME1– ME2 and the ME2 – DV link (the latter implied by H3). In line with our notions and the results of the previous experiments, we did not observe any moderation by the Preference for Predictability on either the ME1– ME2 link ($B = 0.03$, $SE = 0.06$, $t < 1$, index of moderated serial mediation: -0.01, 95% *CI* [-0.0546; 0.0209]) or the ME2 – DV link ($B = 0.04$, $SE = 0.12$, $t < 1$; index of moderated serial mediation: 0.01, 95% *CI* [-0.0371; 0.0433]), thus ruling out those alternative possibilities.

Furthermore, the observed interaction effect appeared to be particular for Preference for Predictability since similar regression analyses using the 'neighboring' constructs did not yield any significant interaction effects (need for order: $B = -0.16$, $SE = 0.22$, $t < 1$; closemindedness: $B = -0.35$, $SE = 0.28$, $t(216) = -1.24$, $p = .216$; decisiveness: $B = 0.21$, $SE = 0.18$, $t(216) = 1.18$, $p = .239$; discomfort with ambiguity: $B = 0.25$, $SE = 0.28$, $t < 1$).

Finally, to test whether the ambivalence induced by consuming an innovative exemplar from the functional food category only spills over to another, unrelated product from the same parent category of functional foods as implied by the inclusion fallacy, but not to products from the category of regular foods, we ran a moderated serial mediation analysis using Hayes' (2018) PROCESS model 86 with 5.000 bootstrapped samples but now including the measure of ambivalence towards the *regular* crackers. The previous findings only held when testing ambivalence towards functional crackers but not ambivalence towards regular crackers. The index of the moderated serial mediation, with ambivalence towards regular crackers included as a ME2, was non-significant as the 95% confidence interval did include zero (index: 0.0005, 95% *CI* [-0.0068; 0.0120]).

Thus, exposure to and actually consuming artificially produced functional food items induces ambivalence (as per H1), which spills over to affect ambivalence to another, unrelated functional food product, in turn decreasing its consumption compared to its regular counterpart (as per H2). However, and perhaps ironically, the effect is only observed for consumers who tend to be open to novel experiences and also open to ambivalent feelings to occur, i.e., consumers with *lower* levels of the Preference for Predictability (as per H4). Finally, the present study also replicates and extends the causal chain approach introduced in Experiments 2A and 2b. Similar to those studies, we manipulated the presumed underlying process (ambivalence) by varying the type of healthy food ingredient (artificially added vs. naturally present). Importantly, extending Experiment 2A, we captured the underlying process with an alternative measure of subjective ambivalence and replicated the result of Experiment 2A that this manipulation indeed induces ambivalence.

8. General discussion

The present research explores the notion of when and why innovations may backfire. Using functional foods as a case in point, we argued that this particular type of product entails an inherent and incompatible trade-off between healthiness and artificiality perceptions and hence may spur feelings of ambivalence. Drawing on literature on (over)generalization effects from exemplars to parent categories, we argued that this ambivalence may not be limited to the specific exemplar at hand but may well spill over and hurt the entire parent category to which the target product belongs. Finally, and critically, we argued that the process is likely conditional and that consumers' Preference for Predictability may moderate the elicitation and/or spillover of

ambivalence.

We gathered evidence for our notions in four experiments, using a total of 660 participants, both students and "real" consumers, examining the impact of mere consideration as well as actual consumption of functional foods, using a variety of measures assessing (subjective) ambivalence, as well as willingness to buy, willingness to try, and actual consumption of (unrelated members of) the parent category. Moreover, we varied the type of functional vs. regular food product, the type of ingredient as well as the source of the ingredient (natural vs. artificially added), to establish the robustness of our findings. Finally, in examining the moderating role of the Preference for Predictability, we examined whether several 'neighboring' constructs (cf. Webster & Kruglanski, 1997) –need for order, closemindedness, decisiveness, and discomfort with ambiguity– would yield similar results.

Experiment 1 showed that merely considering a functional food product could negatively affect category-related responses toward the parent category of functional foods and that this effect was moderated by the Preference for Predictability. More specifically, all studies consistently showed that negative effects of exposure to a functional food exemplar (on ambivalence and category-related responses) were more pronounced among consumers low, rather than high, in the Preference for Predictability. These results suggest, perhaps ironically, that one needs a certain openness to epistemic incongruence for ambivalence to be experienced, and it shows that such openness is not necessarily positively valenced, but merely captures the absence of premature seizing or freezing (cf. Roets et al., 2015). Moreover, we found these effects regardless of the type of ingredient used, and regardless of the type of DV, i.e., on ambivalence toward the exemplar, willingness to buy and to try from the parent category, and actually consuming an unrelated member from the parent category. In addition, using a causal chain approach (Spencer et al., 2005), we showed in Experiments 2A and 2B that the effects are specifically observed when the focal ingredient was presented as healthy, yet artificially added, rather than naturally present, thus highlighting that the perceived incongruence between healthiness and artificiality lies at the root of the ambivalence spillover effects. Notably, Experiment 3 replicated, extended, and integrated the previous studies. Using actual (functional) food tasting as the IV and actual consumption of a different, unrelated product of the same parent category as the DV, this study demonstrated the full sequence of spillover effects by assessing two types of ambivalence—ambivalence specific to the exemplar and ambivalence towards an unrelated member from the same parent category. This study also showed converging evidence for the moderating role of the Preference for Predictability and the causal chain procedure (Spencer et al., 2005). The moderated mediation analysis showed that consumers low, but not high, in the Preference for Predictability may experience ambivalence when tasting a novel functional food product and that this ambivalence induces ambivalence toward another member of the parent product category, in turn reducing its consumption relative to its regular counterpart. Interestingly, the 'neighboring constructs' of need for order, decisiveness, closemindedness, and discomfort with ambiguity failed to yield similar results. These findings underscore that ambivalence does not equate with ambiguity or uncertainty *per se*. As highlighted by Van Harreveld, Rutjens, Schneider, Nohlen, and Keskinis (2014) and others (see e.g., Proulx, Inzlicht, & Harmon-Jones, 2012), one may be fully unambiguous and certain about experiencing opposing thoughts, feelings, and evaluations and the ensuing sense of tension and conflict. Indeed, as Luttrell, Petty, and Briñol (2016) demonstrate, greater ambivalence associates with greater evaluative instability as attitude certainty *increases,* rather than *decreases*. Thus, rather than aversion to uncertainty or ambiguity (implied by such constructs as need for order, closemindedness, or discomfort with ambiguity, see Kruglanski & Webster, 1996), and in support of the prerequisite of basic openness to parallel, alternative and possibly conflicting cognitions, the present results are in line with research showing that predictive reasoning *lowers* sensitivity to alternative possibilities (Fernbach et al., 2010). Thus, consumers *high* in the Preference for Predictability are possibly less amenable to ambivalence, because they are less sensitive to the parallel alternative evaluations that the ambivalence-inducing stimulus might yield. Future research might examine this intriguing possibility more extensively.

8.1. Theoretical implications

We believe the research reported here contributes to the literature in four ways. First, we extend the literature on the perceptions and (non) adoption of (food) innovations by examining the role of ambivalence as a psychological barrier to adoption, but a barrier that plays a bigger role for some than for other consumers—those low in the Preference for Predictability. This research suggest that psychological factors are critical in understanding the innovation acceptance process beyond the consideration of economic or cultural factors.

Second, we also contribute to the literature on (un)healthy food consumption. While pertinent work on food-related decision-making in consumer psychology has typically focused on self-regulatory challenges, such as those involved in the choice for tasty vs. healthy food options (e.g., Shiv & Fedhorikhin, 1999) or the tension between long-term health goals and short-term indulgence goals (e.g., Belei et al., 2012; see Fennis, 2017, for an overview), ambivalence as a driver underlying (un)healthy food consumption has received less attention.

Third, we extend work on spillover effects *per se* (e.g., Votolato & Unnava, 2006). While brand-to-brand or category-to-brand spillover effects have been well documented, to our knowledge, brand-to-category effects have not yet received as much research attention (but see Joiner & Loken, 1998), although overgeneralization theory would allow for it (Osherson et al., 1990). Hence, the present work adds to the scant research in this area stipulating when and why such spillover effects occur.

Fourth, we contribute to the literature on the role of epistemic motivations in consumer judgment and decision-making by highlighting the role of individual differences in the Preference for Predictability. Unlike for example the preference for order (Fennis & Wiebenga, 2015) or the need for closure (Kruglanski & Webster, 1996), the role of the Preference for Predictability in understanding consumer judgment and decision-making has—to our knowledge—not been systematically researched yet. The present work shows that innovation adoption may be among the relevant choice contexts in which the Preference for Predictability may have an important role to play, thus underscoring the relevance of the construct for the field.

8.2. Implications for marketing practice

The present research offers new insights on how to more efficiently reach out to potential consumers of novel products. That is, we offer a deeper understanding of when consumers may respond positively vs. negatively to functional food products thus offering tools to identify the 'right' consumer segments by moving beyond traditional segmentation criteria such as those based on demographics or lifestyle. The present research points to assessing levels of the Preference for Predictability in addition to more conventional criteria to efficiently approach these consumers. A benefit of the present research is that the measures used are generally brief, thus providing a cost, effort-efficient, and hence easily implementable tool to identify the consumer segment of interest.

Furthermore, interventions to promote functional food consumption may tailor messages and contexts in advertising and communication campaigns to new customers. Our research, perhaps counterintuitively, suggests that to avoid unwanted ambivalence occurring, it may be advisable not to highlight the novel-engineered aspect too much to reduce the likelihood of evoking the conflicting feelings and cognitions that are at the heart of consumer ambivalence. In other words, our work suggests that too much "newness" may be bad and evoke feelings of ambivalence, ironically, particularly among those consumers that may

show an *a priori* openness to such "newness".

Moreover, the present research converges with previous findings showing that consumers' perception of novel functional food products depends on their framing. Although food products can contain *both* attributes of a natural origin *and* added, engineered ones (e.g., added vitamins in non-sugared fruit juice or added calcium to natural, skimmed milk), consumers strongly prefer those products framed in terms of the naturalness of such attributes, rather than their artificiality. To the extent that the artificiality is part and parcel of the product (as is the case for functional foods), promotion campaigns should focus more on the proposed health benefits *per se*, than on the origin of the attribute and its engineered nature. Thus, companies may want to refrain from "ingredient branding" (De Pelsmacker, Geuens, & van den Bergh, 2017) in order to de-emphasize the artificiality of the novel ingredient. Moreover, to avoid negative spillovers to other members of the product category, new functional food products that are introduced to the market may be shielded from backfire effects by dissociating them from other functional foods. Although not tested in this study, this may be possibly accomplished by dissociating the product from any functional food "relatives" in terms of packaging or labeling. Companies with many brands in their portfolio like Mondeléz, Nestlé, or Unilever might do so by (re)considering their branding strategies for newly introduced functional foods (or otherwise novel foods). They may choose to abstain from such strategies as endorsement branding, co-branding, or the cross-selling of multiple new food products (see De Pelsmacker et al., 2017), at least during the introduction stage when the innovativeness dimension and 'newness' is still salient to consumers. Instead, companies may want to consider a strategy of "brand dilution" to isolate the functional food product from category family members during its introduction stage.

8.3. Future research directions

The present series of studies points to several additional avenues for future research. First, we used functional foods as a case in point of innovative products, but there is no *a priori* reason to assume that the present findings would be restricted to food products. Thus, future research may assess the moderating role of the Preference for Predictability in the spillover of ambivalence for innovative exemplars of other parent categories, reaching beyond food products to include e.g., durable non-food product categories. We expect the present results to generalize to novel exemplars from other (non-food) parent categories to the extent that these, too, harbor attributes with simultaneous and incompatible positive and negative evaluative implications.

Interestingly, as indicated by Nisbett and colleagues (e.g., Holyoak & Nisbett, 1988; Thagard & Nisbett, 1982), generalizability from exemplars to parent categories is (also) a function of exemplar variability, with stronger generalization effects for exemplars with lower variability. This work suggests that greater generalization effects might be observed in physical than in social categories because perceived variability is lower for the former than the latter (cf. Thagard & Nisbett, 1982). This observation might inspire future research, since brands can be associated with physical as well as non-physical (e.g., virtual) products and services, and they can possess more or less social properties (see Malone & Fiske, 2013, Kervyn, Fiske, & Malone, 2012). This might yield a testable "generalization matrix" with (over) generalization effects possibly being strongest for high physical/low social brands, and weakest for their opposite.

Moreover, while we are not aware of any such tasks available, future studies may examine acute, state variations in the Preference for Predictability and assess whether their effects are in line with the present ones. Yet, such state manipulations may prove to be challenging, since need for closure manipulations as a likely candidate, typically conflate various facets of the construct in the task (see Roets et al., 2015 for an overview).

Furthermore, one may consider functional foods as a less 'extreme' instance of a more radical food innovation: that of genetically modified foods. Future research might examine whether similar effects are obtained when focusing on these types of foods. Also, when focusing on the role of functional food ambivalence, previous research has shown that such ambivalence effects may depend on cultural differences. For example, dialectical consumers (e.g., from Eastern cultures) tend to be more accepting of contradiction and incongruence (Pang et al., 2017; Wang et al., 2016) and thus may be more open when they are confronted with incongruent evaluative implications of a food product (and hence possibly experience more ambivalence). Thus, future research may want to examine whether the spillover effects demonstrated in the present work are modulated by these particular cultural differences.

In addition, part of the support for our notions comes from (moderated) mediation analyses. While these are informative and have seen a tremendous surge in the literature, particularly after the introduction and wide diffusion of Hayes' (2018) PROCESS macro, the results should be interpreted cautiously as several authors have warned against overenthusiastically embracing results of mediation analyses (see Fiedler et al., 2018; Pieters, 2017). For example, as we indicated earlier, while our results were consistent with the hypothesized (moderated) mediation models, they might also fit alternative, untested models (Fiedler et al., 2018), and hence future research might extend the present findings by stipulating and testing alternative mediation models. Moreover, mediation results are correlational, thus precluding unequivocal causal inferences (see Pieters, 2017). For these reasons, the present package of studies also included Experiments 2A and 2B, where the mediating construct (ambivalence), was not only measured but its conceptual foundations were also directly manipulated. This so-called "causal chain" approach (Spencer et al., 2005) uses a deductive "if-then" approach to assessing the role of a mediator, by manipulating, rather than measuring[1] the underlying process. Hence, in the causal chain approach, one first explicates when the proposed underlying process should be more or less pronounced and then manipulates an independent variable (acting as a conceptual 'light switch') to demonstrate that this indeed happens under the stated conditions. This is then followed by using the same manipulation to show it also affects the proposed outcome (the DV), thus obviating the need to directly measure the mediator. Experiment 2A followed this approach by manipulating the type of ingredient, based on the rationale that *if* ambivalence arises from the evaluative incompatibility between the healthiness and artificiality of the key ingredient, *then* that ingredient framed as healthy and artificial should induce ambivalence, while that same ingredient framed as healthy and natural should not. Experiment 2A showed this indeed to be the case. Experiment 2B then used the same approach, using the same manipulation to show that this manipulation indeed affects the proposed outcome: the spillover to parent category responses (in both studies moderated by the Preference for Predictability). Moreover, we replicated this procedure in Experiment 3, and in that study also included another measure of ambivalence thus corroborating the effectiveness of the procedure. We urge future research to similarly combine both approaches to further strengthen the causal inferences that can be drawn from research on consumer ambivalence.

Finally, future studies can provide deeper insights into how enduring the negative spillover effects are and how they change over time. For example, mere exposure (Zajonc, 1968) to innovative items will likely diminish the negative effects of ambivalence on purchase behavior—consumers who frequently encounter novel functional foods might show lower levels of ambiguity. Thus, companies introducing innovative food products can possibly overcome initial negative spillover effects by advertising campaigns featuring high repetition rates. Furthermore, joining the persuasion, ambivalence, and innovation literatures offers fruitful avenues for research and may assist researchers in seeking to understand what type of persuasion messages can help to overcome negative spillover effects. For example, it may be that presenting innovative food items using an authority source or other persuasion techniques can attenuate the ambivalence effects resulting from the initial

exposure.

8.4. Concluding remarks

In sum, by showing that food innovations may backfire and hurt the entire product category, particularly among consumers with a default openness to such innovations, the present research showcases a—possibly ironic—phenomenon in the marketplace, yet one that may well be relatively prevalent. In addition to technological drivers and barriers of innovation introduction, we show that it is important taking into account psychological barriers. Thus, the present work may aid in preventing costly future failures on the one hand and the development and proliferation of genuine food innovation successes on the other.

CRediT authorship contribution statement

Justina Gineikiene: Conceptualization, Methodology, Formal analysis, Writing – original draft, Funding acquisition. **Bob M. Fennis:** Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing.

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.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jbusres.2023.113670.

References

Aqueveque, C. (2016). Responses to different positioning strategies for unfamiliar food among food neophobics and neophilics. *Food Quality and Preference, 53*, 66–70.

Ares, G., & Gámbaro, A. (2007). Influence of gender, age and motives underlying food choice on perceived healthiness and willingness to try functional foods. *Appetite, 49*(1), 148–158.

Armitage, C. J., & Arden, M. A. (2007). Felt and potential ambivalence across the stages of change. *Journal of Health Psychology, 12*, 149–158.

Arts, J. W., Frambach, R. T., & Bijmolt, T. H. (2011). Generalizations on consumer innovation adoption: A meta-analysis on drivers of intention and behavior. *International Journal of Research in Marketing, 28*(2), 134–144.

Barauskaite, D., Gineikiene, J., Fennis, B. M., Auruskeviciene, V., Yamaguchi, M., & Kondo, N. (2018). Eating healthy to impress: How conspicuous consumption, perceived self-control motivation, and descriptive normative influence determine functional food choices. *Appetite, 131*, 59–67.

Belei, N., Geyskens, K., Goukens, C., Ramanathan, S., & Lemmink, J. (2012). The best of both worlds? Effects of attribute-induced goal conflict on consumption of healthful indulgences. *Journal of Marketing Research, 49*(6), 900–909.

Berry, C., Burton, S., & Howlett, E. (2017). It's only natural: The mediating impact of consumers' attribute inferences on the relationships between product claims, perceived product healthfulness, and purchase intentions. *Journal of the Academy of Marketing Science, 45*(5), 698–719.

Bigliardi, B., & Galati, F. (2013). Innovation trends in the food industry: The case of functional foods. *Trends in Food Science and Technology, 31*(2), 118–129.

Brown, C. L., & Carpenter, G. S. (2000). Why is the trivial important? A reasons-based account for the effects of trivial attributes on choice. *Journal of Consumer Research, 26*(4), 372–385.

Cacioppo, J. T., & Berntson, G. G. (1994). Relationship between attitudes and evaluative space: A critical review, with emphasis on the separability of positive and negative substrates. *Psychological Bulletin, 115*, 401–423.

Cardello, A. V. (2003). Consumer concerns and expectations about novel food processing technologies: Effects on product liking. *Appetite, 40*(3), 217–233.

Carpenter, G. S., Glazer, R., & Nakamoto, K. (1994). Meaningful brands from meaningless differentiation: The dependence on irrelevant attributes. *Journal of Marketing Research, 26*(3), 339–350.

Carpenter, G. S., & Nakamoto, K. (1989). Consumer preference formation and pioneering advantage. *Journal of Marketing research, 26*, 285–298.

Choi, H., & Reid, L. N. (2016). Congruity effects and moderating influences in nutrient-claimed food advertising. *Journal of Business Research, 69*(9), 3430–3438.

Cornil, Y., Ordabayeva, N., Kaiser, U., Weber, B., & Chandon, P. (2014). The acuity of vice: Attitude ambivalence improves visual sensitivity to increasing portion sizes. *Journal of Consumer Psychology, 24*(2), 177–187.

De Pelsmacker, P., Geuens, M., & van den Bergh, J. (2017). *Marketing Communications* (7th ed.). London: Pearson.

Devcich, D. A., Pedersen, I. K., & Petrie, K. J. (2007). You eat what you are: Modern health worries and the acceptance of natural and synthetic additives in functional foods. *Appetite, 48*(3), 333–337.

Dijksterhuis, A. P., Van Knippenberg, A. D., Kruglanski, A. W., & Schaper, C. (1996). Motivated social cognition: Need for closure effects on memory and judgment. *Journal of Experimental Social Psychology, 32*(3), 254–270.

Diplock, A. T., Aggett, P. J., Ashwell, M., Bornet, F., Fern, E. B., & Roberfroid, M. B. (1999). Scientific concepts of functional foods in Europe: Consensus document. *British Journal of Nutrition, 81*(4), 1–27.

Evangelidis, I., & van Osselaer, S. M. (2019). Interattribute evaluation theory. *Journal of Experimental Psychology: General, 148*(10), 1733.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149–1160.

Fennis, B. M. (2017). How to foster health and well-being when self-control is low. In D. T. D. De Ridder, M. A. Adriaanse, & K. Fujita (Eds.), *The Routledge International Handbook of Self-Control in Health and Well-Being* (pp. 446–459). New York: Routledge.

Fennis, B. M., Adriaanse, M. A., Stroebe, W., & Pol, B. (2011). Bridging the intention–behavior gap: Inducing implementation intentions through persuasive appeals. *Journal of Consumer Psychology, 21*(3), 302–311.

Fennis, B. M., & Stroebe, W. (2021). *The psychology of advertising* (3rd ed). New York: Routledge.

Fennis, B. M., & Wiebenga, J. H. (2015). Disordered environments prompt mere goal pursuit. *Journal of Environmental Psychology, 43*(9), 226–237.

Fernbach, P. M., Darlow, A., & Sloman, S. A. (2010). Neglect of alternative causes in predictive but not diagnostic reasoning. *Psychological Science, 21*(3), 329–336.

Fiedler, K., Harris, C., & Schott, M. (2018). Unwarranted inferences from statistical mediation tests–An analysis of articles published in 2015. *Journal of Experimental Social Psychology, 75*, 95–102.

Frewer, L., Scholderer, J., & Lambert, N. (2003). Consumer acceptance of functional foods: Issues for the future. *British Food Journal, 105*(10), 714–731.

Gineikiene, J., Kiudyte, J., & Degutis, M. (2017). Functional, organic or conventional? Food choices of health conscious and skeptical consumers. *Baltic Journal of Management, 12*(2), 139–152.

Hayes, A. F. (2018). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A regression-Based Approach* (2nd ed.). Guilford Press.

Hingston, S. T., & Noseworthy, T. J. (2018). Why consumers don't see the benefits of genetically modified foods, and what marketers can do about It. *Journal of Marketing, 82*, 125–140.

Holyoak, K. J., & Nisbett, R. E. (1988). Induction. In R. J. Sternberg, & E. E. Smith (Eds.), *The psychology of human thought* (pp. 50–91). Cambridge University Press.

Hsee, C. K., & Leclerc, F. (1998). Will products look more attractive when presented separately or together? *Journal of Consumer Research, 25*(2), 175–186.

Joiner, C., & Loken, B. (1998). The inclusion effect and category-based induction: Theory and application to brand categories. *Journal of Consumer Psychology, 7*(2), 101–129.

Kardes, F. R., Fennis, B. M., Hirt, E. R., Tormala, Z. L., & Bullington, B. (2007). The role of the need for cognitive closure in the effectiveness of the disrupt-then-reframe influence technique. *Journal of Consumer Research, 34*(3), 377–385.

Kardes, F. R., & Kalyanaram, G. (1992). Order-of-entry effects on consumer memory and judgment: An information integration perspective. *Journal of Marketing Research, 29*(3), 343–357.

Kardes, F. R., Kalyanaram, G., Chandrashekaran, M., & Dornoff, R. J. (1993). Brand retrieval, consideration set composition, consumer choice, and the pioneering advantage. *Journal of Consumer Research, 20*(1), 62–75.

Kardes, F. R., Posavac, S. S., & Cronley, M. L. (2004). Consumer inference: A review of processes, bases, and judgment contexts. *Journal of Consumer Psychology, 14*(3), 230–256.

Karmarkar, U. R., & Bollinger, B. (2015). BYOB: How bringing your own shopping bags leads to treating yourself and the environment. *Journal of Marketing, 79*(4), 1–15.

Katsikeas, C. S., Auh, S., Spyropoulou, S., & Menguc, B. (2018). Unpacking the relationship between sales control and salesperson performance: A regulatory fit perspective. *Journal of Marketing, 82*(3), 45–69.

Kervyn, N., Fiske, S. T., & Malone, C. (2012). Brands as intentional agents framework: How perceived intentions and ability can map brand perception. *Journal of Consumer Psychology, 22*(2), 166–176.

Kruglanski, A. W., & Webster, D. M. (1996). Motivated closing of the mind: "Seizing" and "freezing.". *Psychological Review, 103*(2), 263–283.

Kruglanski, A. W., Webster, D. M., & Klem, A. (1993). Motivated resistance and openness to persuasion in the presence or absence of prior information. *Journal of Personality and Social Psychology, 65*(5), 861–876.

Laros, F. J., & Steenkamp, J. B. E. (2005). Emotions in consumer behavior: A hierarchical approach. *Journal of Business Research, 58*(10), 1437–1445.

Larsen, J. T. (2007). Ambivalence. In R. Baumeister, & K. D. Vohs (Eds.), *Encyclopedia of social psychology* (Vol. 1, pp. 31–35). Los Angeles, CA: Sage.

Lipkus, I. M., Green, J. D., Feaganes, J. R., & Sedikides, C. (2001). The relationship between attitudinal ambivalence and desire to quit smoking among college smokers. *Journal of Applied Social Psychology, 31*, 113–133.

Luttrell, A., Petty, R. E., & Briñol, P. (2016). Ambivalence and certainty can interact to predict attitude stability over time. *Journal of Experimental Social Psychology, 63*, 56–68.

Malone, C., & Fiske, S. T. (2013). *The human brand: How we relate to people, products, and companies*. John Wiley & Sons.

Mascaraque, M. (2017, November 1). Global functional food trends: Natural vs fortified. Nutraceuticals World. Available from: https://www.nutraceuticalsworld.com/

issues/2017-11/view_features/global-functional-food-trends-natural-vs-fortified/2156. Last accessed 27th of February, 2020.
Menrad, K. (2004). Innovations in the food industry in Germany. *Research Policy, 33*, 845–878.
Neutraceuticalsworld. (2017). Global functional food trends: Natural vs. fortified. Available from https://www.nutraceuticalsworld.com/issues/2017-11/view_features/global-functional-food-trends-natural-vs-fortified/2156.
Newby-Clark, I. R., McGregor, I., & Zanna, M. P. (2002). Thinking and caring about cognitive inconsistency: When and for whom does attitudinal ambivalence feel uncomfortable? *Journal of Personality and Social Psychology, 82*(2), 157–166.
Nowlis, S. M., & Simonson, I. (1996). The effect of new product features on brand choice. *Journal of Marketing Research, 33*, 36–46.
Oakley, J. L., Duhachek, A., Balachander, S., & Sriram, S. (2008). Order of entry and the moderating role of comparison brands in brand extension evaluation. *Journal of Consumer Research, 34*(5), 706–712.
Osherson, D. N., Smith, E. E., Wilkie, O., Lopez, A., & Shafir, E. (1990). Category-based induction. *Psychological review, 97*(2), 185.
Otnes, C., Lowrey, T. M., & Shrum, L. J. (1997). Toward an understanding of consumer ambivalence. *Journal of Consumer Research, 24*(1), 80–93.
Pang, J., Keh, H. T., Li, X., & Maheswaran, D. (2017). "Every coin has two sides": The effects of dialectical thinking and attitudinal ambivalence on psychological discomfort and consumer choice. *Journal of Consumer Psychology, 27*(2), 218–230.
Pennebaker, J. W., Boyd, R. L., Jordan, K., & Blackburn, K. (2015). *The development and psychometric properties of LIWC2015*. University of Texas.
Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York, NY: Springer.
Pieters, R. (2017). Meaningful mediation analysis: Plausible causal inference and informative communication. *Journal of Consumer Research, 44*(3), 692–716.
Posavac, S. S., Sanbonmatsu, D. M., Kardes, F. R., & Fitzsimons, G. J. (2004). The brand positivity effect: When evaluation confers preference. *Journal of Consumer Research, 31*, 643–651.
Posavac, S. S., Sanbonmatsu1, D. M., Seo, J. Y., & Iacobucci, D. (2014). How attitudes toward product categories drive individual brand attitudes and choice. *Psychology and Marketing, 31*(10), 843–852.
Priester, J. R., & Petty, R. E. (1996). The gradual threshold model of ambivalence: Relating the positive and negative bases of attitudes to subjective ambivalence. *Journal of Personality and Social Psychology, 71*(3), 431–449.
Priester, J. R., & Petty, R. E. (2001). Extending the bases of subjective attitudinal ambivalence: Interpersonal and intrapersonal antecedents of evaluative tension. *Journal of Personality and Social Psychology, 80*(1), 19–34.
Proulx, T., Inzlicht, M., & Harmon-Jones, E. (2012). Understanding all inconsistency compensation as a palliative response to violated expectations. *Trends in Cognitive Sciences, 16*(5), 285–291.
Puhakka, R., Valve, R., & Sinkkonen, A. (2018). Older consumers' perceptions of functional foods and non-edible health-enhancing innovations. *International Journal of Consumer Studies, 42*(1), 111–119.
Putrevu, S., & Lord, K. R. (1994). Comparative and noncomparative advertising: Attitudinal effects under cognitive and affective involvement conditions. *Journal of Advertising, 23*(2), 77–91.
Robinson, N. (2014, November 25). *Stiff regulation shrinks global functional food market.* Food Manufacture. Available from https://www.foodmanufacture.co.uk/Article/2014/11/24/Global-functional-food-market-shrinks.
Roets, A., Kruglanski, A. W., Kossowska, M., Pierro, A., & Hong, Y. Y. (2015). The motivated gatekeeper of our minds: New directions in need for closure theory and research. In *Advances in experimental social psychology* (Vol. 52, pp. 221–283). Academic Press.
Roets, A., & Van Hiel, A. (2007). Separating ability from need: Clarifying the dimensional structure of the need for closure scale. *Personality and Social Psychology Bulletin, 33*(2), 266–280.
Ruth, J. A., Brunel, F. F., & Otnes, C. C. (2002). Linking thoughts to feelings: Investigating cognitive appraisals and consumption emotions in a mixed-emotions context. *Journal of the Academy of Marketing Science, 30*(1), 44–58.
Shafir, E. B., Smith, E. E., & Osherson, D. N. (1990). Typicality and reasoning fallacies. *Memory & Cognition, 18*(3), 229–239.
Shiv, B., & Fedorikhin, A. (1999). Heart and mind in conflict: The interplay of affect and cognition in consumer decision making. *Journal of Consumer Research, 26*(3), 278–292.
Siegrist, M., Shi, J., Giusto, A., & Hartmann, C. (2015). Worlds apart. Consumer acceptance of functional foods and beverages in Germany and China. *Appetite, 92*, 87–93.
Simonson, I. (1989). Choice based on reasons: The case of attraction and compromise effects. *Journal of Consumer Research, 16*(2), 158–174.
Simonson, I., Nowlis, S. M., & Simonson, Y. (1993). The effect of irrelevant preference arguments on consumer choice. *Journal of Consumer Psychology, 2*(3), 287–306.
Siró, I., Kápolna, E., Kápolna, B., & Lugasi, A. (2008). Functional food. Product development, marketing and consumer acceptance—A review. *Appetite, 51*(3), 456–467.
Spencer, S. J., Zanna, M. P., & Fong, G. T. (2005). Establishing a causal chain: why experiments are often more effective than mediational analyses in examining psychological processes. *Journal of Personality and Social Psychology, 89*(6), 845–851.
Thagard, P., & Nisbett, R. E. (1982). Variability and confirmation. *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition, 42*(3), 379–394.
Thompson, M. M., Zanna, M. P., & Griffin, D. W. (1995). Let's not be indifferent about (attitudinal) ambivalence. In R.E. Petty, J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 361–386).
Ullrich, J. (2012). A multivariate approach to ambivalence it is more than meets the IV. In J. I. Krueger (Ed.), *Social Judgment and Decision Making* (pp. 115–134). New York: Psychology Press.
Ullrich, J., Schermelleh-Engel, K., & Böttcher, B. (2008). The moderator effect that wasn't there: Statistical problems in ambivalence research. *Journal of Personality and Social Psychology, 95*(4), 774.
Urala, N., Schutz, H., & Spinks, J. (2011). Consumer perceptions of "functional food" in the United States.". *Journal of Food Products Marketing, 17*(4), 407–419.
Van Harreveld, F., Nohlen, H. U., & Schneider, I. K. (2015). The ABC of ambivalence: Affective, behavioral, and cognitive consequences of attitudinal conflict. In *Advances in Experimental Social Psychology* (Vol. 52, pp. 285–324). Academic Press.
Van Harreveld, F., Rutjens, B. T., Schneider, I. K., Nohlen, H. U., & Keskinis, K. (2014). In doubt and disorderly: Ambivalence promotes compensatory perceptions of order. *Journal of Experimental Psychology: General, 143*(4), 1666.
Van Harreveld, F., Van der Pligt, J., & de Liver, Y. N. (2009). The agony of ambivalence and ways to resolve it: Introducing the MAID model. *Personality and Social Psychology Review, 13*(1), 45–61.
Van Kleef, E., van Trijp, H. C., & Luning, P. (2005). Functional foods: Health claim-food product compatibility and the impact of health claim framing on consumer evaluation. *Appetite, 44*(3), 299–308.
Votolato, N. L., & Unnava, H. R. (2006). Spillover of negative information on brand alliances. *Journal of Consumer Psychology, 16*(2), 196–202.
Wang, H., Batra, R., & Chen, Z. (2016). The moderating role of dialecticism in consumer responses to product information. *Journal of Consumer Psychology, 26*(3), 381–394.
Webster, D. M., & Kruglanski, A. W. (1994). Individual differences in need for cognitive closure. *Journal of Personality and Social Psychology, 67*(6), 1049–1062.
Webster, D. M., & Kruglanski, A. W. (1997). Cognitive and social consequences of the need for cognitive closure. *European Review of Social Psychology, 8*(1), 133–173.
Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology, 9*, 1–25.
Zhang, S., & Markman, A. B. (1998). Overcoming the early entrant advantage: The role of alignable and nonalignable differences. *Journal of Marketing Research, 35*(4), 413–426.

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