Products in Disguise: Communicating Product Benefits with Surface Mimicry

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CONTRIBUTION STATEMENT

Although considerable research on healthy food promotion has sought to understand the impact of health claims, this study offers a novel avenue to promote healthy food options. Specifically, the current article introduces the idea of surface mimicry (i.e., adjusting the visual appearance of a product to make it look like another product) as an effective strategy to communicate product benefits. While surface mimicry has frequently been adopted in practice (e.g., Alessi's octopus shaped lemon squeezer), this notion of copying a visual property of one product and integrating it into the appearance of another product is new to consumer behavior research in general and to healthy food promotion in specific. Consequently, to date, the potential of surface mimicry to communicate product benefits has not been illustrated. The same goes for its theoretical underpinnings.

The main aim of this article is to demonstrate how surface mimicry can convey product benefits due to the activation of a property mapping mindset. We argue that property mapping leads to an assimilation of the target product's beliefs with the mimicked product's properties on the condition that these properties are alignable, dissimilar, and salient. In contrast to unhealthy food products, healthy food products are often perceived as poor tasting. We show that when we visually map a property of a product with a desirable benefit (i.e., tasty but unhealthy food) onto the target product (i.e., healthy food), this triggers consumers to engage in a property mapping process by which the salient but dissimilar property (i.e., good taste) is mapped onto the target product. Our findings show that the mapping of the good taste property from the mimicked onto the target product leads to increased taste perceptions and, by extension, purchase intention and consumption of the target product. Within consumer behavior research, no ecologically valid antecedents that trigger a property mapping mindset have been identified. Given the obesity

epidemic, it is also pertinent to investigate how surface mimicry can nudge consumers into adopting a healthier diet.

ABSTRACT

In an effort to find a novel way to enhance the attractiveness of healthy food, this article proposes surface mimicry—that is, designing a product to visually resemble another product—as an effective intervention to communicate property information to consumers. Specifically, it advances the notion that exposure to surface mimicry primes property mapping, a thinking style that leads consumers to transfer property information from one product onto another. To this end, three studies show that exposure to a target food product (e.g., kiwifruit) mimicking visual characteristics of another, modifier food product (e.g., popsicle) induces a transfer of attribute values of the modifier onto the target product for salient, alignable attributes on which the products differ (e.g., tastiness). A fourth study points to the activation of a property-mapping mindset as the underlying process. Finally, the effect is shown to persist, but it attenuates when the difference in belief(s) about the target and mimicked product is substantial (e.g., the taste expectations for Brussels sprouts and popsicles).

Keywords: surface mimicry, product design, property mapping, healthy food promotion

A product's appearance is a key determinant of its commercial success (Black and Baker 1987; Bloch 1995). When shopping for everyday groceries, consumers tend to base their impressions on the products' visual appearance (Berkowitz 1987; Crilly, Moultrie, and Clarkson 2004). That is, consumers rely on visual properties, such as shape and color, to derive beliefs pertaining to the products' content, quality, and use (Becker et al. 2011). Products' looks thus serve as an essential communication vehicle to proactively convey product property information at the point-of-purchase (Berkowitz 1987; Bloch 1995).

The current article advances the notion that surface mimicry—designing one product to *look* like another product—is an effective technique to communicate property information to consumers. More specifically, we posit that due to the inclusion of a visual property of a (modifier) product as part of the appearance of another (target) product, surface mimicry induces property mapping, a thinking style that leads consumers to transfer property information from one product onto another. In turn, we argue that this mapping of property information alters consumers' existing beliefs about the target product's properties.

By proposing and testing the effects of surface mimicry on product beliefs, this research makes important theoretical contributions. First, the observed effects of surface mimicry add to the literature testifying to the potential of visual elements to communicate property information (Creusen and Schoormans 2005). Earlier research focused on how graphical properties such as color and pictures, along with structural properties such as size, shape, and proportion, impact consumer perceptions of product properties (e.g., volume, flavor). Studies of graphical properties include work on color (Francis 1995; Garber, Hyatt, and Starr 2000) and pictures (Underwood and Klein 2002); studies of structural properties along these lines include explorations of the effects of size (e.g., package elongation, Raghubir and Krishna 1999), shape (e.g., natural shapes,

Berkowitz 1987; attention-grabbing shapes, Folkes and Matta 2004; high vs. wide shapes, Chen et al. 2020; rounded vs. angular shapes, Spence and Gallace 2011), and proportion (Raghubir and Greenleaf 2006). To our knowledge, the effect on a viewer's perceptions of or beliefs about the product as a result of mimicking these visual properties and applying them to the appearance of another product has not yet been addressed within the domain of consumer behavior.

Second, consumers tend to adopt beliefs that are in line with their product category knowledge (Rajagopal and Burnkrant 2009) and reject properties that are prototypical for products in other categories. Even though there is a considerable amount of research on the advantages of adding features to products (Gibbert and Mazursky 2009; Gill and Lei 2009; Gregan-Paxton, Hoeffler, and Zhao 2005; Moreau, Markman, and Lehman 2001), all these reported effects are conditional upon consumers' likelihood of adopting new or adapting existing product beliefs. Marketing research has shown that one way to enhance this likelihood is by priming a property-mapping mindset (Gibbert and Mazursky 2009; Rajagopal and Burnkrant 2009; Swaminathan et al. 2015). While the value of triggering a property-mapping mindset has already been clearly established, it is unclear which interventions can evoke such a mindset. Therefore, the goal of this work is to identify an ecologically valid antecedent of property mapping, rather than focus on its beneficial outcomes.

Third, this research unveils a theoretical framework that allows predictions to be made about the specific belief(s) that will or will not be mapped from the mimicked product onto the target product. That is, a consumer's beliefs about a target product will only assimilate alignable, dissimilar, and salient attributes of the modifier product. Extant research in psycholinguistics and marketing makes cautious assumptions on the determinants of the outcome of a property-mapping process, but no theoretical framework has yet been proposed. Such a framework will

facilitate strategic implementation of surface mimicry in product and package design or marketing communications.

Finally, the potential of surface mimicry to communicate product property information is primarily demonstrated by applying the technique to healthy food products, which often are perceived as poor tasting (Belei et al. 2012; Raghunathan, Naylor, and Hoyer 2006; Stroebe et al. 2013). Therefore, we duplicate a visual property (i.e., product shape, package, or serving mechanism) that is prototypical of a tasty food product for application to the appearance of a healthy food product in order to communicate that the healthy product also is tasty. Given that consumers have a hard time choosing healthy foods over more unhealthy alternatives, the current work adds to the growing body of research identifying interventions to nudge consumers into making better food choices (e.g., Cadario and Chandon 2020).

THEORETICAL FRAMEWORK

Surface Mimicry

When moving down the aisles of a grocery store, consumers scan many products from a distance in rapid succession. They look at the larger visual properties, such as color and shape, before they attempt to read any detailed product information (Becker et al. 2011; Garber, Hyatt, and Boya 2008). These visual properties often serve to communicate product information (Berkowitz 1987; Folkes and Matta 2004), even when they are not valid indicators of it (Becker et al. 2011; van Herpen and van Trijp 2011). Therefore, marketers can design products and packages in such a way that their visual appearance proactively generates positive beliefs (Bloch

1995; Deliza and MacFie 1996). In this respect, we aim to gain a scientific understanding of the communicative potential of a specific type of mimicry, that is, surface mimicry. According to Lidwell, Holden, and Butler (2010, p. 156), surface mimicry is about "making a product *look* like something else." Well-known examples of surface mimicry are Alessi's iconic design products such as its octopus-shaped lemon squeezer and its parrot-shaped corkscrew.

In evolutionary biology, mimicry refers to the act of copying the characteristics of objects, organisms, or environments and imitating the expressions and mannerisms of other species (Wickler 1968). Biological mimicry can take many forms, with surface mimicry being a prevalent form whereby one animal's appearance reminds a viewer of the appearance of another animal that has desirable characteristics. For example, many species of hoverfly developed wasp-like coloration, as this resemblance with wasps helps them communicate to potential predators that they are inedible or otherwise costly to attack (Ruxton, Sherratt, and Speed 2004). Hence, for organisms, surface mimicry is critically important as a communication strategy that has enabled members of various species to survive. Surprisingly, this potential of mimicry to communicate (product) information to consumers has largely been neglected in academic marketing research. To fill this gap, we examine whether mimicking a visual property prototypical of a (modifier) product in the appearance of a target product alters the beliefs that consumers hold about the target product—i.e., have these beliefs assimilated the mimicked or modifier product's properties into the perception of the target product? This proposition is based on the idea that surface mimicry primes a process of property mapping.

Property Mapping

Property mapping is a cognitive process whereby consumers interpret a combination of products in such a way that properties or attributes of one (modifier) product map onto the second (target) product. This leads, for example, to one interpreting the concept of "a whale boat" as a boat shaped like a whale (Rajagopal and Burnkrant 2009). While property mapping has mainly been discussed in the literature on conceptual combinations in psycholinguistics as a cognitive process via which people make sense of novel word combinations (Wisniewski 1996), marketing scholars have recognized the interesting outcomes of property-mapping processes in terms of product beliefs. For example, property mapping helps to overcome the single product category belief (Rajagopal and Burnkrant 2009), which is imperative to effectively market hybrid products that combine features of multiple categories (e.g., Apple's iWatch combining wristwatch and MP3 functions; Noseworthy, Wang, and Islam 2012). Moreover, using property mapping can help consumers ascribe meaning to co-branded products (Park, Jun, and Shocker 1996). Although marketing research has superficially addressed the benefits of a property-mapping mindset to establish product beliefs, little is known about property mapping's antecedents. To date, all marketing research relies on a priming procedure. No marketing stimuli or tactics that can evoke a property-mapping mindset in and of itself have been identified.

In the case of surface mimicry, one object is depicted with a visual property of another object. Even though the combination in casu occurs on a visual level, it seems likely that people will also process these combinations conceptually (i.e., they will try to make sense of the presentation). For instance, when object [Y] *mimics the shape* of object [X], the visual property 'shape' is already mapped from object [X] onto object [Y]. Therefore, when being exposed to this instance of surface mimicry, people are triggered to engage in property mapping. Given the results of several studies showing that a cognitive process that is activated will persist over

several tasks and contexts (Malkoc, Zauberman, and Bettman 2010; Xu and Wyer 2008), we argue that surface mimicry can prime a process of property mapping.

HYPOTHESES DEVELOPMENT

Assuming surface mimicry indeed sets a property-mapping process in motion, we propose the conceptual model shown in figure 1. First, an important prerequisite for property mapping to affect beliefs about the target product is the existence of alignable properties. Wisniewski (1998) argued that two concepts having many alignable properties provide a broad scope for property mapping. This is most likely when the objects show high similarity (e.g., when they belong to the same superordinate category). The more similar two concepts are, the more communalities they share, and the easier it is to identify alignable properties. The value of these alignable properties might then be mapped from the modifier (mimicked object) onto the target object.

Second, for the outcome of property mapping to become apparent in the set of beliefs related to the target product, the target and mimicked products should differ in terms of identified alignable attributes (Wisniewski 1996; 1997). For instance, consider the conceptual combination *zebra horse*. When comparing a zebra and a horse, people will easily see the commonalities (e.g., four legs, identical body shape), but they will also notice that a zebra has stripes and a horse does not. Skin tone is thus the alignable property on which the animals differ. When making sense of *zebra horse*, they will map the skin tone of a zebra onto a horse. The interpretation resulting from the property-mapping process is thus *striped horse*.

Third, whether the value of an alignable property of the mimicked product is mapped onto the target product likely depends on whether this property is salient (Aaker and Keller 1990). Property mapping requires accessibility to the modifier category's attributes. When engaging in property mapping, one attempts to locate transferable attributes of the mimicked category. Hence, only salient attribute values will be mapped from the modifier onto the target product or brand (Swaminathan et al. 2015). In sum, if exposure to surface mimicry initiates a cognitive process of property mapping, we can expect product beliefs to be affected as follows:

H1: Designing a target product to mimic a modifier product, leads the consumer to assimilate the (a) alignable, (b) dissimilar, and (c) salient attributes of the mimicked product with the target product, while other beliefs about the target product remain unaffected (= surface mimicry effect).

As outlined above, we argue that hypothesis 1 is likely to occur because surface mimicry sets in motion a process of property mapping. This mediation is captured in hypothesis 2.

H2: The activation of a property-mapping mindset underlies the surface mimicry effect.

Surface mimicry is anticipated to influence product beliefs. As stated in hypothesis 1, one of the prerequisites is the existence of dissimilar beliefs about the target product and mimicked product. If beliefs are the same, no surface mimicry effect can be detected, as a similar value will be mapped on the existing value. But how dissimilar can the beliefs be? It is a priori unclear how robust the surface mimicry effect is and whether it is possible to generate a change in beliefs when the dissimilarity becomes too big. We speculate that the surface mimicry effect is likely to be attenuated (or even eliminated) when the dissimilarity or distance in beliefs about the target product and mimicked product is too great. If the belief associated with the mimicked product

deviates from that concerning the target product beyond consumers' latitude of acceptance (the range of opinions on an issue that a person finds acceptable; Meyers-Levy and Sternthal 1993; Sherif and Hovland 1961), consumers will consider it implausible that the target product would be comparable to the mimicked product on the attribute, and thus, they are likely to question the mimicry information. This means that consumers' beliefs are malleable only within their latitude of acceptance. The more dissimilar or the larger the distance in beliefs between the target product and mimicked product, the more likely that the attribute value of the mimicked product will fall outside the latitude of acceptance. Vast research shows that claims beyond a certain threshold of credibility will not lead to assimilation of target beliefs (Stafford, Leigh, and Martin 1995). Hence, when surface mimicry is taken too far, its impact likely is attenuated.

H3: The surface mimicry effect is more pronounced when the distance in beliefs between the target product and the mimicked product is less rather than more substantial.

Integrating all the above leads to the conceptual model on the impact of surface mimicry on product beliefs and consumer responses as visualized in figure 1.

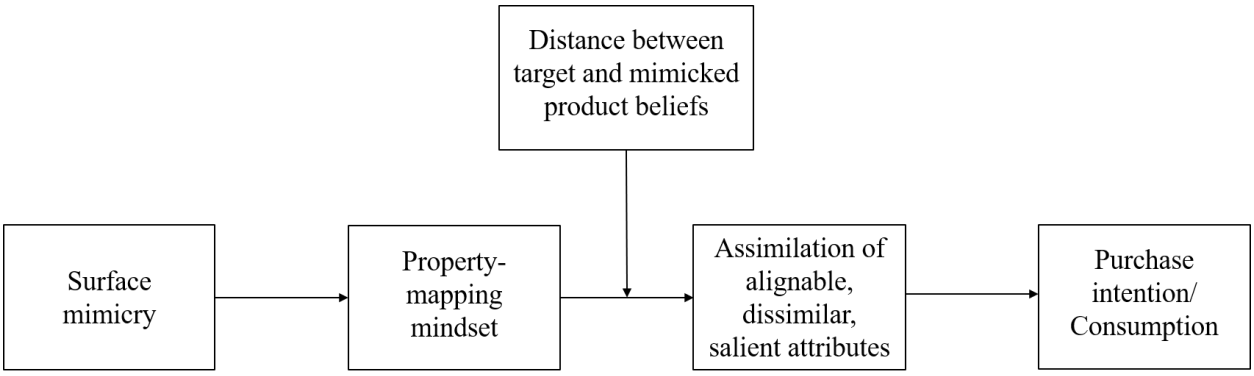


Figure 1. The conceptual model schematizing the effects of surface mimicry.

EMPIRICAL PACKAGE: A HEALTHY-FOOD MARKETING CASE

The central aim of this article is to demonstrate the potential of surface mimicry to communicate property information as a result of the priming of a property-mapping process. To this end, we will use healthy-food promotion as a highly relevant test case. Given that people continue to struggle to choose healthy over unhealthy food options, it is pertinent to investigate whether surface mimicry can nudge them into making better food choices. A key challenge in the search for interventions to foster healthy eating behavior is that many foods touted for their healthful properties are perceived by consumers as relatively poor-tasting (Belei et al. 2012; Maimaran and Fishbach 2014; Raghunathan, Naylor, and Hoyer 2006; Stroebe et al. 2013). Moreover, consumers are rarely willing to compromise on taste in exchange for health benefits (Krutulyte et al. 2011; Verbeke 2006). The relative overweighting of taste to health benefits means that inferior taste perceptions constitute an essential challenge to healthy-food promotion.

As such, it seems surprising that food marketing practitioners and scholars mainly consider interventions that accentuate the nutritional value of healthy food items (Bublitz and Peracchio 2015; Chandon and Wansink 2012; Roose, Geuens, and Vermeir 2018). A notable exception comes from Bolthouse Farms, which launched the "Baby carrots, eat'em like junk food" campaign, using junk-food-style advertising and packaging to stimulate consumption of baby carrots. The company introduced snack packs that mimic the look of potato chip bags and managed to increase sales of baby carrots by 10–12% (McGray 2011). In line with this real-world example, the empirical package in the present article mainly applies surface mimicry to healthy food products in an effort to find a novel avenue to promote healthy food options. Specifically, it aims to investigate whether designing a healthy product to mimic a product

typically perceived as tasty—by mimicking its shape, package, or serving mechanism—indeed leads the mimicked product's tastiness value to transfer onto the target product.

The article presents a set of five experiments. Studies 1a and 1b establish that surface mimicry increases taste beliefs, but only when taste is an alignable property with a dissimilar value (hypotheses 1a and 1b). Specifically, when a healthy product mimics a product from another category, taste is not an alignable attribute, and beliefs about the target product remain unchanged (study 1a). Taste beliefs also do not improve when a product mimics an equally (un)tasty product (study 1a, study 1b). Study 1b illustrates consequences further downstream: Improved taste perceptions for healthy products spur healthy food consumption. Study 2 then focuses on attribute salience (hypothesis 1c). When the mimicked product is mainly characterized by its tastiness, then taste beliefs are assimilated to the target product. When health is a more salient attribute, this attribute's value gets transferred. With studies 1a, 1b, and 2 already depicting a pattern of changes in product beliefs that uniquely align with a property-mapping account, the main aim of study 3 is to provide direct evidence for the mediating role of property mapping (hypothesis 2). A final study then considers two healthy target products that show a less (vs. more) substantial difference in taste beliefs compared to the mimicked product. We find that surface mimicry ameliorates taste beliefs about both products, though the resulting change is less pronounced when the difference in taste beliefs from the mimicked product is more (vs. less) substantial.

A pretest was run to make sure that the products in our main experiments fulfilled the criteria of (dis)similar values on alignable, salient attributes. Specifically, one Amazon Mechanical Turk sample (n = 148) and one Prolific sample (n = 149) evaluated taste and health beliefs related to both the mimicked and target products; and for the mimicked products they also

indicated salience of the following attributes: tastiness, healthiness, convenience, perishability, freshness, how filling it is, and readiness to consume. We refer to appendix B for more details on the pretests.

STUDY 1A: IMPACT OF SURFACE MIMICRY ON ALIGNABLE, DISSIMILAR PROPERTIES

Study 1a explores whether surface mimicry affects beliefs about the target product. Specifically, we test whether designing a healthy food product (e.g., watermelon) to mimic another (food) product influences the taste beliefs associated with the healthy food. Our expectation is that this will be the case when the mimicked food product is generally perceived as tasty (e.g., popsicle) such that taste forms (a) an alignable attribute with (b) a dissimilar value, as captured in hypotheses 1a and 1b. Because taste is a more salient attribute for popsicles than healthiness is, we expect the target product (i.e., watermelon) to be affected in terms of related taste beliefs but not health beliefs (cf. hypothesis 1c).

To confirm that the effect occurs due to a transfer of values on alignable, dissimilar properties, and not due to any surprising characteristic of surface mimicry—for example, surface mimicry might elicit pleasure-related emotions that could positively influence product beliefs—two other forms of surface mimicry were included in the study design. Specifically, we include a condition in which a healthy food product takes the shape of an unrelated object (e.g., a star), and one in which a healthy food product mimics a different healthy, equally tasty food product (e.g., an apple). According to our theorizing, neither of these two instances of surface mimicry should alter existing taste beliefs. In the first instance, when a healthy product mimics a dissimilar

object, no alignable properties between the objects are likely to be detected, resulting in unaffected taste beliefs about the healthy product. In the second instance, both healthy products have alignable properties with similar values. As such, if it is the value of the mimicked product that is mapped onto the target product, this should not lead to a change in taste beliefs (nor health beliefs) associated with the target product. In contrast, if surface mimicry influences product beliefs because of its unexpected, appealing nature, the effect should also be apparent in these two alternative instances of surface mimicry.

Method

In return for a monetary compensation, 195 U.S. members of Amazon Mechanical Turk participated in an online study. Two participants failed the attention control question ("Please select 'disagree'."), leaving 193 participants (98 men, 95 women; M_{age} = 35.60, SD = 11.46) for further analysis. Full-sample analyses yield similar results. The participants were randomly assigned to either the control condition or one of three surface mimicry conditions. In the latter conditions, participants saw an advertisement presenting a piece of watermelon shaped (1) as a popsicle (i.e., healthy product mimicking a tasty product), (2) as an apple (i.e., healthy product mimicking another healthy, equally tasty product), or (3) as a star (i.e., healthy product mimicking a dissimilar object). The control advertisement portrayed a chunk of watermelon in its natural shape (see appendix A for the stimulus material). In the condition in which the watermelon was designed to look like a popsicle, a popsicle stick was used as the serving mechanism. In the other conditions, the watermelon was put on a skewer to keep perceived consumption convenience equal across conditions.

Participants were asked to indicate how surprising the advertisement was to them on a single-item, nine-point semantic differential scale. Next, perceptions of the portrayed product's tastiness ($\alpha = .88$) and healthiness ($\alpha = .88$) were measured on two-item ("tastes bad–tastes good," "unappetizing–appetizing") and five-item (e.g., "low in nutrients–high in nutrients," "high in calories–low in calories") nine-point semantic differential scales, respectively (Adams and Geuens 2007). We also measured perceived consumption convenience on a single-item, nine-point semantic differential scale. Finally, the extent to which the product looked like a popsicle was measured on a single-item, five-point Likert scale.

Results and Discussion

Pretest results (Amazon Mechanical Turk, n = 148) confirm the assumptions on product beliefs underlying this study (see appendix B for more details). Specifically, the results show that (1) a popsicle's most salient attribute is its good taste, and (2) the associated taste beliefs about the product pairs are indeed similar (e.g., watermelon and apple) or dissimilar (e.g., watermelon and popsicle), as anticipated.

Table 1 presents an overview of the average beliefs and standard deviations in the different conditions recorded in the main study. A planned-contrast test revealed that participants associated the product's design more with popsicles when it was presented on a popsicle stick versus on a skewer ($t(189) = 9.37$, $p < .001$). We thus can exclude the possibility that the control condition and the two alternative surface mimicry conditions cued properties of a popsicle. Moreover, all products were perceived as equally convenient to consume (one-way ANOVA, $F(3,189) = .94$, $p > .1$). Another planned-contrast test indicated that advertisements portraying

surface mimicry were found to be more surprising than the control advertisement ($t(189) = 4.89$, $p < .001$).

TABLE 1

MEANS AND SDs FOR STUDY 1A

	Surface Mimicry						Control	
	Popsicle (*n* = 48)		*Apple* (*n* = 48)		*Star* (*n* = 49)		(*n* = 48)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Association with popsicles [1]	3.02[a]	1.33	1.29[b]	.71	1.82[b]	1.17	1.58[b]	.92
Convenience [2]	6.87[a]	1.70	6.29[a]	2.15	6.82[a]	1.91	6.73[a]	1.78
Ad surprise [2]	5.19[a]	2.17	5.33[a]	1.79	5.71[a]	1.76	4.46[b]	2.18
Tastiness [2]	7.82[a]	1.35	6.59[b]	2.06	6.83[b]	1.73	7.15[b]	1.57
Healthiness [2]	6.86[a]	1.40	7.04[a]	1.49	7.28[a]	1.61	7.33[a]	1.03

[1] Variables measured on five-point scales; higher values reflect higher mean association ratings.

[2] Variables measured on nine-point scales; higher values reflect higher mean perception ratings.

[a,b] Means with the same superscripts do not differ significantly ($p > .05$). Means with different superscripts differ significantly ($p \leq .05$).

On an overarching level, the hypothesized surface mimicry effect of a healthy product mimicking a tasty product (i.e., the popsicle condition) assumes an interaction pattern with taste beliefs being higher in the popsicle condition and health beliefs being similar across conditions.

This anticipated interaction effect between the between-subjects manipulation of surface mimicry and the within-subject measurement of taste and health beliefs was verified via a repeated-measures ANOVA. The interaction was significant ($F(3,189) = 6.01$, $p < .001$, Cohen's d = .62). A further univariate breakdown of this interaction indicates that the conditions significantly differ in terms of taste beliefs ($F(3,189) = 4.75$, $p = .003$, Cohen's d = .55), but not in terms of health beliefs ($F(3,189) = 1.13$, $p > .1$, Cohen's d = .27).

To further verify whether the results align with expectations, we zoom in on the most relevant comparisons. Planned-contrast tests, comparing each surface mimicry condition with the control condition, reveal that participants rated the tastiness of the watermelon higher than the control condition ($M_{control} = 7.15$, SD = 1.57) only when it was shaped like a popsicle ($M_{popsicle} = 7.82$, SD = 1.35; $t(92.01) = -2.26$, $p = .026$, Cohen's d = -.46). As expected, shaping the watermelon like a star did not affect existing taste beliefs ($t(94.48) = .95$, $p > .1$, Cohen's d = .19), and neither did shaping a healthy product like another healthy product ($t(87.86) = 1.48$, $p > .1$, Cohen's d = .30). As indicated, health beliefs were equal across conditions, and more detailed pairwise comparisons did not reveal significant differences in health beliefs between conditions (table 1).

As expected, designing a healthy product to mimic a tasty product made the healthy product appear tastier. This instance of surface mimicry incited the mapping of the property of good taste of the mimicked product onto the healthy product. The transfer of product beliefs occurred only when surface mimicry was applied to products with alignable attributes (hypothesis 1a) with dissimilar values (hypothesis 1b). Other forms of surface mimicry did not shift existing product beliefs. We also find tentative evidence that only salient attributes transfer

(hypothesis 1c), as the unhealthy character of the unhealthy product (which was less salient than its tastiness) did not affect the belief about healthiness of the healthy target product.

In this study, we directly accounted for surface mimicry's surprising character as an alternative account. The results clearly indicate that the unexpected nature of surface mimicry cannot account for the positive impact of using a tasty mimic, as perceived unexpectedness was high in all three surface mimicry conditions, but a change in product beliefs was observed only for a tasty mimic. As the observed pattern of findings is uniquely in line with a property-mapping account, these findings suggest that alternative accounts likely are invalid too. For example, research has shown that surface mimicry evokes more abstract processing (Bogaerts, Labyt, and Pandelaere 2016), and level of processing can affect product beliefs (Wright et al. 2012) and product valuation (Pham, Hung, and Gorn 2011). From a construal-level account, however, it is not clear why only taste beliefs and not health beliefs would shift, nor why product beliefs would change in response to only one particular instance of surface mimicry (i.e., when a healthy product mimics a tasty product, and not when a healthy product mimics a star).

STUDY 1B: IMPACT OF SURFACE MIMICRY ON FOOD INTAKE

The objective of this study is twofold. First, this study extends the finding that surface mimicry affects taste beliefs by showing that the intervention's effect translates into downstream behavioral effects, such as food intake. To that end, we apply surface mimicry to baby carrots mimicking French fries and observe whether the surface mimicry induces respondents to eat more of the healthy vegetable. A second goal is to corroborate the evidence on the necessity of the target product and mimicked product exhibiting dissimilar values on alignable attributes

(hypotheses 1a and 1b). While study 1a addressed this issue by showing that there is no transfer of taste (nor health) values when both the target and mimicked product are healthy and have relatively low taste values, study 1b offers evidence that the effect also is attenuated when both the target and mimicked product are unhealthy but quite tasty. Rather than keeping the target product constant and varying the mimicked product (cf. study 1a), this study keeps the mimicked product constant (i.e., French fries) and varies the target product (i.e., baby carrots versus Lays Mama Mia's chips).

Method

In exchange for monetary compensation, 111 students at a Western European university (45 men, 66 women; M_{age} = 22.92, SD = 7.04) participated in a lab study. Upon entering the lab, participants were seated in isolated cubicles to exclude the influence of the presence of others on their consumption. In the first task, either a healthy snack (i.e., 120 grams (4.23 ounces) of baby carrots) or an unhealthy snack (i.e., 30 grams (1.06 ounces) of Lays Mama Mia's chips) was offered to all participants, after questioning them about food allergies and measuring their hunger level by means of a slider (0 = "completely satisfied," 100 = "extremely hungry"). To keep the perceived volume of both snack portions constant, the weight of the served portions differs substantially between the two snacks. Consequently, only comparisons of the control and surface mimicry conditions, within snack type, are warranted. The serving mechanism of the snacks was manipulated between-subjects, such that the snacks were presented either on a white stone plate (i.e., control conditions) or in a white stone cone (i.e., surface mimicry conditions) (see appendix A). The cone is a typical serving manner of French fries in the country of investigation

(originally, only paper cones were used in fry shacks, nowadays porcelain cones are also commonly used in restaurants).

Participants were instructed to watch a short movie fragment (5 minutes and 38 seconds), about which they would be questioned afterwards. While watching, they were free to eat as much of the snack as they wanted. After the movie fragment, participants were instructed to return the plate or cone to the supervisor before completing the questions about the movie clip. The leftover snacks were weighed by the supervisor to calculate consumption volume. In addition, participants' taste experience of the snack was measured by means of a two-item 11-point semantic differential scale ("tastes bad–tastes good," "unappetizing–appetizing"). Because participants actually experienced the taste of the product in this study, this two-item measure of tastiness was extended with a one-item 11-point Likert scale measuring the extent to which they enjoyed the taste of the product ("not at all," "very much") ($\alpha = .92$). Perceived healthiness of the snack was measured with the same five-item, 11-point semantic differential scale as in study 1a ($\alpha = .78$). As a manipulation check, we asked the participants whether the snack had reminded them of French fries, with responses provided on an 11-point Likert scale.

Results and Discussion

Assumptions concerning attribute salience and the (dis)similarity of attribute values between mimicked and target products were first verified in a pretest (see appendix B). Next, a two-way ANOVA was conducted to check whether the manipulation was successful. The results show a significant main effect of product type: Mama Mia chips ($M_{chips} = 7.70$, SD = 3.12) reminded participants more of French fries than did baby carrots ($M_{carrots} = 4.33$, SD = 3.11,

$F(1,107) = 32.45$, $p < .001$). More importantly, the results also reveal a significant main effect of surface mimicry on the extent to which the snack reminded the participants of French fries ($F(1,107) = 34.76$, $p < .001$), which did not depend on the type of product that was undergoing the surface mimicry ($F(1,107) = .62$, $p > .1$). When the snack was presented in a French fry cone ($M_{\text{mimicry}} = 7.76$, SD = 3.11), the serving mechanism reminded the participants more of French fries compared to when the snack was presented on a plate ($M_{\text{control}} = 4.28$, SD = 3.12).

Results from a two-way ANCOVA show a significant main effect of snack type on consumption volume ($F(1,106) = 41.11$, $p < .001$, Cohen's d = 1.23), which was anticipated due to the difference in the weight of the served portions. Most importantly, this effect is complemented by a significant interaction effect, pointing to the differential impact of surface mimicry on consumption volume depending on the snack type ($F(1,106) = 4.06$, $p = .047$, Cohen's d = .39) when participants' hunger level was controlled for ($F(1,106) = 4.83$, $p = .030$, Cohen's d = .42). Specifically, simple-effect tests reveal that participants ate significantly more when they received the baby carrots in a French fry cone versus on a plate ($F(1,106) = 8.40$, $p = .005$, Cohen's d = .56; see table 2 for descriptives). Offering the unhealthy snack in a French fry cone did not impact consumption volume ($F(1,106) = .01$, $p > .1$, Cohen's d < .001). However, as the consumption data are skewed for carrot consumption (1.6) but not for chip consumption (.3), this may have resulted in lower power to detect a difference in chip versus carrot consumption. Hence, we ran separate analyses for carrot and chip consumption, after log-transforming the carrot consumption data to conform to normality (skewness = -.32). The results again show that surface mimicry had a (marginally) significant effect on carrot consumption ($M_{\text{mimicry}} = 3.45$ grams, SD = .80; $M_{\text{control}} = 3.08$ grams, SD = .66; $t(55) = -1.90$, $p = .06$, Cohen's d = -.50), but did not affect chip consumption ($M_{\text{mimicry}} = 14.11$ grams, SD = 9.23; $M_{\text{control}} =$

12.34 grams, SD = 8.67; $t(52) = -.72$, $p > .1$, Cohen's d = -.20). We conclude that surface mimicry can increase consumption volume when the target product and the mimicked product have alignable properties with dissimilar values (hypotheses 1a and 1b). Surface mimicry can thus be used to nudge consumers to increase their intake of healthy food. In the web appendix we report study WA1, exhibiting another downstream consequence of surface mimicry, an influence on food choices. Study WA4 provides additional evidence that surface mimicry can increase consumption volume, especially when the distance in beliefs about the target product and the mimicked product is not too large.

After consumption, participants reported taste experience and enjoyment of the target snack and health beliefs. A repeated-measures ANOVA was run, with taste and health beliefs as the within-subject measures, and snack type and surface mimicry as the between-subjects factors. Breaking down the three-way interaction ($F(1,107) = 3.33$, $p = .071$, Cohen's d = .35) reveals the following pattern of taste experiences and health beliefs: Though applying surface mimicry to an unhealthy snack did not increase reported taste experience ($F(1,107) = .13$, $p = .72$, Cohen's d = .07), surface mimicry did increase the experienced tastiness of the healthy snack ($F(1,107) = 7.07$, $p = .009$, Cohen's d = .51). The surface mimicry and control conditions, however, do not differ in terms of health beliefs, neither when the focal product is healthy ($F(1,107) = 1.08$, $p > .1$, Cohen's d = .20), nor when it is unhealthy ($F(1,107) = .05$, $p > .1$, Cohen's d = .04).

TABLE 2

MEANS AND SDs FOR STUDY 1B

	Baby Carrots		Mama Mia Chips	
	Surface Mimicry	Control	Surface Mimicry	Control

	(n = 29)		*(n =28)*		*(n = 28)*		*(n =26)*	
	M	SD	M	SD	M	SD	M	SD
Consumption (grams)	40.90	28.77	26.38	17.11	14.11	9.23	12.34	8.67
Tastiness	8.16	2.05	6.74	2.38	8.58	1.60	8.78	1.96
Healthiness	7.87	.98	7.60	.88	3.70	1.02	3.64	1.02

In sum, surface mimicry only affected beliefs about taste and not about health. This observation is again in line with our theorizing that the transfer of product beliefs is limited to properties that are most salient for the mimicked product (hypothesis 1c). Alternatively, this observation might stem from the specific nature of attributes, such as the fact that taste perceptions are more malleable than health perceptions. Study 2 more directly explores the role of attribute salience versus attribute type (and corresponding malleability).

STUDY 2: IMPACT OF SURFACE MIMICRY DEPENDS ON ATTRIBUTE SALIENCE

Study 2 demonstrates that surface mimicry affects product beliefs, (1) by confirming that designing a healthy food product to mimic a food product that is typically perceived as tasty improves existing taste beliefs about the healthy food product, and (2) by exploring whether a tasty product that mimics a healthy product can, in turn, lead to improved beliefs about the health value of the tasty product. As such, this study aims to show that the effect of surface mimicry is not restricted to a particular type of belief (e.g., taste beliefs). Rather, this study supports the concept that the surface mimicry manipulation is blind to the attribute type, but it influences those beliefs that are most prototypical or salient for the mimicked product (hypothesis 1c). In

addition, prior research has shown that tastiness is a more dominant driver of consumers' food product purchase intentions than healthiness (Mai and Hoffmann 2015), so we examine whether improved taste beliefs significantly mediate the effect of surface mimicry on purchase intentions toward the healthy product, and if improved health beliefs may not be as likely to translate into intentions to purchase the tasty product.

Method

In return for monetary compensation, 252 Prolific participants completed an online questionnaire. Fifteen participants' data were discarded: 14 failed the attention check and one respondent showed speeding behavior (i.e., a response time of 69 seconds vs. a median response time of 244.5 seconds). This resulted in a sample of 237 participants (154 men; M_{age} = 24.83, SD = 8.23). They were randomly assigned to one of four between-subjects conditions varying in terms of (1) target product (healthy vs. unhealthy) and (2) surface mimicry (absent vs. present).

The healthy product (i.e., strawberries) was presented in a box typical of chocolates in the surface mimicry condition, whereas the strawberries came in a regular box in the control condition. When a tasty product served as the target product (i.e., ice cream), then the surface mimicry manipulation was established by combining two scoops of ice cream with the typical stems of cherries, while these stems were omitted in the control condition (see appendix A). After the product had been presented, we measured participants' purchase intentions on a three-item, seven-point Likert scale ("I would consider buying [this product]," "I would like to try [this product]," "I would be inclined to buy [this product]"; $\alpha = .88$). Next, participants rated the presented strawberries or ice cream on perceived tastiness ($\alpha = .86$) and healthiness ($\alpha = .92$) on

two-item ("tastes bad–tastes good," "unappetizing–appetizing") and five-item (e.g., "low in nutrients–high in nutrients," "high in calories–low in calories") nine-point semantic differential scales, respectively (Adams and Geuens 2007). A one-item, seven-point Likert scale was inserted to verify whether or not the presented strawberries (ice cream) reminded the participant of chocolates (cherries). The attention check was inserted here as well.

Results and Discussion

The results of a pretest suggest that taste is the most salient characteristic for chocolates —being significantly more salient than (un)healthiness—whereas the opposite holds for cherries. Consequently, we expect taste beliefs about the chocolates, not health beliefs, to transfer onto the strawberries, and health beliefs (but not taste beliefs) to be transferred from the cherries onto the ice cream. The pretest results further confirm that the modifier and target brands differ in terms of their most salient attribute values (see appendix B). Moreover, the results of the manipulation check confirm that implementing surface mimicry reminded participants of the mimicked product. That is, applying surface mimicry to the strawberries reminded participants in the experimental condition more of chocolates (M_{mimicry} = 5.21, SD = 1.68; M_{control} = 2.05, SD = 1.29; $t(119) = -11.55$, $p < .001$). A similar finding was observed when the ice cream mimicked cherries (M_{mimicry} = 6.09, SD = 1.28; M_{control} = 3.52, SD = 1.62; $t(114) = -9.42$, $p < .001$).

A repeated-measures ANOVA returns a non-significant three-way interaction between product type (healthy vs. unhealthy), surface mimicry (absent vs. present), and the type of belief (taste vs. health) ($F(1,233) = .76$, $p = .39$, Cohen's d = .11). Nevertheless, when scrutinizing the effects in more detail, we see that the pattern is in line with expectations. Similar to the results of

the previous studies, we find that when a healthy product mimics a tasty product (i.e., strawberries presented like chocolates), the taste beliefs are higher than in the control condition ($M_{mimicry}$ = 7.09, SD = 1.80 vs. $M_{control}$ = 6.41, SD = 2.06; $F(1,233) = 3.81$, $p = .05$, Cohen's d = .26), whereas health beliefs do not significantly differ ($M_{mimicry}$ = 7.23, SD = 1.12; $M_{control}$ = 6.95, SD = 1.27; $F(1,233) = 1.74$, $p > .1$, Cohen's d = .17). For a tasty product that mimics a healthy product (i.e., ice cream mimicking cherries), we find the opposite pattern. The application of surface mimicry led to increased health beliefs ($M_{mimicry}$ = 4.47, SD = 1.32; $M_{control}$ = 3.97, SD = 1.22; $F(1,233) = 5.89$, $p = .02$, Cohen's d = .32), whereas taste beliefs did not significantly change ($M_{mimicry}$ = 6.49, SD = 1.65; $M_{control}$ = 6.02, SD = 1.92; $F(1,233) = 2.10$, $p > .1$, Cohen's d = .19).

The strawberry data also support the claim that surface mimicry influences purchase intentions indirectly, through taste beliefs. Even though there is no direct effect of surface mimicry on purchase intentions ($M_{mimicry}$ = 4.69, SD = 1.45; $M_{control}$ = 4.75, SD = 1.46; $F(1,233)$ = .058, $p > .1$, Cohen's d = .07), there is a significant mediation by taste beliefs (ab = .367; 95% confidence interval = .005 to .743) but not health beliefs (ab = -.0002; 95% confidence interval = -.060 to .061) (Hayes 2017).

The intentions to purchase the ice cream expressed by those in the surface mimicry condition are not significantly different from those expressed by participants in the control condition ($M_{mimicry}$ = 3.38, SD = 2.04; $M_{control}$ = 3.38, SD = 1.37; $F(1,233) = .34$, $p > .1$, Cohen's d = .07). A mediation analysis then points to a non-significant mediation of health beliefs (ab = .062; 95% confidence interval = -.050 to .199) and taste beliefs (ab = .208; 95% confidence interval = -.065 to .516), suggesting that, unlike ameliorated taste beliefs, improved health beliefs do not necessarily translate into improved purchase intentions.

Overall, this pattern of results suggests that surface mimicry is blind to the type of product belief that is being transferred from the mimicked product onto the target product. Rather, these results indicate that what information exactly is being transferred depends on the salience or prototypicality of the mimicked product attribute. However, we note that these results should be interpreted with caution considering that we went on to inspect a non-significant three-way interaction effect in more detail. The results of study WA4 (see web appendix) provide further evidence for our theorizing by showing that only the most salient of eleven attributes was affected by the mimicry application.

STUDY 3: PRIMING OF PROPERTY MAPPING BY SURFACE MIMICRY

The observed pattern of findings in studies 1a–2 solely aligns with a property-mapping account. The goal of study 3 is to provide direct evidence for this account. Specifically, study 3 aims to obtain empirical evidence for the claim that surface mimicry primes a property-mapping process (hypothesis 2). An alternative manner to interpret combinations of objects or concepts is "relational linking." A relational linking process implies a thematic relations approach (Wisniewski 1996, 1997), such that people search for a plausible relationship between two concepts (e.g., a *whale boat* can be interpreted as *a boat used for whale watching*). Under relational linking, the focus is on how the two concepts are related socially, functionally, or situationally (Ahluwalia 2008). For example, when considering the relation between two brands or products, different types of relational links—such as similarity of users, functional overlap, or commonalities in usage situation—could be considered. Unlike property mapping, relational linking interpretations preserve the original meanings of the concepts in a combination

(Swaminathan et al. 2015). When engaging in property mapping, people instead take a salient property of one concept as a modifier of the other (e.g., a *whale boat* is interpreted as *a boat shaped like a whale;* Wisniewski 1996, 1997). Hence, the role of the modifier concept is reduced to providing property information, rather than preserving its actual meaning.

To verify whether surface mimicry activates a property-mapping process, we measured the extent to which consumers engaged in property mapping (vs. relational linking) after being exposed to a healthy food product mimicking a tasty food product (i.e., surface mimicry condition), or a healthy food product (i.e., control condition), or a healthy food product positioned next to a tasty product (i.e., semantic prime condition). The latter condition was added to the study design to illustrate that property mapping is a unique consequence of surface mimicry that does not occur when a consumer is merely exposed to both the healthy and the tasty food product. Both in the surface mimicry and semantic prime conditions, content nodes associated with the food products may be activated, while the cognitive process initiating a property-mapping process is expected to be activated only in the surface mimicry condition.

Method

One hundred and fifty U.S. members of Amazon Mechanical Turk (84 men, 66 women; M_{age} = 36.07, SD = 11.10) participated in a between-subjects study with three conditions, consisting of two phases. In the first phase, the participants were shown a farmers' market advertisement promoting the consumption of fresh vegetables. The advertisement portrayed tomato, lettuce, and shredded carrots (i.e., control condition) or these vegetables *looking like* a burger (i.e., surface mimicry condition) or *placed next to* a burger (i.e., semantic prime

condition) (see appendix A). The latter condition was incorporated in order to investigate whether making content associated with the mimicked product accessible would be sufficient to increase the taste beliefs about the vegetables. Participants were asked to indicate their beliefs about the advertised vegetables' tastiness (α = .89) and healthiness (α = .90) on multi-item nine-point semantic differential scales, analogous to study 1a (Adams and Geuens 2007). Purchase intention of the vegetables was measured by the same three items that were used in study 2 (although one item was worded negatively). Hence, purchase intention was gauged by means of a three-item, seven-point Likert scale (α = .93). As a manipulation check, we also asked the participants whether the ad reminded them of a burger, with response given on a seven-point Likert scale. Note that we anticipate both the surface mimicry and semantic prime conditions to activate the concept of a burger, whereas this should not be the case in the control condition.

In phase two, which was framed as an unrelated interpretation task of novel noun-noun phrases, we measured the extent to which participants engaged in property mapping versus relational linking. Five noun-noun phrases, both having plausible property-mapping and relational-linking interpretations, were selected from Wisniewski and Love (1998) and Hampton, Francis, and Robson (2007) (see appendix C). Participants were informed that they would see phrases that they had never heard before, together with two alternative interpretations. Each interpretation is either the outcome of a property-mapping or relational-linking process. To illustrate, they were told that the phrase *'spear chisel'* could be interpreted as *'a long, pointy chisel'* (i.e., property-mapping interpretation) or as *'a tool for sharpening spears'* (i.e., relational-linking interpretation). Participants were asked to indicate which interpretation of each phrase was more plausible, following their own intuition (1 = "interpretation on the left is much more

plausible," 5 = "interpretation on the right is much more plausible"). Higher mean scores on the interpretation task indicate higher relative plausibility for the property-mapping interpretation.

Results and Discussion

Pretest results again confirmed that attribute salience scores of the mimicked product are as assumed. That is, a burger's most salient attribute is its good taste (appendix B). In addition, a contrast test indicates that presenting vegetables in the shape of a burger reminded consumers more of the mimicked product compared to the control condition (M_{mimicry} = 5.26, SD = 1.08; M_{control} = 2.71, SD = 1.03; $t(147) = 14.63$, $p < .001$). As anticipated, a similar difference is observed when comparing the semantic prime and the control conditions ($M_{\text{semantic prime}}$ = 5.50, SD = 1.19; M_{control} = 2.71, SD = 1.03; $t(147) = 15.57$, $p < .001$).

First, a repeated-measures ANOVA indicates that the interaction between the conditions and the measured beliefs (taste and health) is marginally significant ($F(2,147) = 2.39$, $p = .095$, Cohen's d = .36). A further breakdown of this interaction suggests differences across conditions in taste beliefs ($F(2,147) = 2.63$, $p = .076$, Cohen's d = .38), but not in health beliefs (M_{control} = 7.79, SD = 1.16; $M_{\text{semantic prime}}$ = 7.36, SD = 1.27; M_{mimicry} = 7.81, SD = 1.17; $F(2,147) = 2.19$, $p > .1$, Cohen's d = .35). More specifically, compared to the control condition (M_{control} = 5.71, SD = 2.00), the advertised vegetables looked tastier when they looked like a burger (M_{mimicry} = 6.56, SD = 2.02; $t(147) = 2.08$, $p = .039$, Cohen's d = .36), but not when they were placed next to a burger ($M_{\text{semantic prime}}$ = 5.78, SD = 2.16; $t(147) = .17$, $p > .1$, Cohen's d = .03). The improved taste beliefs translated into a higher purchase intention for the advertised vegetables in the surface mimicry condition (M_{mimicry} = 5.14, SD = 1.53; $t(147) = 2.84$, $p = .005$, Cohen's d = .47)

but not in the semantic prime condition ($M_{\text{semantic prime}}$ = 4.22, SD = 1.80; $t(147) = .03$, $p > .1$, Cohen's d < .001), compared to the control condition (M_{control} = 4.21, SD = 1.61). In addition, from a parallel mediation analysis, it can be concluded that the effect of surface mimicry (cf. infra for dummy coding specifications) on purchase intentions is mediated by taste beliefs (*ab* = .52, 95% confidence interval = .052 to .988), but not by health beliefs (*ab* = .002, 95% confidence interval = -.051 to .079).

Analysis of the interpretation task reveals that the surface mimicry condition (M_{mimicry} = 3.70, SD = .69) yielded a higher plausibility of property-mapping interpretations for the five novel noun-noun phrases compared to the semantic prime condition ($M_{\text{semantic prime}}$ = 3.33, SD = .60; $t(147) = 2.72$, $p = .007$, Cohen's d = .45) and compared to the control condition (M_{control} = 3.20, SD = .67; $t(147) = 3.79$, $p < .001$, Cohen's d = .63). As the mean score of the interpretation task was significantly higher, participants engaged more in property mapping when they were first exposed to surface mimicry. To investigate whether the property-mapping process initiated by exposure to surface mimicry affected participants' taste beliefs, a bootstrap mediation analysis (Hayes 2017) was conducted. The effect of the surface mimicry condition was contrasted with the effect of the control and semantic prime conditions (i.e., a surface mimicry dummy variable with [control condition = 0, semantic prime condition = 0, surface mimicry condition = 1] as a coding scheme served as the independent variable), controlling for the difference between the former two conditions (i.e., a semantic prime dummy variable with the following coding scheme [control condition = 0, semantic prime condition = 1, surface mimicry condition = 0] was included as a covariate). Results disclose that the extent of property mapping underlies the effect of surface mimicry on taste beliefs (*ab* = .27, 95% confidence interval = .067 to .59) (hypothesis 2).

First, this study provides empirical evidence against the claim that merely making content associated with the mimicked product accessible is sufficient to ameliorate existing taste beliefs about the target product. The results show that improved taste beliefs are not due to a semantic priming process, but rather imply that they are an outcome uniquely engendered by surface mimicry. Second, we demonstrate that exposure to surface mimicry increases engagement in property mapping. A mediation analysis reveals that the extent of property mapping mediates the impact of surface mimicry on taste beliefs about the healthy product, thereby confirming hypothesis 2. Studies WA2 and WA3 in the web appendix further demonstrate the role of property mapping in explaining the surface mimicry effect. Study WA2 adopted a moderation-of-process strategy to further support the mediating role of property mapping, while study WA3 highlights that spontaneous inferences after being exposed to a surface mimicry manipulation are similar to inferences in response to explicit property-mapping instructions. Hence, the latter study implements an approach similar to that adopted by Pham (1998), who argued that a comparison of outcomes that result spontaneously after stimulus exposure to outcomes that result when explicit processing instructions are given to participants can attest to the similarity in processes underlying the observed effect.

STUDY 4: DOES THE SURFACE MIMICRY EFFECT HOLD FOR SUBSTANTIALLY DIFFERENT BELIEFS?

A final study gives better insight into the scope of the surface mimicry effect. The foregoing studies already illustrated that somewhat divergent values of the target and mimicked products on alignable properties are necessary in order to detect an effect of surface mimicry.

Study 4 investigates whether the surface mimicry effect also holds when the difference in product beliefs between the mimicked product and the target product is more substantial. As hypothesis 3 describes, we expect the effect of surface mimicry to be less pronounced when it is aimed at closing a bigger (vs. smaller) gap in beliefs about the target product and the mimicked product, because assimilation is less likely in case of greater divergence (Stafford, Leigh, and Martin 1995). Alternatively, we acknowledge that when the gap is substantial, the room for change also is more substantial.

Method

In return for monetary compensation, 149 U.S. members of Amazon Mechanical Turk (85 men, 64 women; M_{age} = 35.74, SD = 11.94) completed an online questionnaire. They were randomly assigned to one of four between-subjects conditions that varied in terms of (1) the gap in taste beliefs between target product and mimicked product and (2) whether surface mimicry was absent or present. Specifically, participants saw a picture of a target product that was pretested to display a more versus less substantial gap in taste beliefs when compared to the mimicked product. Taste beliefs related to Brussels sprouts are substantially lower than taste beliefs related to cherry tomatoes. Hence the gap between the taste beliefs about the former target product and the mimicked product (i.e., a lollipop) is larger compared to the gap between the latter product and the mimicked product (see appendix B for taste beliefs associated with the target products). For each target product a picture with and without a surface mimicry application was created (control vs. surface mimicry). Each participant saw one of four pictures (see appendix A for the stimuli).

Brussels sprouts and cherry tomatoes were selected as they are both healthy products, with diverging taste beliefs, and with comparable shapes and sizes to which a similar surface mimicry manipulation can be applied. When surface mimicry was applied, the target product was presented on a stick so as to resemble a lollipop. Whether this design intervention successfully reminded participants of the mimicked product was verified via a one-item seven-point measure, after measuring health ($\alpha = .82$) and taste ($\alpha = .91$) beliefs associated with the depicted target product, respectively via a two-item and a five-item nine-point semantic differential scale.

Results and Discussion

As indicated by the results of a separate pretest, reported in appendix B, tastiness is the attribute that is most characteristic of the mimicked product (i.e., lollipop). Moreover, the results of this pretest show that Brussels sprouts ($M = 4.72$, SD = 2.13) are considered less tasty than cherry tomatoes ($M = 6.52$, SD = 1.44; $t(45) = -5.85$, $p < .001$), and the gap between the taste perceptions associated with a lollipop and with Brussels sprouts ($M = 3.15$, SD = 2.38) is significantly larger than the gap between the taste perceptions associated with a lollipop and with cherry tomatoes ($M = 1.29$, SD = 1.70; $t(24) = 3.95$, $p = .001$). Moreover, the results of the manipulation check are in line with our expectations. Both cherry tomatoes and Brussels sprouts on a stick ($M = 5.87$, SD = 1.04) reminded participants significantly more of a lollipop compared to when these products were presented in their regular format ($M = 3.41$, SD = 1.93; $F(1,145) = 95.69$, $p < .001$). Hence, we only observed a main effect of surface mimicry. Neither the main effect of product ($F(1,145) = 1.73$, $p > .1$) nor the interaction effect ($F(1,145) = .26$, $p > .1$) was significant.

To formally test hypothesis 3, we ran a repeated-measures ANOVA, with product type and the manipulation of surface mimicry as between-subjects variables, on taste and health beliefs. The results point to a marginally significant three-way interaction effect ($F(1,145) = 3.71$, $p = .056$, Cohen's d = .32). Simple-effect tests indicate that taste beliefs about cherry tomatoes are higher when they are presented as a lollipop compared to when they are in their regular presentation format ($M_{mimicry} = 7.64$, SD = 1.06; $M_{control} = 5.90$, SD = 1.71; $F(1,145) = 21.50$, $p < .001$, Cohen's d = .77). Applying surface mimicry to Brussels sprouts also increased taste beliefs ($M_{mimicry} = 5.15$, SD = 2.07; $M_{control} = 4.42$, SD = 1.47; $F(1,145) = 3.82$, $p = .053$, Cohen's d = .33), albeit to a lesser extent.

Finally, the mimicry and control conditions do not differ in terms of health beliefs when the focal product is tomatoes ($M_{mimicry} = 7.11$, SD = 1.02; $M_{control} = 7.29$, SD = 1.38; $F(1,145) = .41$, $p = .52$, Cohen's d = .11) or Brussels sprouts ($M_{mimicry} = 7.56$, SD = 1.18; $M_{control} = 7.57$, SD = 1.36; $F(1,145) = .00$, $p = .98$, Cohen's d < .01). Hence, in line with the other reported studies and our assumption on the importance of the salience of the attributes (H1c), we find that surface mimicry—when applied to a healthy product mimicking a tasty product—only improves taste beliefs and leaves health beliefs unaffected.

These results provide tentative evidence for the effect of surface mimicry being less pronounced when implemented to influence beliefs that deviate more substantially from those related to the mimicked product. In the web appendix, we present the results of study WA4 in which we measured the effectiveness of mimicking a milkshake for yogurt (small difference in taste beliefs) versus buttermilk (substantial difference in taste beliefs). Surface mimicry increased yogurt consumption but did not significantly affect the consumption of buttermilk. Taste experience, measured after consumption of the target product, was not affected by surface

mimicry in case of a small discrepancy in taste beliefs between the target and mimicked product (i.e., yogurt), but was significantly more negative in case of a large discrepancy between taste beliefs about the target and mimicked product (i.e., buttermilk). These results seem to point to a potential contrast effect when real taste experience is far beyond a priori taste expectations. In addition, this study tested whether mimicry leads respondents to categorize the product in another product category, as recategorization of the target product could be an alternative explanation for the mimicry effect. This was not the case, though. Finally, note that the results of study 4 and the study in WA4 should be interpreted with caution. It is impossible to conclude with certainty that the change in taste beliefs and consumption follows from the magnitude of the gap in taste beliefs. The target products (Brussels sprouts and cherry tomatoes in study 4, and yogurt and buttermilk in study WA4) may differ in several other respects that could contribute to the magnitude of the surface mimicry effect.

GENERAL DISCUSSION

The current article shows that surface mimicry—that is, designing a product to look like another product—can effectively convey property information about the product undergoing the surface mimicry to the consumer. We demonstrate that mimicking a visual property prototypical of a product for application to the design of a target product can alter consumer perceptions of the target product, in that perceptions of the target product may assimilate the mimicked product's alignable, dissimilar, and salient properties. This is because visual exposure to surface mimicry primes a property-mapping mindset—a thinking style that leads consumers to map values of certain properties from one product onto another.

To test its communicative potential, we applied surface mimicry to healthy foods. Specifically, we mimicked the shape, package, or serving mechanism of a tasty food product for a less tasty but healthy food product. The article reports five studies showing that this type of surface mimicry can serve as a subtle taste cue that guides purchase intention and consumption of the healthy product. These five studies included only explicit measures, but study WA5 shows that the surface mimicry effect is also picked up by implicit measures of taste beliefs, attesting to the subtle nature of surface mimicry. Although surface mimicry can be an effective means to guide taste beliefs, a boundary to its effectiveness is highlighted in study 4. When the distance in beliefs to be bridged is large, the result of the property-mapping process might be less credible, which attenuates the potential of a subtle tool like surface mimicry to engender a significant change. In sum, our studies consistently reveal that surface mimicry, if applied strategically, can aid consumers in maintaining a healthy diet by making them believe that the healthy product is both nutritious and tasty.

Theoretical and Practical Contributions

The current research makes several theoretical and practical contributions. First, the observed effects of surface mimicry add to the literature testifying to the potential of visual design to communicate product benefits (Bloch 1995; Creusen and Schoormans 2005). Within the food domain, experimental studies on how visual elements can serve as tools for healthy food promotion are limited (Pires and Agante 2011). In addition, research addressing the impact of visual cues incorporated in product and package design on resulting beliefs about the taste and health of the product is scarce compared to research on the impact of verbal cues (e.g., health

claims; van Rompay, Deterink, and Fenko 2016). The few studies that have explored the impact of visual cues incorporated in product and package design of foods focus mainly on symbolic meanings of shapes varying in angularity and their impact on flavor perceptions, rather than beliefs about taste (Becker et al. 2011; Deroy and Valentin 2011; Spence and Gallace 2011). They state that rounded shapes are typically matched with sweet-tasting foods and beverages, while angular shapes are matched with intense, carbonated, or bitter-tasting items (Deroy and Valentin 2011; Spence and Gallace 2011). The study of surface mimicry extends this stream of research by incorporating a diverse set of dependent variables, including expectations of tastiness, rather than just specific flavor expectations. In so doing, we confirm that these expectations translate into purchase intentions and consumption decisions.

Second, the reported findings lead to theoretical insights that transcend the food domain. Specifically, our identification of surface mimicry as triggering a property-mapping mindset contributes to existing research in this area. Extant research has shown that a property-mapping mindset aids in the marketing of hybrid products and co-branded products (Gibbert and Mazursky 2009; Rajagopal and Burnkrant 2009; Swaminathan et al. 2015), though clear insights on which interventions trigger a property-mapping mindset and which attributes are likely to transfer were lacking. Our findings promote the implementation of surface mimicry when the goal is to subtly change product beliefs. In the food domain this could help not only to ameliorate distaste related to healthy products, as we illustrate in the current work, but also to improve the taste perception, popularity, or normality of cultured meat or insect-based products to overcome food neophobia by presenting them in the shape of popular, familiar, and well-liked meat products. Outside the food domain, surface mimicry can be helpful in transferring an interesting attribute from another product within the same superordinate product category onto the target

product. For example, in the skincare category, sunscreen delivered in a roller package as is typical for deodorants may feed the product belief that the sunscreen also overcomes excessive sweating. Likewise, sunscreen coming in a typical facial care product package may instigate the belief that the sunscreen not only protects against sun damage but also provides skin nurturance. In the chemical household product category, the recently introduced laundry pods (filled with concentrated detergent, fabric softener, and sometimes stain-lifter) may have gained in perceptions of powerfulness and a more complete treatment by mimicking the appearance of dishwasher 'powerball' pods. For more technical products, design mimicry of well-chosen products could feed quality perceptions or perceptions of user-friendliness. As long as the surface reminds consumers of a specific product and this product comes along with a (for the target product) desirable attribute that is alignable, (somewhat) dissimilar, and salient, the marketplace presents several application options. In fact, recent findings suggest that the surface mimicry effect may not be limited to single-product design to alter inferred product benefits; multiple product items can be displayed in store together, forming the shape of another object that possesses a characteristic desirable for the target product on display (Keh, Wang, and Yan 2021).

Third, our research also yields insights that are informative in understanding other, related techniques like anthropomorphism. Specifically, one way to anthropomorphize products is by altering their appearance such that, for example, their shapes resemble human faces (Landwehr, McGill, and Hermann 2011; Maeng and Aggarwal 2018; Wen Wan, Peng Chen, and Jin 2017). Prior research found that the implications of this type of anthropomorphism go beyond consumers' noting the analogy between products and human faces. Perceiving the analogy leads consumers to make product inferences and influences product liking (Aggarwal and McGill

2007). A similar finding has been reported for product designs reminding consumers of human body shapes (De Bondt, Van Kerckhove, and Geuens 2018; Romero and Craig 2017). In sum, anthropomorphic designs can lead people to attribute human qualities and more favorable evaluations to products (Touré-Tillery and McGill 2015). In a way, these findings on anthropomorphism can be considered examples of surface mimicry, with humans as the mimicked objects. Even though we acknowledge that there might be more to the explanation of the effects of anthropomorphism due to the specific nature and complexity of the relationships we entertain with other humans, our findings on surface mimicry might nonetheless be informative for this body of work in that they highlight property mapping as a basic process that could be part of the explanation.

Fourth, by showing that a visual presentation of surface mimicry can trigger a cognitive process, this article also extends literature on process priming (Janiszewski and Wyer 2014). In a review article on priming, Janiszewski and Wyer (2014) explicitly acknowledge the idea that exposure to a visual stimulus could activate a cognitive process, which they labeled content→process priming. Whereas conceptual priming—whereby exposure to a stimulus makes related concepts more accessible—is well-accepted and prevalent in the literature, the possibility that a cognitive process can be activated upon exposure is less established. Our research findings present a rare instance of content→process priming by showing that when consumers encounter surface mimicry, it may not only make concepts associated with the target and mimicked product more accessible, but also prime a property-mapping process. As empirical demonstrations of content→process priming are scarce, our research findings aid in validating theories of process priming.

Moreover, this research offers strategic insights for product designers and marketers. The findings shed light on how surface mimicry can serve as an effective design strategy to communicate property information to consumers at the point-of-purchase. Although several product designers make use of surface mimicry (e.g., Alessi's iconic design products), the present work is the first to empirically demonstrate the effect of this design strategy on product-related beliefs and corresponding consumer behaviors.

As we applied surface mimicry to convey that healthy foods are also tasty, the recommendations to marketers involved in promoting healthy foods are straightforward. Many healthy foods are sold in packages that do not allow for much on-pack communication of product benefits (e.g., produce packaging is often transparent; Bublitz and Peracchio 2015), but with design technology becoming increasingly less expensive and more developed (Spence 2012), surface mimicry can offer an interesting route to a competitive advantage. Mimicking the shape, package, or serving mechanism of a tasty, unhealthy food product may not come across as the most obvious strategy to guide consumer behavior, but evidence from the marketplace already demonstrates that it can increase sales of healthy products, as shown by our example of Bolthouse Farms and its baby carrots in "junk food" snack packs. Similarly, McDonald's introduced the kiwi stick in Italy and sold more than 330,000 units within the first two months of the product's launch (Marchetti 2010). Our studies suggest that the exposure to a picture or an advertisement in which surface mimicry is applied to a product can increase purchase intentions, which widens the implementation possibilities for marketers even further. That is, even if financial or technical constraints limit redesigns of the product, package, or serving mechanism, simply incorporating surface mimicry in marketing campaign material may produce positive outcomes.

In light of the obesity epidemic, the impact of surface mimicry also represents a practically relevant implication for consumers and policy makers. Although consumers in most industrialized countries are becoming increasingly aware of the importance of maintaining a healthy lifestyle, many of them still fail to consume the recommended daily intake of fruits and vegetables (U.S. Departments of Agriculture and Health and Human Services 2010). Because health remains secondary to taste in determining food choices (Krutulyte et al. 2011; Verbeke 2006), it is crucial that the taste beliefs about healthy foods are competitive with the taste expectations about their unhealthy counterparts. By applying surface mimicry, policy makers can reposition healthy foods as healthful indulgences, facilitating the promotion of a healthy shift in eating habits while simultaneously avoiding the pitfalls of traditional normative interventions, such as consumer reactance. That is, many consumers perceive health labels or fat and sugar taxation as threats to their freedom to choose to eat what they want (Wagner, Howland, and Mann 2015). Surface mimicry can be considered a subtle taste cue that evokes less aversive reactions, given that healthy choices are not explicitly forced on consumers. Although in many Western countries healthy eating is regarded as a need (Finkelstein and Fishbach 2010; Rozin et al. 1999), we suggest that the market instead begin positioning healthy options as a want, and surface mimicry may be a particularly suitable tool for this effort. Policy makers then could nudge people into adopting healthy diets, while still preserving their choice autonomy (Roberto, Pomeranz, and Fisher 2014).

Limitations and Further Research Directions

Some limitations to our research should be mentioned. This research approaches the surface mimicry effect only from a short-term perspective. Additional research might assess the consequences of repeated exposures to surface mimicry. On the one hand, habituation to an atypical design might decrease its potential to alter beliefs. When consumers become accustomed to portrayals of surface mimicry, it is likely that they will pay less attention to them or put less effort into making sense of the visual stimuli. For a property-mapping mindset to become activated, it seems crucial that consumers at least come to the understanding that one product is presented in the shape of another product. On the other hand, the taste experience may consolidate over time in the sense that consumers may learn to appreciate the healthy food and thus would no longer need a nudge to choose and consume the food in the absence of surface mimicry. If so, this may compensate for the "wearing out" of the effectiveness of surface mimicry. Longitudinal studies would provide more insight about the effects of surface mimicry after repeated exposures.

In addition, diagnostic experiences with a product might dilute the impact of surface mimicry. We used familiar products in our studies, but we cannot ignore the possibility that prior product experiences might reduce the effectiveness of surface mimicry in influencing product beliefs. Indeed, the limited change in taste beliefs associated with Brussels sprouts goes in this direction. In addition, potential backfire effects if taste expectations are disconfirmed may be a cause for concern, as our fourth study in the web appendix points out. Such pre- and post-product experiences could be addressed explicitly in future research.

Our studies focus mainly on the impact of surface mimicry when a healthy food product is designed to look like a tasty food product. We also identified an interesting, though less desirable, extension in light of the obesity epidemic. That is, a similar mapping of salient

properties appears to take place when an unhealthy food product is designed to mimic a healthy food product, apparently leading to a mapping of the mimicked product's healthiness onto the unhealthy target product. This way, surface mimicry might create the belief that the unhealthy product is not so harmful for one's physical wellbeing, providing consumers a license to indulge. However, the recognition that perceived tastiness rather than perceived healthiness drives most purchase intentions and food consumption (Mai and Hoffmann 2015) gives nuance to this anticipated change in health perceptions. Nevertheless, future research should be mindful of the downsides of surface mimicry as a technique to modify consumers' product beliefs.

In conclusion, we offer insights on how surface mimicry—a frequently applied design intervention that has not yet received academic attention—affects product beliefs and corresponding behavior. Specifically, we show that whereas healthy foods tend to be perceived as bland and tasteless (Raghunathan et al. 2006), presenting them in a shape, package, or serving mechanism of foods that are typically perceived as tasty can successfully shift these taste beliefs and, in turn, increase purchase intentions and consumption of the healthy food options. Given that many consumers struggle to meet the guidelines for the consumption of healthy food such as fruits and vegetables, these findings are highly relevant and provide public policy makers and marketers with a simple tool to stimulate healthier eating patterns.

APPENDICES

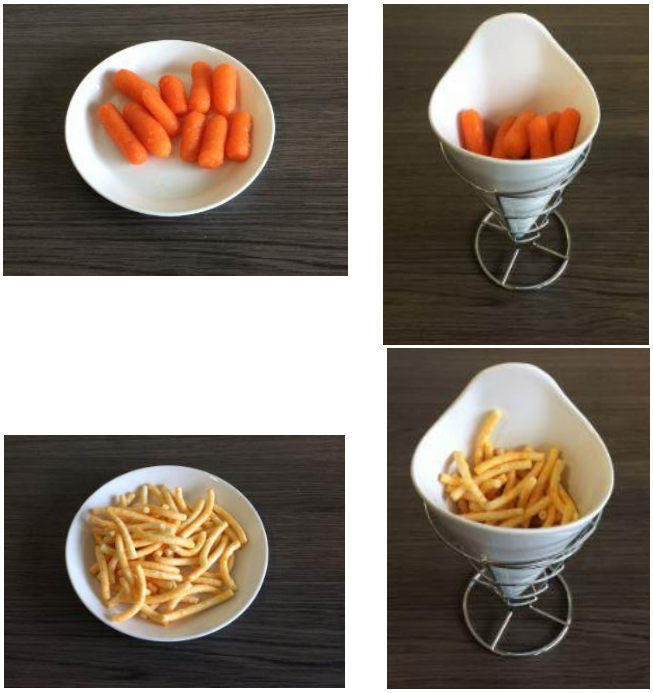
Appendix A. Stimuli

A copy of the stimuli used in the different studies is presented below. The study questionnaires can be retrieved from https://osf.io/ry5sn/?view_only=10f321021e5649b9a25b8762c36ec335

Study 1a. Mock advertisements

Control condition (left) and surface mimicry conditions (right)

Study 1b. Snacks



Control conditions (left) and surface mimicry conditions (right)

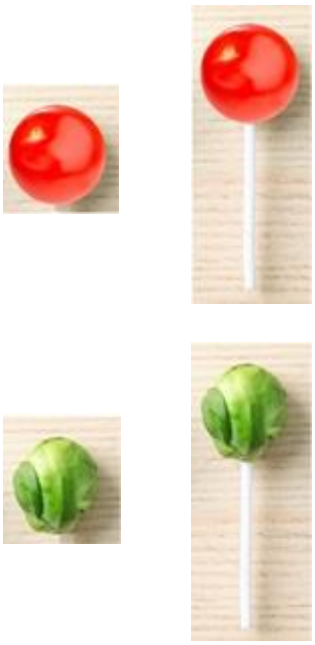
Study 2. Stimuli

Control conditions (left) and surface mimicry conditions (right)

Study 3. Mock advertisements

Control condition (left), semantic priming condition (middle) and surface mimicry condition (right)

Study 4. Stimuli



Control conditions (left) and surface mimicry conditions (right)

Appendix B. Pretest results Studies 1a–4

Below are the results of paired sample t-tests, testing whether the mean salience score of the mimicked product's most salient attribute is significantly more salient than the second (third) most salient attribute. Attribute salience was measured by asking participants to divide 100 points across seven attributes (tastiness, healthiness, convenience, perishability, fillingness, freshness, and readiness to consume). Taste and health beliefs were measured on a two-item and five-item nine-point semantic differential scale. Paired sample t-tests compare the mimicked product and target product's taste and health beliefs. A first batch of 148 Mturk participants (90 men, 58 women; M_{Age} = 33.74, *SD* = 10.62) were asked to rate only a randomly selected subset of 10 products to limit the length of the questionnaire. By consequence, data included in the analyses only encompass ratings that were both completed by the same participant. Attribute salience and beliefs for the products that were used in study 2 (chocolates, cherries, strawberries, and ice cream) were measured in a separate pretest, which was completed by 149 Prolific participants (47 men, 101 women, 1 other; M_{Age} = 30.90, *SD* = 10.13).

Attribute salience

	Mimicked product	Most salient property	*M*	*SD*	Second/third most salient property	*M*	*SD*	Test statistic
Study 1a	popsicle	(un)tastiness	29.87	23.69	(un)healthiness	14.40	12.73	$t(86) = 4.86$, $p < .001$
		(un)tastiness	29.87	23.69	(in)convenience	13.11	9.61	$t(86) = 5.73$, $p < .001$
	apple	(un)tastiness	21.71	17.26	(un)healthiness	21.35	19.17	$t(87) = -.13$, $p > .1$
Study 1b	French fries	(un)tastiness	32.85	24.65	(un)healthiness	16.93	18.22	$t(85) = 4.21$, $p < .001$
Study 2	chocolate	(un)tastiness	47.75	23.88	Readiness to consume	17.43	11.82	$t(148) = 11.85$, $p < .001$
		(un)tastiness	47.75	23.88	(in)convenience	16.97	12.14	$t(148) = 11.89$, $p < .001$
	cherries	(un)healthiness	25.35	19.14	(un)freshness	22.73	16.19	$t(148) = 1.13$, $p = .261$
		(un)healthiness	25.35	19.14	(un)tastiness	19.99	16.53	$t(148) = 2.31$, $p = .022$
Study 3	burger	(un)tastiness	27.60	22.53	(un)healthiness	15.65	15.82	$t(82) = 3.63$, $p < .001$

		(un)tastiness	27.60	22.53	(un)fillingness	13.67	13.33	$t(86) = 4.68$, $p < .001$
Study 4	lollipop	(un)tastiness	31.00	26.15	(un)healthiness	18.29	16.96	$t(84) = 3.41$, $p = .001$
		(un)tastiness	31.00	26.15	(in)convenience	14.16	14.18	$t(84) = 4.79$, $p < .001$

Taste beliefs

	Target Product	*M*	*SD*	Mimicked Product	*M*	*SD*	Test statistic
Study 1a	watermelon	7.14	1.66	popsicle	7.70	1.15	$t(43) = -2.12$, $p = .040$
	watermelon	7.09	1.61	Apple	7.24	1.34	$t(45) = -.53$, $p > .1$
Study 1b	carrots	7.03	1.79	French fries	8.01	1.31	$t(45) = -3.31$, $p = .002$
	Mama Mia Lays chips	7.90	1.12	French fries	7.98	1.20	$t(48) = -.42$, $p > .1$
Study 2	strawberries	7.94	1.46	chocolates	8.25	1.17	$t(148) = -2.75$, $p = .007$
	ice cream	7.97	1.35	cherries	7.28	1.86	$t(148) = 4.38$, $p < .001$

Study 3	vegetable assortment	6.59	1.67	burger	7.70	1.47	$t(47) = -3.36$, $p = .002$
Study 4	cherry tomatoes	6.11	1.62	lollipop	7.58	1.12	$t(49) = -5.89$, $p < .001$
	Brussels sprouts	4.25	2.28	lollipop	7.78	.83	$t(49) = -9.94$, $p < .001$

Health beliefs

	Target Product	*M*	*SD*	Mimicked Product	*M*	*SD*	Test statistic
Study 1a	watermelon	7.63	1.30	popsicle	4.42	2.45	$t(43) = 6.73$, $p < .001$
	watermelon	7.87	1.08	apple	7.94	1.01	$t(45) = -.55$, $p > .1$
Study 1b	carrots	7.61	1.27	French fries	4.18	2.76	$t(45) = 6.65$, $p < .001$
	Mama Mia Lays chips	4.19	2.91	French fries	4.13	2.80	$t(48) = .39$, $p > .1$

Study 2	strawberries	7.57	1.31	chocolates	2.73	1.28	$t(148) = 28.41$, $p < .001$
	ice cream	2.71	1.22	cherries	7.43	1.26	$t(148) = -29.34$, $p < .001$
Study3	vegetable assortment	7.80	1.16	burger	4.60	2.50	$t(47) = 7.20$, $p < .001$
Study 4	cherry tomatoes	7.65	1.13	lollipop	3.99	2.47	$t(49) = 9.05$, $p < .001$
	Brussels sprouts	7.51	1.18	lollipop	4.48	2.61	$t(49) = 6.59$, $p < .001$

Appendix C. Study 3, instructions and noun-noun phrases

Instructions

In part 2 of the task, we are interested in how people interpret the meaning of **new phrases** which they have never heard before.

Imagine you hear somebody talking about something called a "*spear chisel*". Different people might interpret this phrase differently. For example, two possible interpretations for this phrase are "*a long, pointy chisel"* and "*a tool for sharpening spears"*.

On each of the following pages, you will find **a new phrase with two different interpretations** of that phrase, as in the example above. It is your task to judge **which interpretation is more plausible**, following your own intuition. Read the interpretations carefully, but don't agonize over them for too long.

Rate the plausibility of the interpretations by selecting a number:

1 = the interpretation on the **left** is **much more plausible**
2 = the interpretation on the **left** is **more plausible**
3 = both interpretations are **equally plausible**
4 = the interpretation on the **right** is **more plausible**
5 = the interpretation on the **right** is **much more plausible**

Phrase	Property mapping interpretation	Relational linking interpretation
zebra jeep	a white and black striped car	a car used for zebra watching
skyscraper tree	a very tall tree	a tree on the roof of a skyscraper
rocket truck	a very fast truck	a truck used to transport rockets
mourner musician	a musician who plays sad songs	a musician who plays at funerals
kidnapper killer	a kidnapper who is also a murderer	someone who murders kidnappers

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Web Appendix

Products in Disguise:

Communicating Product Benefits with Surface Mimicry

Anneleen Van Kerckhove

Caroline De Bondt

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This document supplements the main text of Van Kerckhove, De Bondt, and Geuens (2022). In WA1, we report a study replicating the effect of surface mimicry on taste beliefs. The added value of this study is that it further corroborates the downstream consequences of this finding. That is, the effect does not only influence taste beliefs, but also food choices. Studies WA2 and WA3 further corroborate the finding that a property mapping process underlies the surface mimicry effect, as advanced in hypothesis 2. Study WA4 then focuses on the application potential of surface mimicry in that it further explores whether the application of surface mimicry to a healthy product with extremely negative taste beliefs can still be effective. Hence, this study aims to corroborate the findings reported in study 4 and, at the same time, observes real food consumption. Study WA5 confirms the shift in taste beliefs associated with products to which surface mimicry is applied via a BIAT (Brief Implicit Association Test). While all reported studies measure taste beliefs in an explicit fashion, this study shows the results converge when implicit measures are used.

STUDY WA1: IMPACT OF SURFACE MIMICRY ON PURCHASE INTENTION AND CHOICE

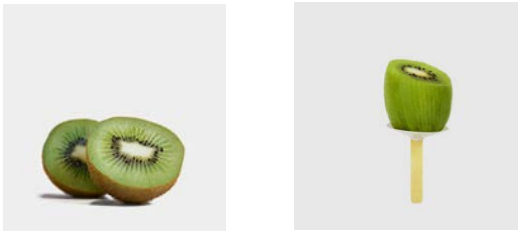
With this study, we aim to replicate that surface mimicry can improve the taste beliefs of a healthy food product without compromising its health beliefs. In addition, this study also expands our findings by demonstrating that the effect of surface mimicry affects more downstream variables like purchase intention and choice of the healthy food product.

Method

A between subjects design study included 120 U.S. members of Amazon Mechanical Turk (79 men, 41 women; M_{Age} = 32.47, SD = 10.61). Each participant viewed four advertisements, in a random order, one of which being an advertisement for Zespri Kiwifruit. This target advertisement displayed either a regular kiwi or a popsicle-shaped kiwi (see figure WA1). Beliefs of the healthiness (α = .85) and tastiness (α = .95) of the products portrayed in the advertisements were measured in the same manner as in other studies reported in the main text (Adams and Geuens 2007). To measure purchase intentions, we used a three-item, seven-point Likert scale (1 = “strongly disagree,” 7 = “strongly agree”; α = .89).

FIGURE WA1

STIMULI DEPICTED IN THE ADVERTISEMENTS IN THE CONTROL (LEFT) AND SURFACE MIMICRY (RIGHT) CONDITION



Next, participants faced an apparently unrelated choice task, in which they had to imagine they were going to the supermarket to purchase five snacks to consume at home or work during the following week. They were offered an assortment of eighteen products: nine healthy and nine unhealthy snacks, including the healthy target product (i.e., kiwifruit) and the unhealthy mimicked product (i.e., a box of Popsicle ice pops and a box of Magnum ice cream bars). In a pretest (n = 89), a kiwi on a stick was shown and participants were asked to write down which food product was being mimicked. The pretest confirmed that most people recognized a popsicle (70.8%). No budget restrictions or price information was provided.

Results and Discussion

That taste beliefs are popsicles' most salient property was confirmed via a pretest ($M_{tastiness}$ = 29.87, SD = 23.69 vs. $M_{\text{healthiness}}$ = 14.40, SD = 12.73; $t(86) = 4.86$, $p < .001$). While the interaction effect between the surface mimicry variable and the within subjects factor capturing taste and health beliefs did not reach statistical significance ($F(1,118) = 2.55$, $p = .11$, Cohen's d = .30), the univariate analyses are in line with expectations. As displayed in table

WA1, the surface mimicry condition yielded significantly better taste beliefs than the control condition ($F(1,118) = 5.26$, $p = .02$, Cohen's d = .42). Again, health beliefs did not differ between conditions ($F(1,118) = .85$, $p > .1$, Cohen's d = .17). The data also support the claim that surface mimicry influences purchase intentions indirectly, through taste perceptions. Relative to participants in the control condition, participants in the surface mimicry condition expressed higher purchase intentions of the kiwi presented in the advertisement, as indicated by an independent samples t-test ($t(118) = -2.47$, $p = .015$). The effect is mediated by taste perceptions ($ab = .19$; 95% confidence interval = .016 to .373) (Hayes 2017).

TABLE WA1

DESCRIPTIVES

	Surface Mimicry		Control	
	M	*SD*	*M*	*SD*
Tastiness [1]	7.84	1.60	7. 17	1.62
Healthiness [1]	7.73	1.37	7. 50	1.31
Purchase intention [2]	5. 68	1.23	5. 06	1.52
Choice	%		%	
Kiwifruit	49.1		23.8	
Popsicles/Magnums	38.6		25.3	
Amount	*M*	*SD*	*M*	*SD*
Healthy snacks	3.33	1.39	3.48	1.30
Unhealthy snacks	1.67	1.39	1.52	1.31

[1] Variables measured on nine-point scales; higher values reflect higher mean ratings.

[2] Variable measured on seven-point scale; higher values reflect greater intentions.

Analyzing participants' snack choices clarified that the surface mimicry condition prompted them to pick kiwifruit more often from the assortment (49.1%) than participants in the control condition did (23.8%, $\chi^2(1) = 8.34$, $p = .004$). We also observe that the total amount of healthy choices did not increase due to surface mimicry ($t(118) = .58$, $p > .1$). Choice of the mimicked product (i.e., popsicles ($\chi^2(1) = 2.43$, $p > .1$) also did not differ significantly across conditions. Surface mimicry thus only fostered choice of the healthy food product that engaged in the mimicry.

The results of this study show that exposure to an advertisement portraying a healthy food product designed to look like a product that is typically perceived as tasty translates into a higher purchase intention and choice of the healthy food product. Thus, surface mimicry may serve as a subtle tastiness cue that can persuade consumers to buy the healthy food product that is undergoing the design intervention.

STUDY WA2: PRIMING OF PROPERTY MAPPING MODERATES THE EFFECT OF SURFACE MIMICRY

The main goal of this study is to corroborate the conclusion of study 3 that surface mimicry initiates a process of property mapping. To achieve this aim, this study adopts a moderation-of-process strategy (Spencer, Zanna, and Fong 2005). In this approach the presumed mediating variable is manipulated to test whether variation in this variable moderates the link between the independent variable and the dependent variable. Consistent with this approach, we propose that a manipulation of property mapping should moderate the surface mimicry effect. The effect of surface mimicry on the transfer of product properties from the mimicked onto the target product is hypothesized to be moderated by an unrelated prime of a property mapping procedure. That is, we propose that priming a property mapping process will instigate a transfer of alignable, dissimilar, and salient properties of the modifier product onto the target product, irrespective of product design (surface mimicry vs. regular design), whereas if property mapping had not been primed in advance, only surface mimicry and not the regular product design will instigate a transfer of alignable, dissimilar, and salient properties.

Method

A total of 251 members of Amazon Mechanical Turk (129 men, 122 women; M_{Age} = 39.91, *SD* = 13.58) were randomly assigned to one of four conditions resulting from a two (processing style: relational linking versus property mapping) by two (presentation mode:

semantic prime versus surface mimicry) between subjects design. Property mapping or relational linking were primed by a task adopted from Wisniewski and Love (1998), which involved presenting participants with a set of conceptual combinations. In the relational linking condition, participants provided interpretations for ten concepts that primarily had a relational link (e.g., clothing truck, holiday tablecloth, kidney surgeon). In the property mapping condition, participants interpreted ten concepts that primarily had a property mapping relationship (e.g., bus truck, zebra tablecloth, butcher surgeon). A complete list of concepts used in the priming procedure is provided in table WA2.

TABLE WA2

PROPERTY MAPPING AND RELATIONAL LINKING PRIMES

Property mapping prime	Relational linking prime
bus truck	clothing truck
skunk beggar	dollar bill beggar
motorcycle bicycle	grocery bicycle
razor insult	girlfriend insult
umbrella tree	fruit tree
zebra tablecloth	holiday tablecloth
sleeping pill sermon	adultery sermon
bullet sprinter	Adidas sprinter
roller coaster dinner	birthday dinner
butcher surgeon	kidney surgeon

Next, participants were either exposed to an ad portraying the target and modifier product side-by-side or an ad applying surface mimicry. Both ads are identical to those that were used in the semantic prime and surface mimicry conditions in study 3. Hence, in what served as the control condition in this study (i.e., the semantic prime condition), the advertisement portrayed tomato, lettuce and shredded carrots placed next to a burger, while in the surface mimicry condition those vegetables were assembled to look like a burger (see Appendix A). Next, participants indicated their perception of the advertised vegetables' tastiness ($\alpha = .88$) and healthiness ($\alpha = .89$), respectively on a two-item and a five-item nine-point semantic differential scale (Adams and Geuens 2007), and purchase intention of the vegetables was measured by means of a three-item, seven-point Likert scale ($\alpha = .87$). Finally, participants reported the extent to which the depicted ads had reminded them of a burger by means of a seven-point Likert scale. Given that the semantic prime ad contains the image of a burger, and that in the surface mimicry ad the vegetables are piled up to look like a burger, we anticipate that participants in both conditions will report to be reminded of burgers.

Results and Discussion

First, given that the same stimuli as in study 3 were used, the required attribute saliences also hold in this study, based on the results derived from a pretest in Appendix B. Following this, we found that, overall, the ads were reminiscent of a burger ($M = 4.91$, $SD = 1.38$; $t(250) = 10.47$, $p < .001$), and both ads reminded participants of a burger to the same extent ($M_{\text{mimicry}} = 4.94$, $SD = 1.36$, $M_{\text{semantic prime}} = 4.88$, $SD = 1.40$; $t(249) = -.35$, $p > .1$), which is in line with our

expectations considering that both conditions were designed to activate the concept node of a burger. Next, a manipulation check was performed on the open-ended responses to the priming task. The responses were coded following a coding procedure adapted from Swaminathan, Gürhan-Canli, Kubat, and Hayran (2015). An interpretation of a conceptual combination was scored as a relational linking interpretation if it referred to the relation for which two concepts were matched (e.g., holiday tablecloth is described as a tablecloth to be used on holidays). An interpretation was scored as a property mapping interpretation if it attributed a property of one concept onto the other (e.g., zebra tablecloth is described as a tablecloth with zebra stripes). If an interpretation did not fit into one of these two categories, for example when the interpretation referred to a relation or transferred a property other than the one for which two concepts were matched, then the interpretation was labeled as 'other'. Two research assistants, who were blind to the goal of the study classified each interpretation into one of three categories. The agreement between research assistants was high (90%). In case of disagreement this was resolved by discussion. Participants in the relational linking condition reported significantly more relational interpretations than those in the property mapping condition ($M_{\text{relational linking}} = 6.26$, $SD = 3.86$ vs. $M_{\text{property mapping}} = .18$, $SD = .48$; $t(249) = 17.60$, $p < .001$). In addition, the interpretations of those in the property mapping condition were significantly more frequently classified as property mapping classifications ($M_{\text{relational linking}} = .04$, $SD = .20$ vs. $M_{\text{property mapping}} = 5.50$, $SD = 3.36$; $t(249) = -18.03$, $p < .001$). This pattern suggests that the processing style priming task was successful.

First, the three-way interaction between the between-subjects factors (i.e., presentation mode and primed processing style) and the within-subjects measurement of product beliefs (i.e., taste and health beliefs) is marginally significant ($F(1,247) = 3.28$, $p = .071$, Cohen's d = .23).

Univariate analyses reveal that after priming relational linking, surface mimicry still resulted in a transfer of taste beliefs from the modifier onto the target product. In the relational linking condition, the advertised vegetables looked tastier when they looked like a burger (M_{mimicry} = 6.87, SD = 1.92) compared to when they were placed next to a burger ($M_{\text{semantic prime}}$ = 5.65, SD = 2.08; $F(1,247) = 10.91$, $p = .001$, Cohen's d = .42). This observation is straightforward when accepting the surface mimicry in itself serves as a property mapping prime. When a property mapping processing style was established by an independent prime, we find that taste beliefs are transferred from the burger onto the vegetables, irrespective of the presentation format. That is, both for the surface mimicry (M_{mimicry} = 6.63, SD = 2.068) and side-by-side presentation format ($M_{\text{semantic prime}}$ = 6.52, SD = 2.15), taste beliefs are equally high ($F(1,247) = .097$, $p > .1$, Cohen's d = .04). Health beliefs, in turn, do not differ between the control condition and surface mimicry condition, neither after a relational prime (M_{mimicry} = 7.71, SD = 1.34 vs. $M_{\text{semantic prime}}$ = 7.44, SD = 1.34; $F(1,247) = 1.09$, $p > .1$), nor following a property mapping prime (M_{mimicry} = 7.63, SD = 1.38 vs. $M_{\text{semantic prime}}$ = 7.62, SD = 1.38; $F(1,247) = .003$, $p > .1$).

In addition, the reported purchase intentions exhibit significant differences. The observed pattern mimics the pattern of reported taste beliefs, in that a significant interaction effect is observed ($F(1,247) = 4.17$, $p = .042$). The purchase intentions are high in the surface mimicry condition, irrespective of a relational linking (M = 5.19, SD = 1.33) or property mapping (M = 5.07, SD = 1.56) strategy had been primed ($F(1,247) = .199$, $p > .1$). Purchase intentions are significantly different in the side-by-side condition, though ($F(1,247) = 6.019$, $p = .015$), in that they are lower in the relational linking (M = 4.39, SD = 1.38) than property mapping (M = 5.03, SD = 1.61) condition. A bootstrap moderated mediation analysis suggests that when taste beliefs are heightened, due to the application of surface mimicry or an independent property mapping

prime, this translates into higher purchase intentions. Hence, the combined influence of the primed cognitive processing style and the presentation format on purchase intentions is mediated by taste beliefs (*ab* = -.59, 95% confidence interval = -1.142 to -.049), but not health beliefs (*ab* = -.02, 95% confidence interval = -.169 to -.028).

Most importantly, the results of this study provide additional evidence for property mapping being the process underlying the observed transfer of properties from the modifier product onto the target product when surface mimicry is applied, because an independent prime of a property mapping procedure moderated the effect.

STUDY WA3: THE ACTIVATION OF PROPERTY MAPPING, NOT RELATIONAL LINKING, MIRRORS THE EFFECT OF SURFACE MIMICRY

The main goal of this study is to further corroborate the conclusion of study 3 and study WA2 by providing more evidence for property mapping as the underlying process. To this end, we take the taste beliefs that are obtained in a surface mimicry condition and compare these to the resulting taste beliefs in conditions that were explicitly instructed to adopt either property mapping or relational linking when processing the surface mimicry ad. A similar approach was adopted by Pham (1998) who argued that one approach to inferring the process that is spontaneously activated upon exposure to a stimulus is to include experimental conditions where explicit processing instructions are given to participants. If ratings are similar in two groups, one with explicit instructions and one without these instructions, then conclusions can be drawn on the process that was followed by the uninstructed subjects.

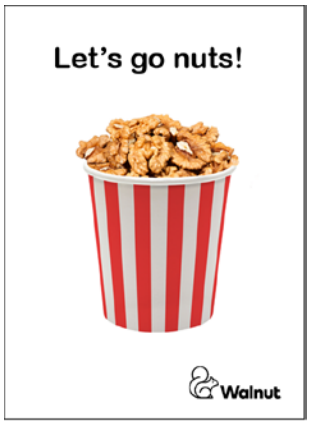
If, as hypothesized, consumers spontaneously engage in property mapping due to processing a surface mimicry ad, the taste beliefs of the participants in the surface mimicry condition should be equally high, and elevated, like the taste beliefs of the participants that were instructed to engage in property mapping. The taste beliefs of participants that were instructed to adopt relational linking, on the other hand, are expected to be significantly lower.

Method

A total of 172 members of Amazon Mechanical Turk (90 men, 82 women; M_{Age} = 41.48, *SD* = 11.35) were randomly assigned to one of three between subjects conditions. In one condition, participants were merely exposed to an ad including a surface mimicry manipulation. That is, walnuts were depicted in a bucket that is typically used for popcorn (see figure WA2 for the mock ad). In the other two conditions, participants were exposed to the same ad, but only after having been instructed on how to process the information in the ad.

FIGURE WA2

MOCK ADVERTISEMENT



Basically, participants were explained what a property mapping or a relational linking interpretation was and they were asked to adopt such a strategy when processing the mock ad (see table WA3 for the exact wording of the instructions). To this end, we made sure that both strategies (property mapping and relational linking) resulted in plausible and sensible interpretations. Thus, while a property mapping processing strategy could yield the conclusion that walnuts are as tasty as popcorn, the relational linking interpretation would lead participants to conclude that walnuts are suitable for snacking in the movie theatre.

TABLE WA3

PROPERTY MAPPING AND RELATIONAL LINKING INSTRUCTIONS

Relational Linking Instructions

Commercial messages often show a product together with other ad elements such as symbols, icons, specific packages, etc. that are usually used for another purpose. The reason companies do this is to indicate that there is a relation between the product and the other element shown in the ad. As such, it could give an idea about when or the situation in which the product can be used or by what type of persons the product could be used.

You are about to see a mock advertisement for a new brand of nuts. Please focus on the product and the accompanying package and think about the relation between the two.

Property Mapping Instructions

Commercial messages often show a product together with other ad elements such as symbols, icons, specific packages, etc. that are usually used for another purpose. The reason companies do this is to indicate that the product shares a characteristic with the other element shown in the ad. For example, a boat in the shape of a whale could indicate that the boat is large like a whale.

You are about to see a mock advertisement for a new brand of nuts. Please focus on the product and the accompanying package and think about product characteristics that the product could share with the product typically served in this package.

Next, participants indicated their perception of the advertised walnuts' tastiness ($\alpha = .89$) and healthiness ($\alpha = .91$), respectively on a two-item and a five-item nine-point semantic differential scale (Adams and Geuens 2007), and purchase intention of the walnuts was measured by means of a three-item, seven-point Likert scale as in study 3 ($\alpha = .86$).

Results and Discussion

First, attribute salience and taste and health beliefs for the products that were used in this study (walnuts and popcorn) were measured in a pretest (similar to the pretest in appendix B but pertaining to different products), which was completed by 60 Mturk participants (34 men, 26 women; M_{Age} = 36.75, *SD* = 10.36). The pretest results confirm that taste is indeed the most salient popcorn attribute and popcorn and walnuts indeed have significantly different taste perceptions (see Table WA4).

TABLE WA4

PRETEST RESULTS

Attribute salience					
Mimicked product	Most salient property	*M(SD)*	Second/third most salient property	*M(SD)*	Test statistic
popcorn	(un)tastiness	28.37(21.94)	(un)convenience	15.03(16.21)	*t(59) = 3.53, p = .001*
	(un)tastiness	28.37(21.94)	(un)healthiness	14.25(14.75)	*t(59) = 3.78, p < .001*
Taste & health beliefs					
Target Product		*M(SD)*	Mimicked Product	*M(SD)*	Test statistic
walnuts		6.57(2.15)	popcorn	7.45(1.49)	*t(59)=-2.83, p=.006*
walnuts		6.99(1.26)	popcorn	5.10(2.08)	*t(59)=6.80, p < .001*

A repeated measures ANOVA reveals that the interaction between the conditions and the taste and health beliefs does not reach statistical significance ($F(2,169) = 2.22$, $p = .11$, Cohen's d = .33). This is not all that surprising, considering that we anticipate the surface mimicry and property mapping condition to assimilate in terms of taste beliefs and that the health beliefs in all three conditions are expected to align. The univariate analyses of taste and health beliefs, however, do align with expectations. Taste beliefs significantly differ across conditions ($M_{relational\_linking} = 6.18$, $SD = 2.08$; $M_{property\_mapping} = 7.06$, $SD = 1.44$; $M_{mimicry} = 6.79$, $SD = 1.61$; $F(2,169) = 3.95$, $p = .021$, Cohen's d = .43). In line with our expectations, a contrast test indicates that after instructing a relational linking process, the taste perceptions are lower compared to the taste perceptions obtained across the property mapping and the surface mimicry condition ($t(169) = 2.68$, $p = .008$). Another contrast test verified that the taste perceptions in the property mapping and surface mimicry condition are not significantly different from each other ($t(169) = -.85$, $p > .1$). Finally, we find that health beliefs are not significantly different across conditions ($M_{relational\_linking} = 5.70$, $SD = 1.78$; $M_{property\_mapping} = 6.09$, $SD = 1.73$; $M_{mimicry} = 6.38$, $SD = 1.64$; $F(2,169) = 2.28$, $p > .1$, Cohen's d = .33).

Note that a direct effect of the conditions on purchase intentions is absent in this study ($M_{relational\_linking} = 4.41$, $SD = 1.47$; $M_{property\_mapping} = 4.84$, $SD = 1.61$; $M_{mimicry} = 4.84$, $SD = 1.68$; $F(2,169) = 1.40$, $p > .10$). Nevertheless, a bootstrap parallel mediation analysis, where a dummy contrasting the relational linking condition with the property mapping and baseline mimicry condition serves as the independent variable, does suggest that the higher taste beliefs in the latter two conditions translate into higher purchase intentions ($ab = .49$, 95% confidence interval = .13 to .93). Health beliefs do not mediate this effect ($ab = .03$, 95% confidence interval = -.02 to .14).

In sum, the pattern of reported results is in line with our expectations. The taste beliefs in the property mapping condition and the baseline surface mimicry condition tend to converge, whereas they diverge from the ratings obtained in the relational linking condition. This observation evidences that the processing style that is spontaneously evoked by a surface mimicry manipulation at least resembles, and most likely is, a property mapping process. Thus, this study provides additional evidence in support of hypothesis 2.

STUDY WA4: DOES THE SURFACE MIMICRY EFFECT HOLD FOR SUBSTANTIALLY DIFFERENT BELIEFS?

Study WA4 adds to the set of studies in several ways. First, like study 1B, this study replicates the surface mimicry effect using a behavioral measure rather than perceptions. Second, in replicating the surface mimicry effect, this study also considers an alternative recategorization account that contributes to the surface mimicry effect. That is, it seems plausible that target product beliefs are more aligned with the mimicked product's beliefs when consumers no longer perceive the target product as being part of its original category, but instead consider it as an exemplar of the mimicked product's category. Third, like study 4, the current study considers the distance between product beliefs of the target product and the mimicked product as a moderator of the surface mimicry effect (hypothesis 3). While study 4 focused on the moderating role of distance in beliefs positing that large discrepancies between taste beliefs are more difficult to overcome, a related account relies on the malleability of the target product's beliefs (e.g., the plausibility that the target product could be tasty) rather than the distance between the target and mimicked product. These two views are discussed in more detail in this study. Finally, this study aims to investigate the scope of the mimicry effect in terms of affected product beliefs. That is, to further support our prediction that the most salient attribute is the most likely to transfer, perceptions of a range of attributes, other than health and taste, are measured so to ascertain that these do not change under the influence of surface mimicry. In sum, the goals of the study were ambitious. However, due to the Covid-19 outbreak, the data collection was haled prematurely and only 96 participants had provided data that could be used for analyses. Nevertheless, the

results are presented and discussed in this web appendix, but without being able to draw firm conclusions.

Method

Ninety-six students (53 men, 43 women; M_{Age} = 20.42, SD = .68) participated in this lab study in return for partial fulfillment of course requirements. The study comprises four between subjects conditions, resulting from the manipulation of two variables, namely the product and the presentation format. That is, participants either received a glass of buttermilk, or they received a glass of yogurt drink. Both products can be deemed healthy, but the former is generally believed to be less tasty than the latter (see table WA5 for the pretest results). The presentation format of both products was altered in the same way so that both were poured into a milkshake glass in the surface mimicry condition, while they were served in a regular glass in the control condition (see figure WA3 for a picture of the stimuli). Hence, buttermilk served as the product of which the taste beliefs would deviate quite substantially from those of the mimicked product (i.e., milkshake).

FIGURE WA3

PICTURE OF THE STIMULI USED IN STUDY WA4

While both buttermilk and yogurt were served during one session, the presentation format manipulation was alternated between sessions. Upon entering the lab, participants were assigned a seat in one of six available cubicles. The participants first reported their current hunger and thirst levels on 0-100 slider scales, they conveyed whether they believed buttermilk and yogurt drink to be attractive, tasty drinks, and they indicated the extent to which they endorsed the idea that buttermilk and yogurt drink could possibly taste good, all on single item 7-point Likert scales. Next, the participants watched a movie fragment during which they could consume the drink that was presented on their desk. After consumption the lab session supervisor recollected the glasses (and weighed them out of participants' sight) and the participants completed the next part of the questionnaire, which gauged taste and health beliefs respectively with a 2-item (α = .99) and a 5-item (α = .78) 9-points semantic differential scale. Next to taste and health beliefs, this study also measured several other product beliefs. More specifically, we measured (via a

similar 9-point bipolar scale as used for taste and health beliefs) the extent to which the participants believed the product was (un)fresh, (not) easily expires, difficult/easy to consume, (not) ready to use, (not) filling, (hard) easy to digest, (not) cool, (not) refreshing, and (not) sweet. A final question verified the product category to which participants would assign the target drink. Participants could simply select one of five predefined options ("milk", "buttermilk", "yogurt", "yogurt drink", or "milkshake") or they could select and further specify the "other:___" option.

Results and Discussion

First, attribute salience and taste and health beliefs for the products that were used in this study (buttermilk, yogurt drink, and milkshake) were measured in a pretest, which was completed by 62 participants of the university's consumer panel (17 men, 45 women; M_{Age} = 39.42, *SD* = 16.38). The pretest results confirm that taste is indeed the most salient milkshake attribute and milkshake and yogurt drink, as well as milkshake and buttermilk, indeed have significantly different taste perceptions. Moreover, the results of this pretest show that buttermilk (*M* = 3.85, *SD* = 2.83) is believed to be less tasty than yogurt drink (*M* = 6.65, *SD* = 2.17; $t(61) = -6.56$, $p < .001$), and the gap between the taste perceptions of a milkshake and buttermilk (*M* = 3.43, *SD* = 3.65) is significantly larger than the gap between the taste perceptions of a milkshake and yogurt drink (*M* = .62, *SD* = 2.29; $t(61) = 6.56$, $p < .001$) (see also table WA5).

TABLE WA5

PRETEST RESULTS

Attribute salience					
Mimicked product	Most salient property	*M(SD)*	2nd/3rd most salient property	*M(SD)*	Test statistic
milkshake	(un)tastiness	33.40(21.32)	Sweetness	18.31(18.33)	$t(61) = 3.45$, $p = .001$
	(un)tastiness	33.40(21.32)	Coolness	9.34(12.22)	$t(61) = 7.67$, $p < .001$
Taste & health beliefs					
Target Product		*M(SD)*	Mimicked Product	*M(SD)*	Test statistic
Taste	buttermilk	3.85(2.83)	milkshake	7.27(2.14)	$t(61) = -7.4$, $p < .001$
	yogurt drink	6.65(2.17)	milkshake	7.27(2.14)	$t(61) = -2.13$, $p = .037$
Health	buttermilk	5.82(1.33)	milkshake	3.36(1.59)	$t(61) = 10.86$, $p < .001$
	yogurt drink	4.60(1.82)	milkshake	3.36(1.59)	$t(61) = 5.67$, $p < .001$

The results of the main study are largely in line with our expectations, as there is a significant interaction effect of the presentation format and product type on consumption quantity ($F(1,91) = 6.63$, $p = .012$). When further probing the interaction effect on consumption, we find that consumption of the yogurt drink is significantly higher when presented in a milkshake glass ($M = 161.83$, $SD = 52.30$) versus a regular glass ($M = 109.47$, $SD = 57.98$; $F(1,91) = 19.55$, $p < .001$), whereas there is no significant increase in consumption of the buttermilk ($M_{control} = 7.15$, $SD = 9.16$ vs. $M_{mimicry} = 16.58$, $SD = 19.43$; $F(1,91) = .65$, $p = .423$).

Moreover, the taste and health beliefs are differentially affected by the surface mimicry manipulation for both products, as the three-way interaction is significant ($F(1,92) = 7.10$, $p = .009$, Cohen's d = .56). The simple effects analyses with taste perceptions as a dependent variable point to a slightly different pattern as the effect of surface mimicry, when applied to yogurt drink, is not significant ($M_{control} = 7.60$, $SD = 1.00$ vs. $M_{mimicry} = 7.85$, $SD = 1.03$; $F(1,91) = .50$, $p = .480$), whereas the effect is significantly negative when applied to buttermilk ($F(1,92) = 10.57$, $p = .002$). The latter, however, may be the result of a contrast effect. That is, taste beliefs were measured after consumption. It seems likely that especially in the condition where the buttermilk was poured into a milkshake glass participants' expectations of great taste were disconfirmed which may have resulted in even more negative taste beliefs being reported in this condition ($M = 1.64$, $SD = .87$) compared to the condition where the buttermilk was presented in a regular glass ($M = 2.77$, $SD = 1.80$). The health beliefs of yogurt drink are comparable when poured into a regular and in a milkshake glass ($F(1,92) = .55$, $p > .1$). Similarly, health beliefs of buttermilk are unaffected by the glass in which it is served ($F(1,92) = .20$, $p > .1$).

For all other product beliefs, besides taste beliefs, we found that surface mimicry did not affect any of them as no main effect of surface mimicry, nor an interaction effect emerged (see table WA6). This finding further supports our proposition that the most salient attribute is most likely to transfer.

TABLE WA6

SURFACE MIMICRY EFFECT ON RANGE OF PRODUCT BELIEFS

Product beliefs	*M*(*SD*) Salience (pretest data)	*F*(main effect mimicry	*p*	*F*(interaction effect mimicry x product)	*p*
Tastiness	33.40(21.32)	3.242	.075	7.857	.006
Healthiness	4.18(8.04)	.042	.838	.706	.403
Freshness	6.35(8.97)	.001	.981	.092	.762
Shelf life	1.97(3.80)	1.158	.285	.407	.525
Convenience	4.87(6.73)	.140	.709	.026	.872
Readiness to use	2.68(5.07)	.007	.934	2.524	.116
Fillingness	8.95(14.95)	.219	.641	.450	.504
Digestibility	1.37(2.80)	.129	.720	2.501	.117
Coolness	9.34(12.22)	.723	.398	.000	.989
Refreshing	8.58(8.36)	.122	.728	.653	.421
Sweetness	18.31(18.33)	.038	.846	1.397	.240

To rule out recategorization as an alternative account for our findings, we also measured in which category the participants would classify the product (milk, buttermilk, yogurt, yogurt drink, milkshake, other). The mimicry manipulation did not affect participants' categorization. In the yogurt drink conditions, 95.7% (92.0%) categorized the product as yogurt drink when the product was served in a milkshake (regular) glass ($X^2(1) = .273$, $p = 1.00$). In the buttermilk conditions, 73.1% (72.7%) categorized the product as buttermilk when the product was served in

a milkshake (regular) glass ($X^2(4) = 2.944$, $p = .567$). Three participants categorized the yogurt drink as milkshake (of which only one in the mimicry condition), whereas none of the participants categorized the buttermilk as milkshake. On the basis of these results, we can conclude that recategorization does not explain the mimicry effect.

A final goal of this study was to dig deeper into the moderating role of distance in beliefs versus plausibility. That is, we proposed that the surface mimicry effect attenuates in case of large discrepancies between (taste) beliefs because these large gaps are more difficult to overcome. When the mimicked product's beliefs fall outside the target product's latitude of acceptance, due to a substantial deviation, then the mimicry effect should attenuate. However, we recognize that a large discrepancy between beliefs may not be the only reason why values could fall outside the latitude of acceptance. For example, when the target product's negative taste beliefs are held firmly, it is unlikely that one can easily imagine the target product as being tasty (i.e., the plausibility of considering the target product as tasty is low). In this case, the mimicked product's taste value may also fall outside the latitude of acceptance and inhibit a surface mimicry effect—not so much because of the large discrepancy in beliefs, but because of the sturdiness with which a belief is held, which yields a narrow latitude of acceptance around it. While both explanations are not identical, they are closely related, as we can expect that when consumers hold more extreme beliefs about a target, these beliefs are likely to be held with more certainty (similar to attitude extremity and attitude certainty; both are determinants of attitude strength and in rare cases consumers can hold extreme attitudes with uncertainty (Litt and Tormala 2010), but this is a unique situation and usually extreme attitudes are held with more certainty (Tormala 2016)). Because extreme target product beliefs tend to deviate more from the mimicked product's beliefs, the belief-gap will be substantial. The distance in taste beliefs

between buttermilk and milkshake (M = 3.60, SD = 1.85) is indeed more pronounced than the one between drink yogurt and milkshake (M = 1.42, SD = 1.29; $t(94) = 6.72$, $p < .001$). At the same time, more extreme beliefs may be held with greater certainty, resulting in lower perceived malleability of beliefs. In this study we measured the participants' perceived plausibility of the target product having a good taste and found that drink yogurt and buttermilk indeed differ in terms of the plausibility that the drink could be tasty ($M_{\text{drinkyogurt}}$ = 5.48, SD = 1.15 vs. $M_{\text{buttermilk}}$ = 2.60, SD = 1.30; $t(94) = 11.48$, $p < .001$). Most importantly, and in line with expectations, we found that distance and plausibility are highly correlated (r = -.72, $p < .001$), which makes it impossible to empirically distinguish their role in the surface mimicry effect in this study. However, as both variables are likely to be highly correlated in reality as well, it seems less of an issue to try and disentangle them; they will only diverge in rare cases.

STUDY WA5: IMPACT OF SURFACE MIMICRY ON IMPLICIT TASTE ASSOCIATIONS

With this study, we aim to provide more robust evidence for the claim that surface mimicry improves consumers' existing taste beliefs of the healthy food product engaging in the mimicry. In order to exclude that participants would respond in a socially desirable way, we opted not to select a self-report measure of taste beliefs. Instead, we set up a Brief Implicit Association Test (BIAT) (Sriram and Greenwald 2009), a computerized categorization task that uses response latencies to indicate the strength of the association between a target concept (e.g., healthy food) and an evaluative property (e.g., tastiness). With this test, we examine whether the strength of implicitly held taste associations of healthy food products depends on the visual presentation of these healthy food products (i.e., regular healthy foods versus healthy foods mimicking tasty foods). The BIAT also enables us to verify taste associations for four different healthy products, to help overcome the problem of idiosyncrasy. This test closely resembles a standard Implicit Association Test (IAT); it uses the same target concepts and evaluative properties, and it has similar stimulus-response mappings. However, unlike the standard IAT, the BIAT focuses on only one target concept and one evaluative property in each block (Sriram and Greenwald 2009).

Method

The BIAT was completed by 109 students for partial course fulfillment, in the consumer laboratory of a Western European university (45 men, 64 women; M_{Age} = 20.72, SD = 2.16). All

participants were seated in isolated cubicles in front of desktop computers with azerty keyboards. The BIAT featured ‘healthy food’ and ‘unhealthy food’ as the target concepts and ‘tasty’ versus ‘not tasty’ as the evaluative properties. All participants completed six categorization blocks, two of which were practice blocks that contained 12 trials in order to familiarize the participants with the task. Each of the four remaining blocks comprised 20 trials that required participants to decide whether a focal stimulus, which appeared in the middle of the screen, did (press I) or did not (press E) belong to one of two focal categories. Participants were instructed to respond as fast as possible to each stimulus while avoiding mistakes.

In each block, two focal categories were presented on top of the screen; one target concept (i.e., ‘unhealthy food’ or ‘healthy food’) paired with one positive evaluative property (i.e., ‘tasty’). As is customary in a BIAT, only one evaluative property appeared consistently throughout the different blocks, while the other one remained non-focal (i.e., ‘not tasty’). The focal property is then interchangeably paired with the unhealthy and healthy food categories. In the test phase, participants completed two times the compatible categorization block (i.e., ‘unhealthy food’ paired with ‘tasty’) and two times the incompatible categorization block (i.e., ‘healthy food’ paired with ‘tasty’). The presentation order of the categorization blocks alternated between participants.

The focal stimuli appearing in the center of the screen consisted of four pictures of healthy food products, four pictures of unhealthy food products, four words related to good taste, and four words related to lack of good taste (see figure WA4). To enable us to check whether the respondents associated healthy food products more strongly with tastiness when surface mimicry is applied, we created two versions of the BIAT. In one version, regular healthy food products appeared, while in the other version, the healthy food products were designed to mimic a tasty

food product. The assignment of participants to the regular or the surface mimicry version of the BIAT was randomly determined. After participants completed the BIAT, they provided socio-demographic data.

FIGURE WA4

INSTRUCTION SCREENS FOR THE BIAT BLOCKS

{UNHEALTHY FOOD}

OR

{TASTY}

Delicious Palatable Appetizing Enjoyable

Hit the I key if you can categorize the word as TASTY or the picture as UNHEALTHY FOOD.

The exemplars of the words and pictures are shown above.

Hit the E key if another word or picture appears that doesn't belong to one of the categories. Do this as fast as possible without making mistakes.

Hit the space bar to start.

Compatible {*unhealthy food* + *tasty*} BIAT block–control and experimental condition

{HEALTHY FOOD}

OR

{TASTY}

Delicious Palatable Appetizing Enjoyable

Hit the I key if you can categorize the word as TASTY or the picture as HEALTHY FOOD. The exemplars of the words and pictures are shown above.

Hit the E key if another word or picture appears that doesn't belong to one of the categories. Do this as fast as possible without making mistakes.

Hit the space bar to start.

Incompatible {*healthy food* + *tasty*} BIAT block–control condition

{HEALTHY FOOD}




OR

{TASTY}

Delicious Palatable Appetizing Enjoyable

Hit the I key if you can categorize the word as TASTY or the picture as HEALTHY FOOD. The exemplars of the words and pictures are shown above.

Hit the E key if another word or picture appears that doesn't belong to one of the categories. Do this as fast as possible without making mistakes.

Hit the space bar to start.

Incompatible {*healthy food* + *tasty*} BIAT block–experimental condition

Results and Discussion

The characterizing nature of taste beliefs for the mimicked products was established via a pretest. For all four mimicked products, respectively burgers ($M_{tastiness}$ = 27.60 SD = 22.53 vs. $M_{\text{healthiness}}$ = 13.67, SD = 13.33; $t(82) = 4.68$, $p < .001$), popsicles ($M_{tastiness}$ = 29.87, SD = 23.69 vs. $M_{\text{healthiness}}$ = 14.40, SD = 12.73; $t(86) = 4.86$, $p < .001$), French fries ($M_{tastiness}$ = 32.85, SD = 24.65 vs. $M_{\text{healthiness}}$ = 16.93, SD = 18.23; $t(85) = 4.21$, $p < .001$), and cake ($M_{tastiness}$ = 33.88, SD = 24.72 vs. $M_{\text{healthiness}}$ = 17.19, SD = 18.00; $t(84) = 4.57$, $p < .001$), it is the case that their tastiness is significantly more characteristic than their second most salient attribute, (un)healthiness.

We engaged in data cleaning prior to analyzing the data, using one trial-level and one participant-level criterion (Greenwald, Nosek, and Banaji 2003). First, all trials with response times longer than 10,000 milliseconds were dropped, and no lower tail treatment was performed. This resulted in three trials being dropped. Second, four participants who responded incorrectly to more than 30% of the trials in the test blocks were discarded entirely, as their error rates suggest they might have misunderstood the task. The average error rate for the remaining sample (N = 105 (43 men); M_{Age} = 20.70, SD = 2.13) was 8.6% (SD = .07, range 0–30%).

To test if the implicit association between healthy food products and tastiness is stronger when surface mimicry is applied to healthy food products, relative to no surface mimicry, we first computed D-measures as the difference between the mean latencies of all the trials of the compatible test blocks and all the trials of the incompatible test blocks, divided by the standard deviation of the latencies of the trials in these two blocks (Greenwald et al. 2003). The D-values range between -2 and +2; lower values imply a stronger association between healthy food and tastiness. The D-values were lower in the surface mimicry condition (D_{mimicry} = .39, SD = .45) than in the control condition (D_{control} = .60, SD = .46; $t(103) = 2.37$, $p = .020$), indicating that

participants implicitly associated healthy foods more strongly with tastiness when surface mimicry was applied.

The results of this study acknowledge that consumers draw on cues of a healthy product's design to form perceptions of its tastiness. Our study showed a significantly stronger association between healthy foods and tastiness due to the application of surface mimicry. Thus, surface mimicry likely conveys the message that healthy food is appetizing to consumers.

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