IS ALL THAT GLITTERS GOLD?

THE EFFECT OF PRODUCT GLOSSINESS ON CONSUMER JUDGMENTS

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by

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CERTIFICATE OF ORIGINALITY

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ABSTRACT

This research examines how and why the visual glossiness of a product influences consumer product attitudes. Seven studies demonstrate that consumers generally have more favorable attitudes toward products with a glossy, as opposed to a matte, surface. This effect is driven by the heightened impression of newness for glossy products and is therefore more salient among consumers with a higher dispositional newness-seeking inclination. In addition, the effect of product glossiness on product attitudes was diminished or reversed when the mental association (i.e., "glossy = new") was challenged, when nostalgic feelings were induced, and when product durability became a primary concern. This research makes contributions in advancing knowledge on product glossiness, visual marketing, and consumer behavior. At the same time, it provides managerial implications for designing products consistent with the brand image of classic versus novel.

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CHAPTER 1. INTRODUCTION

In 2017, 79.02 million units of cars were sold globally (Global Auto Report 2018). The vast majority of these cars, both mass-market and high-end brands, were coated in glossy (shiny) paint (e.g., Ferrari, Porsche, Volvo, Toyota, and Ford). What happens with cars merely captures the tip of the iceberg of the fascination that consumers seem to have with glossy products. From the iPhone XS by Apple to Topas suitcases by Rimowa, from Aurora cookware by Zwilling to So Kate high-heel shoes by Christian Louboutin, consumers nowadays are surrounded by glossy products. Products with matte surfaces are of course also very prevalent and abundant. BMW reintroduced its M3 Coupe Frozen limited edition in three matte colors (Stoklosa 2012), and Microsoft dropped its previously glossy finish to adopt a matte design instead for the Xbox 360S (Svetlik 2011). Meanwhile, numerous products are offered in both glossy and matte versions. For instance, the iPhone 7 is sold in both the glossy black (jet black) and matte black editions (Apple Inc. 2018). Saint Laurent offers both shiny and matte colors of its lipsticks (Yves Saint Laurent 2018). With both glossy and matte products competing for our attention, it is relevant and useful for researchers and marketers to understand consumers' different reactions to products that are designed to be glossy versus matte.

Given this importance of glossiness, compared with other well-known visual marketing elements such as color, shape, form, and typeface (e.g., Bagchi and Cheema 2013; Deng, Hui, and Hutchinson 2010; Gorn et al. 2004; Hagtvedt and Patrick 2008; Hoegg and Alba 2008; Hoegg, Alba, and Dahl 2010; Jiang et al. 2016; Mehta et al. 2017; Mehta and Zhu 2009; Patrick 2016; Patrick and Hagtvedt 2011), there is a dearth of research on glossiness in the marketing realm (for a notable exception, see Meert, Pandelaere, and Patrick 2014). How

and when the glossiness of a product's surface influences consumers' judgments has scarcely been investigated. In an attempt to begin to fill this research gap, I draw on previous research in visual marketing and product-newness impressions to develop a conceptual framework that predicts and finds that consumers have a general preference for products with a glossy surface over those with a matte finish, because of the mental association between visual glossiness and product newness. I show that this general preference for glossy over matte designs is more salient in people with a higher dispositional newness-seeking inclination, but that it is diminished or reversed: 1) when the mental association (i.e., "glossy = new") is challenged, 2) when nostalgic feelings are induced, and 3) when product durability becomes the primary concern.

My hypotheses are supported by the findings of seven studies, which contribute to several streams of research. The current research contributes to the product design and visual marketing literatures (e.g., Bagchi and Cheema 2013; Deng et al. 2010; Elder and Krishna 2012; Gorn et al. 2004; Hagtvedt and Patrick 2008; Hoegg and Alba 2008; Hoegg et al. 2010; Jiang et al. 2016; Krishna 2006; Krishna, Cian, and Aydinoğlu 2017; Mehta et al. 2017; Mehta and Zhu 2009; Patrick 2016; Patrick and Hagtvedt 2011; Raghubir and Krishna 1999) by demonstrating the important role played by a largely overlooked visual aspect in product evaluation: product glossiness. Adding to the pioneering work by Meert, Pandelaere, and Patrick (2014), my findings suggest that a general preference for glossiness among consumers results from the heightened impression of newness that is associated with a glossy product, and I examine how this general liking of glossy products can be diminished or reversed. This work contributes to the growing literature on psychological newness (e.g., Alexander, Lynch, and Wang 2008; Goode, Dahl, and Moreau 2013; Hoeffler 2003; Jhang, Grant, and Campbell 2012; Zhao, Hoeffler, and Dahl 2009). An increase in the perception of newness is often achieved through modifying the functionality of the product (e.g., Hoeffler

2003; Zhao et al. 2009). My research shows that an impression of newness can also be achieved by modifying the visual appearance of the product—a comparatively minor and less costly move for companies. Last but not least, this research advances the literatures on product durability (e.g., Cripps and Meyer 1994; Jiang et al. 2016) and nostalgic marketing (e.g., Huang, Huang, and Wyer 2016; Zhou et al. 2012) by revealing how consumer reactions to visual marketing elements can be altered by feelings of nostalgia and concerns about product durability.

CHAPTER 2. CONCEPTUAL BACKGROUND

2.1. VISUAL MARKETING

Visual sense (sight) is one of the five traditionally recognized perception methods that involve plentiful variations and abundant combinations. Consumers are revealed as having an inclination toward visual, rather than verbal expressions of information in a product assortment, a preference that is also referred to as the "visual preference heuristic" (Townsend and Kahn 2013). Besides, visual attention is not evenly distributed, as consumers have a propensity to focus on the horizontal center of the visual context, which is named as the central gaze cascade effect (Atalay, Bodur, and Rasolofoarison 2012). The visual aspects that marketers can manipulate have been widely explored, represented by color, position, shape, symmetry, and boundary (e.g., Aloumi et al. 2013; Cutright 2012; Deng et al. 2010; Gorn et al. 2004; Jiang et al. 2016; Lee et al. 2014; Meyers-Levy and Peracchio 1995; Miller and Kahn 2005). Visual stimuli embedded in these aspects are also prevailingly applied in marketing contexts, represented by logos, advertisements, product design, store layout, and online communication.

According to Labrecque, Patrick, and Milne (2013), visual stimuli can shape consumer judgments, preferences and choices via two routes: (1) its embodied meaning can stimulate biological responses and result in psychological outcomes such as product attitudes and purchase motivation, and (2) its referential meaning can generate learned associations and influence marketing outcomes represented by the advertising effectiveness and quality inference. The first route is more closely related to the automatic responses following associative mental processes in System I, whereas the second route corresponds to the

deliberate reactions after propositional mental processes in System II in the associative-propositional evaluation model (Gawronski and Bodenhausen 2011) and dual processing model (Dhar and Gorlin 2013). In essence, visual elements can be leveraged in marketing to elicit both intuitive and intentional responses from consumers.

On one hand, heuristics initiated by visual stimuli are associated with misattribution. To illustrate, colors can generate temporary physiological changes among consumers, such as colors with longer wavelengths (closer to red) or with high saturation which can induce a feeling of arousal, witnessed by higher blood pressure, respiratory rate and eye blink frequency, compared with colors with shorter wavelengths (closer to blue) or with high value that can serve the relaxation function (Crowley 1993; Gerard 1957; Gorn et al. 1997). In line with this research, colors can be classified into those eliciting happy (e.g., yellow) versus sad (e.g., black) emotions (Cimbalo et al. 1978). Subsequently, the physical reactions and emotional states triggered by the color can be misattributed to high versus low desirability for the products. Especially when the misattribution is less straightforward, it is very hard for consumers to shield themselves from the priming effect of these visual elements. To represent this, the background color of webpages may influence the subjective judgment of the loading speed, so that the perceived quickness, instead of emotions, can be misattributed to the online content (Gorn et al. 2004). The obscuration of the link between color and time perception can largely diminish the possibility for bias correction by viewers.

On the other hand, visual stimuli also play a vital role in marketing due to conceptual metaphors. Specifically, color composition can result in sway of construal level, elucidated by Lee et al.'s (2014) finding that black-and-white is associated with a higher level of construal when compared to colorful imagery. In addition, position can bias weight judgment, such that elements located at the bottom of a packaging seem to be heavier than those at the top (Deng and Kahn 2009), higher vertical position represents rationality, while lower stands

for emotion (Cian, Krishna, and Schwarz 2015), and objects on the left are regarded as healthier than items on the right (Romero and Biswas 2016).

The conceptual metaphors of visual depictions can also exert influence on the mental simulation process and consumer engagement (Finn 1988; Pieters, Wedel, and Batra 2010; Pieters and Wedel 2004). For instance, in the product evaluation context, circular (angular) logos can make concepts related to softness (hardness) more accessible in the memory, so that when establishing mental imagery, experiences related to conformability (durability) may be more easily triggered (Jiang et al. 2016). Similarly, depending on the risks involved in the purchasing decision, logo frames can be stimulated as either protection with enhanced purchasing intention, or confinement with lower willingness to pay (Fajardo, Zhang, and Tsiros 2016). Moreover, the intensity of automatic mental simulations can be escalated by orienting an item toward dominant hand (Elder and Krishna 2011), or including dynamic features in static pictures (Cian et al. 2014). As a consequence, visual cues both within the product and in the circumstance can fluctuate product evaluations through the bond between vision and motor simulation (Jeannerod 2001).

To recap, research on visual marketing provides a considerable number of enlightening insights with empirical meaningfulness. Nevertheless, there is scarce investigation of the particular role played by visual glossiness in regard to consumer preference and choice, which is the primary focus in this research.

2.2. VISUAL GLOSSINESS

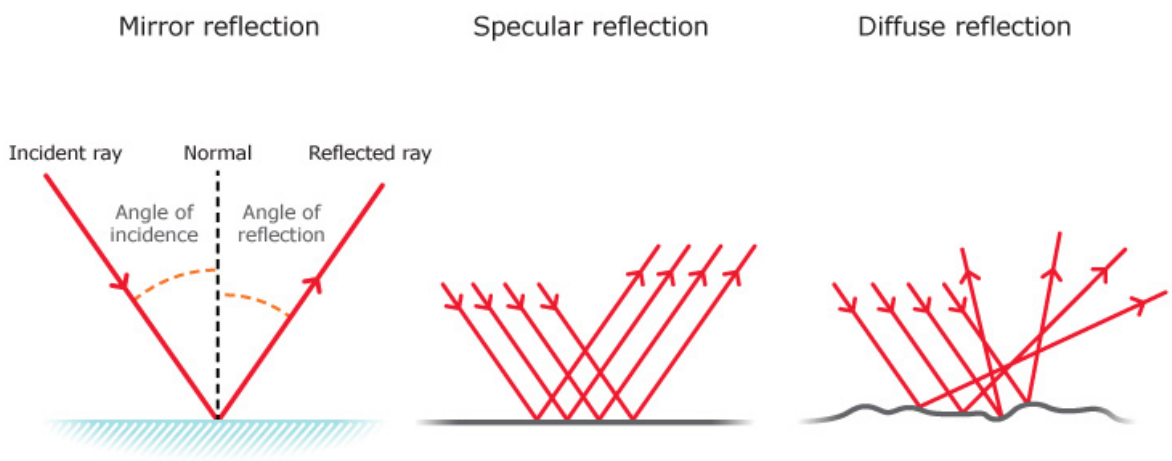
To marketers, consumers' visual sense (sight) is probably the most important sense to satisfy. As conveyed by the popular phrase "a picture is worth a thousand words," managers

and researchers have paid extensive attention to factors such as the color, shape, and symmetry in the design of a logo, a product, a print ad, a store layout, a social media website, and so on (e.g., Bagchi and Cheema 2012; Deng et al. 2010; Elder and Krishna 2012; Gorn et al. 2004; Hagtvedt and Patrick 2008; Hoegg and Alba 2008; Hoegg et al. 2010; Jiang et al. 2016; Krishna 2006; Krishna et al. 2017; Mehta et al. 2017; Mehta and Zhu 2009; Patrick 2016; Patrick and Hagtvedt 2011; Raghubir and Krishna 1999).

However, one visual aspect of the product has been mostly neglected in the marketing literature. That aspect is the visual glossiness of products. Glossiness is closely related to light reflection. Euclid, a renowned Ancient Greek mathematician, first described the law of reflection in about 300 BC: (1) light travels in straight lines, and (2) the angle at which incident light strikes a plane mirror and the angle at which this light reflects from that mirror are the same, i.e. the angle of reflection is equal to the angle of incidence (Heiberg, Menge, and Curtze 1895). This type of reflection was later defined as specular reflection or, alternatively, regular reflection (Chartier 2005). On the contrary, when a surface is microscopically irregular (e.g., fibers), reflected light rays will bounce in different directions, i.e. in a non-directional fashion, and cause diffuse reflection, also called Lambertian reflectance (Chartier 2005; Nicodemus et al. 1977), as shown in Figure 1 (University of Waikato 2012).

FIGURE 1

TYPES OF LIGHT REFLECTION **(University of Waikato 2012)**



In early research, objective gloss was measured simply by the ratio of specular to diffuse reflection (Pfund 1930). Later on, the bidirectional reflectance distribution function (BRDF) was widely adopted to characterize the objective surface reflectance, which takes the amount and direction of both incoming and reflected light into consideration (Olkkonen and Brainard 2010; Oren and Nayar 1995). Meanwhile, derived from Pfund's (1930) finding that the subjective glossiness perception may not be identical to objective gloss, Hunter (1937) suggested six pivotal kinds of perceptual glossiness: (1) specular gloss: perceived shininess, (2) sheen: perceived shininess on a matte surface due to the visual angle, (3) disparity between specular reflected and diffused reflected area, (4) absence-of-bloom gloss: haze area next to the highlight, (5) distinctness-of-reflected-image gloss: sharpness of the reflected imagery, and (6) absence-of-surface-texture gloss: lack of visible surface blemishes. Extending this research, there has been plenty of research working on the relationship between perceptual glossiness and other factors, e.g., binocular disparity, motion (e.g., head movement), surface geometry, scene illumination and visual angle (Anderson and Kim 2009; Ho, Maloney, and Landy 2006; Sakano and Ando 2010).

As the focus of this paper is to investigate consumers' perceptions and attitudes, perceptual glossiness was chosen as the independent variable and substantiated in the manipulation check questions. In the studies, both the single factor objective glossiness, i.e.

the specular reflection compared to diffuse reflection (Pfund 1930), and the perceptual glossiness, e.g., specular gloss and distinctness-of-reflected-image gloss were manipulated to amplify the discrepancy between glossy and matte conditions. As sole specular reflection happens only when a surface is identical to a flawless mirror, diffuse reflection can hardly be prevented in reality, even when a solid is well-polished. Hence, glossiness and matte become relative concepts representing two directions on a continuum, instead of two absolute classifications in this research. Then, when holding other factors constant, depending on both the texture and the surface smoothness, the audience may judge a surface to be relatively glossy when specular reflection dominates (e.g., a polished metallic surface), while as rather matte when diffuse reflection dominates (e.g., a gunny cloth; Nicodemus et al. 1977).

The importance of visual glossiness in the design of a product has become increasingly apparent in today's world. The fact that plenty of companies such as Apple, BMW, and Microsoft now offer both glossy and matte versions of their products testifies to the truth that not only are there consumers who prefer each type, but the difference in the exterior surface of products is a significant attribute for consumers. Product designers seem to be recognizing that they may have underestimated the appeal of glossiness to consumers in many product domains, and hence they now attach more importance to it (Bahn et al. 2009). In contrast to industry practice, however, this visual marketing element seems to have attracted very little attention within academic research. In the only research on glossiness in our field that I could find, Meert et al. (2014) report that people showed a greater preference for (landscape and planet) photographs and (dance) promotion leaflets when they were printed on glossy versus matte paper, an effect they suggested is likely to stem from an innate biological need for fresh water. In the current study, my goal is to add to this research on glossiness by exploring the impact of product glossiness on consumers' product attitudes. Specifically, I propose that in addition to the innate association between glossiness and

wetness (Meert et al. 2014), glossiness induces the perception of newness, which has psychological implications for product preferences.

2.3. PSYCHOLOGICAL IMPRESSIONS OF NEWNESS

The Oxford Advanced Learner's Dictionary defines *new* as "not existing before, recently made, invented or introduced" (Hornby and Crowther 1995). Marketers tend to classify new products into two types based on the degree of newness: 1) incrementally new products (INPs), which are incrementally or artificially new, i.e., new products that are similar to their previous versions but which have modified features, and 2) really new products (RNPs) that are genuinely new, that is, these products never existed before or contain radically different features from what was previously available (Hoeffler 2003). Consumers have been found to react differently to these two types of new products. For example, when considering purchasing INPs compared to RNPs, consumers a priori have been found to have less uncertainty about the consumption utility of INPs (Hoeffler 2003), to think more concretely about their purchase feasibility (Alexander et al. 2008), and to be less influenced by imaginative visualization (Zhao et al. 2009).

Whether a product will be perceived as new is ultimately in the eye of the beholder, the consumer, rather than in the eyes of the company. The judgment of a product's newness is by definition subjective (i.e., a product will be perceived as new no matter how new or old it really is, or as old no matter how new or old it is). Products can be perceived as new for different reasons as well. Hart and Jacoby (1973) suggested that each of the following can result in an impression of newness: 1) novelty (the perceived discrepancy from alternatives), 2) recency (a time-based perception depending on how recently the product was

manufactured or released), and 3) scarcity (the scarce availability that may accompany a very new product recently introduced). Because the judgment of product newness is largely subjective, it can be influenced by various contextual and individual factors. Donnelly and Etzel (1974), for example, identified four dimensions to operationalize product newness in marketing: physical appearance, packaging, required user preparation, and manufacturer's technological processing. Selinger, Dahl, and Moreau (2006) showed that perception of product newness is contingent on the consumer's ability to identify with certainty an appropriate category anchor. From a visual-marketing perspective, Radford and Bloch (2011) argued that a product is new as long as consumers perceive it as such, and the newness of a product is strongly communicated via its visual design. They found that consumers perceived a product as newer when it sports a sleek or minimalist style, compared to a boxy or busy look.

2.4. GLOSSINESS AND NEWNESS

In the current research, I posit that glossy products will result in greater perceptions of newness than will matte products. To support this reasoning, I draw on studies of human memory and inference making (e.g., Collins and Loftus 1975; Kardes et al. 2004; Mitchell 1982; Shanks and López 1996; Simmons and Lynch 1991; Wickelgren 1981). This stream of literature suggests that inference making is largely directed by mental associations stored in our minds—that is, when people encounter one construct, they are likely to infer that a second construct will also appear if these two constructs are strongly associated mentally (e.g., Gilbert 1989; Gorn, Jiang, and Johar 2008; Jiang et al. 2016).

The visual experience of glossiness and the psychological concept of newness are frequently co-activated. With evolution, human beings have gradually learned that glossy objects in nature are usually fresh and new. For instance, fruits from the current season are shinier, whereas they lose their shine with age. Similarly, flowers look fresh and glossy after a rainfall or upon being watered. As for products, new cars are typically shiny, while older ones are more dull-looking. The same is true for many other items, such as leather goods, ceramics, and coins ("shiny as a new penny") and other metals such as jewelry and tableware. Therefore, the visual experience of glossiness is usually accompanied by the perception of newness. Due to frequent co-activation, a mental association between glossiness and newness is formed and strengthened. Then, as suggested by the associative network model of memory (e.g., Collins and Loftus 1975; Mitchell 1982; Wickelgren 1981), during information retrieval people are likely to form inferences based on strongly associated pairs of constructs (e.g., Gorn et al. 2008; Jiang et al. 2016; Kardes et al. 2004). In this way, once individuals encounter a visual representation of glossiness, this experience can lead them to infer that the focal object is new. As a result, consumers should tend to judge products with a glossy surface as newer than their matte counterparts.

To validate the existence of the mental association between glossiness and newness, I conducted an Implicit Association Test (IAT; Greenwald, McGhee, and Schwartz 1998), which is frequently used to identify mental associations in implicit cognition, based on people's reaction time when classifying a series of stimuli into pairs of categories (Lane et al. 2007; Mai, Symmank, and Seeberg-Elverfeldt 2016). I predicted that "glossy" is mentally associated with "new," whereas "matte" is mapped onto "old." Therefore, when completing an IAT, participants were expected to respond more quickly when they were asked to classify visual and verbal stimuli into "glossy or new" versus "matte or old" (consistent with the

glossiness–newness mental association), rather than "glossy or old" versus "matte or new" (inconsistent with the glossiness–newness association).

The pilot study was conducted online (N = 101) using the IATGEN program (IATs in Qualtrics, see de Leeuw 2015; Greenwald, Nosek, and Banaji 2003). To test the mental association between glossiness and newness, I used as my stimuli ten pictures of either glossy or matte spheres and ten adjectives related to either "new" (i.e., *recent*, *fresh*, *modern*, *current,* and *innovative*) or "old" (i.e., *former*, *aged*, *ancient*, *worn,* and *stale*). This study followed the standard IAT design used in previous marketing research (e.g., Gibson 2008; Lee et al. 2017; Perkins and Forehand 2012; Rozin et al. 2012) to identify mental associations in implicit cognition, based on people's reaction time, to classify a series of stimuli into pairs of categories (Lane et al. 2007; Mai, Symmank, and Seeberg-Elverfeldt 2016; for the detailed stimuli of this pilot study, see the appendix A).

I predicted that "glossy" is mentally associated with "new," whereas "matte" is mapped onto "old." In this way, when completing an IAT, participants were expected to respond more quickly when they were asked to classify visual and verbal stimuli into "glossy or new" versus "matte or old" (consistent with the glossiness–newness mental association), rather than "glossy or old" versus "matte or new" (inconsistent with the glossiness–newness association).

2.4.1. Method

One hundred and one US adult consumers (M_{age} = 36.00, 52.4% female) participated in this study via MTurk for a nominal payment. The test was constructed using Iatgen (IATs in Qualtrics, de Leeuw 2015; Greenwald et al. 2003), which automatically screened out participants who used devices without a qualified keyboard before they started the task.

To begin, respondents were instructed that this study intended to examine how rapidly and accurately they could classify visual and verbal stimuli into different categories. They were provided with an example for illustration, adopted from the classic flower–insect attitude IAT study conducted by Greenwald et al. (1998). They were told that when the word or image belonged to the category on the left, they needed to press the E key as quickly as they can. On the contrary, when it belonged to the category on the right, they should press the I key as quickly as they can.

Next, they proceeded to the main task, which included seven blocks, following the design used in previous marketing literature (e.g., Gibson 2008; Lee et al. 2017; Perkins and Forehand 2012; Rozin et al. 2012; all referring the procedure outlined by Greenwald et al. 2003). In total, there were 180 trials divided into seven blocks. Blocks 1, 2, and 5 served as practice trials. In blocks 1 and 5 (20 trials each), participants were shown several pictures of spheres in different colors, and they classified them into "glossy" or "matte" categories, with reversed left/right position of the "glossy" and "matte" labels in the two blocks. In block 2 (20 trials), they categorized adjectives into those expressing meanings related to "new" versus meanings concerning "old," including *recent*, *fresh*, *modern*, *current,* and *innovative,* as well as *former*, *aged*, *ancient*, *worn,* and *stale*. In total, there were ten images of a sphere with glossy versus matte design and ten words expressing "new" versus "old," so that participants encountered repetitive trials within each block. Blocks 3 (20 trials), 4 (40 trials), 6 (20 trials), and 7 (40 trials) were the critical blocks, where participants were shown the pictures of spheres and the adjectives singly. They were asked to classify each stimulus into "glossy or new" versus "matte or old" in two adjoining blocks (blocks 3 and 4 or blocks 6 and 7), and "glossy or old" versus "matte or new" in the two remaining blocks (blocks 6 and 7 or blocks 3 and 4).

In this IAT, the ten images of glossy versus matte spheres and ten adjectives expressing "new" versus "old" were selected and verified based on a separate pretest (N = 52); the left/right position of the categorizing labels were counterbalanced; and the presenting sequence of the stimuli within each block was randomized. Participants with incorrect answers in the trials were reminded and forced to correct their responses by pressing the other key before proceeding to the next trial. As argued by Greenwald et al. (2003), this natural error penalty was equivalent to, or even sometimes slightly greater than, computed error penalty (600 millisecond). I predicted that because the categorization of "glossy or new" versus "matte or old" is consistent with the established glossiness–newness mental association, while "glossy or old" versus "matte or new" is counter to the glossiness–newness associative link, I should witness a shorter response time in the trials with "glossy or new" versus "matte or old" classification labels when compared to other trials with "glossy or old" versus "matte or new" labels amongst the four critical blocks.

2.4.2. Results

The *D*-score of each participant was calculated (Greenwald et al. 2003): A positive score indicated that the participants responded more quickly when glossiness was paired up with newness, and matte was paired with oldness; while a negative score indicated that participants responded more quickly when glossiness was paired with oldness, and matte was paired with newness. As expected, the mean *D*-score of all participants was positive (M_d = .24, SD_d = .43), and a *t*-test verified that the score was highly significantly different from zero ($t(100) = 5.58$, $p < .00001$, $d = .56$). Besides, when dropping those respondents with excessive (latency larger than 10,000 millisecond) or overly short (more than 10% of trials less than 300 millisecond) response time (Greenwald et al. 2003), the mean *D*-score was still

significantly larger than zero (M_d = .25, SD_d = .40; $t(79) = 5.51$, $p < .00001$, $d = .62$). Given the highly significant *p*-values and large Cohen's *d* effect sizes, I can draw the conclusion that consumers are likely to have a very strong mental association between glossiness and newness. In this way, it becomes reasonable to surmise that this solid association may play a role in consumer judgments of products based on this aspect of their visual designs.

2.4.3. Discussion

This study provided verification for the existence and strength of the mental association between glossiness and newness. Compared with self-reported measurements, this IAT study directly measured the reaction time among participants in real categorizing behavior, so that it did not require participants to be self-aware of their perception for visual glossiness. To further extend this mental association, in study 2, I tested the explicit introspection on the perception of newness among consumers when they encountered products with a glossy design; and in study 4, I directionally reversed this implicit association through an explicit and salient visual cue. Integrally, these three studies provide a deeper understanding of the mental association between glossiness and newness and its marketing impact on product attitude.

CHAPTER 3. THE CURRENT RESEARCH

I reasoned that the perception of newness that is heightened by a glossy product design is likely to lead to more favorable product attitudes. The pervasive logical fallacy in philosophy, *argumentum ad novitatem* (appeal to novelty; Bennett 2012) holds that individuals tend to believe prematurely that something is correct or better simply because it is new. The appeal to novelty is supported by neurological research. The experience of novelty activates the substantia nigra/ventral segmental area of the brain, which in turn activates the two brain areas that are important for learning and memory, i.e., the hippocampus and amygdala (Bunzeck et al. 2014). Exposure to novelty also releases dopamine, which gives the person a pleasurable sensation when seeking or obtaining a reward (Bunzeck and Düzel 2006). The preference for newness is supported in the consumption domain as well. Products judged as newer are generally preferred over their older counterparts, simply because of the belief that newness implies improvement and superiority, even if this is not necessarily the case (e.g., Jie and Li 2016). Consistent with this finding, game players showed higher engagement and gave higher game ratings when they played games framed as "a new version" (versus identical games without the new-version framing; Denisova and Cairns 2015). These research findings provide evidence that perceived product newness can be used as a heuristic that guides consumer preferences across various product domains (Jie and Li 2016).

Bringing this research together, I predict that glossier (vs. more matte) products can trigger higher perceived newness of a product, which should result in more favorable product attitudes. Stating this formally, I propose the following:

H1: Consumers generally have more favorable attitudes toward products with a glossy, rather than matte, design.

H2: This effect is driven by the impressions of greater newness of glossy products.

Previous research documented that mental associations can be altered by situational factors (e.g., Gorn et al. 2008; Jiang et al. 2016). For example, Gorn et al. (2008) demonstrated that the mental association between a babyface and honesty can be temporarily reversed when the participants are given evidence that babyfaced people committed intentional offenses. My first two hypotheses are based on the argument that the positive impact of glossiness on the perceived newness of a product is derived from the glossiness–newness mental association. However, I expect that if the glossiness–newness mental association is challenged, the effect of product glossiness on product attitude is likely to be attenuated or even reversed. Stating this formally, I propose:

H3: The effect of product glossiness on product attitude will be attenuated or reversed when the "glossiness = newness" mental association is challenged.

Further, another moderator I intend to investigate is feelings of nostalgia. Nostalgia occurs when people reminisce and think back to memorable positive life episodes in their past, usually with mixed, bittersweet feelings (i.e., pleasure about having had these experiences and sadness at the fact that they are gone; e.g., Huang et al. 2016; Zhou et al. 2008; Zhou et al. 2012). Past research found that feelings of nostalgia can trigger prosocial behavior, love, security, a sense of self, and higher self-esteem (e.g., Baldwin, Biernat, and Landau 2015; Zhou et al. 2012). As past experiences are unlikely to reoccur, individuals experiencing nostalgia are motivated to savor their cherished bygone events (Davis 1979; Huang et al. 2016; Zhou et al. 2012). If this is the case, then when individuals are induced to feel nostalgic, they should be more likely to prefer more traditional, heritage, and classic-looking products over newer ones. This prediction is in line with the finding that consumers

with more favorable attitudes toward the past are less innovative (Steenkamp, ter Hofstede, and Wedel 1999).

Compared with glossy products, those with matte designs are generally regarded as more classic and vintage. First of all, the manufacturing process for glossy products requires a certain level of technology (e.g., polishing and synthesizing), which was not prevalent in the past (e.g., Fullerton 1988). In addition, brands and products need to persist through the vicissitudes of time and history in order to become classic, during which glossy designs tend to become more matte as they age. As a result, traditional and classic-looking products tend to be less glossy; for example, lipsticks today are much glossier than in the past (Young 2018). In the realm of fashion, some designers attempt to make an appeal to history and position their apparel as traditional and classic. To achieve this, they tend to use muted rather than flashy or shiny colors in the fabrics (e.g., Ralph Lauren and Hermes). Bringing together my reasoning and previous research, and stating my prediction formally, I predict the following:

H4: The effect of product glossiness on product attitude will be attenuated or even reversed when feelings of nostalgia are induced.

Another factor that can potentially moderate my proposed effect is the concern about a product's durability. Durability is one of the major quality dimensions, and it can be measured by the average product life (Garvin 1984). Durable goods, also termed hard goods, are products with a relatively long usage time, such as household electronic appliances and furniture (Cripps and Meyer 1994). Durables have distinctive characteristics, such as relatively little information search and price comparisons before purchase (Beatty and Smoth 1987; Grewal and Marmorstein 1994; Wilkie and Dickson 1985), as well as slower replacement compared to the optimality suggested by normative theory and overestimation of the opportunity cost of replacements (Cripps and Meyer 1994). Worth noticing is that due to

individual differences, some consumers may also exert greater durability concern even when a product does not belong to durables. In this way, I am able to frame the purchasing decision related to a particular item as requiring an either higher or lower durability concern to examine if the preference of glossiness will vary. Although it may not always be salient in a consumer's mind, durability is an important and positive product attribute (e.g., Jiang et al. 2016). More and more companies are extending the life spans of their consumer products in order to reduce waste, get greater market share, increase customer loyalty, and make higher profits (e.g., Kostecki 2013).

In the current research, I expect that the perception of durability will be lower for glossy products. Glossiness can potentially induce the cross-modal perception of lightweight and thin (Cloonan and Decré 2015), which I reasoned to be conceptually related to brittleness, i.e., lower durability. In addition, while durability implies a long timeframe (e.g., product life cycle; Garvin 1984), glossiness is likely to be mentally associated with transience. For instance, fruits and flowers are glossy for a short period, then they become dull later. Similarly, glossy leather shoes will quickly become matte and stay matte if not shined and polished. Therefore, consumers may intuitively perceive that the glossy state of a product is brief and temporary, relative to a long-lasting and stable matte-looking state. Supporting this prediction, other evidence suggests that, metaphorically, glossy surfaces can be associated with higher risks. Smudges are more noticeable on a glossy surface compared to a matte one, including scratches, fingerprints, and dust (e.g., complaints about the glossy version of the Xbox). As another example, knives with glossier blades are judged as sharper and more dangerous (Karana, Hekkert, and Kandachar 2009). In addition, someone who is driving or walking can use glossiness as a visual cue to estimate how slippery a surface is (Joh et al. 2006). When it is raining or snowing, roads and sidewalks can be slick and dangerous. Vehicles and people have less grip on them compared to a rougher or less shiny

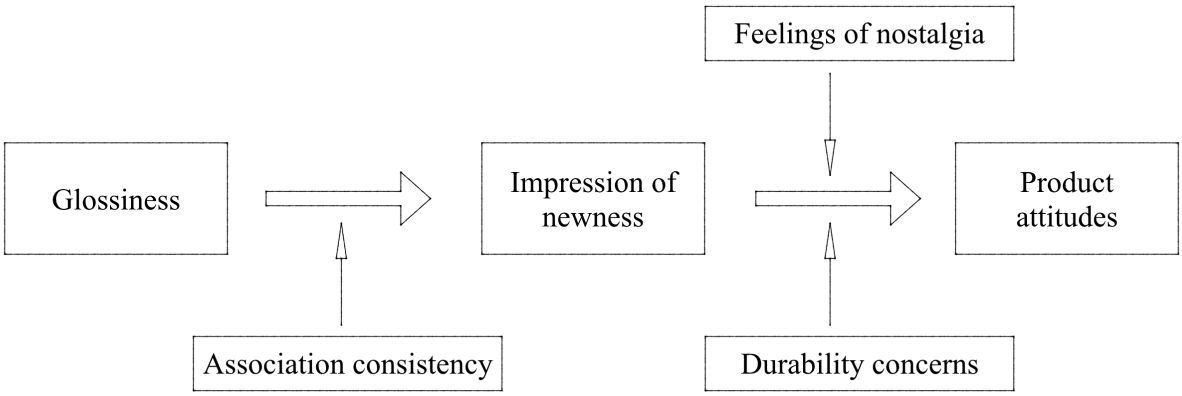
surface. Thus glossy surfaces can be associated with greater risk of potential injury. Given the mental associations between glossiness and brittleness, transience, and high risk, I predict that when durability becomes a focal concern for consumers, the preference for glossy rather than matte products is likely to be dampened. Stating this formally, I propose:

H5: The effect of product glossiness on product attitude will be attenuated or even reversed when consumers are primarily concerned about product durability.

These five hypotheses are summarized in the conceptual model (Figure 2) below.

FIGURE 2

CONCEPTUAL MODEL



I found support for the proposed hypotheses in seven studies. Studies 1a and 1b demonstrated the general preference for product glossiness across different product categories. The second study provided a direct test of the mediating role of perceived newness. Using real behavioral data, study 3 showed that consumers bid higher prices for products with a glossy rather than a matte surface, an effect that was more salient among those with a higher dispositional newness-seeking tendency. Apart from replicating the findings in the previous studies, study 4 revealed that the glossiness–newness association can be temporarily challenged by priming the reversed association (i.e., “matte = new”), thereby

reducing the preference for glossy products among consumers. My last two experiments tested two other moderators. They showed that the observed effect was in one case attenuated and in the other case reversed, when nostalgic feelings were induced (study 5), and when product durability became the primary concern (study 6).

CHAPTER 4. STUDIES

4.1. STUDY 1A

The first study focused on providing support for my basic hypothesis (H1) that consumers in general have more favorable attitudes toward products with a glossy rather than matte design. In this study, I presented participants with pairs of glossy versus matte products from different product categories, and I expected that participants would be more likely to pick glossy products over matte ones across categories.

4.1.1. Method

Two hundred and one US adult consumers (M_{age} = 39.67, 49.8% female) participated in this study via Amazon Mechanical Turk (MTurk) for a nominal payment.

Participants were asked to imagine that they were making real consumption choices between various options of different products. Then they were presented with nine pairs of products from different product categories (e.g., laptops, shoes, vases; see appendix D), in a randomized order. Each pair included a glossy and a matte product from the same product category but with different visual designs. The design variations were used to reduce the possibility of demand characteristics. Nevertheless, I also counterbalanced the visual design of the glossy and the matte products in each pair to control for the influence of other visual design elements, except for my focal visual factor, i.e., glossiness. A pretest with a separate

group of respondents on MTurk (N = 100) confirmed that the glossy products I used were indeed seen as significantly glossier than the matte ones (see appendix B for details).

After seeing each pair of products, participants were asked to choose the one that they preferred from the pair. At the end of the study, as in all later studies, participants completed a few standard demographic measures, including gender and age. These demographic measures did not significantly influence my findings in any of the studies, thus they will not be discussed further.

4.1.2. Results

TABLE 1

STUDY 1A: CHOICES OF THE PRODUCTS

Products in random sequence	Glossy	Matte
1. Chairs	50.25%	49.75%
2. Coffee machines	55.22%	44.78%
3. Bike helmets	54.73%	45.27%
4. Kettles	53.23%	46.77%
5. Laptops	54.23%	45.77%
6. Leather shoes	40.80%	59.20%
7. Lipsticks	55.22%	44.78%
8. Taps	56.72%	43.28%
9. Vases	54.73%	45.27%

I coded participants' product choice as "1" if they chose the glossy product and as "0" if they selected the matte one. Consistent with my expectation, participants had higher likelihood of choosing a glossy product over a matte one in eight of the nine product categories I tested (for the likelihood in each individual product category, see table 1). In addition, I averaged this likelihood to choose glossy products over matte ones across all nine categories and compared this averaged likelihood with the chance likelihood (i.e., 50%). As

expected, a one-sample *t*-test revealed that across product categories the average likelihood of choosing the glossy product over the matte one was significantly higher than chance (M = 52.79%, SD = .18; $t(200) = 2.23$, $p = .027$; $d = .16$). Thus, consistent with my expectation, participants in general preferred a glossy product to a matte one.

4.2. STUDY 1B

In study 1b, I intended to test the association from a different angle, i.e. instead of making a choice between a glossy and a matte product version, the participants were asked to indicate their preference based on a Likert scale.

4.2.1. Method

One hundred and ninety-nine US adult consumers (M_{age} = 34.51, 47.2% female) participated in this study via Amazon Mechanical Turk (MTurk) for a nominal payment.

The participants were instructed to evaluate some products in an online shop. Then they were presented with nine pairs of products from different product categories that I used in study 1a (with other design attributes being counterbalanced) in a randomized order. Then, instead of choosing the one they preferred from each pair (in study 1a), they were asked to indicate their preference for the products based on a scale (0 = prefer A; 100 = prefer B), and whether A or B was a glossy (vs. matte) version had been counterbalanced.

4.2.2. Results

I recoded participants' answers to the question, so that a larger number indicated a higher preference for the glossy, rather than matte options. Consistent with my expectation, participants had higher preference for a glossy product over a matte one in seven of the nine product categories I tested (for the figure in each individual product category, see table 2). Although the detailed preference figure for each product category did not fully replicate what I found in study 1a, similar to study 1a, I also averaged this preference for glossy products over matte ones across all nine categories and compared this averaged likelihood with the mid-point preference (i.e., 50). Confirming hypothesis 1, a one-sample *t*-test revealed that across product categories, the average preference for the glossy product over the matte one was significantly higher than the mid-point ($M = 52.90$, SD = 12.99; $t(198) = 8.58$, $p < .001$; $d = .22$). Hence, replicating my findings in study 1a, participants in general preferred a glossy product to a matte one.

TABLE 2

STUDY 1B: CHOICES OF THE PRODUCTS

Products in random sequence	Preference for glossiness
1. Chairs	46.36
2. Coffee machines	61.88
3. Bike helmets	55.94
4. Kettles	48.80
5. Laptops	74.39
6. Leather shoes	58.42
7. Lipsticks	60.65
8. Taps	55.71
9. Vases	58.96

4.2.3. Discussion

Studies 1a and 1b provide initial support for H1 by demonstrating that, in general, consumers have a higher preference for glossy products, compared to their matte counterparts, and this preference for glossiness also led to their higher likelihood of choosing to buy a glossy product over a matte one. I explored the underlying mechanism of this phenomenon in the remainder of the studies.

4.3. STUDY 2

In this study I used a between-subjects design to examine my hypothesis that consumers have more favorable attitudes toward products with a glossy rather than matte appearance (H1). More importantly, I directly tested for the mediational role of perceived newness of the product (H2).

4.3.1. Method

One hundred US adult consumers (M_{age} = 40.9, 50.0% female) participated in this study via MTurk for a nominal payment, and they were randomly assigned to either the glossy or the matte between-subjects condition.

Participants imagined that they were planning to purchase some mugs online. Then in the glossy (matte) condition, they were presented with information about a set of glossy (matte) mugs and were asked to evaluate them. All other product information provided (i.e., verbal descriptions and other visual aspects of the mug set) in the two conditions was identical (see appendix E). A pretest with a separate group of respondents on MTurk (N =

101) confirmed that the glossy mug set was indeed seen as significantly glossier than the matte mugs (see appendix B for details).

After reading the product information, participants indicated their attitude toward the mug set on three 9-point measures (α = .92): how much they liked the mug set (1 = very little; 9 = very much), how attractive they thought the mugs were (1 = very unattractive; 9 = very attractive), and how good they thought the mug set was (1 = very bad; 9 = very good). Next, perceived newness was measured with a six-item scale adapted from past literature (i.e., not new/very new, not recent/very recent, not innovative/very innovative, not original/very original, not unique/very unique, and not creative/very creative; α = .94; Goode, Dahl, and Moreau 2013; Hart and Jacoby 1973), all on 9-point scales.

4.3.2. Results

As in studies 1a and 1b, I observed a general preference for glossiness among participants. Specifically, there was a more favorable attitude toward the glossy product (M_{glossy} = 6.10, SD = 2.13) than the matte one (M_{matte} = 5.01, SD = 2.39; $t(98) = 2.39$, $p = .019$; $d = .48$). The glossy mug set also induced an increased level of product-newness perceptions (M_{glossy} = 6.95, SD = 1.59) than the matte one did (M_{matte} = 6.15, SD = 2.27; $t(98) = 2.04$, $p = .045$). More importantly, bootstrapping methods (PROCESS Model 4, with 5,000 resamples; Hayes 2013) confirmed the mediating role of perceived product newness in the effect of glossiness on product attitude (Glossy = 1, Matte = 2; β = -.55, SE = .27; 95% CI: -1.10 to -.05).

4.3.3. Discussion

The results of study 2 replicate the findings of studies 1a and 1b regarding the linkage between product glossiness and consumers' product attitude. Notably, the results of the mediation analysis in this experiment provide direct support for H2; that is, the effect of product glossiness on consumer attitudes is driven by the heightened perception of product newness when the product has a glossy appearance.

4.4. STUDY 3

I hypothesized that if the observed effect is really driven by the heightened product newness inferred from the glossy product surface, I should expect this effect to be more salient among consumers who are chronically more attracted to newness. Study 3 tested this possibility using a real product-bidding context.

4.4.1. Method

One hundred and seventy-six Hong Kong undergraduates (M_{age} = 21.0, 66.5% female) participated in this study for a nominal payment and were randomly assigned to either the glossy or the matte condition.

Participants were told that in appreciation for taking part in the research project, they would be given a chance to bid for computer accessories provided by a sponsor company. Participants were then presented with either a glossy or a matte real computer mouse. To control for factors other than product glossiness, I used the glossy and matte versions of the same 3,500dpi RAZER ABYSSUS mouse in this study (see appendix E). In addition, a

pretest with a separate group of participants from the same subject pool (N = 79) confirmed that the glossy mouse was indeed considered to be significantly glossier than the matte mouse (see appendix B for details).

After viewing the mouse, the participants wrote down the amount of money (in HKD) that they would like to bid for the mouse (writing HK$0 if they had no interests in the product at all). They were reminded that they must bear the consequences of their bidding price if successful, since the highest bidder would need to actually purchase this mouse by paying the indicated price. Then participants' dispositional newness-seeking tendency was measured using the seven-item short-form Change-Seeking Index (e.g., "I am continually seeking new ideas and experiences"; α = .83; Steenkamp and Baumgartner 1995), on 9-point scales (1 = strongly disagree; 9 = strongly agree). After the study, the highest bidders for the products were contacted, and the products were sold to them based on their bidding prices.

4.4.2. Results

The bidding-price data were normalized through log-transformation. Consistent with expectations, participants were willing to bid a higher price for the glossy mouse (M_{glossy} = 2.79, SD = 1.99) than the matte one (M_{matte} = 2.09, SD = 2.11; $F(1, 174) = 5.23$, $p = .023$; $\eta_p^2 = .03$). I then did a linear regression in which I regressed participants' bidding price on glossiness, newness-seeking tendency, and their interaction term. The results revealed a significant glossiness × newness-seeking interaction on bidding price (β = -.60, SE = .27; $t(172) = -2.21$, $p = .029$). To explore this interaction, I used the Johnson-Neyman "floodlight" approach recommended in recent literature (e.g., McClelland et al. 2015; Spiller et al. 2013). In line with my prediction, I found that the effect of glossy (vs. matte) design on bidding price was more salient among those who had a higher dispositional newness-seeking

inclination (index higher than 5.39, 60.80% above; β = -.62, SE = .31; t = -1.97, p = .05; PROCESS model 1 with 5,000 bootstrapping samples; see Hayes 2013).

4.4.3. Discussion

Through consequential bidding behavior on glossy versus matte real products, study 3 replicated my previous findings that consumers in general are more attracted to glossy than matte products. Although the retail price for the glossy RAZER ABYSSUS mouse was exactly the same as the matte one, in this study participants on average were willing to pay approximately US$2.22 more for the glossy mouse (M_{glossy} = $8.34, SD = 13.06) than the matte one (M_{matte} = $6.12, SD = 11.14).

In addition, consistent with my proposed underlying mechanism, I found that the effect of glossiness on bidding price is more salient for participants who have a higher dispositional newness-seeking inclination. This provides further support for my theorizing that perceived product newness underlies the observed preference for glossiness.

4.5. STUDY 4

I argued that the observed glossiness effect on preference occurs because there is a mental association between glossiness and newness. I reasoned, however, that if this mental association is challenged by a temporarily activated association that is inconsistent with the original association (e.g., “matte = new”), I should then expect to see a reversed or at least diminished effect of glossiness on perceived product newness and product attitudes. Study 4 tested this possibility.

4.5.1. Method

Three hundred and nine US adult consumers (M_{age} = 43.47, 47.2% female) participated in this study via MTurk for a nominal payment, and they were randomly assigned to conditions of a 2 (glossiness: glossy vs. matte) × 2 (association: consistent vs. inconsistent) between-subjects design.

I first manipulated participants' mental association between glossiness and newness through a memory task adapted from Gorn et al. (2008). Specifically, participants were told that researchers were interested in understanding how well consumers can clearly identify different versions of the same product after a company has updated the appearance of their product. Under this premise, participants were presented with eight product pairs, each pair for 30 seconds, in different product domains (e.g., laptops, shoes, vases; see appendix F). There were two product pictures in each pair: one labeled as the original (i.e., old) version of the product, and the other labeled as the new version of the product. One of the products in the pair had a glossy appearance, while the other had a matte look. The products were selected from the stimuli pretested and used in study 1 with other design features counterbalanced.

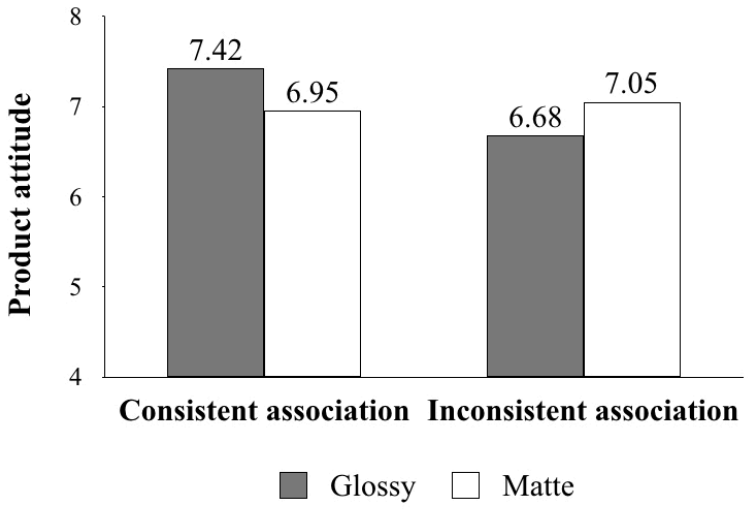
Mental association was manipulated by varying the level of glossiness between the old and new versions of the product. In the consistent-association condition, the glossy-looking products were always labeled as the new version, while the matte-looking products were always labeled as the old version. Conversely, in the inconsistent-association condition, the glossy products were labeled as the old version, with the matte products labeled as the new version. As part of the cover story and to reinforce the association, participants were

instructed to try their best to memorize whether each product was an old or new version of the brand.

Then participants were told to complete a purported filler task before their memories were tested. Specifically, participants in the glossy (matte) condition evaluated a glossy-looking (matte-looking) portable battery (see appendix E). An earlier pretest with a separate group of respondents on MTurk (N = 100) had confirmed that the glossy portable battery was indeed seen as significantly glossier than the matte one (see appendix B for details). After reading the product description, participants completed the 3-item product-attitude measure (α = .87) and the 6-item product-newness measure (α = .94), the same ones as used in study 2. Finally, participants were again shown several products that they had seen in the first task and were asked to indicate if each product was the old or the new version. Most participants (85.44%) were able to correctly answer all the questions.

FIGURE 3

STUDY 4: PRODUCT ATTITUDE



4.5.2. Results

A 2 × 2 ANOVA verified the expected glossiness × association interaction on participant attitudes ($F(1, 305) = 6.33$, $p = .012$; $\eta_p^2 = .02$; see figure 3). Specifically, when the consistent association ("glossy = new") was activated, participants evaluated the glossy portable battery more positively ($M_{glossy} = 7.42$, SD = 1.21) than the matte portable battery ($M_{matte} = 6.95$, SD = 1.47; $F(1, 305) = 3.94$, $p = .048$; $\eta_p^2 = .01$). This effect, however, was directionally reversed when the inconsistent association ("matte = new") was activated ($M_{glossy} = 6.68$, SD = 1.79 vs. $M_{matte} = 7.05$, SD = 1.36; $F(1, 305) = 2.47$, $p = .117$).

Similarly, there was a significant glossiness × association interaction on the perceived product-newness judgment ($F(1, 305) = 10.06$, $p = .002$; $\eta_p^2 = .03$). Specifically, when the consistent association ("glossy = new") was activated, participants indicated greater perceptions of newness for the glossy portable battery ($M_{glossy} = 7.50$, SD = 1.44) than for the matte portable battery ($M_{matte} = 6.94$, SD = 1.41; $F(1, 305) = 5.04$, $p = .025$; $\eta_p^2 = .02$). This effect, however, was reversed when the inconsistent association ("matte = new") was activated ($M_{glossy} = 6.45$, SD = 1.98, $M_{matte} = 7.01$, SD = 1.35; $F(1, 305) = 5.02$, $p = .026$; $\eta_p^2 = .02$).

I tested a moderated mediation model using bootstrapping procedures (Hayes 2013; PROCESS model 8; 5,000 bootstrapping samples). Consistent with expectations, the effect of glossiness on participants' attitudes was moderated by mental association and mediated by product-newness judgment (Glossy = 1, Matte = 2; β = -.65, SE = .22; 95% CI: -1.12 to -.24). Specifically, the indirect effect of product glossiness on attitudes driven by perceived newness was significant and positive in the consistent-association condition (β = -.33, SE = .14; 95% CI: -.60 to -.06), and significant and negative in the inconsistent-association condition (β = .33, SE = .16; 95% CI: .03 to .67).

4.5.3. Discussion

Supporting my proposed underlying mechanism, study 4 showed that the previously observed effect was directionally reversed when the glossiness–newness mental association was overridden by a temporarily activated inconsistent mental association (i.e., “matte = new”). In addition, the moderated mediation results of this study provided further evidence for the mediational role of psychological newness.

4.6. STUDY 5

My theorizing is based on the assumption that product newness is an attractive product characteristic in consumers’ eyes. This assumption, however, does not always hold. For instance, collectors treasure antiques that were manufactured long ago, and classical music performed in the Musikverein in Vienna still fascinates visitors in an endless stream. Thus, consumers may frequently value heritage or tradition over newness of products. In those situations, I expect that my proposed effect of glossiness on consumer attitude should be weakened or even reversed, since product newness may become less attractive, or even aversive. In study 5, I investigated this possibility by testing the moderating role of consumer nostalgia. I predicted that the observed effect would be weakened or even reversed for nostalgic consumers (H4) because nostalgia heightens the value of history and heritage.

4.6.1. Method

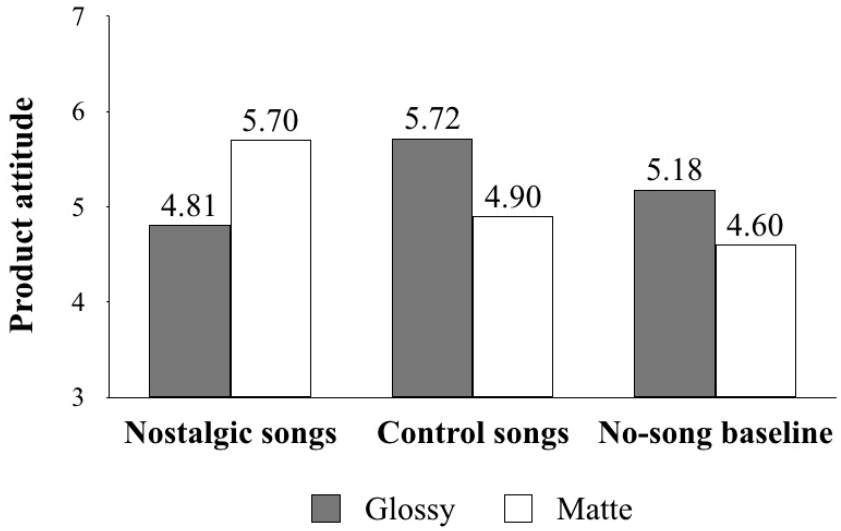
Three hundred and ninety-seven Hong Kong undergraduate students (M_{age} = 20.43, 65.7% female) participated in this study for a nominal payment and were randomly assigned to conditions of a 2 (glossiness: glossy vs. matte) × 3 (music: nostalgic songs vs. control songs vs. no-song baseline) between-subjects design.

Participants first completed a music-evaluation task in which they listened to three songs and evaluated them one by one. In the nostalgic-songs condition, participants listened to three songs that were popular when they were in primary school (i.e., they were between six and twelve years of age), while in the control-songs condition the three songs were popular in the past few months. These six songs were selected based on a pretest among an independent sample of undergraduates (N = 48). A second independent pretest (N = 115) confirmed that nostalgic songs and control songs did differ in the feeling of nostalgia they induced, but these two sets of songs did not lead to different mood or arousal levels (see appendix G for details). Participants in the no-song baseline condition skipped this music-evaluation task and proceeded directly to the second task.

Participants were next asked to imagine that they were planning to purchase a chair. In the glossy (matte) condition, they were presented with a picture of a glossy (matte) chair (see appendix E) and were asked to evaluate it. An earlier pretest with a separate group of undergraduate respondents (N = 79) confirmed that the glossy chair was indeed seen as significantly glossier than the matte chair (see appendix B for details). Participants then completed the 3-item product-attitude measure (α = .93) that I used in the previous studies.

FIGURE 4

STUDY 5: PRODUCT ATTITUDE



4.6.2. Results

Consistent with my expectations, an ANOVA revealed only a significant glossiness × music interaction on consumer attitude ($F(1, 391) = 8.86$, $p < .001$; $\eta_p^2 = .04$; see figure 4). Replicating previous findings, in the no-song baseline condition participants indicated more positive attitudes toward the glossy chair ($M_{glossy} = 5.18$, SD = 1.81) than the matte chair ($M_{matte} = 4.60$, SD = 2.00; $F(1, 391) = 3.83$, $p = .051$; $\eta_p^2 = .01$). Similarly, in the control-songs condition, participants also indicated more positive attitudes toward the glossy chair ($M_{glossy} = 5.72$, SD = 1.26) compared to the matte one ($M_{matte} = 4.90$, SD = 1.64; $F(1, 391) = 6.35$, $p = .012$; $\eta_p^2 = .02$). However, in the nostalgic-songs condition, a reversed preference was observed, i.e., the matte chair was rated more favorably ($M_{matte} = 5.70$, SD = 1.94) than the glossy one ($M_{glossy} = 4.81$, SD = 1.90; $F(1, 391) = 8.34$, $p = .004$; $\eta_p^2 = .02$).

4.6.3. Discussion

Confirming H4, study 5 demonstrated that the previously observed effect of glossiness on product attitude was reversed when the feeling of nostalgia was induced. This is consistent with my theorizing that glossiness increases perceived newness of a product, while matte represents low newness but a longer history or more heritage. When consumers feel nostalgic, they tend to value history and heritage more than newness, and thus they have a more positive attitude toward matte products than glossy ones.

4.7. STUDY 6

My last study examined another moderator in my conceptual model, i.e., durability concerns. Even though glossy products are in general preferred over matte ones, I predicted that not all inferences drawn from glossiness are positive. Specifically, I expected that products with a glossy appearance could be regarded as less durable than their matte counterparts. Thus, when durability becomes the primary concern, the preference for glossiness is likely to be dampened (H5). Study 6 tested this possibility.

4.7.1. Method

US adult consumers (N = 281; M_{age} = 43.47, 52.8% female) participated in this study via MTurk for a nominal payment. They were randomly assigned to conditions of a 2 (glossiness: glossy vs. matte) × 2 (evaluation focus: durability-focused vs. baseline) between-subjects design.

Participants imagined a scenario in which they planned to purchase some mugs. In the durability-focused condition, participants were told that their previous mug set was broken

after using it for one week; thus, they were very concerned about the quality of the mugs. This information, however, was not mentioned in the baseline condition. To confirm whether this manipulation successfully induced durability concerns, I conducted a pretest with an independent MTurk sample (N = 100). Results of the pretest showed that participants in the durability-focused condition indeed rated durability as a more important product attribute when compared to other participants in the baseline condition (see appendix H for details).

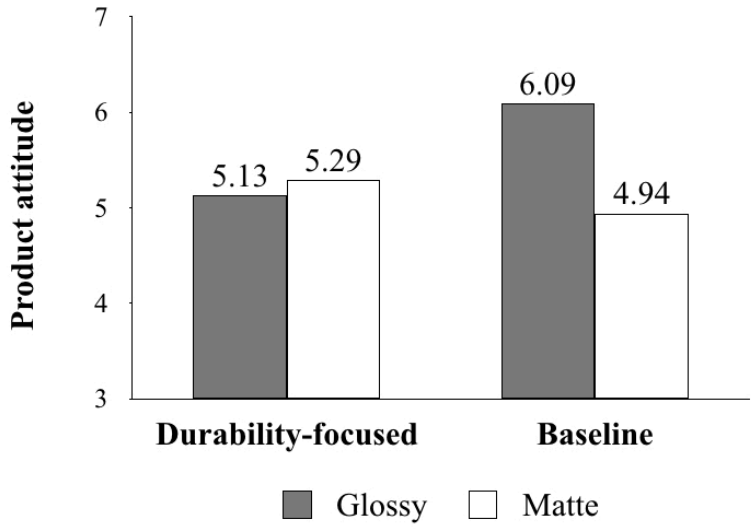
After imagining the scenario, participants were presented with either the glossy or the matte mug set used in study 2, and they completed the same 3-item product-attitude measure (α = .90) that I used in previous studies.

4.7.2. Results

An ANOVA revealed a significant main effect of glossiness on product attitude (F(1, 277) = 4.48, p = .035), qualified by a significant glossiness × evaluation focus interaction (F(1, 277) = 7.78, p = .006; η_p^2 = .03; see figure 5). Replicating my previous findings, participants showed a more favorable attitude toward the glossy (M_{glossy} = 6.09, SD = 1.63) than the matte mugs in the baseline condition (M_{matte} = 4.94, SD = 2.00; F(1, 277) = 12.33, p = .001; η_p^2 = .04). This effect, however, disappeared when durability concerns were highlighted (M_{glossy} = 5.13, SD = 1.99 vs. M_{matte} = 5.29, SD = 2.20; F < 1; NS).

FIGURE 5

STUDY 6: PRODUCT ATTITUDE



4.7.3. Discussion

The findings from study 6 support H5 and suggest that product glossiness is not always beneficial for companies. Apart from being less preferred among nostalgic consumers, glossy products carry another potential disadvantage in that they are likely to be associated with low product durability. Therefore, when durability becomes the primary concern in product judgment—for example, when consumers have recently experienced a product failure, or when durability is of great importance for a particular product category—consumers may not have more favorable attitudes toward product options with a glossy rather than matte design.

CHAPTER 5. GENERAL DISCUSSION

5.1. SUMMARY

Consumers frequently use visual elements in the marketing context as heuristics in judging various features of a product, such as its weight, quality, functionality, variety, complexity, or comfort level (e.g., Deng and Kahn 2009; Deng et al. 2016; Hagtvedt and Patrick 2014; Hoegg et al. 2010; Jiang et al. 2016), presumably because these visual elements are so salient and prevalent. Adding to this stream of research, in the current work I investigate the impact of a visual marketing element (product glossiness) on consumer judgments that has heretofore received very little attention in academic research. Six studies reveal that consumers in general prefer glossy to matte products across different product domains (studies 1–6). This effect is found to be driven by the mental association people have between glossiness and newness (study 2), and to be influenced by consumers' dispositional interest in seeking newness (study 3). Moreover, I find that the preference for glossiness is diminished and sometimes even reversed when the mental association (i.e., "glossy = new") is challenged (study 4), when nostalgic feelings are induced (study 5), and when product durability becomes a primary concern (study 6).

5.2. THEORETICAL CONTRIBUTIONS

My research contributes to the growing visual-marketing literature (e.g., Bagchi and Cheema 2012; Deng et al. 2010; Elder and Krishna 2012; Gorn et al. 2004; Hagtvedt and

Patrick 2008; Hoegg and Alba 2008; Hoegg et al. 2010; Jiang et al. 2016; Krishna 2006; Krishna et al. 2017; Mehta et al. 2017; Mehta and Zhu 2009; Patrick 2016; Patrick and Hagtvedt 2011; Raghubir and Krishna 1999) by offering novel insights regarding an important visual-marketing element, product glossiness. Every product with a surface has its level of glossiness (Kim, Marlow, and Anderson 2012). Despite the prevalence of visual glossiness in our environment—apart from its evolutionary association with water, which has been found to lead to a preference for product images printed on glossy versus matte papers and glossy versus matte photographs of landscapes and planets (Meert et al. 2014) — researchers have not yet examined the consequences of product glossiness for consumer judgments and behavior. Incorporating both laboratory and behavioral data, this research not only illustrates the consumer preference for glossy products across different product categories (e.g., mugs, portable batteries, chairs, computer mice, taps, coffee machine, lipsticks, laptops, and kettles) in various marketing contexts, it also documents situations when this effect can be mitigated or even reversed.

The current research advances our knowledge on psychological newness. Instead of examining the situation when new features are incorporated into the functionality of products (e.g., Hoeffler 2003; Zhao et al. 2009), this paper probes a non-functional source of product newness (i.e., glossiness), which can affect impressions of newness by merely altering the product appearance. I explain how the mental association between glossiness and newness influences subsequent consumer behavior, and I verify this mental association through the pilot IAT study and the finding that the effect is mitigated when the mental association ("glossy = new") is challenged (study 4). Future research is needed to explore other factors that might also influence consumers' subjective perception of product newness.

My findings add to the literature on product durability and nostalgic marketing as well. Although there is a growing amount of research on these two important marketing

elements (e.g., Cripps and Meyer 1994; Huang et al. 2016; Jiang et al. 2016; Zhou et al. 2012), studies have not yet looked at the interface between these elements and consumers' visual product preferences. Addressing this research gap, the current research finds that people alter their reactions to visual marketing elements based on feelings of nostalgia and concerns about product durability. In so doing, I hope to stimulate future research investigating how visual cues that are considered aesthetically pleasant, such as product glossiness, can interact with the other marketing elements to determine consumer preferences.

Across studies, I found that participants had more favorable attitudes toward products that were perceived as newer due to their higher levels of visual glossiness. That said, previous research on newness suggests that consumers' preference for new products may not be monotonic. For example, compared to incrementally new products (INPs), consumers are reluctant to accept really new products (RNPs) because they are uncertain about their performance, and the learning cost is high (e.g., Hoeffler 2003; Zhao et al. 2009). Putting my research in the context of these previous findings, perhaps product glossiness can increase the perceived newness of the product, but only to some extent, although it remains to be tested to what extent. It is unlikely that visual glossiness would be able to totally alter a person's perception of the product (e.g., from INP to RNP), since most of the time product aesthetics are not typically the major source of product innovation. It remains for future research to investigate the interrelationships among product glossiness, product aesthetics, and product newness in different situations.

In the current research, I adopted a general definition of impressions of newness based on the previous literature (Goode et al. 2013; Hart and Jacoby 1973) and examined its implications in a wide range of product domains. However, an impression of newness may be endowed with distinct meanings in different contexts. For example, newness may be related

to trendiness in the fashion and beauty industry, freshness for food and beverages, and futurism and avant-garde in the arts and in architecture. These distinct aspects of newness in different contexts may lead to specific consumer inferences and unique downstream consequences. The precise implications of psychological newness in different contexts might be another fruitful avenue for future research.

Besides, past research suggests that people seem unable to resist paying attention to shiny things (Meert et al. 2014; Rice 2016). Given this, glossiness may be a way to cut through the clutter of products that consumers typically see in the marketplace, like in a shopping mall or on a typical floor of a department store. Envirosell Inc., a marketing firm for top Fortune 500 companies, including Walmart and Gap, conducted a study that found that pedestrians automatically slowed down when passing shiny storefronts (Rice 2016). In this way, depending on the personal desire for attention, people may have varying preferences for glossy versus matte product designs. Future research can shed light on the various moderators of preference for glossiness related to attention. For instance, one could speculate that people may not like products with glossy (vs. matte) designs if they have low self-esteem, because they would not want to attract social attention when they feel that way.

5.3. MANAGERIAL IMPLICATIONS

My research also has managerial implications. As glossiness is one of the important design dimensions that companies need to address when creating their products, the findings in this paper can be applied to product designs that best fit the brand image. Glossy product designs may be especially suitable when the brand image is new and novel (e.g., a new beauty product or a new electronic appliance). In contrast, if the brand image is classic or

enduring, e.g., selling life-saving appliances, classic watches, or books on history, companies may prefer to use a matte product design. Going further, a brand may also be able to utilize both glossiness and matte in its product designs. As an example, a suitcase company could manufacture luggage with a glossy exterior surface to enhance the perceived newness of the product, while using matte textiles inside the luggage to communicate its durability.

Before wrapping up, I emphasize again that this work contributes to the gap in research on the relatively neglected visual element of product glossiness. My studies provide robust evidence that people in general tend to prefer glossy products, and they do so because of a mental association between glossiness and a psychological impression of newness. That said, I feel that my research, along with Meert et al.'s (2014) research that focused primarily on the effect of glossiness on image and picture preference, has only "scratched the surface" (if you pardon the pun) of the impact of this visual element that helps form the initial impression created when one looks at a product.

5.4. LIMITATIONS AND FUTURE RESEARCH

5.4.1. Individual Differences

Inevitably, this research has its limitations. First, the participants involved in the studies were university students and MTurk workers, who might in general be more innovative than the average consumer population. This corresponds to the finding in Study 3 that the average newness-seeking inclination of the participants was 5.58, which was significantly higher than the medium score of 5.00 on a 9-point scale ($t = 6.72$, $p < .001$). Therefore, conservatively speaking, consumers who are not equipped with the ability to use

the internet, or do not intend to participate in the studies might be more conservative and thereby have a weaker newness pursuit, compared to the participants in my studies. Even so, as human beings prevalently prefer newer creatures and experiences (Benett 2012; Jie and Li 2016), I believe that the preference for glossy over matte products I identified can be applicable to the general population, and may become even stronger along with rapid technological progress and the flourishing consumption market. Still, it will be intriguing for future research to explore other characteristics that may influence whether consumers display this preference for visual glossiness, so that the brands with different targeting strategies may adapt their glossiness levels to divergent consumer demands.

5.4.2. Meanings of Newness

Second, newness may be endowed with different meanings in different contexts. In particular, in the fashion and beauty industry, glossy products may be perceived as trendier than their matte counterparts, as "new" can be interpreted as "fashionable" in this product domain. I found evidence of this speculation in one of my supplementary studies, where the results disclosed that for a lipstick, the glossier the participants felt it was, the trendier they rated the product (p = .005). In this research, I adopted a more general scale with six questions adapted from past literature to measure perceived newness (Goode, Dahl, and Moreau, 2013; Hart and Jacob, 1973). These questions can be applied to a wide range of product domains. Even so, I do not deny that newness may be incorporated with different meanings depending on the product category, such as trendiness in the fashion and beauty industry, freshness for food and beverages, and futurism and avant-garde for arts and architectures. I also provide an avenue for future research to specify the meaning of newness more precisely and accurately.

5.4.3. Applications

Third, in the seven studies in this research, I only explored the effect of glossy versus matte surface when directly being applied in product design. Nevertheless, I believe that the findings in this article can be further extended to other visual marketing stimuli, such as packaging, logos, advertisement, social media, and interior design. It is also open to future research to compare and see if there are any distinctions of the impact of visual glossiness when applied in different marketing elements.

5.4.4. Glossiness and Time

Fourth, based on my results demonstrating the moderating role played by nostalgic feelings and durability concerns in regard to the impact of glossiness on product attitude, I surmise that the distinctive impact of glossy versus matte design can be reflected on a timeline. First, I think that glossiness may represent a positive or future direction, so that glossy products are perceived as newer, more recent, more futuristic, and more innovative. On the contrary, a matte design can be associated with a negative or past direction on the timeline, so that they are cherished when nostalgic feelings are induced. Second, I infer that glossiness is associated with a shorter time window, but matte is related to a longer timeframe. This is evinced by my finding that glossy products were perceived as less durable than matte ones. If this is the case, consumers may have a higher replacement rate for products with a glossy, rather than matte design. I encourage future research to examine the relationship between glossiness and time, and its other downstream consequences on consumer judgment and behavior.

5.4.5. Glossiness, Value, Brightness and Smoothness

Fifth, I believe that glossiness has its unique contributions as it is distinctive from other well-established constructs, such as value (lightness), brightness, and smoothness (for more details, see appendix I). Above all, value, brightness and glossiness are defined distinctively. Value (lightness) describes the whiteness versus blackness of a specific color, which depends on the percentage of light a color can reflect; brightness describes how much light actually reflects from a surface to the visual field; while glossiness represents the relative proportion of specular reflection to diffuse reflection (Cleland 1937; Olkkonen and Brainard 2010; Schirillo, Reeves and Arend 1990). In addition, glossiness can be easily distinguished from value and brightness in reality. Glossy products usually have a "highlight" (white spots), and when they move or spin, and the highlight can move to a different location on the products. Hence, the brightness of a product experienced by the audience is unevenly distributed on a glossy product (Nefs, Koenderink, and Kappers 2006). As highlight is a very important attribute when subjectively judging whether a surface is glossy or matte (Beck and Prazdny 1981), it is a key characteristic manipulated in the experiments in this research. At the same time, other factors that may influence value and brightness judgments (e.g., illumination and viewing direction; Hartung and Kersten 2002; Ho, Landy, and Maloney 2006) were controlled as almost constant in my designs. In one of my supplementary studies, I found that the effect of glossiness on healthiness judgment was in the opposite direction to the effect of value on healthiness inference (Mai, Symmank, and Seeberg-Elverfeldt 2016) when applied in food packaging design. However, I mainly leave the opportunity for future research to further explore this.

Another construct related to glossiness is smoothness, which was defined as how frictionless a surface is and can be subjectively judged by the particle size and density on a surface (Stevens and Harris 1962). In this paper, surface glossiness and smoothness are distinguished mainly from two perspectives. First, except for Study 4, respondents were not provided with an opportunity to have haptic contact with the product by feeling the actual texture of the product's surface. However, it cannot be denied that consumers may make inferences regarding the smoothness through a product's outlook, and they may perceive a matte surface to be rougher than a glossy one when they are explicitly asked. Second, the surface in the matte condition does not have very large particles, but instead, consists of very tiny ones that make the surface flat rather than lumpy from a macroscopic view. This can be evidenced from the results in most studies, which found that the participants felt that the surface was still smoother than neutral ($M > 5.00$) on a 9-point scale. Future research may design relevant studies to further distinguish the influence of glossiness from other sensory constructs.

5.4.6. Glossiness and Attention

Sixth, past research suggests that people do not seem to be able to resist paying attention to shiny things (Meert et al. 2014; Rice 2016). Given this, glossiness may be a way to cut through the clutter of products that consumers typically see in the marketplace, like in a shopping mall, or on a typical floor of a department store. Envirosell Inc., a marketing firm for top fortune 500 companies, including Walmart & Gap, conducted a study which found that pedestrians automatically slowed down when passing shiny store fronts (Rice 2016). In this way, depending on the personal desire for attention, consumers may have varying preference for glossy versus matte product designs. Further research can shed light on the

various moderators of preference for glossiness related to attention. For instance, I speculate that when consumers feel like conforming to a group, e.g., after being socially excluded, they may dislike products with glossy designs, when compared to others with a matte surface.

5.4.7. Glossiness and Healthiness

Besides, future research may also investigate other impacts of glossiness on various marketing-related judgments and behavior. For instance, I also found that there was a negative impact of packaging glossiness on the perception of food healthiness. Two studies demonstrate that consumers judge food and beverages with glossy exterior packages as less healthy, than those in matte packages. This effect is driven by the belief that food and beverages in glossy packaging are more processed, and moderated by the stereotyped perceived healthiness of the food category.

I suggest that consumers infer the level of food processing from the glossiness of its exterior packaging, and believe that the food in glossy (matte) packages is more (less) processed in production. This supposition is rationalized on evolutionary grounds. Solids in nature such as trees, rocks and animals usually have matte surfaces. Although some of the natural objects may look glossy at a specific time point, such as right after rainfall, this episodic glossy state is not enduring. Therefore, matte represents the prevailing and stable stage of solids in nature. Meanwhile, human effort and machine processes are usually involved in making glossy surfaces, e.g., smelting, slicing, and burnishing of plastic and metal (Lee, Jung, and Chu 2015; Sun et al. 2016). As a result, human beings may have gradually developed strong mental associations between glossy surfaces and human or machine processes due to repeated pairing-up during evolution, an effect similar to the perceptual link between symmetry and attractiveness (Grammer and Thornhill 1994). Thus, I

propose that food in glossy (matte) packages can be perceived as having a higher (lower) degree of processing.

At the same time, food and beverages with a higher level of processing may be regarded as less healthy based on two rationales. First, the degree of processing is negatively related to naturalness, which positively predicts healthiness in general (Rozin 2005; Karnopp et al. 2017). Second, processing is prevalently interpreted as adding extra ingredients to food, such as additives and preservatives, which are stereotyped as unhealthy (Luomala et al. 2015). Furthermore, I predict that packaging glossiness serves as a heuristic in judging healthiness only when consumers cannot find other straightforward and solid cues to guide their evaluation. For instance, consumers may hold a strong belief that fruit juice-flavored soda belongs to the unhealthy beverage category, so that their evaluation of healthiness may be independent of packaging glossiness. Meanwhile, consumers may have a blurred perception of healthiness of fruit juice, so that packaging glossiness can be adopted as the evaluation basis. Therefore, stereotyped healthiness of a food category may play a moderating role in the relationship. Given that food-related judgments are influenced by consumers' abilities to relieve stress and to maintain self-control (Dallman 2009), and the body mass index (BMI) can represent these abilities (Logel and Cohen 2011), I controlled participants' BMI (i.e. the ratio of weight to squared height (kg/m^2); Keys et al. 1972) in my studies.

In study 1, university students ($N = 96$) were recruited and randomly assigned to glossy or matte packaging conditions and were asked to evaluate a food product. Specifically, participants in the glossy (matte) packaging condition were provided with a photo of a glossy (matte) milk box, while strictly controlling other visual attributes of the box. Participants judged the perceived level of processing of the milk. At the end of the study, participants also provided their height and weight for BMI calculation. Consistent with my predictions, when

controlling for participants' BMI, participants in the glossy packaging condition perceived the milk as being significantly more processed in the production than those in the matte packaging condition.

The objective of study 2 is twofold: to examine that perceived level of processing mediates the main effect, and to verify that the effect happens only when consumers have a blurred perception of healthiness in the food category. In study 2, MTurk participants (N=257) were recruited and randomly assigned to one of the 2 (glossy vs. matte packaging) × 2 (juice vs. soda) between subject conditions. Participants were given one of four photos of a bottled beverage, either indicating *Juicy Juice*, *all natural*, and *100% juice*, or *Juicy Soda*, *sparkling*, and *10% juice* on its packaging, and either in a glossy or matte bottle design, while holding other attributes constant. Next, the participants indicated their perceived level of processing in the product production and estimated its healthiness. As in study 1, the participants also provided their height and weight for BMI calculation. As expected, when controlling BMI, there was a significant moderated mediation effect. When the product was fruit juice, participants in the glossy (matte) packaging condition judged the fruit juice as being significantly less healthy (healthier), an effect which was mediated by the perceived level of processing. However, when the product was soda, the impact of packaging glossiness on both the degree of processing and perceived healthiness became insignificant.

To recap, I found that consumers perceived food and beverages to be less healthy (healthier) if they have glossy (matte) packaging, an effect which is driven by a higher perceived degree of food processing of glossy-packaged food items, and moderated by the stereotyped perceived healthiness of the product category. Taken together, my findings shed light on literature in regard to glossiness, packaging design, visual marketing, food healthiness and consumer behavior, as well as providing a practical solution for brands to

establish a healthier food image through lessening the glossiness of their package designs (for more details, see appendix J).

5.4.8. Glossiness and Environmental Protection

In addition, I also investigated another situation when consumers have more negative attitudes toward a glossy, compared to a matte, product design. It was found that when an environmental protection goal becomes salient, consumers have more favorable attitudes toward products with a matte rather than glossy design. This effect is mediated by the heightened perceived naturalness of materials used in manufacturing matte (vs. glossy) products. I further predict that this effect should be more relevant for disposable products, rather than durable goods. In addition, when disposing of the products, consumers are more likely to exert efforts to recycle glossy than matte products, due to the greater estimated harm to the environment of products with a glossy (vs. matte) surface.

5.4.9. Summary

To recapitulate, I have provided insights into the impact of glossiness on newness and consumer attitudes in this research. My findings contribute to different streams of research, offer wide marketing implications, and also encourage diversifying future research.

REFERENCES

Alexander, David L., John G. Lynch, Jr., and Qing Wang (2008), "As Time Goes By: Do Cold Feet Follow Warm Intentions for Really New versus Incrementally New Products?" *Journal of Marketing Research*, 45 (3), 307–19.

Apple Inc. (2018), "Choose an iPhone 7 Model," https://www.apple.com/hk/shop/buy-iphone/iphone-7.

Bagchi, Rajesh and Amar Cheema (2013), "The Effect of Red Background Color on Willingness-to-Pay: The Moderating Role of Selling Mechanism," *Journal of Consumer Research*, 39 (5), 947–60.

Bahn, Sangwoo, Cheol Lee, Chang S. Nam, and Myung H. Yun (2009), "Incorporating Affective Customer Needs for Luxuriousness into Product Design Attributes," *Human Factors and Ergonomics in Manufacturing*, 19 (2), 105–27.

Baldwin, Matthew, Monica Biernat, and Mark J. Landau (2015), "Remembering the Real Me: Nostalgia Offers a Window to the Intrinsic Self," *Journal of Personality and Social Psychology*, 108 (1), 128–47.

Bennett, Bo (2012), *Logically Fallacious: The Ultimate Collection of over 300 Logical Fallacies (academic edition)*, Boston: eBookIt.com Press.

Bunzeck, Nico and Emrah Düzel (2006), "Absolute Coding of Stimulus Novelty in the Human Substantia Nigra/VTA," *Neuron*, 51 (3), 369–79.

Bunzeck, Nico, Marc Guitart-Masip, Raymond J. Dolan, and Emrah Düzel (2014), "Pharmacological Dissociation of Novelty Responses in the Human Brain," *Cereb Cortex*, 24 (5), 1351–60.

Chartier, Germain (2005), *Introduction to Optics*, New York: Springer Press.

Cloonan, Caroline and Gwenaëlle B. Decré (2015), "The Cross-Modal Effects of Packaging Glossiness on Haptic Perception," in *Asia Pacific Advances in Consumer Research*,

Vol. 11, ed. Echo W. Wan and Meng Zhang, Duluth, MN: Association for Consumer Research, 124–25.

Collins, Allan M. and Elizabeth F. Loftus (1975), "A Spreading-Activation Theory of Semantic Processing," *Psychological Review*, 82 (6), 407–28.

Cripps, John D. and Robert J. Meyer (1994), "Heuristics and Biases in Timing the Replacement of Durable Products," *Journal of Consumer Research*, 21 (2), 304–18.

Davis, Fred (1979), *Yearning for Yesterday: A Sociology of Nostalgia*, New York: The Free Press.

de Leeuw, Joshua R. (2015), "jsPsych: A JavaScript Library for Creating Behavioral Experiments in a Web Browser," *Behavior Research Methods*, 47 (1), 1–12.

Deng, Xiaoyan and Barbara E. Kahn (2009), "Is Your Product on the Right Side? The 'Location Effect' on Perceived Product Heaviness and Package Evaluation," *Journal of Marketing Research*, 46 (6), 725–38.

Deng, Xiaoyan, Barbara E. Kahn, H. Rao Unnava, and Hyojin Lee (2016), "A 'Wide' Variety: Effects of Horizontal versus Vertical Display on Assortment Processing, Perceived Variety, and Choices," *Journal of Marketing Research*, 53 (5), 682–98.

Deng, Xiaoyan, Sam K. Hui, and Wesley Hutchinson (2010), "Consumer Preferences for Color Combinations: An Empirical Analysis of Similarity-Based Color Relationships," *Journal of Consumer Psychology*, 20 (4), 476–84.

Denisova, Alena and Paul Cairns (2015), "The Placebo Effect in Digital Games: Phantom Perception of Adaptive Artificial Intelligence," in *Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play*, Association for Computing Machinery Press, 23–33.

Donnelly, James H., Jr. and Michael J. Etzel (1974), "Attempting to Operationalize Product Newness: A Reply to Ostlund and Tellefsen," *Journal of Applied Psychology*, 59 (4), 761–63.

Elder, Ryan S. and Aradhna Krishna (2012), "The 'Visual Depiction Effect' in Advertising: Facilitating Embodied Mental Simulation Through Product Orientation," *Journal of Consumer Research*, 38 (6), 988–1003.

Fullerton, Ronald A. (1988), "How Modern Is Modern Marketing? Marketing's Evolution and the Myth of the 'Production Era'," *Journal of Marketing*, 52 (1), 108–25.

Garvin, David A. (1984), "Product Quality: An Important Strategic Weapon," *Business Horizons*, 27 (3), 40–43.

Gibson, Bryan (2008), "Can Evaluative Conditioning Change Attitudes toward Mature Brands? New Evidence from the Implicit Association Test," *Journal of Consumer Research*, 35 (1), 178–88.

Gilbert, Daniel T. (1989), "Thinking Lightly about Others: Automatic Components of the Social Inference Process," *Unintended Thought*, ed. James S. Uleman and John A. Bargh, New York: Guilford Press, 189–211.

Global Auto Report (2018), "Number of Cars Sold Worldwide from 1990 to 2018 (in Million Units)," Statista, https://www.statista.com/statistics/200002/international-car-sales-since-1990/.

Goode, Miranda R., Darren W. Dahl, and C. Page Moreau (2013), "Innovation Aesthetics: The Relationship between Category Cues, Categorization Certainty, and Newness Perceptions," *Journal of Product Innovation Management*, 30 (2), 192–208.

Gorn, Gerald J., Amitava Chattopadhyay, Jaideep Sengupta, and Shashank Tripathi (2004), "Waiting for the Web: How Screen Color Affects Time Perception," *Journal of Marketing Research*, 41 (2), 215–25.

Gorn, Gerald J., Yuwei Jiang, and Gita V. Johar (2008), "Babyfaces, Trait Inferences, and Company Evaluations in a Public Relations Crisis," *Journal of Consumer Research*, 35 (1), 36–49.

Greenwald, Anthony G., Brian A. Nosek, and Mahzarin R. Banaji (2003), "Understanding and Using the Implicit Associations Test: I, An Improved Scoring Algorithm," *Journal of Personality and Social Psychology*, 85 (2), 197–216.

Greenwald, Anthony G., Debbie E. McGhee, and Jordan L. K. Schwartz (1998), "Measuring Individual Differences in Implicit Cognition: The Implicit Association Test," *Journal of Personality and Social Psychology*, 74 (6), 1464–80.

Hagtvedt, Henrik and Vanessa M. Patrick (2008), "Art Infusion: The Influence of Visual Art on the Perception and Evaluation of Consumer Products," *Journal of Marketing Research*, 45 (3), 379–89.

Hagtvedt, Henrik and Vanessa M. Patrick (2014), "Consumer Response to Overstyling: Balancing Aesthetics and Functionality in Product Design," *Psychology & Marketing*, 31 (7), 518–25.

Hart, Edward W. and Jacob Jacoby (1973), "Novelty, Recency, and Scarcity as Predictors of Perceived Newness," in *Proceedings of the Annual Convention of the American Psychological Association*, Michigan: American Psychological Association, 845–46.

Hayes, Andrew F. (2013), *Introduction to Mediation, Moderation and Conditional Process Analysis: A Regression-based Approach*, New York: The Guilford Press.

Heiberg, Johan L., Heinrich Menge, and Ernst L. Curtze (1895), *Euclidis Opera Omnia*, Lipsiae (New York): In Aedibus B. G. Teubner Press.

Hoeffler, Steve (2003), "Measuring Preferences for Really New Products," *Journal of Marketing Research*, 40 (4), 406–20.

Hoegg, JoAndrea and Joseph W. Alba (2008), "A Role for Aesthetics in Consumer Psychology," in *Handbook of Consumer Psychology*, ed. Curtis P. Haugtvedt, Paul M. Herr, and Frank R. Kardes, Newbury Park, CA: Sage Press, 733–54.

Hoegg, JoAndrea, Joseph W. Alba, and Darren W. Dahl (2010), "The Good, the Bad, and the Ugly: Influence of Aesthetics on Product Feature Judgments," *Journal of Consumer Psychology*, 20 (4), 419–30.

Hornby, Albert S. and Jonathan Crowther (1995), *Oxford Advanced Leaner's Dictionary of Current English*, Kuala Lumpur: Oxford University Press.

Huang, Xun (Irene), Zhongqiang (Tak) Huang, and Robert S. Wyer, Jr. (2016), "Slowing Down in the Good Old Days: The Effect of Nostalgia on Consumer Patience," *Journal of Consumer Research*, 43 (3), 372–87.

Jhang, Ji H., Susan J. Grant, and Margaret C. Campbell (2012), "Get It? Got It. Good! Enhancing New Product Acceptance by Facilitating Resolution of Extreme Incongruity," *Journal of Marketing Research*, 49 (2), 247–59.

Jiang, Yuwei, Gerald J. Gorn, Maria Galli, and Amitava Chattopadhyay (2016), "Does Your Company Have the Right Logo? How and Why Circular and Angular Logo Shapes Influence Brand Attribute Judgments," *Journal of Consumer Research*, 42 (5), 709–26.

Jie, Joseph Y. and Ye Li (2016), "Newness for Newness's Sake: Consumers' Bias toward Newer Options," working paper, University of California, Riverside.

Joh, Amy S., Karen E. Adolph, Margot R. Campbell, and Marion A. Eppler (2006), "Why Walkers Slip: Shine Is Not a Reliable Cue for Slippery Ground," *Perception & Psychophysics*, 68 (3), 339–52.

Karana, Elvin, Paul Hekkert, and Prabhu Kandachar (2009), "Meanings of Materials through Sensorial Properties and Manufacturing Processes," *Materials and Design*, 30 (7), 2778–84.

Kardes, Frank R., Maria L. Cronley, James J. Kellaris, and Steven S. Posavac (2004), "The Role of Selective Information Processing in Price-Quality Inference," *Journal of Consumer Research*, 31 (2), 368–74.

Kim, Juno, Phillip J. Marlow, and Barton L. Anderson (2012), "The Dark Side of Gloss," *Nature Neuroscience*, 15 (11), 1590–95.

Kostecki, Michel (2013), *The Durable Use of Consumer Products: New Options for Business and Consumption*, Dordrecht: Springer Science+Business Media Press.

Krishna, Aradhna (2006), "The Interaction of Senses: The Effect of Vision and Touch on the Elongation Bias," *Journal of Consumer Research*, 32 (4), 557–66.

Krishna, Aradhna, Luca Cian, and Nilüfer Z. Aydinoğlu (2017), "Sensory Aspects of Package Design," *Journal of Retailing*, 93 (1), 43–54.

Labrecque, Lauren I., Vanessa M. Patrick, and George R. Milne (2013), "The Marketers' Prismatic Palette: A Review of Color Research and Future Directions," *Psychology and Marketing*, 30 (2), 187–202.

Lane, Kristin A., Mahzarin R. Banaji, Brian A. Nosek, and Anthony G. Greenwald (2007), "Understanding and Using the Implicit Association Test: IV: What We Know (So Far) about the Method," in *Implicit Measures of Attitudes*, ed. Bernd Wittenbrink and Norbert Schwarz, New York: Guilford Press, 59–102.

Lee, Hyojin, Kentaro Fujita, Xiaoyan Deng, and H. Rao Unnava (2017), "The Role of Temporal Distance on the Color of Future-directed Imagery: A Construal-Level Perspective," *Journal of Consumer Research*, 43 (5), 707–25.

Mai, Robert, Claudia Symmank, and Berenike Seeberg-Elverfeldt (2016), "Light and Pale Colors in Food Packaging: When Does This Package Cue Signal Superior Healthiness or Inferior Tastiness?" *Journal of Retailing*, 92 (4), 426–44.

McClelland, Gary H., John G. Lynch, Jr., Julie R. Irwin, Stephen A. Spiller, and Gavan J. Fitzsimons (2015), "Median Splits, Type II Errors, and False-Positive Consumer Psychology: Don't Fight the Power," *Journal of Consumer Psychology*, 25 (4), 679–89.

Meert, Katrien, Mario Pandelaere, and Vanessa M. Patrick (2014), "Taking a Shine to It: How the Preference for Glossy Stems from an Innate Need for Water," *Journal of Consumer Psychology*, 24 (2), 195–206.

Mehta, Ravi, Joris Demmers, Willemijn M. van Dolen, and Charles B. Weinberg (2017), "When Red Means Go: Non-Normative Effects of Red under Sensation Seeking," *Journal of Consumer Psychology*, 27, 91–97.

Mehta, Ravi, and Rui (Juliet) Zhu (2009), "Blue or Red? Exploring the Effect of Color on Cognitive Task Performances," *Science*, 323, 1226–29.

Mitchell, Andrew A. (1982), "Models of Memory: Implications for Measuring Knowledge Structures," in *Advances in Consumer Research*, Vol. 9, ed. Andrew A. Mitchell, Ann Arbor, MI: Association for Consumer Research, 45–51.

Nicodemus, Fred E., Joseph C. Richmond, Jack J. Hsis, Warren I. Ginsberg, and Peter T. Limperis (1977), *Geometrical Considerations and Nomenclature for Reflectance*, Washington: National Bureau of Standards Press.

Patrick, Vanessa M. (2016), "Everyday Consumer Aesthetics," *Current Opinion in Psychology*, 10, 60–64.

Patrick, Vanessa M. and Henrik Hagtvedt (2011), "Aesthetic Incongruity Resolution," *Journal of Marketing Research*, 48 (2), 393–402.

Pfund, August H. (1930), "The Measurement of Gloss," *Journal of the Optical Society of America*, 20 (1), 23–25.

Perkins, Andrew W. and Mark R. Forehand (2012), "Implicit Self-Referencing: The Effect of Nonvolitional Self-Association on Brand and Product Attitude," *Journal of Consumer Research*, 39 (1), 142–56.

Radford, Scott K. and Peter H. Bloch (2011), "Linking Innovation to Design: Consumer Responses to Visual Product Newness," *Journal of Product Innovation Management*, 28 (S1), 208–20.

Raghubir, Priya and Aradhna Krishna (1999), "Vital Dimensions in Volume Perception: Can the Eye Fool the Stomach?" *Journal of Marketing Research*, 36 (3), 313–26.

Rice, Christopher (2016), "Why Does Shiny Stuff Sell?" https://siliconlightworks.com/resoures/why-does-shiny-stuff-sell.

Rozin, Paul, Julia M. Hormes, Myles S. Faith, and Brian Wansink (2012), "Is Meat Male? A Quantitative Multimethod Framework to Establish Metaphoric Relationships," *Journal of Consumer Research*, 39 (3), 629–43.

Selinger, Miranda, Darren Dahl, and C. Page Moreau (2006), "'Is This Product Really New?' A Study on the Effect of Category Information and Certainty on Newness Evaluations of New-to-Market Products," in *Advances in Consumer Research*, Vol. 33, ed. Connie Pechmann and Linda Price, Duluth, MN: Association for Consumer Research, 323–23.

Shanks, David R. and Francisco J. López (1996), "Causal Order Does Not Affect Cue Selection in Human Associative Learning," *Memory & Cognition*, 24 (4), 511–22.

Simmons, Carolyn J. and John G. Lynch, Jr. (1991), "Inference Effects without Inference Making? Effects of Missing Information on Discounting and Use of Presented Information," *Journal of Consumer Research*, 17 (4), 477–91.

Spiller, Stephen A., Gavan J. Fitzsimons, John G. Lynch, Jr., and Gary H. McClelland (2013), "Spotlights, Floodlights, and the Magic Number Zero: Simple Effects Tests in Moderated Regression," *Journal of Marketing Research*, 50 (2), 277–88.

Steenkamp, Jan-Benedict E. M. and Hans Baumgartner (1995), "Development and Cross-Cultural Validation of a Short Form of CSI as a Measure of Optimum Stimulation Level," *International Journal of Research in Marketing*, 12 (2), 97–104.

Steenkamp, Jan-Benedict E. M., Frenkel ter Hofstede, and Michel Wedel (1999), "A Cross-National Investigation into the Individual and National Cultural Antecedents of Consumer Innovativeness," *Journal of Marketing*, 63 (2), 55–69.

Stoklosa, Alexander (2012), "BMW Introduces 2013 M3 Coupe Frozen Limited Edition (Now Available in Three Matte Colors!)," https://www.caranddriver.com/news/bmw-introduces-2013-m3-coupe-frozen-limited-edition-now-available-in-three-matte-colors.

Svetlik, Joe (2011), "Xbox 360 S Going All Matte, No Gloss," CNET Gaming, https://www.cnet.com/news/xbox-360-s-going-all-matte-no-gloss/.

Townsend, Claudia and Barbara E. Kahn (2013), "The 'Visual Preference Heuristic': The Influence of Visual versus Verbal Depiction on Assortment Processing, Perceived Variety, and Choice Overload," *Journal of Consumer Research*, 40 (5), 993–1015.

Watson, David, Lee A. Clark, and Auke Tellegen (1988), "Development and Validation of Brief Measures of Positive and Negative Affect: The PANAS Scales," *Journal of Personality and Social Psychology*, 54 (6), 1066–70.

Wickelgren, Wayne A. (1981), "Human Learning and Memory," *Annual Review of Psychology*, 32 (1), 21–52.

Young, Sarah (2018), “Lip Gloss Is Back on the Beauty Scene for 2018,” *Independent,* https://www.independent.co.uk/life-style/fashion/lip-gloss-trend-comeback-2018-beauty-glossier-fenty-beauty-a8367351.html.

Yves Saint Laurent (2018), “Yves Saint Laurent Lipsticks,” https://www.yslbeauty.com.hk/en/product-category/makeup-en/makeup-lips-en/.

Zhao, Min, Steve Hoeffler, and Darren W. Dahl (2009), “The Role of Imagination-Focused Visualization on New Product Evaluation,” *Journal of Marketing Research*, 46 (1), 46–55.

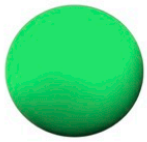
Zhou, Xinyue, Constantine Sedikides, Tim Wildschut, and Ding-Guo Gao (2008), “Counteracting Loneliness: On the Restorative Function of Nostalgia,” *Psychological Science*, 19 (10), 1023–29.

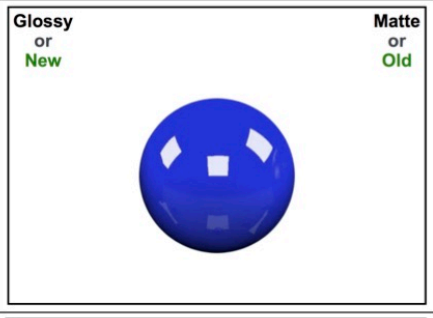
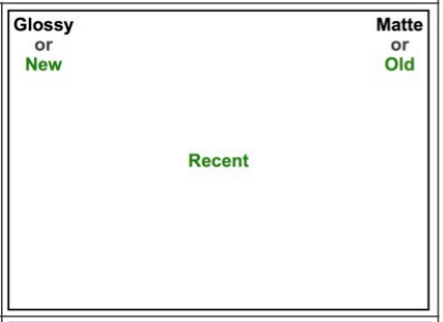
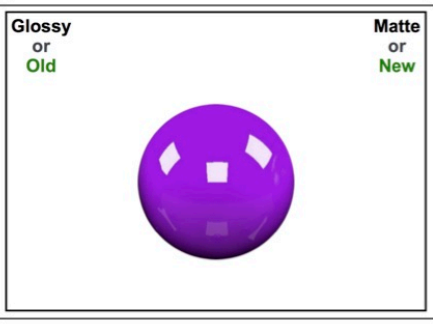
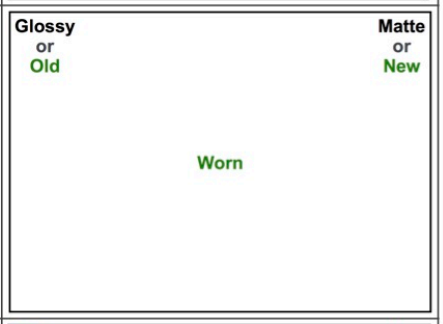
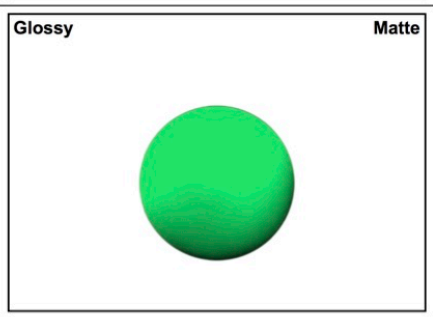
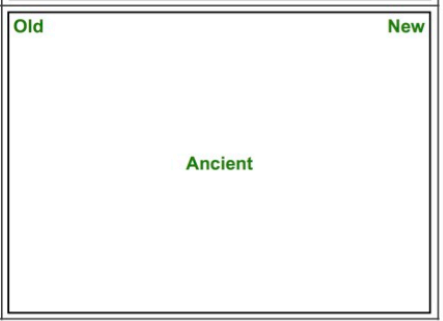
Zhou, Xinyue, Tim Wildschut, Constantine Sedikides, Kan Shi, and Cong Feng (2012), “Nostalgia: The Gift That Keeps on Giving,” *Journal of Consumer Research*, 39 (1), 39–50.

APPENDICES

APPENDIX A

PILOT STUDY: STIMULI

Glossy versus Matte Spheres				
				
				

IAT Example Trials		
Consistent trials		
Inconsistent trials		
Practice trials		

APPENDIX B

PRETESTS OF GLOSSINESS

Questions:

Participants randomly saw the glossy **or** the matte version of each product design.

1. How **glossy** do you think the product in the picture is?

(1 = Not glossy at all; 9 = Very glossy)

2. How **shiny** do you think the product is?

(1 = Not shiny at all; 9 = Very shiny)

3. How much **light** do you think this product can **reflect**?

(1 = Very little; 9 = Very much)

4. How **smooth** do you think the surface of the product is?

(1 = Very rough; 9 = Very smooth)

5. How much do you think that this product has been **polished**?

(1 = Very little; 9 = Very much)

Results:

Studies	Products/Shapes	Glossiness	Mean	SD
Pilot (only questions 1 to 3)	Blue sphere	Glossy	6.96***	1.53
		Matte	4.35	2.48
	Green sphere	Glossy	7.00***	1.48
		Matte	4.44	2.39
	Pink sphere	Glossy	7.01***	1.45
		Matte	4.52	2.24
	Orange Sphere	Glossy	6.78***	1.75
		Matte	4.34	2.24
	Purple sphere	Glossy	6.87***	1.65
		Matte	4.43	2.52
Studies 1 and 4	Chair (design A)	Glossy	7.54***	1.22
		Matte	4.72	1.64
	Chair (design B)	Glossy	7.65***	1.35
		Matte	4.91	2.00
	Coffee machine (design A)	Glossy	5.93**	1.76
		Matte	4.89	1.76

	Coffee machine (design B)	Glossy	7.28***	1.31
		Matte	4.86	1.75
	Bike helmet (design A)	Glossy	6.90***	1.33
		Matte	5.79	1.88
	Bike helmet (design B)	Glossy	7.02***	1.41
		Matte	5.78	1.77
	Kettle (design A)	Glossy	8.03***	1.13
		Matte	5.99	1.40
	Kettle (design B)	Glossy	7.37***	1.22
		Matte	4.03	1.61
	Laptop (design A)	Glossy	6.54***	1.64
		Matte	4.80	1.67
	Laptop (design B)	Glossy	6.96***	1.21
		Matte	5.54	1.70
	Leather shoes (design A)	Glossy	8.13***	1.00
		Matte	3.85	1.88
	Leather shoes (design B)	Glossy	8.10***	.92
		Matte	3.45	1.90
	Lipsticks (design A)	Glossy	6.38***	1.69
		Matte	4.71	1.81
	Lipsticks (design B)	Glossy	6.78***	1.32
		Matte	4.77	1.78
	Taps (design A)	Glossy	7.70***	1.23
		Matte	6.68	1.65
	Taps (design B)	Glossy	7.78***	1.04
		Matte	6.48	1.54
	Vases (design A)	Glossy	7.14***	1.33
		Matte	3.26	1.55
	Vases (design B)	Glossy	7.64***	1.21
		Matte	4.26	1.41
Studies 2 and 6	Mugs	Glossy	7.45***	.95
		Matte	3.76	1.58
Study 3	Computer mice	Glossy	6.31***	1.45
		Matte	4.47	1.41
Study 4	Portable batteries	Glossy	7.43***	1.02
		Matte	3.20	1.74
Study 5	Chairs	Glossy	7.51***	.87
		Matte	4.95	1.78

* $p < .05$; ** $p < .01$; *** $p < .001$

APPENDIX C

PILOT STUDY: PRETEST OF ADJECTIVES

Questions:

(randomized word sequence)

Word XXX

Please classify this word into one of the three categories:

( ) is a synonym of "**new**" or can express "**new**"

( ) **cannot** express "new" or "old"

( ) is a synonym of "**old**" or can express "**old**"

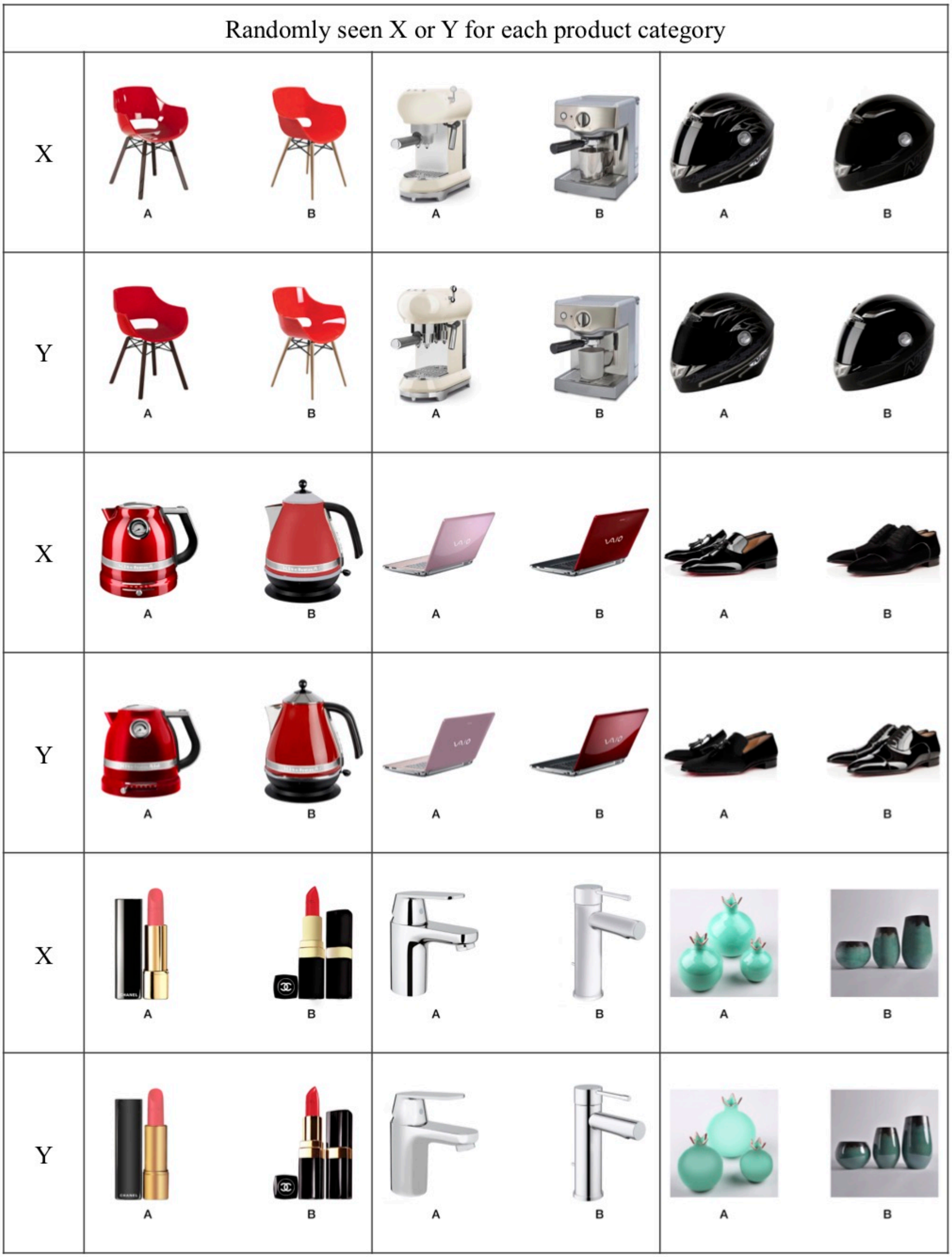
Results:

Adjectives Expressing "New"			
Words	New	Neither	Old
Modern	76.5%***	13.7%	9.8%
Fresh	72.5%***	19.6%	7.8%
Innovative	72.5%***	21.6%	5.9%
Recent	66.7%*	23.5%	9.8%
Current	64.7%*	27.5%	7.8%
Adjectives Expressing "Old"			
Words	New	Neither	Old
Ancient	15.7%	3.9%	80.4%***
Aged	11.8%	13.7%	74.5%***
Former	9.8%	17.6%	72.5%***
Worn	9.8%	25.5%	64.7%*
Stale	13.7%	25.5%	60.8%

Significantly larger than 50%: * $p < .05$; ** $p < .01$; *** $p < .001$

APPENDIX D

STUDY 1: GLOSSY VERSUS MATTE PRODUCTS (RANDOMIZED ORDER)



APPENDIX E

STIMULI USED IN STUDIES 2 TO 6

<table>
<tr><td colspan="2">STUDIES 2 AND 6</td></tr>
<tr><td>Glossy mugs</td><td>Matte mugs</td></tr>
<tr><td> 

Product:
Mugs (Set of 3)
Volume:
A: 13 oz, B: 16 oz, C: 22 oz
Item weight:
A: 9 oz, B: 11 oz, C: 15 oz
Material:
Bone-China ceramic
Manufacturer:
Velonair
ASIN:
B06XP1HRVL
Other information:
Free packaging in gift box</td><td> 

Product:
Mugs (Set of 3)
Volume:
A: 13 oz, B: 16 oz, C: 22 oz
Item weight:
A: 9 oz, B: 11 oz, C: 15 oz
Material:
Bone-China ceramic
Manufacturer:
Velonair
ASIN:
B06XP1HRVL
Other information:
Free packaging in gift box</td></tr>
<tr><td colspan="2">STUDY 3</td></tr>
<tr><td>Glossy mouse</td><td>Matte mouse</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">STUDY 4</td></tr>
<tr><td>Glossy portable battery</td><td>Matte portable battery</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">STUDY 5</td></tr>
<tr><td>Glossy chair</td><td>Matte chair</td></tr>
<tr><td>  </td><td>  </td></tr>
</table>

APPENDIX F

STUDY 4: MEMORY TASK

Inconsistent association (matte–newness) Randomly seen X1 or Y1		Consistent association (glossiness–newness) Randomly seen X2 or Y2	
X1	Y1	X2	Y2

APPENDIX G

STUDY 5: PRETEST OF SONGS

Songs:

(in Cantonese, nostalgic vs. control songs between-subjects design)

Nostalgic songs: 下一站天后，紅日，朋友仔

Control songs: 畢業之後，Wonder Women，愛與罪

Questions:

[After each song]

1. Overall, how would you **rate** this song? (Star 1–5)

2. How **exciting** do you think this song is? (1 = Very calm; 9 = Very exciting)

3. How **nostalgic** do you think this song is? (1 = Very little; 9 = Very much)

4. Based on your estimation, in which **year** was this song first released?

[After three songs] Positive and Negative Affect Schedule (PANAS; Watson, Clark, and Tellegen 1988) to measure their feelings **right now**

Results:

Items	Conditions	Mean	SD
Average song ratings	Nostalgic	3.40	.87
	Control	3.24	.62
Average exciting levels	Nostalgic	5.56	1.43
	Control	5.66	1.10
Average nostalgic feelings	Nostalgic	7.06***	1.07
	Control	4.71	1.45
Average perceived release year	Nostalgic	2002.60***	2.39
	Control	2007.76	4.90
Mood (positive)	Nostalgic	27.39	5.45
	Control	28.43	5.99
Mood (negative)	Nostalgic	21.53	7.89
	Control	23.84	9.42

* $p < .05$; ** $p < .01$; *** $p < .001$

APPENDIX H

STUDY 6: PRETEST OF DURABILITY FOCUS

Durability focus vs. baseline between-subjects design:

Please indicate your perceived importance of the following dimensions when purchasing mugs:

Brand (1 = Not important at all; 9 = Very important)

Color (1 = Not important at all; 9 = Very important)

Shape (1 = Not important at all; 9 = Very important)

Size (1 = Not important at all; 9 = Very important)

Texture (1 = Not important at all; 9 = Very important)

Durability (1 = Not important at all; 9 = Very important)

Price (1 = Not important at all; 9 = Very important)

Results:

Items	Conditions	Mean	SD
Brand	Durability-focused	3.92	2.46
	Baseline	3.50	2.49
Color	Durability-focused	6.24	2.02
	Baseline	6.34	2.20
Shape	Durability-focused	6.72	1.96
	Baseline	6.66	2.07
Size	Durability-focused	7.48	1.31
	Baseline	7.06	1.82
Texture	Durability-focused	5.78	2.26
	Baseline	5.63	2.17
Durability	Durability-focused	8.10**	1.53
	Baseline	6.88	2.08
Price	Durability-focused	7.54	2.01
	Baseline	7.50	1.71

* $p < .05$; ** $p < .01$; *** $p < .001$

APPENDIX I

GLOSSINESS, VALUE AND BRIGHTNESS

This research investigated a design attribute independent from the well-established three dimensions of color (hue, chroma and value). Glossiness has its unique contributions as it is distinctive from other well-established constructs, such as value (lightness) and brightness. According to the Munsell color system, a particular color can be specified based on three basic dimensions: hue, chroma (saturation) and value (lightness) (Munsell 1912). Hue represents the pigment of color, which consists of five principal ones (red, yellow, green, blue, and purple), as well as five intermediate ones between two adjacent principle hues (Munsell 1912). Different from hue, which is perceived as a qualitative color attribute, both chroma (saturation) and value (lightness) can vary along a continuous quantitative scale (Abramov 1997). Chroma (saturation) refers to the amount of pigmentation in the color, and observers may intuitively feel that the color is purer, richer or fuller when it has a high saturation (Gorn et al. 2004). The dimension most likely to be confused with glossiness is value (lightness), which describes the whiteness versus blackness of a specific color (Cleland 1937).

Before the 1980s, researchers usually regarded value (lightness) as identical to brightness. However, the two constructs gradually became discriminated from each other during the late 20th century (Arend and Goldstein 1987b; Schirillo, Reeves, and Arend 1990; Arend and Spehar 1993). Brightness represents the actual light intensity reflected from an object to the visual field of an observer (Blakeslee and McCourt 2003), while value (lightness) refers to the apparent light reflectance rate of a patch (Arend and Spehar 1993). Brightness is elicited by the luminance of a visual target, i.e. the luminous intensity of light travelling in a given direction (Blakeslee and McCourt 2003). Meanwhile, brightness also

depends on illuminance, i.e. the direction and abundance of light in the environment that travels to the surface (Cornsweet and Teller 1965). In other words, lightness is a relatively permanent property of a surface that can determine what percentage of light it can reflect, whereas brightness is transient depending on the solid attributes, as well as the external environment.

FIGURE 2

VALUE, BRIGHTNESS AND GLOSSINESS COMPARISONS

Figure 2a: Comparison between Two Blue Spheres

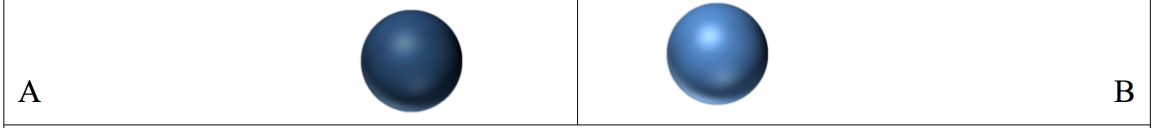


Figure 2b: Value (Lightness) Comparison

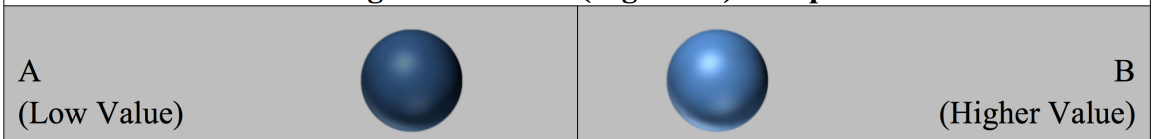


Figure 2c: Brightness Comparison

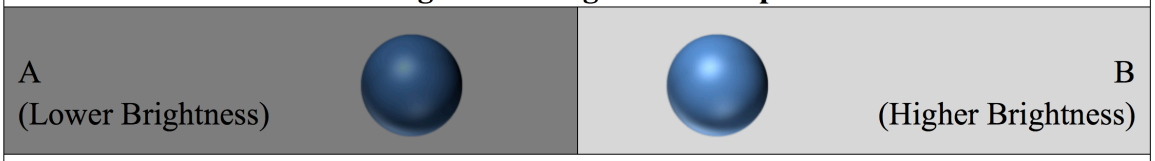
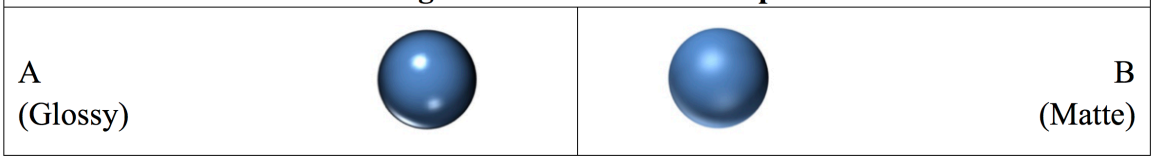


Figure 2d: Glossiness Comparison



As illustrated in Figure 2a, the brightness levels are different between A and B. However, without reliance on surroundings, it is challenging to determine whether the two spheres are different in regard to their value (lightness) or not, because human's sense of sight confounds reflectance and illumination (Olkkonen and Brainard 2010). Nevertheless, if the difference between A and B remains when the environment is held constant (Figure 2b), it

is likely that the two spheres differ from each other in regard to their value (lightness), i.e. the internal attribute of the light reflection of color. Specifically, in Figure 2b, compared to the blue in A, the blue in B is paler or lighter by reflecting more light. On the contrary, sometimes, the difference can be attributed to the environment (Figure 2c), as the surrounding on the right is brighter than the one on the left, comparable to day versus night. Then, the difference in the ball may be driven by the environmental difference, instead of internal attribute of color value (lightness) dissimilarity, and this discrepancy in brightness in Figure 2c can be observed even when the two balls are actually identical in value (lightness).

To summarize, value (lightness) measures what percentage of light a color can reflect, brightness describes how much light actually reflects from a surface to the visual field, while glossiness represents the relative proportion of specular reflection to diffuse reflection (Olkkonen and Brainard 2010; Schirillo, Reeves and Arend 1990). As clarified in Figure 2d, glossiness is visually different from color value (lightness) and brightness. For the glossy sphere A in Figure 2d, specular reflection dominates over diffuse reflection. However, given the current visual angle, only the highlighted area (white spots) represents the specular reflection that reaches the visual field of the audience, while specular reflection in non-highlighted areas have been directed to other directions out of the field of vision to make it seems milky or hazy (Beck 1972; Hunter 1937). In this way, when the sphere moves or spins, the highlight can move to a different location on the sphere. The glossier a surface is, the more will the viewing direction matter for brightness judgment by the audience (Nefs, Koenderink, and Kappers 2006).

Lucidly speaking, when a surface is very glossy, it is brighter, but the brightness is not evenly distributed, and the location of luminance may vary depending on the angle of view (Doerschner, Boyaci, and Maloney 2010; Fleming, Dror, and Adelson 2003). As the matte sphere B in Figure 2d is only relatively matte, instead of purely matte, the highlight can still

be identified, but in a more obscure way. This is consonant with the research suggesting that individuals tend to perceive a surface as glossier when the highlight has higher brightness, specular coverage, sharpness, and contrast (Hurlbert, Cumming, and Parker 1991; Marlow and Anderson 2013), as well as when the specular "lowlight" is darker or clear-cut from the surrounding surface shading (Kim, Marlow, and Anderson 2012). To conclude, highlight is a very important attribute when subjectively judging whether a surface is glossy or matte (Beck and Prazdny 1981), so that this will be a key characteristic manipulated in the experiments in this research. At the same time, illumination and its direction may also influence the perceived gloss, e.g., an object in an illumination map of white noise or placed in a direction with smaller illuminant angle may appear to be less glossy than it actually is (Hartung and Kersten 2002; Ho, Landy, and Maloney 2006). However, these two factors were controlled as almost constant in the study designs.

APPENDIX J

PACKAGING GLOSSINESS AND FOOD HEALTHINESS

In the current research, it was revealed that products with glossy surface can result in higher consumer attitudes, an effect which is mediated by the perceived product newness. However, this preference for glossy product may not hold in the food and beverages domain, where glossiness is associated with negative attributes exclusive to edible products. I posit that food and beverage packaging glossiness is symbolized as having a higher degree of processing and thus unhealthier. Before probing into the hypotheses, relevant key constructs will be clarified.

The Concept of "Processing" in the Food Industry

In general, food other than raw agricultural commodities can be called processed food; however, the extent of processing can vary substantially (Poti et al. 2015). Food processing is a titanic industry. Global processed food sales stood at around US$2 trillion in 2015, and the US accounts for US$750 revenue with around 21,000 companies in operation (Pollock 2015). Worldwide annual demand was expected to exceed US$53 billion in 2016 for food processing machinery alone (The Freedonia Group 2012). In 2012, more than three quarters of energy in household food originated from moderately to highly processed food and beverages (Poti et al. 2015). In the marketing context, consumer attitudes toward food processing can be predicted by the Food Technology Neophobia Scale (FTNS), which includes four forces: (1) risk perception and novelty seeking (2) media influence (3) own health and (4) environmental concerns (Verneau et al. 2014). Food is perceived as substantially processed when it is genetically modified, so that it can induce negative

attitudes among consumers due to fear (Laros and Steenkamp 2004). In addition, purchase intention regarding processed organic food was revealed as partially biased by individuals' moral concerns, in a way that even though processed organic food is regarded as less natural than fresh organic food, it is still significantly preferred over general non-organic food by those with a high moral standard (Dean, Raats, and Shepherd 2008).

The notion of manufacturer's technological processing was touched upon by Donnelly and Etzel (1974). Food processing denotes the various operations by which raw foodstuffs are made suitable for consumption, cooking or storage (Karnopp et al. 2016). In this paper, degree of processing is linked to two variables, namely, complexity and production mode, where complexity refers to the intensity and degree of processing, while production mode refers to how hand-made versus machine-made a product is (Abouab and Gomez 2015; Donnelly and Etzel). It has been revealed that hand-made products are regarded as more natural when compared with machine-made products (Abouab and Gomez 2015). Granted that naturalness is not equivalent to a lower degree of processing, naturalness has been evaluated by consumers based on the absence of certain negative features, e.g., processing and additives (Rozin, Fischler, and Shields-Argelès 2012). On this account, we represent both complex and machine production as the higher extreme of manufacturer's technological processing, whereas both simple and human production is the lower end of the processing in this article.

Packaging Glossiness, Degree of Processing and Food Healthiness

I advance that glossy product packaging is perceived as more processed, which results in a lower perception of healthiness. Two rationales can support the speculation that food and beverages with a higher degree of processing may be regarded as unhealthy. First, the degree

of processing is negatively related to naturalness, which positively predicts healthiness in general (Karnopp et al. 2017; Rozin 2005). When the food production process includes less processing in a physical instead of chemical way involving only familiar ingredients, it is likely to be perceived as both more natural and healthier (Evan, Challemaison, and Cox 2010). Second, processing is interpreted as adding extra ingredients to food, such as additives and preservatives, which are stereotyped as unhealthy (Luomala et al. 2015). This corresponds to the finding that food baskets including only moderately and highly processed food have more saturated fat, sugar and sodium ingredients, when compared to other food baskets with only less-processed food (Monteiro et al. 2011; Poti et al. 2015).

Even though I contend that glossy product design may not directly amplify the perceived technological innovation in a product, we do believe that glossiness is closely associated with a higher level of processing. Translucent material was suspected, even though not examined, to be regarded as more artificial than opaque material (Johnson et al. 2003). As mentioned previously, solid objects in nature are usually matte, e.g., trees, rocks and animals, and only become glossy after processing, e.g., smelting, slicing and burnishing. Consequently, food and beverages in matte packaging may induce a feeling of originality and purity, compared to a feeling of being processed for those in a glossy package. An obvious counterargument is that water is glossy by nature (Meert et al. 2014). Still, concrete artifacts can be modified from matte to glossy after processing, whereas drinks are still glossy even after the manufacturing process. In this way, as the glossiness of a liquid is relatively stable between the original and processed conditions, consumers are likely to base their degree of processing judgment on the packaging of the beverages, instead of the drinks themselves. Consequently, as the packaging is solid, matte ones may be perceived as involving lower level of processing than glossy ones, and consumers may regard products with a lower level

of processing (simpler, less and hand-made processing) as healthier. Correspondingly, hypotheses are proposed as:

H1: Consumers are likely to have lower perceived healthiness of food and beverage products in glossy, instead of matte packaging.

H2: This effect of glossiness on perceived healthiness is likely to be mediated by the perceived degree of processing of the edible products.

Furthermore, it is speculated that the effect in H1 can be moderated by the ambivalence of food healthiness, i.e. the negative impact of packaging gloss on product attitudes is significant only when the perceived healthiness of this food category is ambivalent. This supposition can be supported by the Elaboration Likelihood Model (ELM) in persuasion. ELM defines two routes of persuasion: (1) central route, where the consumers tend to process the information with thoughtful thinking procedure and their analytical skills to decide their attitudes toward the argument, and (2) peripheral route, where individuals tend to rely on simply and direct cues to determine the extent to which they agree with the message presented (Petty 1977; Petty and Cacioppo 1978). Compared to the packaging glossiness, knowledge about a food category can be regarded as more central and less peripheral. As central route is more rational and relevant to the healthiness evaluation on food products, it may dominate over peripheral route, with greater weight in judgments and greater consistency with real behavior (Petty and Cacioppo 1986). Therefore, when the perceived healthiness of the food category is unambivalent, the central route analysis adopted by the individuals can override the effect of packaging glossiness, so that the impact of packaging glossiness on perceived healthiness is likely to become insignificant.

Put it differently, consumers subconsciously use glossiness as a cue to judge the processing of a food only when they cannot rely on more rational and evident cues as a gauge. The glossiness cue is believed to be under awareness as it is not logical to infer food's

degree of processing and healthiness based on its packaging glossiness. Once becoming aware of using this subtle cue, consumers may incline to correct this judgment, or even overcorrect it (Förster and Liberman 2007; Schwarz and Clore 2007; Wilson and Brekke 1994). Hence, when a product category is believed to be vastly healthy or unhealthy with a low ambivalence level, customers may consciously employ this stereotype as a heuristic for judging food, instead of unconsciously referring to the secondary indication of packaging glossiness. Conservatively speaking, unambivalent healthiness perception is likely to dominate over, if not replacing, the priming effect of a glossy package. Therefore, hypothesis 3 is proposed as:

H3: The effects in H1 and H2 can be moderated by the ambivalence of food healthiness. The effect of packaging glossiness on perceived healthiness is likely to be attenuated when consumers have unambivalent perceived healthiness of the food or beverage category.

Closely related to the moderating role of ambivalent healthiness perception, the second suggested moderator in the causal relationship is cognitive load. When evaluating a food or beverage product, consumers may refer to two different sources of cues, where the first route is more stimulus-based, related to the automatic responses following associative mental processes in System I, whereas the second route is more memory-based, corresponding to the deliberate reactions after propositional mental processes in System II in the associative-propositional evaluation model (Gawronski and Bodenhausen 2006) and dual processing model (Dhar and Gorlin 2013). These two systems are parallel to the peripheral and central route in the ELM model, in a way that System I can operate based on heuristics with minimal cognitive efforts involved, while System II relies on plenty of cognitive resources (Rottenstreich, Sood, and Brenner 2007).

As a result, cognitive load (e.g., remembering a seven-digit number) can restrain deliberate processing while strengthen the reliance on intuition in making the product judgment. In this research, based healthiness perception on the glossiness of the food packaging is regarded as a heuristic; as with deliberate thinking, a subject may become aware of the fact that packaging glossiness should be irrelevant to the healthiness of the content inside. In other words, their perceived healthiness is biased by the intuitive association between glossiness and degree of processing. In this way, once their deliberate thinking is limited due to high cognitive load, they may have an even higher preference for a matte, instead of glossy product, due to overreliance on System I to make the evaluation. H4 is proposed accordingly as:

H4: The effects in H1 and H2 can be moderated by the level of cognitive load. The effect of packaging glossiness on perceived healthiness is likely to be strengthened under high cognitive load.

Furthermore, the negative impact of glossiness on food attitudes might be alleviated by consumers' regulatory focus. It is predicted that the preference for food and beverages with a lower degree of processing may be attenuated by those individuals with a prevention regulatory focus due to more positive associations of food processing. Even though intuitively less preferred, processed food is still widely accepted and even dominates over fresh food in the US market (Poti et al. 2015). There are some merits of food processing that are cherished by consumers. To represent this, Boekel et al. (2010) listed nine of the archetypal advantages of food processing, including: (1) inactivation of pathogens, (2) inactivation of natural toxins, enzymes and extended storage life, (3) enhanced digestibility and bioavailability of nutrients, (4) better sensory quality, (5) functional health benefits, (6) convenience, (7) lower cost, (8) diversity, and (9) time saving and life quality. Apart from

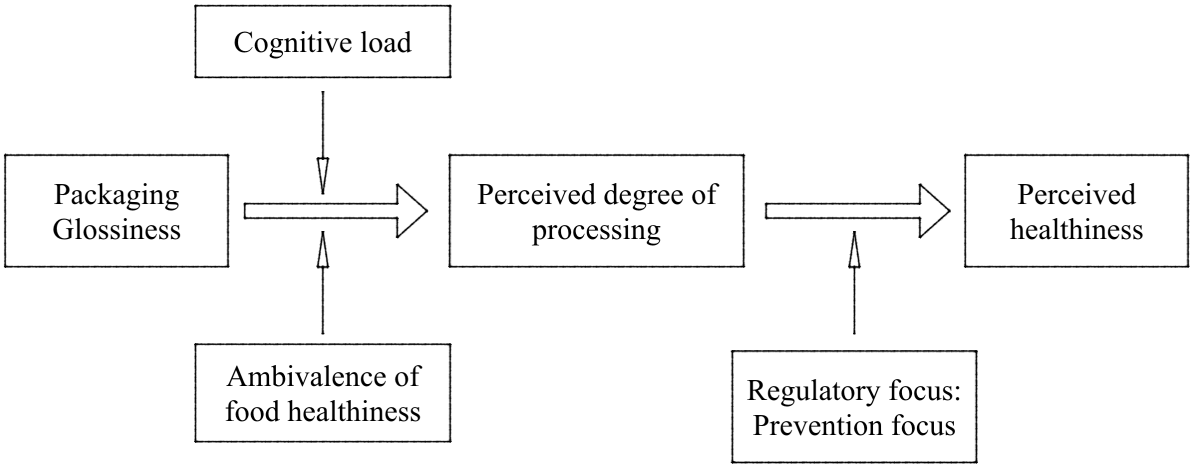
these, a higher degree of processing can also bring the benefits of standardization and product consistency (Eufic 2010).

In this way, food processing can result in (1) and (2), along with standardization and consistency, which bring about a perception of lower food risks and higher food safety. For instance, some food is processed by preserving it in cans, bottles or jars that are airtight, which prevent constant physical contact with air as a way to minimize the bacteria in food (Eufic 2010). In other words, it is believed that food processing procedures provide an extra step in safety control, compared to raw food. In short, prevention-focus consumers place a higher emphasis on security and safety. As a result, they may perceive food and beverages packaged in glossy packages as less unhealthy or even healthier than those in matte containers, due to the beneficence brought by higher degree of processing that they cherish. Stated formally, we predict that:

H4: The effects in H1 and H2 are moderated by consumers' regulatory focus. The effect of packaging glossiness on perceived healthiness is likely to be attenuated among prevention-focused consumers.

To sum up, the conceptual model in this research is summarized in Figure 4 below.

Figure 4: Conceptual Model



Overview of Studies

Study 1 and 2 investigated the effect of glossy packaging design on the perception of food processing and healthiness. Both study 1 and 2 used liquid beverages to represent edible products. Derived from Meert et al.'s (2014) finding that humans have an innate association between gloss and water, consumers should have a greater preference for glossy containers when the content is a beverage, instead of food. Therefore, the actual effect of matte packaging preference should be stronger for food than for beverages. In other words, the observed effect in this conservative research was underestimated in the actual food and beverages industry. Study 1 demonstrated that milk in a glossy box was regarded as less healthy than it in a matte box. Study 2 tested H1 and H2, as well as verified that the effect was moderated by the ambivalence of perceived healthiness of the food category (H3).

This research project primarily focuses on the effect of packaging glossiness in the food domain, where literature suggests that Body Mass Index (BMI) plays a vital role. First, food evaluations may vary depending on the eating habits among consumers, and BMI accounts for the discrepancy between restrained eaters (with higher BMI) and unrestrained

eaters (with lower BMI; Provencher, Polivy, and Herman 2009). Besides, eating-related judgments are influenced by consumers' abilities to relieve stress and to maintain self-control (Dallman 2009), and BMI can represent these abilities (Logel and Cohen 2011). Furthermore, implicit attitudes toward food and beverage products was revealed as being dissimilar among consumers from different BMI groups (Czyzewska and Graham 2008). Given the importance of BMI, we measured participants' BMI in all our studies and used it as a control variable. When recruiting Asian-dominated participants, height in centimeters and weight in kilograms were collected and BMI was calculated by using the ratio of weight to squared height (kg/m^2), whereas when using American dominated samples, respondents' height in inches and weight in pounds were collected and BMI was measured using the ratio of weight to squared height (lbs/in^2) multiplied by 703 (Keys et al. 1972). The healthy level of BMI was higher than or equal to 18.5, while lower than 25 (US Department of Health and Human Service 1998; World Health Organization 1998).

STUDY 1

Method

Study 1 was designed to provide initial evidence for hypotheses 1. Ninety-six university students in Hong Kong (72 females; M_{age} = 21.46, SD = 2.31) were recruited and randomly assigned to glossy or matte conditions and were told that they would evaluate a product in this study. Specifically, participants in the glossy condition were given the image of a glossy milk box while others in the matte condition were given a picture of a matte milk box, as shown in Appendix C. They were first given some time to have a careful look at the image, before proceeding to the next page, where they indicated their perceived healthiness

of the milk based on a 9-point Likert scale, including how natural (1 = Very unnatural, 9 = Very natural), organic (1 = Very inorganic; 9 = Very organic), pure (1 = Very impure; 9 = Very pure), and original (1= Very unoriginal; 9 = Very original) they perceived the milk was, which were combined into a single index measuring perceived beverage healthiness (α = .87).

Next, they completed glossiness manipulation check questions, including how glossy they thought the milk packaging was (1= Very matte; 9 = Very glossy), how shiny the packaging was (1 = Very dull, 9 = Very shiny), how much light it can reflect (1 = Very little, 9 = Very much), and how smooth the surface of the milk box was (1 = Very rough, 9 = Very smooth), averaged to a perceived glossiness index (α = .85). Finally, the respondents completed demographic questions and were thanked before they left. Worth noticing is that the demographics included their height in centimeters and weight in kilograms, which were used to calculate their BMI.

Results and Discussion

In support of the manipulation, participants in the glossy (versus matte) condition reported that they felt the milk box was glossier (M_{glossy} = 6.02, SD = 1.59 vs. M_{matte} = 5.06, SD = 1.42; $F(1, 93) = 6.17$, $p = .015$). When controlling BMI, the results provide evidence that consumers perceive glossy packaging as less healthier (M = 3.83, SD = 1.66) than its matte counterpart (M = 3.16, SD = 1.45; $F(1, 93) = 4.94$, $p = .029$). Therefore, study 1 provided initial evidence for our conceptual model by showing that consumers had a lower perceived healthiness for the food and beverages in a glossy, instead of matte packaging. Study 2 further tested the mediating role of perceived degree of processing in the main effect of packaging glossiness on perceived product healthiness.

STUDY 2

The goal of study 2 was twofold. The first aim was to explore into the mechanism driven the effect of packaging glossiness on perceived food healthiness, i.e. the mediating role played by perceived degree of processing (H2), apart from replicating the main effect observed in study 1 (H1). Furthermore, study 2 tested if the effect still pertained when the perceived healthiness of a particular food category is unambivalent. Specifically, the product used in experiment 1 was full milk, which may be perceived as healthy, as it is more original and less processed when compared with skimmed milk, or, on the contrary, may be perceived as unhealthy, as it contains more fat and calories than skimmed milk. In this way, consumers may have ambivalent healthiness judgment on the full milk product category. Thus, the effect of packaging glossiness on healthiness perception may be significant only when consumers have an ambivalent perception of the healthiness in the food category (H3).

Study 2 further verifies if the effect pertains when consumers have a crystal clear thought that food or beverage category is unhealthy, by including a juice-flavored soda (10% juice) condition in our study design. Put it differently, in the current study, we manipulated the ambivalence of the perceived healthiness of the food and beverage category by including two between-subjects product conditions. In one condition, respondents were given the imagery of bottled juice, where they may have an ambivalent perception of its healthiness. This is based on the rationale that compared to freshly squeezed juice, bottled juice may be unhealthier, while relative to other soft drinks, bottled juice may be healthier. In this way, in an absence of a benchmark in the between-subjects design, consumers may have an ambivalent perception of the healthiness of bottled juice. On the contrary, the other condition included the picture of bottled juice-flavored soda, which may elicit a more unambivalent unhealthy perception when compared to the bottled juice.

Method

Study 2 employed a 2 (packaging: glossy vs. matte) × 2 (perceived healthiness: ambivalent vs. unambivalent) between-subjects design. A total of 385 mTurk workers from the United States (186 females, M_{age} = 38.82, SD = 13.30) participated in this study for a small incentive. To begin with, subjects were introduced to the purpose of this questionnaire, i.e. to collect their opinions on a product. Then, they were given one of four images of a bottle of beverage. The glossy bottle in the original image was simplified in its design with the brand name removed, before using Photoshop software to add a matte layer on the top of it, to make it matte (Appendix D). The only two distinctions between the juice and soda condition were: (1) the product name on the bottle was *Juicy Juice* vs. *Juicy Soda*, and (2) the label beneath the product name was *all natural, 100% juice* vs. *sparkling, 10% juice*. The respondents were given some time to have a careful look at the picture of the beverage before proceeding to the next page. On the next page, they were guided to provide their opinion on the healthiness of this product (1 = Very unhealthy, 9 = Very healthy) based on a 9-point Likert sale.

On the succeeding page, the participants were given questions related to their perceived degree of processing of this beverage based on four questions on a 9-point scale, including how much it was processed (1= Very little; 9 = Very much); how complicated its production process was (1 = Very simple; 9 = Very complicated); how the production process can be described as (1 = Is very manual; 9 = Is very automatic) and (1 = Mainly involves humans; 9 = Mainly involves machines), which were merged to constitute an degree of processing index (α = .70). Subsequently, subjects provided answers to the manipulation check questions, including the perceived glossiness and beverage recall questions. The

glossiness questions replicated what we used in study 1, including how glossy, shiny, light reflecting and smooth they thought the bottle was on a 9-point scale. The responses to these four questions were integrated into a perceived glossiness index ($\alpha = .87$). In the beverage recall questions, participants were guided to recall the product they saw in the study and indicate the percentage of juice in the product. Finally, the respondents completed demographic questions, including whether they felt they were distracted when completing the tasks, their height in inches and weight in pounds, which were used to calculate BMI, and were thanked before they left.

Results and Discussion

Manipulation Checks. Fifty-nine mTurk workers (15.32%) were excluded from further analysis because they reported being highly distracted during the session, leaving a sample size of 326. The manipulation check verified that the participants perceived the glossy juice bottle as significantly glossier than the matte one ($M_{glossy} = 6.89$, SD = 1.52 vs. $M_{matte} = 4.67$, SD = 1.97; $F(1, 324) = 129.96$, $p < .001$). Meanwhile, 95.40% of the participants were able to properly recall the product category (juice vs. soda) properly and 91.72% of them accurately reported the percentage of juice ingredient (100% vs. 10%) in their assigned visual stimulus. These tests suggested that the manipulations of packaging glossiness and category can be regarded as successful in this study.

Degree of Processing. ANCOVA test using BMI as a covariant revealed the main effect of packaging glossiness manipulation on perceived degree of processing of the beverage item, such that the participants regarded the beverage in glossy packaging as more processed than when in a matte bottle ($M_{glossy} = 6.98$, SD = 1.31 vs. $M_{matte} = 6.67$, SD = 1.59;

$F(1, 312) = 4.24$, $p = .040$). Meanwhile, perceived level of processing was also driven by the main effect of product category, as respondents perceived the soda as more processed than the juice in general ($M_{juice} = 6.28$, SD = 1.47 vs. $M_{soda} = 7.40$, SD = 1.21; $F(1, 312) = 55.73$, $p < .001$). Most importantly, there was a significant packaging glossiness by food category interaction ($F(1, 312) = 6.05$; $p = .014$). Consistent with our predictions, as respondents have ambivalent perceived healthiness of bottled juice, they tended to rely on packaging glossiness as a heuristic in evaluating its level of processing, so that juice in a glossy bottle was inferred as more processed than the one in a matte packaging ($M_{glossy} = 6.60$, SD = 1.27 vs. $M_{matte} = 5.95$, SD = 1.59; $F(1, 312) = 10.40$, $p = .001$). Meanwhile, as they had an unambivalent unhealthiness perception of the beverage category of bottled juice-flavored soda, it became unnecessary for them to rely on packaging glossiness levels to form their opinion on the level of processing. As a result, the difference between the two glossiness conditions diminished when the stimulus used as soda, instead of juice ($M_{glossy} = 7.37$, SD = 1.51 vs. $M_{matte} = 7.43$, SD = 1.52; $F(1, 312) = .076$, NS).

Perceived Healthiness. When controlling BMI, analyses disclosed a significant main effect of beverage category on perceived healthiness, in a way that the respondents judged the juice as much healthier than soda ($M_{juice} = 5.97$, SD = 2.30 vs. $M_{soda} = 2.81$, SD = 1.90; $F(1, 312) = 178.56$, $p < .001$). Notably, this main effect was qualified by a significant packaging glossiness by ambivalence interaction comparable to the previous findings in level of processing. To specify, when given a bottled juice, the results were consistent with the pattern observed in Study 1, where juice in a glossy packaging was regarded as less healthy than the one in a matte bottle ($M_{glossy} = 5.63$, SD = 2.32 vs. $M_{matte} = 6.31$, SD = 2.25; $F(1, 312) = 5.02$, $p = .026$). Nevertheless, the discrepancy in perceived healthiness was eliminated in the soda condition, when participants became less likely to apply a glossiness heuristic in

judging the product healthiness (M_{glossy} = 2.90, SD = 2.01 vs. M_{matte} = 2.71, SD = 1.80; F(1, 312) = .220, NS).

Moderated Mediation. Using BMI as a covariant, PROCESS Model 8 (Hayes 2013) was utilized to further test whether degree of processing mediated the impact of packaging glossiness on perceived healthiness depending on the ambivalence of perceived healthiness. As anticipated, there was a significant moderated mediation effect (b = -.17, SE = .08, 95% CI, .-.35 to -.04). To specify, ambivalence moderated the A path between packaging glossiness and perceived degree of processing in the relationship when using 5,000 bootstrapped samples. In particular, in the juice condition, packaging glossiness generated higher unhealthy perceptions driven by a heightened degree of processing (b = .15, SE = .06, 95% CI, .06 to .30), whereas in the soda condition, the mediation effect became insignificant (b = -.01, SE = .04, 95% CI, -1.03 to .07, including zero). Therefore, the finding suggested that a higher level of packaging glossiness could dampen perceived food healthiness due to a higher perceived degree of processing, an effect happened only when consumers have an ambivalent healthiness stereotype of a particular food category.

Discussion. Study 2 extended the previous findings in study 1 by revealing the moderating effect of ambivalence. To specify, as consumers had an unambivalent belief that juice-flavored soda with 10% juice belonged to unhealthy product category, there was no need for them to leverage the packaging glossiness as a heuristic in judging the beverage healthiness. As a consequence, the glossiness-unhealthiness bond driven by a boosted degree of processing became dampened.

Future studies

This framework may be broadened from two perspectives in the future. Above all, instead of directly instructing the participants to report their perceived healthiness of the food items on scales, we will include more indirect measurements in future studies, e.g. guiding the respondents to estimate the amount of calories in the food product, as a more obscured measure of their perceived food healthiness (Chernev 2011; Chernev and Gal 2010).

Second, two other moderators of the main effect are planned to be confirmed, i.e. cognitive load and regulatory focus. To start, an experiment will serve the purpose of substantiating the moderating role of cognitive load. At the beginning, respondents will be randomly assigned to one of the 2 (low cognitive load vs. high cognitive load) × 2 (glossy vs. matte) between-subjects conditions. In the high (low) cognitive load condition, participants will be told to remember a seven-digit (two-digit) number when completing the task. Then, they will be given the advertisement of the soup mix in a glossy vs. matte packaging, while controlling other product dimensions as constant. The verbal content of the ad will also be standardized, which will describe a promotion of the soup mix and where to find it with this discounted price.

Next, participants will complete a question measuring their estimated calories within this soup mix. They will be given a reference product, i.e. a 100-gram chocolate bar, which contains around 500 calories, to serve as a benchmark. At last, they will respond to manipulation check and demographic questions. It is predicted that those under the high cognitive load condition will have an even larger discrepancy in perceived healthiness between the matte and glossy condition, when compared to other respondents in the low cognitive load condition. In other words, cognitive load may heighten the perceived healthiness for food with matte, instead of glossy packaging.

Furthermore, another experiment related to consumers' regulatory focus will be conducted using a 2 × 2 between-subjects design. To begin with, participants will be randomly assigned to prevention versus promotion groups, where they will be instructed to complete a pencil-and-paper owl versus cheese version of the maze task respectively. The maze task will be similar to the one designed by Friedman and Förster (2001), where in both regulatory conditions, the goal will be described as helping a rat that is trapped in a maze to find its way out. However, in the prevention condition, the scenario will be described as an owl hovering above the maze and the rat might be caught if it cannot escape the maze as soon as possible. In the promotion condition, the situation will be illustrated as the rat starving and needing to find a piece of Swiss cheese outside the maze as soon as possible.

Subsequently, they will be given a coffee advertisement to evaluate their perceived healthiness based on similar calories estimation question as used in the previous study. In the ad, the coffee tin (packaging) will vary in its glossiness while putting other design attributes and verbal content under control. Next, respondents will respond to manipulation check questions, including glossiness similar to previous studies, along with four items used to estimate their prevention versus promotion regulatory focus, where they will be instructed to answer the questions based on their current state, instead of chronological orientation. The items includes: *I focus on opportunities that will enhance my life; I focus on ensuring that I will avoid potential mishaps or negative events; I am primarily motivated by seeking potential successes; I am primarily motivated by avoiding failure* (Cunningham, Raye, and Johnson 2005), based on a 9-point Likert scale (1 = Strongly disagree; 9 = Strongly agree).

DISCUSSION

This research investigates the influence of glossy packaging of food and beverages. This research may be especially helpful for renowned brands, which already have a sizable customer base. For these brands, altering the size, color, or shape in the packaging or logo may cause adaption difficulties for existing customers and potential risks of decreasing brand loyalty. However, compared to size, color and shape, glossiness is a less evident attribute with lower risks, but is still impactful. Usually, the bottled containers of juice are made of glossy plastics. Suppose that a juice brand would like to build up a healthier and more original brand image, it may add a matte or foggy layer to the plastic bottle. If the budget is very limited, they may consider changing the label of the juice into a matte one, instead of reproducing a brand-new matte bottle.

Even within a particular brand, the company may use different packaging glossiness for different product lines. To specify, a tea company may supply both packed tea leaves as well as tea powder. In this way, they may use a matte tin box for the tea leaves product (less processed), but a glossy box or neutral box for tea powder (more processed). This may enhance the processing fluency among consumers and boost their satisfaction accordingly. All in all, both research streams can shed light on the product design of brands.

The research may also contribute to the psychological well-being among modern consumers by two means. First, the theory in this paper may be instrumental in slow living and savoring, as well as contributing to the psychological well-being of modern consumers. In recent decades, a slow pace of life has been brought to public attention and embraced by its advocators. To represent this, the slow movement was initiated in Rome in 1986 with protests against the opening of McDonald's fast food restaurants (Fosl 2012), followed by the founding of the World Institute of Slowness in 1999 to foster all kinds of slow living, and also the slow food movement, which promotes consuming food with sustainable and traditional production processes (Ras 2015). Besides, there are numerous books and

magazines endorsing that savoring life can contribute to higher psychological well-being among humans, e.g., *In praise of Slowness: Challenging the Cult of Speed and The Slow Fix: Solve Problems and Work Smarter*, and *Live Better in a World Addicted to Speed* by Carl Honore (Honore 2004, 2013).

Derived from the findings in this paper, on one hand, as matte is associated with longer time period, prolonged product life cycle, and healthiness, the interior design of stores and homes can be altered to include more matte elements as a way to promote savoring behavior. To illustrate, the window and door frames, ceilings, wallpaper, floors, and furniture can adopt matte materials or be painted in matte to facilitate a heathy lifestyle.

On the other hand, being aware the findings in this article, consumers can also be better protected from impulsive purchasing behavior. Specifically, when they visit a store with glossy interior decor, such as glossy wallpaper and glossy display windows, buyers can become alerted to the fact that their interests in the product may not only be driven by the superior product attributes, but the tricks in the store design as well. Similarly, when they are judging the healthiness of food and beverages, consumers can also become more aware that they should adjust their evaluation in a more objective way regardless of the impact of the glossiness of the packaging. In this way, consumers will tend to make more rational decisions in their purchasing and reduce their future regrets. Precisely, building on the conclusions in this paper, consumers may be stimulated to savor and lessen their impulsive purchases.

Going beyond managerial implications and psychological well-being, this paper also contributes to resource saving and environmental sustainability. As matte products may be perceived as more durable rather than glossy ones, the government and environmental-related charitable organizations may appeal for more matte design in products to prolong the using time. For example, matte slippers, notebooks with a matte cover, matte cups and handbags made of matte leather may be used for a longer time. Meanwhile, the application of gloss also

extends to public instruments, such as the handrails on metros, bookshelves in public libraries and floor buttons on elevators. Governments may consider adding a glossy coat to these facilities. As glossy items are expected to be used for a shorter period of time and be less durable, individuals may tend to protect them by using them more carefully. In this way, it can save repair cost for maintaining these facilities. In a nutshell, a better comprehension of the influence of glossiness can be beneficial to companies, consumers, as well as society in general.

An existing limitation of the current studies is that it did not explicitly test if brightness, lightness, or smoothness may have similar effects on perceived newness and perceived food healthiness. Future studies may serve the purpose of distinguishing the impact of glossiness from the impact of brightness or lightness. It is postulated that the brightness or lightness in product design is unlikely to drive the difference in perceived newness, because the perceived newness may not be evidently correlated to the lightness or brightness of products due to embodied cognition or human evolution. Similarly, it is posited that packaging brightness and lightness may not drive the difference in perceived healthiness, as the healthiness discrepancy here is caused by the perceived degree of processing, which may not be changed by the brightness or lightness of the packaging. In fact, in Mai, Symmank, and Seeberg-Elverfeldt's (2016) paper, it was disclosed that food with light- and pale-colored packages are perceived as healthier, while in our studies, we revealed that glossy packaging can lead to lower healthiness perception of the food items. In other words, glossiness is a very unique construct that can induce impact divergence from widely explored properties in product design. Therefore, research in glossiness has its merits and meaningfulness.

COMPLEMENTARY REFERENCES

Abouab, Nathalie and Pierrick Gomez (2015), "Human Contact Imagined During the Production Process Increases Food Naturalness Perceptions," *Appetite*, 91 (April), 273–77.

Abramov, Israel (1997), "Physiological Mechanisms of Color Vision," in *Color Categories in Thought and Language*, ed. Hardin Clyde L. and Luisa Maffi, Cambridge: Cambridge University Press, 89–117.

Aloumi, Ahmad, Siamak Noroozi, Bob Eves, and Mihai Dupac (2013), "The Impact of Color Contrast on the Perception of Complexity–Simplicity of Design Product," *International Journal of Design Creativity and Innovation*, 1 (March), 233–54.

Anderson, Barton L. and Juno Kim (2009), "Image Statistics Do Not Explain the Perception of Gloss and Lightness," *Journal of Vision*, 9 (October), 1–17.

Arend, Lawrence E. and Branka Spehar (1993), "Lightness, Brightness, and Brightness Contrast: 1. Illuminance Variation," *Perception & Psychophysics*, 54 (July), 82–90.

Arend, Lawrence E. and Robert Goldstein (1987a), "Lightness Models, Gradient Illusions, and Curl," *Perception & Psychophysics*, 42 (March), 65–80.

Arend, Lawrence E. and Robert Goldstein (1987b), "Simultaneous Constancy, Lightness and Brightness," *Journal of the Optical Society of America*, 4 (December), 2281–85.

Argo, Jennifer J., Darren W. Dahl, and Andrea C. Morales (2006), "Consumer Contamination: How Consumers React to Products Touched by Others," *Journal of Marketing*, 70 (April), 81–94.

Atalay, A. Selin, H. Onur Bodur, and Dina Rasolofoarison (2012), "Shining in the Center: Central Gaze Cascade Effect on Product Choice," *Journal of Consumer Research*, 39 (December), 848–66.

Bajaj, Aditi and Samuel Bond (2014), "Effects of Design Symmetry on Perceptions of Brand Personality," in Advances in Consumer Research, eds. June Cotte and Stacy Wood, Duluth, MN: Association for Consumer Research, 402–02.

Baldwin, Matthew, Monica Biernat, and Mark J. Landau (2015), "Remembering the Real Me: Nostalgia Offers a Window to the Intrinsic Self," *Journal of Personality and Social Psychology*, 108 (January), 128–47.

——— and Mark J. Landau (2014), "Exploring Nostalgia's Influence on Psychological Growth," *Self and Identity*, 13 (March), 162–77.

Batcho, Krystine Irene (1998), "Personal Nostalgia, World View, Memory, and Emotionality," *Perceptual and Motor Skills*, 87 (October), 411–32.

——— (2007), "Nostalgia and the Emotional Tone and Content of Song Lyrics," *American Journal of Psychology*, 120 (Fall), 361–81.

Beck, Jacob (1972), *Surface Color Perception*, New York: Cornell University Press.

Beck, Jacob and Slava Prazdny (1981), "Highlights and the Perception of Glossiness," *Perception & Psychophysics*, 30 (July), 407–10.

Beer, Sean (2008), "Authenticity and Food Experience - Commercial and Academic Perspectives," *Journal of Foodservice*, 19 (June), 153–53.

Beverland, Michael (2006), "The 'Real Thing': Branding Authenticity in the Luxury Wine Trade," *Journal of Business Research*, 59 (February), 251–58.

Bianchi, Constanza, and Grete Birtwistle (2010), "Sell, Give away, or Donate: An Exploratory Study of Fashion Clothing Disposal Behaviour in Two Countries," *The International Review of Retail, Distribution and Consumer Research*, 20 (June), 353–68.

Bianchi, Constanza, and Grete Birtwistle (2012), "Consumer Clothing Disposal Behaviour: A Comparative Study," *International Journal of Consumer Studies*, 36 (May), 335–41.

Birtwistle, Grete, and Cathleen M. Moore (2007), "Fashion Clothing–Where Does It All End up?" *International Journal of Retail and Distribution Management*, 35 (March), 210–16.

Blakeslee, Barbara and Mark E McCourt (2003), "A Multiscale Spatial Filtering Account of Brightness Phenomena," in *Levels of Perception*, ed. Laurence Harris and Michael Jenkin, New York: Springer Press, 47–72.

Boekel, Martinus V., Vincenzo Fogliano, Nicoletta Pellegrini, Catherine Stanton, Gabriele Scholz, Sam Lalljie, Veronika Somoza, Dietrich Knorr, Pratima Rao Jasti, and Gerhard Eisenbran (2010), "A Review on the Beneficial Aspects of Food Processing," *Molecular Nutrition & Food Research*, 54 (September), 1215–47.

Boyle, David (2003), *Authenticity: Brands, Fakes, Spin and the Lust for Real Life*. London: Flamingo Press.

Castaño, Raquel, Mita Sujan, Manish Kacker, and Harish Sujan (2008), "Managing Consumer Uncertainty in the Adoption of New Products: Temporal Distance and Mental Simulation," *Journal of Marketing Research*, 45 (June), 320–36.

Chang, Chun-Tuan (2007), "Health-Care Product Advertising: The Influences of Message Framing and Perceived Product Characteristics," *Psychology & Marketing*, 24 (February), 143–69.

Cian, Luca, Aradhna Krishna, and Ryan S. Elder (2014), "This Logo Moves Me: Dynamic Imagery from Static Images," *Journal of Marketing Research*, 51 (April), 18–28.

Cimbalo, Richard S., Karen L. Beck, and Donna S. Sendziak (1978), "Emotionally Toned Pictures and Color Selection for Children and College Students," *Journal of Genetic Psychology*, 33 (September), 303–04.

Claudio, Luz (2007), "Waste Couture: Environmental Impact of the Clothing Industry," *Environmental Health Perspectives*, 115 (September), A449–54.

Cleland, Thomas M. (1937), *A Practical Description of the Munsell Color System with Suggestions for Its Use*, Michigan: University of Michigan Library Press.

Cornsweet, Tom N. and Davida Y. Teller (1965), "Relation of Increment Thresholds to Brightness and Luminance," *Journal of the Optical Society of America*, 55 (October), 1303–08.

Crowley, Ann E. (1993), "The Two-Dimensional Impact of Color on Shopping," *Marketing Letters*, 4 (1), 59–69.

Cunningham, William A., Carol L. Raye, and Marcia K. Johnson (2005), "Neural Correlates of Evaluation Associated with Promotion and Prevention Regulatory Focus," *Cognitive, Affective, & Behavioral Neuroscience*, 5 (June), 202–11.

Cutright, Keisha M. (2012), "The Beauty of Boundaries: When and Why We Seek Structure in Consumption," *Journal of Consumer Research*, 38 (February), 775–90.

Dean, Moira, Monique M. Raats, and Richard Shepherd (2008), "Moral Concerns and Consumer Choice of Fresh and Processed Organic Foods," *Journal of Applied Social Psychology*, 38 (August), 2088–107.

Deng, Xiaoyan, Sam K. Hui, and J. Wesley Hutchinson (2010), "Consumer Preferences for Color Combinations: An Empirical Analysis of Similarity-Based Color Relationships," *Journal of Consumer Psychology*, 20 (October), 476–84.

Derber, Charies (2000), *The Pursuit of Attention: Power and Ego in Everyday Life*. New York: Oxford University Press.

Dhar, Ravi and Margarita Gorlin (2013), "A Dual-System Framework to Understand Preference Construction Processes in Choice," *Journal of Consumer Psychology*, 23 (June), 528–42.

Doerschner, Katja, Huseyin Boyaci, and Laurence T. Maloney (2010), "Estimating the Glossiness Transfer Function Induced by Illumination Change and Testing Its Transitivity," *Journal of Vision*, 10 (April), 1–9.

Donnelly, James H. and Michael J. Etzel (1973), "Degrees of Product Newness and Early Trial," *Journal of Marketing Research*, 10 (August), 295–300.

Eufic (2010), "The Greatest Thing Since Sliced Bread? A Review of the Benefits of Processed Foods," http://www.eufic.org/en/food-production/article/the-greatest-thing-since-sliced-bread-a-review-of-the-benefits-of-processed.

Fajardo, Tatiana M., Jiao Zhang, and Michael Tsiros (2016), "The Contingent Nature of the Symbolic Associations of Visual Design Elements: The Case of Brand Logo Frames," *Journal of Consumer Research*, 43 (September), 549–66.

Fedoroff, Ingrid C., Janet Polivy, and C. Peter Herman (1997), "The Effect of Pre-Exposure to Food Cues on the Eating Behavior of Restrained and Unrestrained Eaters," *Appetite*, 28 (February), 33–47.

Fine, Gary (2003), "Crafting Authenticity: The Validation of Identity in Self-Taught Art," *Theory and Society*, 32 (April), 153–80.

Finn, Adam (1988), "Print Ad Readership Recognition Scores: An Information Processing Perspective," *Journal of Marketing Research*, 25 (May), 168–77.

Fishbach, Ayelet, and Aparna A. Labroo (2007), "Be Better or Be Merry: How Mood Affects Self-Control," *Journal of Personality and Social Psychology*, 93 (August), 158–73.

Fleming, Roland W., Ron O. Dror, and Edward H. Adelson (2003), "Real-World Illumination and the Perception of Surface Reflectance Properties," *Journal of Vision*, 3 (October), 247–68.

Förster, Jens and Nira Liberman (2007), "Knowledge Activation," in *Social psychology*. *Handbook of Basic Principles*, ed. Arie W. Kruglanski and E. Tory Higgins, New York: Guilford, 201–231.

Fosl, Peter S. (2012), *The Big Lebowski and Philosophy: Keeping Your Mind Limber with Abiding Wisdom*, Hoboken, New Jersey: John Wiley & Sons Press.

Friedman, Ronald S. and Jens Förster (2001), "The Effects of Promotion and Prevention Cues on Creativity," *Journal of Personality and Social Psychology*, 81 (December), 1001–13.

Gawronski, Bertram and Galen V. Bodenhausen (2011), "The Associative-Propositional Evaluation Model: Theory, Evidence, and Open Questions," *Advances in Experimental Social Psychology*, 44 (June), 59–127.

Genesis Products (2016), "2016 GlobalShop Show Reveals Strong Trend toward High Gloss Acrylic," https://www.genesisproductsinc.com/2016-globalshop-show-reveals-strong-trend-toward-high-gloss-acrylic/.

Gerard, Robert M. (1957), "Differential Effects of Colored Lights on Psychophysiological Functions," unpublished dissertation, University of California, LA.

Goudeau, Cynthia V. (2014), "Ready to Tear? A Study of Fashion and Consumer Disposal Behavior," Langston University, working paper.

Grayson, Kent and Radan Martinec (2004), "Consumer Perceptions of Iconicity and Indexicality and Their Influence on Assessments of Authentic Market Offerings," *Journal of Consumer Research*, 31 (September), 296–312.

Hargadon, Andrew and Yellowlees Douglas (2001), "When Innovation Meet Institutions: Edison and the Design of the Electric Light," *Administrative Science Quarterly*, 46 (September), 476–76.

Harris, Jennifer L., John A. Bargh, and Kelly D. Brownell (2009), "Priming Effects of Television Food Advertising on Eating Behavior," *Health Psychology*, 28 (August), 404–13.

Hines, Tony and Margaret Bruce (2001), *Fashion Marketing: Contemporary Issues*, Oxford: Butterworth-Heinemann Press.

Hofmeester, G. H., J. A. M Kemp, and A. C. M. Blankendaal (1996), "Sensuality in Product Design: A Structured Approach," in Proceedings of the SIGCHI Conference on Human Factors in Computer System, eds. Bonnie Nardi, Gerrit C. van der Veer, and Michael J. Tauber, Vancouver: Association for Computing Machinery, 428–35.

Holmberg, Kenneth, Peter Andersson, Ali Erdemir (2012), "Global Energy Consumption Due to Friction in Passenger Cars," *Tribology International*, 47 (March), 221–21.

Honoré, Carl (2013), *The Slow Fix: Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed*. New York: Harper Collins Press.

——— (2004). *In Praise of Slowness*. San Francisco: Harper Press.

Hornby, Albert S. and Jonathan Crowther (1995). *Oxford Advanced Leaner's Dictionary of Current English*. Kuala Lumpur: Oxford University Press.

Ho, Yun-Xian, Michael S. Landy, and Laurence T. Maloney (2006), "How Direction of Illumination Affects Visually Perceived Surface Roughness," *Journal of Vision*, 6 (May), 634–48.

———, ———, and ——— (2008), "Conjoint Measurement of Gloss and Surface Texture," *Psychological Science*, 19 (February), 196–204.

Hsiao, Kun-An, Lin-Lin Chen, Chi-Fu Wang, and Huai-Te Tsang (2006), "Fundamental Dimensions of Affective Responses to Product Shapes," *International Journal of Industrial Ergonomics*, 36 (June), 553–64.

Hung, Wei-Kin and Lin-Lin Chen (2012), "Effects of Novelty and Its Dimensions on Aesthetic Preference in Product Design," *International Journal of Design*, 6 (August), 81–90.

Hunter, Richard S. (1937), "Methods of Determining Gloss," *Journal of Research of the National Bureau of Standards*, 18 (January), 19–41.

Hurlbert, Anya C., Cumming B., and Parker A. (1991), "Recognition and Perceptual Use of Specular Reflections," *Investigative Ophthalmology & Visual Science*, 32 (March), 1278–78.

Jeannerod, Marc (2001), "Neural Simulation of Action: A Unifying Mechanism for Motor Cognition," *Neuroimage*, 14 (July), S103– 09.

Johnson, Kara W., Torben Lenau, and Mike F. Ashby (2003), "The Aesthetic and Perceived Attributes of Products," *the 14th International Conference on Engineering Design*.

Joung, Hyun-Mee and Haesun Park-Poaps (2013), "Factors Motivating and Influencing Clothing Disposal Behaviours," *International Journal of Consumer Studies*, 37 (January), 105–11.

Juhl, Jacob, Clay Routledge, Jamie Arndt, Constantine Sedikides, and Tim Wildschut (2010), "Fighting the Future with the Past: Nostalgia Buffers Existential Threat," *Journal of Research in Personality*, 44 (June), 309-14.

Karnoppa, Ediana V., Juliana D. Vazb, Antonio A. Schaferc, Ludmila C. Munizb, Rosângela D. Souzab, Iná D. Santosc, Denise P. Gigantec, and Maria C. Assuncãoc (2017), "Food Consumption of Children Younger than 6 Years According to the Degree of Food Processing," *Journal de Pediatria*, 93 (January), 70–78.

Kennick, Walter H. (1985), "Art and Inauthenticity," *The Journal of Aesthetics and Art Criticism*, 14 (October), 3–12.

Kim, Angella J. and Eunju Ko (2012), "Do Social Media Marketing Activities Enhance Customer Equity? An Empirical Study of Luxury Fashion Brand," *Journal of Business Research*, 65 (October), 1480–86.

Kim, Juno, and Barton L. Anderson (2010), "Image Statistics and the Perception of Surface Gloss and Lightness," *Journal of Vision*, 10 (July), 1–17.

———, Marlow, P., and Barton L. Anderson (2011), "The Perception of Gloss Depends on Highlight Congruence with Surface Shading," *Journal of Vision*, 11 (August), 1–19.

———, ———, and ——— (2012), "The Dark Side of Gloss," *Nature Neuroscience*, 15 (November), 1590–95.

Lakoff, George and Mark Johnson (1999), *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought*, New York: Basic Books Press.

Landau, Mark J., Brian P. Meier, and Lucas A. Keefer (2010), "A Metaphor-Enriched Social Cognition," *Psychological Bulletin*, 136 (November), 1045–67.

Laros, Fleur J. and Jan-Benedict E. Steenkamp (2004), "Importance of Fear in the Case of Genetically Modified Food," *Psychology & Marketing*, 21 (November), 889–908.

Leary, Mark R., Ellen S. Tambor, Sonja K. Terdal, and Deborah L. Downs (1995), "Self-Esteem as an Interpersonal Monitor: The Sociometer Hypothesis," *Journal of Personality and Social Psychology*, 68 (June), 518–30.

Lee, Spike W. and Norbert Schwarz (2012), "Bidirectionality, Mediation, and Moderation of Metaphorical Effects: The Embodiment of Social Suspicion and Fishy Smells," *Journal of Personality and Social Psychology*, 103 (August), 737–49.

Liao, Shu-Ling and Yu-Yi Ma (2009), "Conceptualizing Consumer Need for Product Authenticity," *The International Journal of Business and Information*, 4 (June), 89–114.

Luomala, Harri, Maijastiina Jokitalo, Hannu Karhu, Hanna-Leena Hietaranta-Luoma, Anu Hopia, and Sanna Hietamäki (2015), "Perceived Health and Taste Ambivalence in Food Consumption," *Journal of Consumer Marketing*, 32 (June), 290–301.

Meyers-Levy, Joan and Laura A. Peracchio (1995), "Understanding the Effects of Color: How the Correspondence Between Available and Required Resources Affects Attitudes," *Journal of Consumer Research*, 22 (September), 121–38.

McIntosh, Colin (2013), Cambridge Advanced Learner's Dictionary. Cambridge: Cambridge University Press.

Miller, Elizabeth G. and Barbara E. Kahn (2005), "Shades of Meaning: The Effect of Color and Flavor Names on Consumer Choice," *Journal of Consumer Research*, 32 (June), 86–92.

Monteiro, Carlos A., Renata B. Levy, Rafael M. Claro, Ines R. Castro, and Geoffrey Cannon (2011), "Increasing Consumption of Ultra-Processed Foods and Likely Impact on Human Health: Evidence from Brazil," *Public Health Nutrition*, 14 (March), 5–13.

Morgan, Louise R. and Grete Birtwistle (2009), "An Investigation of Young Fashion Consumers' Disposal Habits," *International Journal of Consumer Studies*, 33 (March), 190–98.

Munsell, Albert H. (1905), *A Color Notion*. Harvard: G. H. Ellis Company Press.

——— (1912), "A Pigment Color System and Notation," *The American Journal of Psychology*, 23 (April), 236–44.

Muntinga, Daniel G., Marjolein Moorman, and Edith G. Smit (2011), "Introducing COBRAs: Exploring Motivations for Brand-Related Social Media Use," *International Journal of Advertising*, 30 (June), 13–46.

Nefs, Harold T., Jan J. Koenderink, and Astrid M. Kappers (2006), "Shape-From-Shading for Matte and Glossy objects," *Acta Psychologica*, 121 (January), 297–316.

Nijssen, Edwin J. and Susan P. Douglas (2011), "Consumer World-Mindedness and Attitudes Toward Product Positioning in Advertising: An Examination of Global Versus Foreign Versus Local Positioning," *Journal of International Marketing*, 19 (September), 113–33.

Olkkonen, Maria K. and David H. Brainard (2010), "Perceived Glossiness and Lightness under Real-World Illumination," *Journal of Vision*, 10 (November), 5–5.

Oren, Michael and Shree K. Nayar (1995), "Generalization of Lambert's Reflectance Model," *The International Journal of Computer Vision*, 14 (March), 227–51.

Park, Jieun, Rajshekhar Javalgi, and Michael Wachter (2016), "Product Ethnicity and Perceived Consumer Authenticity: The Moderating Role of Product Type," *The Journal of Consumer Marketing*, 33 (September), 458–68.

Phillips, Ashley and Julia Horniacek (2016), "13 Shades of Matte Lipstick From Brands We Love," http://www.bestproducts.com/beauty/g260/best-matte-lipstick-brands/.

Pieters, Rik and Michel Wedel (2004), "Attention Capture and Transfer in Advertising: Brand, Pictorial, and Text-Size Effects," *Journal of Marketing*, 68 (April), 36–50.

——— and ——— (2007), "Goal Control of Attention to Advertising: The Yarbus Implication," *Journal of Consumer Research*, 68 (2), 224–33.

———, ———, and Rajeev Batra (2010), "The Stopping Power of Advertising: Measures and Effects of Visual Complexity," *Journal of Marketing*, 74 (September), 48–60.

Poti, Jennifer M., Michelle A. Mendez, Shu W. Ng, and Barry M. Popkin (2015), "Is the Degree of Food Processing and Convenience Linked with the Nutritional Quality of Foods Purchased by US households?" *The American Journal of Clinical Nutrition*, 101 (May) 1251–62.

Ras, Irene (2015), "Don't Hurry, Be Happy," *Flow*, 8 (April), 11–18.

Ratner Rebecca K. and Barbara E. Kahn (2002), "The Impact of Private versus Public Consumption on Variety-Seeking Behavior," *Journal of Consumer Research*, 29 (September), 246–57.

Romero, Marisabel and Dipayan Biswas (2016), "Healthy-Left, Unhealthy-Right: Can Displaying Healthy Items to the Left (versus Right) of Unhealthy Items Nudge Healthier Choices?" *Journal of Consumer Research*, 43 (March), 103–12.

Rose, Randall l. and Stacy l. Wood (2005), "Paradox and the Consumption of Authenticity through Reality Television," *Journal of Consumer Research*, 32 (September), 284–96.

Rottenstreich, Yuval, Sanjay Sood, and Lyle Brenner (2007), "Feeling and Thinking in Memory-Based versus Stimulus-Based Choices," *Journal of Consumer Research*, 33 (March), 461–69.

Routledge, Clay, Jamie Arndt, Tim Wildschut, Constantine Sedikides, Claire M. Hart, Jacob Juhl, Ad J. Vingerhoets, and Wolff Schlotz (2011), "The Past Makes the Present Meaningful: Nostalgia as an Existential Resource," *Journal of Personality and Social Psychology*, 101 (September), 638–52.

Rozin, Paul (2005), "The Meaning of 'Natural'. Process More Important than Content," *Psychological Science*, 16 (December), 652–58.

———, Claude Fischler, and Christy Shields-Argelès (2012), "European and American Perspectives on the Meaning of Natural," *Appetite*, 59 (June), 448–55.

Sakano, Yuichi and Hiroshi Ando (2008), "Both Head Motion and Stereo Viewing Enhance Perceived Glossiness," *Journal of Vision December* 8 (December), 80–80.

———, Claude Fischler and Christy Shields-Argelès (2012), "European and American Perspectives on the Meaning of Natural," *Appetite*, 59 (June), 448–55.

Sedikides, Constantine, Tim Wildschut, and Denise Baden (2004), "Nostalgia: Conceptual Issues and Existential Functions," in *Handbook of Experimental Existential*

Psychology, ed. Jeff Greenberg, Sander L. Koole, and Tom Pyszczynski, New York: Guilford, 200–14.

Schirillo, James, Adam Reeves, and Lawrence E. Arend (1990), "Perceived Lightness, but Not Brightness, of Achromatic Surfaces Depends on Perceived Depth Information," *Perception & Psychophysics*, 48 (May), 82–90.

Schmidt, Hanns-Ludwig, Maria Butzenlechner, Andreas Rossmann, Siglinde Schwarz, Hugo Kexel, and Klaus Kempe (1993), "Inter-And Intramolecular Isotope Correlations in Organic Compounds as a Criterion for Authenticity Identification and Origin Assignment," *European Food Research and Technology*, 196 (February), 105–10.

Schotter, Elizabeth R., Raymond W. Berry, Craig R. McKenzie, and Keith Rayner (2010), "Gaze Bias: Selective Encoding and Liking Effects," *Visual Cognition*, 18 (May), 1113–32.

Schwarz, Norbert and Gerald L. Clore (2007), "Feelings and Phenomenal Experiences," in *Social psychology*. *Handbook of Basic Principles*, eds. Arie W. Kruglanski and E. Tory Higgins, New York: Guilford, 385–407.

Shimojo, Shinsuke, Claudiu Simion, Eiko Shimojo, and Christian Scheier (2003), "Gaze Bias Both Reflects and Influences Preference," *Nature Neuroscience*, 6 (November), 1317–22.

Shu, Andrew (2014), "What Is the Difference between Matte and Glossy Paper?" https://www.mgxcopy.com/blog/san-diego-printing/2014/05/09/difference-matte-and-glossy-paper/.

Smets, Gerda, Kees Overbeeke, and William Gaver (1994), "Form-Giving: Expressing the Nonobvious," in Proceedings of the SIGCHI Conference on Human Factors in Computer System, eds. Beth Adelson, Susan Dumais, and Judith Olson, Boston: Association for Computing Machinery, 79–84.

Sidali, Katia L. and Sarah Hemmerling (2014), "Developing an Authenticity Model of Traditional Food Specialties," *British Food Journal*, 116 (November), 1692 –709.

Silverstone, Roger and Eric Hirsch (1992), *Consuming Technologies Media and Information in Domestic Spaces*, London and New York: Routledge Press. Stevens, Joseph C. and Harris B. Savin (1962), "The Scaling of Subjective Roughness and Smoothness," *Journal of Experimental Psychology*, 64 (November), 489–94.

Sung, Yongjun and Spencer F. Tinkham (2005), "Brand Personality Structures in the United States and Korea: Common and Culture-Specific Factors," *Journal of Consumer Psychology*, 15 (October), 334–50.

Sweeneya, Jillian C. and Geoffrey N. Soutar (2001), "Consumer Perceived Value: The Development of a Multiple Item Scale," *Journal of Retailing*, 77 (Summer), 203–20.

The Freedonia Group (2012), "Global Demand for Food Processing Machinery To Exceed $53B in 2016," https://www.foodonline.com/doc/global-demand-for-food-processing-machinery-to-exceed-0001.

Tice, Dianne M. and Ellen Bratslavsky (2000), "Giving in to Feel Good: The Place of Emotion Regulation in the Context of General Self-Control," *Psychological Inquiry*, 11 (3), 149– 59.

———, ———, and Roy F. Baumeister (2001), "Emotional Distress Regulation Takes Precedence over Im- pulse Control: If You Feel Bad, Do It!" *Journal of Personality and Social Psychology*, 80 (January), 53–67.

Verneau, Fabio, Francesco Caracciolo, Adele Coppola, and Pasquale Lombardi (2014), "Consumer Fears and Familiarity of Processed Food. The Value of Information Provided by the FTNS," *Appetite*, 73 (November), 140–46.

Wang Yajin and Vladas Griskevicius (2013), "Conspicuous Consumption, Relationships, and Rivals: Women's Luxury Products as Signals to Other Women," *Journal of Consumer Research*, 40 (February), 834–54.

Ward, Gregory J. (1992), "Measuring and Modeling Anisotropic Reflection," *Computer Graphics*, 26 (July), 265–72.

Watson, Maegan Z. and Ruoh-Nan Yan (2013), "An Exploratory Study of the Decision Processes of Fast versus Slow Fashion Consumers," *Journal of Fashion Marketing and Management*, 17 (February), 141–59.

White, Katherine, Lily Lin, Darren W. Dahl, and Robin J. B. Ritchie (2016), "When Do Consumers Avoid Imperfections? Superficial Packaging Damage as a Contamination Cue," *Journal of Marketing Research*, 53 (February), 110–23.

Williams, Lawrence E., Julie Y. Huang, and John A. Bargh (2009), "The Scaffolded Mind: Higher Mental Processes Are Grounded in Early experience of the Physical World," *European Journal of Social Psychology*, 39 (December), 1257–67.

Wilson, Timothy D. and Nancy Brekke (1994), "Mental Contamination and Mental Correction: Unwanted Influences on Judgments and Evaluations," *Psychological Bulletin*, 116 (September), 117–42.

Zhou, Xinyue, Tim Wildschut, Constantine Sedikides, Kan Shi, and Cong Feng (2012), "Nostalgia: The Gift That Keeps on Giving," *Journal of Consumer Research*, 39 (June), 39–50.