

Sensory Aspects of Package Design[☆]

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Abstract

Packaging is a critical aspect of the marketing offer, with many implications for the multi-sensory customer experience. It can affect attention, comprehension of value, perception of product functionality, and also consumption, with important consequences for consumer experience and response. Thus, while it was once viewed as being useful only for product preservation and logistics, package design has evolved into a key marketing tool. We introduce the layered-packaging taxonomy that highlights new ways to think about product packaging. This taxonomy has two dimensions: the physicality dimension, which is composed of the *outer–intermediate–inner* packaging layers, and the functionality dimension, which is composed of the *purchase–consumption* packaging layers. We then build on this taxonomy to present an integrative conceptualization of the sensory aspects of package design as they affect key stages of customer experience.

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Introduction

In the last decade, there has been a paradigm shift toward developing more sensorially engaging and interactive products and services. New research highlights the importance of “sensory marketing and embodied cognition”—the idea that we perceive the world through our senses and that our bodily sensations affect the decisions we make without our conscious awareness (Krishna and Schwarz 2014). Krishna (2010) defines sensory marketing as “marketing that engages the consumers’ senses and affects their perception, judgment, and behavior” (p. 333). Strategically, sensory marketing provides a multi-sensory experience to consumers with the intention of creating additional value. The sensory aspects of products and their presentation to consumers (smell, sound, touch, taste, or look), individually or through their interplay, shape the holistic customer experience and the interaction between companies and consumers.

“In the past, communications with customers were essentially monologues—companies just talked at consumers. Then, they evolved into dialogues, with customers providing feedback. Now they are becoming multidimensional conversations, with products finding their own voices and consumers responding viscerally and subconsciously to them” (interview with Krishna in *Harvard Business Review*, 2015, p. 29). Such conversations should guide product innovation and marketing. Companies should devise their marketing offers in an all-encompassing manner, using the senses to define product experiences and brand identities that consumers will care about and remember.

This paper aims to heighten awareness of the need for researchers to focus more on the sensory aspects of packaging. Most of the previous sensory research in marketing has focused on the environment (such as store settings or atmospherics; e.g., Mattila and Wirtz 2008; Spence et al. 2014) or the product itself (such as how food tastes, looks, and smells; e.g., Hoegg and Alba 2007; Peck and Childers 2008). Less attention has been paid to packaging, a situation that this paper may help to ameliorate. Packaging is one critical aspect of the marketing offer, with its many implications for the overall customer experience. In this paper, we gather together research related to the sensory aspects of package design as they affect key facets of the customer experience. We also introduce an over-

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all conceptualization of multi-sensory customer experience and discuss its significance. Products are presented to consumers wrapped in their unique packaging: the package becomes the outfit of the product and conveys its look and feel throughout the customer–brand interaction. We identify key stages of the multi-sensory customer–product interaction: attention, expectation formation, engagement, and consumption. While our review incorporates insights from existing research and practice, we also include new theoretical questions to stimulate future research and propose new ways of thinking about product packaging.

As we begin, we want to introduce a new taxonomy aid to describe the multi-sensory customer–product interaction presented above—what we call the *layered-packaging taxonomy*. We propose that packaging has two major dimensions—the physicality dimension and the functionality dimension. The physicality dimension focuses on how the package appears to the consumers and is composed of the *outer–intermediate–inner* packaging layers. The functionality dimension relates to what purpose the packaging serves and is composed of the *purchase–consumption* packaging layers.

Importantly, the physicality dimension stresses that packaging does not merely refer to the *outer packaging*—such as the hard paper packaging that envelopes the plastic bottle that the 50 tablets of ibuprofen come in, or the plastic packaging of a bag of KitKats that contain many small KitKats, or the paper packaging that a bar of soap comes in. Packaging also refers to *intermediate packaging*, such as the plastic medicine bottle of ibuprofen that resides within the hard paper outer packaging, and the wrappers for the individual KitKat bars. Furthermore, packaging refers to the *inner packaging* or *product packaging*, such as the shape, color, form, and texture of the ibuprofen tablet,

the KitKat bar, or the bar of soap (see Fig. 1). While all manufactured products have inner packaging or product packaging, only some have intermediate and outer packaging.

We further introduce two other terms: *purchase packaging*, which mostly affects consumers at the time of purchase (typically, the outer packaging), and *consumption packaging*, which mostly affects consumers at the time of consumption (typically, the inner packaging; and also intermediate packaging if it exists for the product). With a bar of soap, the outer and intermediate packaging are not present at the time of consumption; only the inner packaging is—the product form of the soap itself. However, with ibuprofen, both the intermediate and inner packaging are present at the time of consumption (see Fig. 2).

Next, we introduce our overall conceptualization of consumers’ sensory experience with a product, as well as the significance of that experience. The rest of the paper identifies and discusses the facets of the customer experience as affected by sensory aspects of packaging. The discussion also highlights implications for different types and roles of packaging as suggested by our layer-packaging taxonomy. We conclude with implications and possible extensions of our review.

Sensory Experience with a Product

Customer–brand interactions are characterized by a multitude of contact points subject to sensation and perception processes. The field of sensory marketing has evolved in an attempt to better understand how customers’ perceptions, emotions, preferences, and consumption are affected by sensory and unconscious processes, with the intention of appealing to them more effectively (Krishna 2010). Products are “sensual” in nature (that is, they relate to sensation or the senses; Krishna

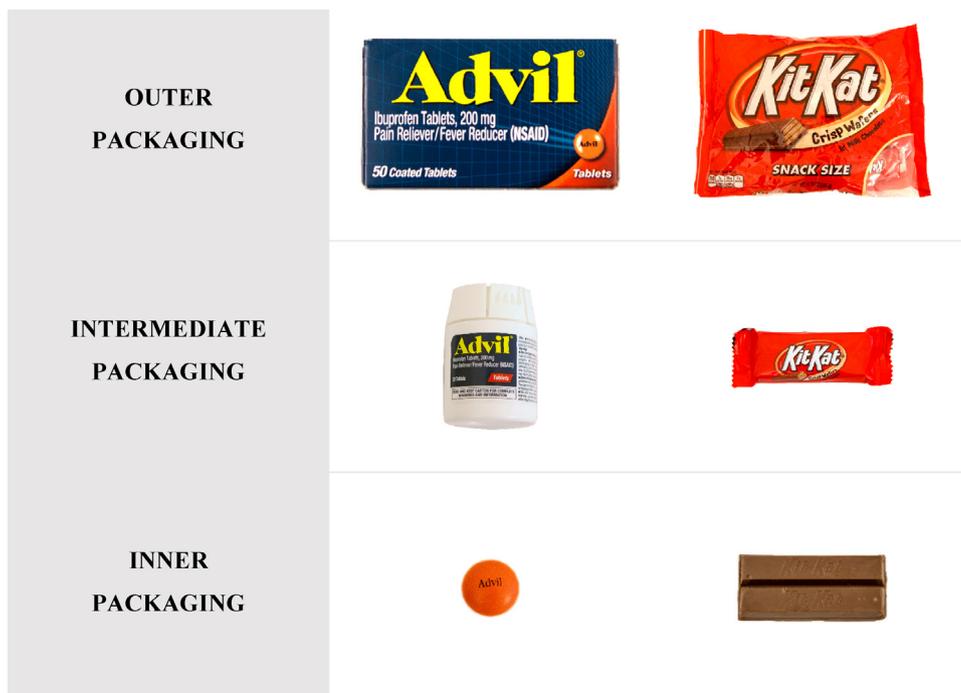


Fig. 1. Examples of the layered-packaging taxonomy: physicality dimension.

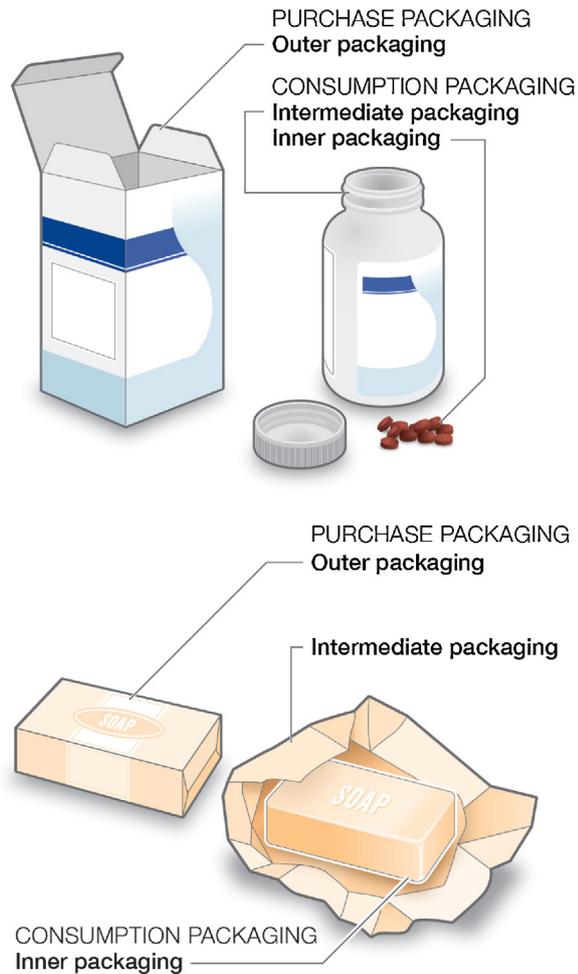


Fig. 2. Examples of the layered-packaging taxonomy: physicality and functionality dimensions.

2010). Therefore, connecting with customers through sensory cues helps marketers manage and enrich the total customer experience.

Most of these customer–brand interactions operate implicitly (i.e., without the consumer’s awareness). Thus, when asked, consumers often believe that sensory inputs had no impact on them. Controlled studies of consumer behavior, however, in the laboratory and the marketplace, say otherwise (Cheskin 1972). Given the amount of marketing stimuli to which consumers are exposed daily, unconscious triggers, such as those that appeal to the basic senses, may help marketers appeal to consumers more efficiently (Krishna 2012).

The total customer experience is a sum of the customer’s shopping experience (interaction with the retail environment, the salespeople, and other customers; Hui and Bateson 1991), product experience (interaction with the product; Hoch 2002), communication experience (interaction between the firm, the customer, and other customers; Krishna, Cian, and Sokolova 2016), brand experience (interaction with brand-related stimuli, e.g., colors, shapes, and fonts; Brakus, Schmitt, and Zhang 2008), and, finally, the consumption experience (Aydinoglu and Sayin 2016; Brakus, Schmitt, and Zarantello 2009). The design and presentation of packaging—either consumption packaging

or purchase packaging—is often a key component in all such experiences. Purchase packaging is a key contact point between the customer and the firm and has implications for attention generation and brand image; consumption packaging then creates product engagement and affects consumption.

We discuss below the critical sensory aspects of package design as they affect the multifaceted and integrated processes customers go through as part of their total experience. Customers’ purchase experience starts by being drawn in toward the product through conscious (or even unconscious) attention. As such, we discuss the various ways packaging can create and enhance visual salience of the product to attract consumer attention and generate interest. The attentive consumer then searches for information of the product’s value. We present a review of how the different verbal and visual cues that may be used as part of package design can convey such information. As the consumer moves toward final purchase and, consequently, the consumption experience, generating personal engagement is critical. The section on customer engagement focuses on both the conscious as well as the automatic processes through which packaging elements might improve connection with customers. Specifically, we review extant research on mental imagery, influence of colors and shapes, and olfactory and haptic properties of packaging. Next, we discuss the direct influences of packaging on consumption experience through its effect on consumers’ size perceptions (before, during, and after consumption). We also review the various biases that consumers are vulnerable to as part of their consumption monitoring processes. We finish with a general discussion of the integrated nature of these components as part of the multi-sensory customer experience, and suggest lines of future research.

Stages of the Multi-sensory Customer Experience

1 Attracting Attention and Initiating the Customer Experience

Most of the time, a company’s product is placed between several other similar (competitors’) products either in retail stores or as part of marketing communications. Consequently, packaging must first attract the customer’s attention (also called bottom-up attention; Milosavljevic and Cerf 2008). Below, we discuss the importance of *visual salience* in attracting attention and the ways in which salience can be increased through effective design of purchase packaging. Accordingly, our discussion here relates mainly to elements of *outer* physical packaging layer and the *purchase* functionality packaging layer.

Importance of Visual Salience

Extensive visual neuroscience research has shown that visual attributes that affect the salience of stimuli can likewise impact where and how long individuals fixate on complex displays, such as vending machines or supermarket shelves (Milosavljevic et al. 2012). Thus, consumers fixate longer on more visually salient items relative to less salient items.

Second, recent neuroeconomic studies have shown that the amount of value individuals give to stimuli when making their



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Source: YouTube, Tetze - Zare it now, CC BY license.

Absolut Vodka's peculiar shape

MacBook Air's unique dimensions

Fig. 3. Creating visual salience by differentiation (shape and size).

choice depends on how much attention they give to those stimuli during the decision-making process (Armél, Beaumel, and Rangel 2008; Krajbich, Armél, and Rangel 2010). In particular, the longer individuals focus on an item, the more likely they are to choose that item and to give it a higher liking rating.

Together, these findings suggest that, regardless of their preferences, individuals are more likely to choose more visually salient options because of how the brain processes visual information. In addition, Milosavljevic et al. (2012) show that at rapid decision speeds, visual salience has a greater impact on choice than preferences. The bias increases with cognitive load, especially when individuals do not strongly prefer any of the options.

If products attract visual attention, consumers are more likely to touch them as well; and, if they touch them, they are even more likely to purchase them (Peck and Childers 2006; Peck and Shu 2009). Using a field study, Peck and Childers (2006) show that increasing the salience of touch (e.g., a sign suggesting shoppers “feel the freshness” of a product) increases impulse purchasing. Peck and Shu (2009) further demonstrate that perceived ownership is increased when the object is touched. Additional research shows that when consumers own (or perceive to own) objects, they place greater value on the objects (Kahneman, Knetsch, and Thaler 1990; Peck, Barger, and Webb 2013).

Increasing Visual Salience

Considering the discussed significance of visual salience, the natural following question is, then, how to create more visually salient packaging? In general, when one or more of an image's low-level features (brightness, color, size, shape, texture, or smell) is considerably different from the background (Vazquez et al. 2010), the detail appears salient.

In terms of *light*, the more saturated (Cian 2012) or brighter (Milosavljevic et al. 2012) a color is in comparison to its surroundings, the more it is visually salient. With respect to *colors*, the red–green axis, according to Frey et al. (2011), is the most salient color contrast, whereas the blue–yellow color contrast is less so. Note that this research is related to natural scenes, and needs to be corroborated for purchase scenarios with further research. But, in general, visual salience depends

on context—how certain features compare to their surroundings. Indeed, how we perceive color has evolved over millennia to help us distinguish edible fruits and young leaves from their natural background (Frey, Honey, and König 2008). Thus, for example, color-highlighted objects on packaging are more salient.

In a similar fashion, packaging that presents a *size* or *shape* different from its surroundings will create higher visual salience (see Fig. 3 for some examples). Moreover, customers will react favorably to elements that defy expectations because they will look for the cause of the deviation. This search for the cause results in additional (positive) attributions to the product, which in turn leads to a more favorable consumer response (Miller and Kahn 2005).

A change in packaging, however, may cause a problem when the novelty creates unreasonable expectations. Let us take Crystal Pepsi's failure as an example. Crystal Pepsi was a soft drink made by PepsiCo from 1992 to 1993 as a caffeine-free version of the traditional Pepsi Cola. The idea was to emphasize, with a drastic change in color (from black to clear), the absence of caffeine, complemented by new packaging to highlight the change. It had a see-through packaging to show the clear (transparent) cola (see Fig. 4a). The commercials were also stressing the color change using claims such as: “You've never seen a taste like this” (see Fig. 4b). When Crystal Pepsi was released, the response was surprisingly dismal despite a huge marketing effort. PepsiCo had to discontinue the product one year after its launch. This failure may have been attributable to the expectations the clear look of the soda created: consumers may have anticipated a different taste from regular Pepsi and were therefore disappointed when the product tasted almost the same (Labrecque, Patrick, and Milne 2013).

2 Providing Information and Setting Expectations

After capturing customers' attention, purchase packaging should provide the potential buyers all the information that they are consciously or unconsciously looking for. In this section, we present a review of how different *verbal* and *visual* cues may be used as part of package design to convey such information and shape expectations. Accordingly, our discussion here relates

a: The look of Crystal Pepsi vs. Traditional Pepsi.



b: A screenshot of a Crystal Pepsi commercial (1993) emphasizing the “new” taste.



Source: YouTube, Super Bowl 2016 Ads, CC BY license.

Fig. 4. Crystal Pepsi.

mainly to elements of *outer* and *intermediate* physical packaging layers, and the *purchase* functionality packaging layer.

Verbal Cues

Probably the most intuitive and simplest way packaging can set expectations is the way it describes its contents. Specifically for food products, consumers cannot reliably or easily deduce the characteristics or benefits they consider most important (e.g., pleasantness, healthfulness, or sensory perceptions) before they have experienced them, and even the experience might provide ambiguous information. Without a reliable understanding of what their food experience will be like, consumers tend to be overly dependent on design cues and packaging-based marketing claims.

An extensive research stream focuses on this topic (for reviews, see Chandon 2013). According to Elder and Krishna (2010), food descriptions intended to appeal to multiple senses generate improved taste perceptions than single-sense descriptions. Because multiple senses (smell, sight, sound, and touch) collectively generate taste, descriptions mentioning these senses will be more influential than descriptions mentioning only taste. For example, in one experiment, Elder and Krishna used a single-sense (vs. multiple-sense) description that read as follows: “Our potato chips deliver the taste you crave. From the first bite you’ll savor the rich barbecue flavor (smell) and enjoy the delicious

salty taste (crunchy texture)—our potato chips are the perfect choice for your snacking” (p. 752). After tasting the chips, participants who read the multiple-sense description listed more positive sensory thoughts and evaluated the chips as tastier. These observations on communication effectiveness based on advertising claims should apply directly to the communicative properties of package design.

Information about the healthiness of the food also influences the food perception (see Chandon and Wansink 2012). For example, Chernev and Gal (2010) found that participants perceived a hamburger as having 761 calories, but they thought the same hamburger, when shown with a broccoli salad, had only 665 calories. This effect results from people thinking in terms of average healthiness instead of caloric count. Note that not all responses to packaging-related marketing communications are the same. Irmak, Vallen, and Robinson (2011) showed that when food is given a relatively unhealthy name (e.g., pasta), participants focused on dieting perceive the item as unhealthier and less tasty than non-dieters. When the same food is given a relatively healthy name (e.g., salad), however, the participants’ focus on dieting has no effect on product evaluations.

Visual Cues and Graphical Positioning

Aside from labels and product descriptions, packaging is usually composed of visual cues. Folkes and Matta (2004) note that consumers tend to shop with their eyes and, according to Dickson and Sawyer (1990), may ignore package labeling. Underwood and Klein (2002) show that the presence of a product image positively affects consumers’ attitudes toward the package and their beliefs about sensory brand attributes. Likewise, a product image can boost consumer self-evaluations (Aydinoglu and Cian 2014), and may increase the likelihood that consumers will use the image as an extrinsic cue (Olson and Jacoby 1972) and a product-quality indicator (Richardson, Dick, and Jain 1994). The presence of a product picture can lead consumers to better imagine a product’s taste, feel, smell, look, and sound (Cian 2012; Paivio 1986; Underwood and Klein 2001). A product’s picture, therefore, can set consumers’ expectations and be an “advance organizer” for the other potentially available packaging information (Kahn and Deng 2010).

Recently, researchers have started to study specific ways through which graphic design of packaging elements can directly influence specific perceived product features. A stream of research is based on conceptual metaphors and embodied cognition (for reviews, see Krishna 2012; Krishna and Schwarz 2014). For example, applying the conceptual metaphor framework and the idea of scaffolding to rationality and emotion, Cian, Krishna, and Schwarz (2015) noted that from childhood, humans tend to associate two “concrete” body parts—the head and the heart—with the more “abstract” concepts of rationality and emotion, respectively. Thus, over time, we develop a conceptual link of rationality with something visually located “up” or “higher” and emotion with something visually located “down” or “lower.” Applying this concept to packaging design, the authors show that information related to the tastiness (or other emotional elements) of a product are perceived more fluently when visually placed at the bottom of the packaging (vs. at the top). Conversely,

information related to the rational elements of a product (e.g., its healthiness) are more fluently perceived when placed in the higher part of the packaging (vs. the lower). The more fluently the images are perceived (where there is a match between visual placement and rationality/emotionality), the more positive are then the attitudes toward the product.

The marketing literature offers additional examples of how a match between physical position and type of product information increases product evaluations, and how a mismatch decreases product evaluations (for a review, see [Cian 2016, 2017](#)). For example, [Sundar and Noseworthy \(2014\)](#) build on previous psychology research that shows a metaphorical link between power and the vertical dimension (i.e., power is associated culturally with something placed up or higher visually). The authors show that consumers have a stronger preference toward powerful brands when the packaging features the brand logo in a high rather than a low position. On the other hand, consumers have a stronger preference toward less powerful brands when the packaging features the brand logo in a low rather than a high position. The authors suggest the mechanism underlying this preference shift to be a fluency effect resulting from an intuitive link consumers make between the concept of power and verticality.

[Deng and Kahn \(2009\)](#) found that consumers perceive product images at the bottom (top) and right (left) of a package as being heavier (lighter). The bottom-heavy association is attributable to humans' tendency to apply the laws of gravity to visual space. The authors explain the right-heavy perception in two steps. First, we tend to "read" pictures from left to right. Second, the left side is the natural anchor point or visual fulcrum, because the eyes enter the field of vision from the left. Thus, an object's weight is perceived as heavier the farther it is from the left side (or the fulcrum). The authors further show that the match between picture position and product heaviness has an impact on participants' preferences toward the product.

[Chae and Hoegg \(2013\)](#) focus on the horizontal dimension, and show that if consumers are from cultures that read from left to right, they generally see the past as being to the left, and the future as being to the right. Thus, if the placement of the product image is congruent with how consumers conceive time (i.e., left = past-related items, right = future-related items), consumers will feel more favorably toward the product.

A wise usage of packaging shape can also aid to subtly convey information and generate expectations. For example, [Velasco et al. \(2014\)](#) studied how to combine rounded versus angular shapes, names, typefaces, and sounds to convey information about a product's taste (sweetness/sourness). They found that rounded shapes (or names, typefaces, and low-pitched sounds) best convey "sweet" tastes, whereas angular shapes (or names, typefaces, and high-pitched sounds) best convey "sour" tastes. Similarly, [Becker et al. \(2011\)](#) showed that angular, versus rounded, packaging for yogurt led consumers to experience the product as having a sharper and more bitter taste. Additionally, the authors claim haptic-color congruence (a rounded shape combined with a low saturated color, or an angular shape combined with a highly saturated color) leads to more favorable attitudes toward a product, relative to shape-color incongru-

ency. [Ares and Deliza \(2010\)](#) found that both color and shape significantly influence consumers' expected liking and willingness to purchase. Specifically, they noted the color and shape of the packaging should be congruent with the expected texture, taste, and calorie intake of the food in order to generate positive experiences among consumers. [Albertazzi et al. \(2013\)](#) also investigated the link between shape and color. In this research, for each geometric shape studied, participants were asked to indicate the color they perceived as the most closely related to it, with their choices coming from the Natural Color System Hue Circle. Results showed that participants' color choices for each shape were not random; that is, participants systematically established a link between shapes and colors when an experimenter asked them to choose the color that, in their opinion, was the most naturally related to a series of given shapes. The authors found the strongest relationships between the circle and the square with reds, and the triangle with yellows. Correspondence analysis suggested two main aspects determined these relationships, specifically, the "warmth" and degree of the "natural lightness" of hues. Taken together, these papers show how position, colors, and shapes of visual cues are subtly interconnected and that their holistic combination may affect consumer expectations.

3 Generating Customer Engagement

Effective package design not only creates expectations and provides information, but, as we discuss in this section, also engages and thrills the consumer. First, we focus on how packaging visuals can lead to an *automatic engagement*, through a spontaneous generation of imagery in viewers' minds using appropriate stimulus orientation ("mental simulation;" [Elder and Krishna 2012](#)) and perceived movement ("dynamic imagery;" [Cian, Krishna, and Elder 2014, 2015](#)). Second, we zoom in on *colors* and their ability to subconsciously trigger a particular feeling ([Labrecque, Patrick, and Milne 2013](#)). Finally, we discuss how to use *haptic* ([Peck and Wiggins 2006](#)), *olfactory* ([Krishna, Morrin, and Sayin 2014](#)), and *auditory* ([Spence 2016](#)) stimuli as part of packaging decisions to engage the customer. Accordingly, our discussion here relates mainly to elements of *outer* and *intermediate* physical packaging layers, and both the *purchase* and the *consumption* functionality packaging layers.

Automatic Engagement

Subtle elements, such as the orientation of a figure (e.g., to the right or to the left), can affect how the viewer (automatically) simulates the interaction with the product. [Elder and Krishna \(2012\)](#) show that a handedness-product-orientation match (e.g., when a right-handed person views an image of a bowl of soup with a spoon on the right) versus a mismatch (e.g., when a right-handed person sees an image of a bowl of soup with a spoon on the left) increases the *mental simulation* of product interaction. In other words, a handedness-object-orientation match facilitates one's mental simulation of interacting with the object, thereby increasing purchase intentions. However, when the product seems unappealing, a handedness-product-orientation match enhances the simulation of a negative experience, thereby

decreasing purchase intentions (see Elder and Krishna 2012, Fig. 3, p. 997 for an example).

In addition to product orientation, another visual characteristic able to evoke an automatic imagery response is perceived movement. Cian, Krishna, and Elder (2014, 2015) focused their research on the ability of a static visual to convey movement without actually moving (what they called dynamic imagery). *Dynamic imagery* is particularly interesting in packaging design, a context in which the use of actual motion is still technically and economically unfeasible. The authors showed that using dynamic imagery for product logos on packaging allows for images within the mind to continue in motion, creating a higher engagement for the viewer. For example, in one of their studies, Cian, Krishna, and Elder (2014) created two different logos for a fictitious brand that differed only in the dynamic imagery they evoked (lower vs. higher dynamism). In this study, the authors measured engagement (testing for gaze duration and number of fixations) using an eye tracker and found that the more dynamic visual led participants to look at the logo longer and also increased the stimulus' magnetism by increasing how often it attracted the observer's visual attention (number of fixations).

Color Engagement

If mental simulation and dynamic imagery increase the viewer's engagement at a cognitive level, *colors* can be used to engage customers more on an emotional level. Considerable evidence suggests colors elicit feelings (for a review, see Labrecque, Patrick, and Milne 2013). Importantly, Valdez and Mehrabian (1994) found hue variations led to systematic differences in feelings. The authors show that shorter-wavelength hues (e.g., blue) induce greater feelings of relaxation than longer-wavelength hues (e.g., red). Additionally, longer-wavelength hues induce higher feelings of excitement than shorter-wavelength hues (Antick and Schandler 1993; Bagchi and Cheema 2013). Building on this research, Gorn et al. (1997) discovered that higher-saturation visuals induce feelings of excitement, and that higher color lightness induces feelings of relaxation.

In terms of lightness (i.e., color value), Hagtvedt (2014) noted that consumers view a product as being more durable, but less convenient, if the color of its packaging is dark versus light. Both effects are attributable to darker products being perceived as heavier. Continuing on color value, some research has focused on the use of black and white (see Greenleaf 2010; Kareklas, Brunel, and Coulter 2014; Lee et al. 2014; Semin and Palma 2014). For example, Greenleaf (2010) noted that black and white can be used to automatically evoke a sense of nostalgia. On a cognitive level, Lee et al. (2014) noted that black and white promote a high-level construal (i.e., focus on the abstract, essential, and defining features of a stimulus), while color triggers a low-level construal (i.e., focus on the concrete, idiosyncratic, and superficial features of a stimulus). Thus, a black-and-white visual on packaging would enhance the perceived importance of the more essential versus more accessory product features. Visual cues are probably the most studied aspect of packaging engagement. However, the research in this topic is highly fragmented and context specific, and a comprehensive framework is still needed.

Olfactory Engagement

In addition to the visual element, packaging can engage customers using *olfactory* cues. Krishna, Morrin, and Sayin (2014) showed that printed food visuals that include a scent increased individuals' physiological (i.e., salivation), evaluative (i.e., desire to eat), and consumptive (i.e., amount consumed) responses. Thus, a scratch-and-sniff strip—as long as it reproduces the actual smell of the food—can benefit ads. More interestingly, Krishna, Morrin, and Sayin (2014) showed how visuals can lead people to “imagine smells” (“smellizing”) and how the effects of olfactory imagery can be similar to those of the actual smell. Consumers who viewed a picture of chocolate chip cookie and were asked to imagine how it smelled salivated much more than consumers who viewed the picture without being asked to imagine the cookie's smell. In conclusion, merely asking individuals to imagine the smell of the advertised food can lead to them desiring the food more (when a picture of the food is included in the ad). These results from research on advertising effectiveness offer directly applicable insights for the use of pictures and (imagined) smells in packaging design.

Haptic Engagement

Research also suggests that packaging can engage customers with its haptic components. Piqueras-Fiszman and Spence's (2012) participants tasted cookies from containers with varied surface textures (rough/granular vs. smooth). Results showed that participants rated the food samples from the rough container as being significantly crunchier and harder than those from the smooth container. Similarly, Krishna and Morrin (2008) showed that the flimsiness of a drink container can negatively influence consumers' ratings of its contents. The authors noted, however, that such an effect has less influence on people who find inherent enjoyment in touch (compared to people who do not). This moderation is attributable to the fact that people who are more sensitive to touch develop, over time, an expertise in understanding when haptic cues are or are not diagnostic.

Peck and Wiggins (2006) investigated the persuasive influence of touch on objects that are extraneous to the core consumption experience. They found that participants perceived a marketing message that incorporates a touch element as being more persuasive than a marketing message that does not, especially when the touch stimulates positive sensory feedback. For example, in one study, the authors designed a membership brochure for a Midwestern children's museum. Half of the brochures included a soft touch element (with no useful product-related information), the other half did not. The authors found that museum visitors exposed to the touch element viewed the brochure more favorably and were more likely to purchase a museum membership than visitors who were not exposed to the touch element. However, this effect occurred only for people who inherently find enjoyment in touch (measured using the “Need for Touch Scale,” Peck and Childers 2003). From a managerial point of view, this research suggests that packaging producers should focus more on experimenting with different texture experiences. A new and peculiar texture should attract more attention, invite more people to touch the object, and, if pleasant, generate a higher haptic engagement. However, even if

haptic elements are a fundamental part of product engagement, there is still a lack of research on this topic.

Auditory Engagement

Much of auditory marketing research has focused on the effects of sound symbolism (the sound of the word affects the perception of the object it represents; Yorkston and Menon 2004), ambient music, jingles and auditory logos, phonetic scripts, and voice (see Meyers-Levy, Bublitz, and Peracchio 2010 for a review). Although research has devoted little attention to the topic, the sounds a product's packaging makes when consumers pick it up off the shelf, when they handle it, or when they open or close it, can influence their multi-sensory product experience. Marketers can use auditory cues to direct the consumer's attention toward improved engagement or suggest positive associations for their products. For example, they can use the sounds of package opening (e.g., beverage container; Spence and Wang 2015) or closing (e.g., mascara shutting with a crisp click; Byron 2012) or the sound of use (e.g., aerosol spray; Spence and Zampini 2008) to create signature sounds that differ from that of the competition. Marketers can also design the sound of the product and its packaging to positively influence the consumer's overall product experience. For instance, Spence (2016) claims that consumers who ate potato chips while listening to the sound of a rattling package of chips rated them as approximately 5% crunchier. In conclusion, packaging designers should try to create both functional and distinctive packaging sounds to improve consumer engagement.

4 Consumption

In addition to its attentional, informational, and experiential influences, packaging also significantly affects people's quantitative judgments and decisions regarding how much they should buy, pay, consume, and store. Earlier work has focused on identifying individual size estimation inaccuracies (and biases) and on uncovering their underlying reasons. With the prevalence of the obesity epidemic in the United States in the last decades (Dietz 2015), researchers have started to focus more heavily on overall "consumption monitoring" in relation to food products. Consumption monitoring recognizes the distinct but related characteristics of pre-consumption size estimations, perceptions of size changes, distractions and external influences during consumption, and post-consumption estimations (perceived consumption and recalled consumption). We discuss these in turn here, as affected by various package design elements. The discussion more heavily relates to *intermediate* and *inner* packaging as they have a more immediate impact on *consumption*, but also includes *outer* and *purchase* packaging components for pre-consumption processes.

Pre-consumption Size Estimations and Psychophysical Biases

Size perception literature notes that consumers rarely read size information on packages and have difficulty in correctly

processing sensory information, hence inferring product size from perceptions of package size and shape (Chandon and Ordabayeva 2009; Folkes and Matta 2004; Krishna 2008). Estimations of package size still necessitate processes of information selection and integration (e.g., Verge and Bogartz 1978), and consumers typically use simplifying heuristics and could be subject to various biases.

Consumer research has used psychophysical models to understand consumer perceptions of volume and the effects of such simplifying heuristics. For instance, Raghurir and Krishna (1999) have shown how the height of a container could be used by consumers as a simplifying visual heuristic to make volume judgments. Consequently, holding actual volume constant, more elongated containers were perceived to have higher volume than shorter and wider containers, an effect that came to be known as the "elongation bias." Building on this work, Krider, Raghurir, and Krishna (2001) have proposed a psychophysical model of how consumers make size judgments—selecting and integrating pieces of information based on their *salience*. They focus on area judgements, as might apply to the packages' surface area when on retail shelves. Their model proposes that "consumers simplify complicated area estimation and comparison tasks by first comparing the most salient dimension between two figures, and then incorporating the less salient secondary dimension to adjust this comparison" (p. 420). The degree of adjustment will depend on the dimensions' relative salience. Thus, for example, if consumers want to choose the largest box of cereal, tall rectangular boxes will be perceived as bigger than square ones of equal volume. Graphics, such as double-sided arrows or lines through the longest dimension of a package, could make these dimensions salient, hence increasing estimated volume. Researchers have shown many other visual biases (an overview of visual biases as a whole may be found in Krishna's (2008, 2010) work).

Perceptions of Size Changes

The marketplace is characterized by various packaging trends such as "supersizing" (i.e., ever-increasing portion sizes) and "downsizing" (e.g., single-serving packages and 100-calorie packs). As such, consumers' responses to changes in both the size and shape of packages and portions have become even more important. The demonstrated perceptual biases provide some insight regarding how consumers will respond to these changes (such as salience of elongation as a shape-based bias). According to studies of size-based biases, people tend to underestimate the degree of changes in package sizes (Chandon and Wansink 2007; Krider, Raghurir, and Krishna 2001). Recent research has focused specifically on the interaction of shape and size effects and changes in multiple dimensions (e.g., Chandon and Ordabayeva 2009; Ordabayeva and Chandon 2013, 2015). Chandon and Ordabayeva (2009) showed that when all three dimensions (height, width, and length) of a product's package change, size changes appear smaller compared to when it changes in only one of these dimensions. Accordingly, marketers who are decreasing package sizes to accommodate increasing costs can downplay the potential negative effects on consumers by changing all three dimensions of the package. In a follow-up work, Ordabayeva and Chandon (2013) also shed light to the

underlying processes behind these effects. They show that these estimation errors do not occur because consumers fail to notice the changes in individual product dimensions, but because they incorrectly combine these changes in an additive rather than a multiplicative manner.

Effects on Consumption

Even more importantly than affecting estimations in general, packaging-related size information also influences “consumption norms”—the portion size deemed appropriate by the consumer (Wansink and van Ittersum 2013). People infer the appropriate amount to eat from the portion size they are served (Rolls, Morris, and Roe 2002), from the size of the package (Wansink 1996), and from the size of the plate or container that is being used (Van Ittersum and Wansink 2012). Accordingly, larger packages and bigger plates and containers have been shown to increase consumption since they provide no (or larger) external control points for the consumer (e.g., Chandon and Wansink 2012; Geier, Rozin, and Doros 2006; Rolls, Engell, and Birch 2000).

Similarly, labeling portions as smaller makes people eat more but think that they are eating less (Aydinoglu and Krishna 2011). Such effects on *perceived* consumption (i.e., how much people think they consumed) are especially interesting and also carry significant policy implications as consumers cannot accurately judge quantity even after consumption. Raghurib and Krishna (1999) have demonstrated another such bias—the perceived size–consumption illusion. They showed that perceived consumption, contrary to perceived volume, was related inversely to the salient dimension of height (as opposed to the elongation bias explained above). When consumers saw a tall container, they perceived it as having more content than a shorter (but wider) container. When they start consuming its content, however, they realize that it is not as big as they thought—their experience contradicts their expectations. Because the consumption volume is smaller than expected, they believe they have consumed less (than from the shorter and wider container). Consequently, consumers tend to overcompensate, consuming more from the more elongated containers.

In response to the difficulties facing consumers in consumption monitoring, marketers have attempted to use smaller packages, snack-size plates, and “virtual partitions” in packaging as a means to create visual cues to stop eating. Such attempts have had some success in preventing overeating; however, recent research also notes limitations on such external control (or “pause”) points as substituting people’s internal self-regulation motivations, thereby ultimately having little to no effectiveness (Vale, Pieters, and Zeelenberg 2008).

The new paradigm of consumption monitoring should consider the interrelated nature of individual, contextual, and marketing-related drivers of perception and consumption processes. Furthermore, while previous research has studied the effects of cognitive and affective factors separately, it is possible that these factors interact (Ordabayeva and Chandon 2015), and that they further operate under the influence of environmental dynamics.

General Discussion

“The psychology of sensation and perception is probably the most advanced and ‘scientific’ part of psychology,” Rozin and Hormes (2010, p. 316) note. Much academic and practical work over the last few decades has applied sensory perception research toward an understanding of consumer behavior, under the umbrella of “sensory marketing.” We gather together in one paper research related to the sensory aspects of product packaging from a customer experience perspective. Our discussion also introduces new ways to think about product packaging by introducing the layered-packaging taxonomy, which highlights the different characteristics and roles of *outer–intermediate–inner* physical packaging layers and the *purchase–consumption* functional packaging layers. We use the proposed taxonomy as an aid to clarify the critical stages of the customer–brand interaction as affected by packaging decisions: attention, expectations, engagement, and consumption.

Recent respect for all these aspects of packaging has led many firms to focus on product and package design, helping spark a packaging renaissance (Miller 1994; Raghurib and Greenleaf 2006), where small changes in package shape have had a large influence on sales and profits (Prince 1994). The world of consumer packaging is also moving in many different directions with new trends making use of and reflecting high-tech, sustainability, functionality, and glitz (Young 2015). While the product may be the prize, the package is critical. Packaging of a product is similar to a person’s outfit and external appearance. It carries great importance in first impressions, initial and ongoing interactions, and the formation of long-lasting relationships between the brand and the consumer.

Parallel to the raised esteem and importance of packaging in the marketplace, we aimed to stress the need for more sensory-focused work on packaging among consumer researchers as well. As the sample studies reviewed in this paper showed, previous work in sensory marketing has been more prolific on research questions related to the environment, product, communications, and individual differences. We believe that some of the insights from these previous related works are directly applicable to packaging effects as well (e.g., the visual stimuli used by Cian, Krishna, and Elder 2014 and Elder and Krishna 2012). We encourage future research to explore other similar potential linkages and also consider the unique characteristics of package design effects in new empirical work. We hope that our proposed taxonomy of different types and roles of packaging will be helpful in providing direction in generating such unique research questions.

Future research on sensory aspects of package design should also consider the integrated nature of the customer experience through its various stages (attention, expectation, engagement, and consumption). While these important facets of the customer experience were discussed mostly within a suggested temporal sequence in this paper, we note that it should be viewed as a dynamic and interrelated process. Customer–brand interactions are mostly repetitive and evolve through time with individual stages of the experience naturally affecting one another as some

of our discussions highlighted. Such interfaces (for instance customer engagement affecting future customer attention) should offer new venues for future research, especially with a consideration of important consequences for consumer response such as perceived value and quality, health and taste inferences, and customer loyalty.

Similarly, we note that prior work has focused on the effects of individual senses (as related to packaging decisions) on consumer perception and behavior. However, as an outfit of the product, packaging also communicates brand identity and brand associations via its multiple structural and visual elements (Underwood 2003). Consequently, package design decisions need to present a coherent image. Accordingly, Krishna (2012) invites new research to adopt a multi-disciplinary paradigm and focus on the interrelations and on the overall coherence between the various sensory elements (see Krishna, Elder, and Caldara 2010 for an example).

Research should also focus on how packaging impacts consumers in a physical versus online store where one has the possibility of touch in one domain and not the other. Li, Daugherty, and Biocca (2001) have conceptualized a challenging type of customer experience—virtual experience. They define virtual experience as “psychological and emotional states that consumers undergo while interacting with products in a 3-D environment” (p. 1). Virtual experience is similar to indirect experience (e.g., advertising and brochures) in that both are mediated experiences (Heeter 2000). It also resembles direct experience (e.g., personal inspection and trial) because both are interactive in nature (Hoch and Deighton 1989). Recent work in consumer behavior has begun to study these unique aspects of virtual consumer–product interactions and how they can be enhanced (e.g., Schlosser 2006), but research on this topic is lacking.

Addressing these (and similar) questions will further advance our understanding of how packaging can engage consumer’s senses, both at the moment of purchase and consumption. Sensory marketing applied to packaging is an emerging field of research; this article, we hope, will spur further exploration of this topic.

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