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Visual Brand Language: Color, Complexity, and Harmony

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Visual Brand Language: Color, Complexity, and Harmony

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by

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Abstract

Visual brand language encompasses the perceptual presence of a brand, which influences consumer brand knowledge. Consumers are known to make brand inferences and attributions on the basis of presented visual elements of design. Elements of visual design—such as logos, graphics on packaging, or composition in assortment—can successfully communicate the characteristics of the brands they represent. This research is therefore motivated to investigate how visual brand language relates to consumer psychology to create a synchronized brand experience. Three essays are presented to explore visual brand language of color in a logo, complexity in packaging, and harmony in an assortment. Implications for marketers on how to think about visual brand language to alter consumption preferences and judgments about the brand are discussed.

The first essay in this dissertation investigates the use of color in retail branding. This essay examines how colors shape perceptions of eco-friendliness to inform ethical judgments about retailers. Evidence shows that shoppers perceive the colors blue and green as more eco-friendly than the color red. Exposure to a retailer’s logo featuring an eco-friendly color makes an ethically ambiguous practice seem more ethical; however, exposure to a logo featuring a non-eco-friendly color makes the same practice seem less ethical (Study 1). This effect is due to the embodied meaning of color and does not stem from referential meanings associated with the names of colors (Study 2). Perceptions of a retailer’s eco-friendliness mediate the relationship between color and ethical judgments (Study 3). Further, although the word “green” appears to influence ethical ratings of retail practices more than the word blue, visual exposure to either color evokes similar perceptions of eco-friendliness and influences downstream effects on ethical judgments of retail practices (Study 4). Alternative explanations for this effect are assessed and
ruled out (Study 5), leading to the conclusion that logo colors can be used to shape consumers’ perceptions of retailer ethicality.

The second essay in this dissertation explores how visual information that is perceived to be complex can also cause consumers to infer an increased sense of informativeness. Although studies have investigated the effect of misleading packaging claims, perceptual variations in package design such as design complexity can cause consumers to assume increased informativeness. In three studies, complexity of design on packaging is isolated to evaluate misperceptions of informativeness. This paper demonstrates that perceptual complexity results in an increase of perceived informativeness and that the underlying mechanism is ease in processing. This only happens under high involvement, not under low involvement. Importantly, this effect is attenuated when correction instructions are provided. Implications for marketers and policy makers in the packaging industry are discussed.

The third essay in this dissertation is motivated to study the effects of harmony in color. High levels of construal thought are known to systematically promote self-control. However, this essay demonstrates that when the coherent organization of a presented assortment is reduced, the influence of a construal mind-set is reversed. This paper demonstrates that lower estimates of consumption associated with broader goal-level implications can be disrupted with the visual effects of an increased assortment size. Furthermore, the underlying mechanism for this shift in preference of consumption is the perceived lack of organization and variety derived from the number of disparate colors in the assortment. Given this finding, the findings reported in the essay demonstrate an important boundary condition by varying the level of harmony in the colors of the assortment. The results demonstrate that food consumption can be influenced by a
combination of individual goals, assortment size, and the colors used in the assortment.

Implications for theory, consumers, and marketers are discussed.

Taken together, the research presented in this dissertation demonstrates that the visual elements of design can impact downstream effects on the consumer. More research in this area is warranted.
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INTRODUCTION

Visual brand language (VBL) uses design to communicate to consumers. VBL takes advantage of the visual information communicated by symbols or logos, copyright on packaging, product form and aesthetics, visual information in advertising, and even branded interiors to communicate to the consumer. The substance of communication between the firm and consumer is based on branding concepts that make sense to the consumer. Firms employ in-depth market research, focus groups, or design thinking to identify with the consumer and to create a branded presence in which consumers are fully engaged. In this way, firms influence consumer culture in a branded world.

The core of communication in VBL consists of concepts rooted in meaningful messages to the consumer. Take the concept of power, for example. In a social sense, an entity that holds power has priority over resources in a social group. Power is often attributed to a dominant player in a group. Similarly, when it comes to a particular category of brands, the dominant player is perceived as the leader in the category. Research indicates that placing entities on a vertically higher plane increases perceived powerfulness (Huang, Li, & Zhang, 2013). In communicating the power of its brand, the firm could use VBL in advertisements or information on packaging to influence the concept of power with which the consumer is familiar.

Recent research in marketing indicates that concepts such as weight (Deng & Kahn, 2009), time (Chae & Hoegg, 2013), happiness (Meier, Robinson, & Caven, 2008), color (Elliot et al., 2010), and others are used to communicate meaning about the brand. The reason these branded concepts use visual information processing to communicate to the consumer is that consumers perceive brands in a social context. Concepts can be mapped onto a visual field in a way that metaphorically reflects meaning inferred from the brand. Conceptual metaphor theory
(CMT) is based on the premise that metaphor is a fundamental aspect of knowledge construction and everyday thought (Lakoff & Johnson, 1980). Metaphors transform existing knowledge into new ways of interpreting information. Therefore, although past experiences and knowledge tend to be the basis of our view of the world, metaphors help us to comprehend present experiences and contextualize new information in a way that is meaningful in the light of existing knowledge (Billow, 1977).

In order for VBL to make sense to the consumer, meaning inherent in visual concepts must be grounded in the prior experiences of the consumer (Gibbs, 2011). In this case, the prior experience of the consumer is informed by the cultural context in which the concept is used and which forms the source domain. The target domain, on the other hand, is in the context that the concept is visually represented to communicate to the consumer. Despite the origin of the term metaphor in linguistics, CMT focuses on the transfer of meaning inherent in concepts (Reddy, 1979). Spatial concepts consist of orientation that can be mapped onto concepts, which is, hence, useful in branding (Lakoff & Johnson, 1980). The structural mapping of the meaning of these concepts on the visual field offers opportunities for communication by the brand.

Role of Gestalt

In all of metaphoric thinking, an important consideration comprises how we think of concepts in both the source and target domain. The sense or meaning that we make of the concept in the source domain is what influences the target domain. Gestalt thinking is based on the assumption that the mind tends to be holistic and analog in the way that it organizes information (Arnheim, 1949). In this way, the meaning inferred by the whole makes more sense than the parts (Lakoff & Johnson, 1980). Hence, it is only when the meaning that the consumer infers by VBL taps into a larger sense that the brand instigates (e.g. how a brand is viewed within
the context of its category, social presence of the brand, how powerful the perception of the brand is, etc.) that communication to the consumer is coherent.

CMT offers marketers many important areas of future research. Marketing literature has begun to evolve in terms of identifying concepts that are relevant to branding (e.g., personality of the brand, power, color, time, etc.). Yet there exist many concepts that need to be evaluated to determine the ways that they impact consumer behavior. Of importance are concepts that influence the consumer judgments of the ethical behavior of the firm, its perceived role in a category, its performance, how informative its presented information is, or even judgments about a given product assortment. Other gaps in CMT also must be noted as opportunities for future research. Take, for example, instances in which a concept operates in two different ways that are incongruent (e.g., perception of time as it maps out to spatial orientation—i.e., left or right), the same concept is described in multiple ways (e.g., happiness is up; power is up; pride is up), or boundary conditions to the influence of metaphoric concepts on consumption (e.g., conceptual representation is effective only in public vs. in private consumption). These are just a few examples of how branding can draw on CMT.

The three essays in this dissertation identify concepts that have a meaningful influence on consumer judgment and behavior. While the unifying theme of the dissertation is CMT, the focus of each essay is on specific concepts that affect consumer knowledge of the brand. The first essay presents an analysis of the role of colors in shaping ethical judgments of a brand. By focusing on colors used in logo design and the meanings that they communicate, this essay explores how color influences intuitive judgments regarding the concept of eco-friendliness. The second essay explores the concept of complexity on inferences of informativeness. Package and advertising that use visual complexity increase inferences of informativeness. But this only
happens when complexity is structured. The underlying mechanism of ease in processing indicates that priming mechanisms, such as correction instructions and misattributions, can be adopted in ways that marketers can use strategically. The third explores the concept of harmony in product assortment. Specifically, this essay proposes that harmony in color will produce the same impact on consumption that a lack of structure or organization would have. To operationalize harmony in color, the paper contains a review of color theory to influence scientific research of colorimetry in marketing and consumer behavior.

References


ESSAY 1

How Logo Colors Influence Shoppers’ Judgments of Retailer Ethicality:
The Mediating Role of Perceived Eco-Friendliness

Abstract

Colors used in retail branding can evoke powerful conceptual metaphors. This research examines how colors shape perceptions of eco-friendliness to inform ethical judgments about retailers. Evidence shows that shoppers perceive the colors blue and green as more eco-friendly than the color red. Exposure to a retailer’s logo featuring an eco-friendly color makes an ethically ambiguous practice seem more ethical; however, exposure to a logo featuring a non-eco-friendly color makes the same practice seem less ethical (Study 1). This effect is due to the embodied meaning of color and does not stem from referential meanings associated with the names of colors (Study 2). Perceptions of a retailer’s eco-friendliness mediate the relationship between color and ethical judgments (Study 3). Further, although the word “green” appears to influence ethical ratings of retail practices more than the word blue, visual exposure to either color evokes similar perceptions of eco-friendliness and influences downstream effects on ethical judgments of retail practices (Study 4). Alternative explanations for this effect are assessed and ruled out (Study 5), leading to the conclusion that logo colors can be used to shape consumers’ perceptions of retailer ethicality.

Keywords: Retail branding; Conceptual Metaphor Theory; Logo design; Ethical judgment
Introduction

Retailers use color as a key component of branding (Arnheim, 1971; Bellizzi & Hite, 1992; Deng, Hui, & Hutchinson, 2010; Labrecque, Patrick, & Milne, 2013). Over the last decade, retailers and policy makers have been particularly concerned with the use of the color green. Although shoppers view the use of the color green by retailers such as Starbucks and Whole Foods favorably as a way to communicate corporate identity (Lindström, 2005), other corporations that use green are regarded dubiously (Imkamp, 2000). Shell, for example, faced strong criticism for advertising itself as a green company, indicating a commitment to the environment, when critics argued that its business practices harmed the environment (Grandia, 2007; Karliner, 2001). Growing skepticism and media coverage have made consumers more sensitive to greenwashing practices (Hsu, 2011). In an attempt to control greenwashing, the United States Patent and Trademark Organization (USPTO 2013) revised its guidelines to prevent companies that are not environmentally friendly from using the word green in their trademark (Collen, 2012). This restriction, however, does not prohibit the use of the color green in visual branding.

A trademark search on the USPTO website indicates that 21,194 company trademarks have the word green in them. This is in stark contrast with a color such as aquamarine, for example, which is used in only 38 trademarks. Surprisingly, the word blue appears 19,857 times on a word trademark search but 155,881 times on a word and image search. The word and image search for the term green yields 127,612 occurrences, slightly fewer than blue (USPTO 2012). This raises a question about how the color itself (vs. the word used to describe a color) may influence shoppers’ perceptions of retailers that use the color in their branding.
Concepts communicated by color are rooted in universally innate experiences that are coded psychologically, anthropologically, and/or linguistically (Wierzbicka, 1990). This is known as embodied meaning (Labrecque, Patrick, & Milne, 2013). Labrecque and colleagues (2013) define embodied meaning in visual stimuli as the attributes in the stimuli that are free from context or the semantic meaning they evoke. In contrast, referential meaning is semantic in nature. One such concept communicated by the color green is that of eco-friendliness, evidence of which is well documented in the marketing literature (Chen, Lai, & Wen, 2006; Peattie & Charter, 1994; Porter & van der Linde, 1995). Indeed, a green brand image is defined as “a set of perceptions of a brand in a consumer’s mind that is linked to environmental commitments and environmental concerns” (Chen, 2010, p. 312).

The present research evaluates whether the meaning of eco-friendliness is embodied in color or is embedded referentially in the use of words to describe the color. Research has documented the downstream effects of color, such as retail price perceptions (Puccinelli, Chandrashekaran, Grewal, & Suri, 2013). However, little is known about downstream effects of color on perceptions of retailer ethicality. Shoppers commonly view retailers that act in an environmentally responsible way to be taking the ethical high road (Shrum, McCarty, & Lowrey, 1995; Trudel & Cotte, 2008). Green is considered good, per se. Eco-friendly products are often referred to as “ethical products” (Luchs et al., 2010). Retailers that go the extra mile to provide green products and introduce green practices (e.g., incentivizing the recycling of store bags, encouraging consumers to bring their own bags) are lauded by shoppers for increasing awareness and addressing environmental issues (Bullard & Manchanda, 2013). Retailers routinely promote their environmentally responsible behavior (White & Simpson, 2013). However, the way consumers view different retailers varies. Often, common retail practices are viewed as attempts
to increase sales and profits. In other cases, consumers give retailers the benefit of the doubt and perceive those same practices as providing benefits to consumers. Consumer perceptions of the goodness of an actor can influence judgments of the goodness of an act (Haidt, 2001, 2007; Nisbett & Wilson, 1977; Thorndike, 1920), particularly when the act is ethically ambiguous (Laczniak & Inderrieden, 1987).

British Petroleum’s act of donating to the National Fish and Wildlife Foundation was viewed more skeptically, given the company’s history of negative environmental impact and its tarnished brand image (Pine, 2010), than the same act of donation by FedEx (Alley, 2013). This makes one wonder if the way consumers perceive a retailer can color their ethical evaluations of the retailer’s practices. Certainly then retailers can carefully use visual branding strategies to maintain positive consumer perceptions (Bellizzi, Crowley & Hasty, 1983; Schmitt & Simonson, 1997).

Indeed, one way to manage retail branding is in the selection of colors used in logos. The meaning inherent in color can be transferred not only from preconditioned associations with a particular color (e.g., green suggests “greenness”), but also from experiencing the color (Lakoff, 2006). A common example is when children are taught to recognize blue skies and green grass. Here, the environmental concepts are not just genetically and culturally recognizable, but also subject to evaluation as a result of direct experience of the color (Wierzbicka, 1990). Conceptual Metaphor Theory (CMT) posits that color, as a mental representation of meaningful concepts, helps organize consumers’ perceptions of the world (Heine, Proulx, & Vohs, 2006). Further, meaning communicated by symbolic representations of a brand, such as a logo, can be a useful tool for marketers (Sundar & Noseworthy, 2014). Hence, we contend that shoppers metaphorically associate the meanings of logo colors with the retailers the logos represent. Such
metaphorical associations shape impressions of brand image and inform shoppers’ ethical judgments about retailers’ actions.

The research presented in this paper examines the metaphorical role of color in shaping shoppers’ perceptions of retailers’ eco-friendliness and, by implication, ethicality. The results of our studies provide several insights. Retailer logos using red are perceived as less eco-friendly than otherwise identical logos featuring green or blue, indicating that shoppers perceive green and blue as indications of eco-friendliness. Moreover, we show that perceptions of eco-friendliness stem directly from the meaning embodied by color, not from referential meanings associated with the words used to describe colors. The color metaphor that conveys eco-friendliness is sufficiently powerful to change consumer perceptions of retailer ethicality. Finally, we demonstrate that exposure to the colors green or blue evokes a similar embodied meaning of eco-friendliness; however, the referential meaning of eco-friendliness stems only from the word green, not from the word blue. Importantly, evidence shows that downstream effects of color on shoppers’ perceptions of retailer ethicality stem exclusively from embodied meaning evoked by visual exposure, not from referential meaning evoked semantically.

**Conceptual framework and hypothesis**

*How color influences ethical judgments*

An essential element in retail branding is the color of the retailer’s logo (Henderson, Giese, & Cote, 2004). Often the color used in retail branding is not limited to just the logo, but determines colors used in any interaction with the retailer such as in advertising, store interiors and even attire worn by customer service personnel (Ailawadi & Keller, 2004; Bellizzi & Hite,
Recent evidence suggests that the valence of color can affect the moral acceptability of a behavior (De Bock, Pandraeere, & Van Kenhove, 2013). Specifically, De Bock and colleagues demonstrate that when good behavior by customer service personnel is described against a green background, consumers rate the behavior more positively. Conversely, when bad behavior is described against a red background consumers view the behavior as less negative.

The authors argue that consumers tend to view undesirable behavior as more acceptable when the background color on which behavior is described matches the valence of the behavior itself. Although this research suggests that colors can influence ethical judgments, the influence of color in retail branding remains rather unclear. When color is used in a logo (rather than a background to describe a practice), we expect to find the influence of color on ethical judgments to be a result of inferences about the retailer rather than the valence of the color presented. Indeed, many common retail practices are ambiguous such that they can be perceived as more or less ethical (Dubinsky & Levy, 1985). Take the example of a store layout that places frequently purchased dairy items at the rear of the store. This norm is commonly attributed to practical considerations of store planning (e.g. refrigeration section is grouped to the rear of the store). Yet, some might argue that placing this essential section at the rear of the store is intended to force consumers to meander around the store, thus increasing opportunities for unplanned purchases. In such cases, shoppers’ perceptions of the retailer can influence ethical judgments of this ethically ambiguous practice. We therefore propose that the color of the logo, which influences how the retailer is perceived by shoppers, can influence ethical judgments.

There is evidence to support this assertion. Research suggests that a retailer’s logo color provides important information about a retailer’s identity (Arnheim, 1971). The color used in a logo does indeed influence the meanings communicated by the logo (Bottomley & Doyle, 2006).
Specifically, the color of a retailer’s logo has a connotative meaning in connection with the retailer’s identity that consumers use when making judgments about the retailer (Ailawadi & Keller, 2004; Keller, 1993). Shoppers believe that if a retailer possesses positive attributes on one dimension, then the retailer has positive attributes on other, unrelated dimensions (Gleim et al., 2013; Schuldt, Muller, & Swartz, 2012).

Conceptual Metaphor Theory (CMT) predicts that seeing a logo color will evoke concepts that transfer to the organization the logo represents (Lakoff, 2006). For example, eco-friendly colors (e.g., blue, green) may signal commitment to environmental responsibility because they evoke concepts of nature (Hemphill, 1996), thus casting a “green halo,” while other colors (e.g., red) evoke negative meanings such as anger or fury (Birren, 1978). CMT also posits that meaning is inferred not just from language, but also from natural dimensions of experience, including colors, shapes, and textures (Lakoff & Johnson, [1980] 2003). When a single entity of stimulus refers to another related entity, it is known as metonymy in CMT (Kövecses & Radden, 1998). Metonymic concepts emerge from correlations in our experience between two entities and have a referential function (Soriano & Valenzuela, 2009). Thus, when a logo features green, an eco-friendly color, we assert that retailers benefit from association with green, as perceptions of an actor influence subsequent judgments about the goodness of actions (Asch, 1946; Thorndike, 1920). Thus, ethically ambiguous practices performed by a retailer represented by a more eco-friendly logo color should be viewed more positively by consumers. In summary of our expectations:
**H1.** Exposure to a more (vs. less) eco-friendly color in a retailer’s logo will influence consumer judgments about the retailer’s actions such that ethically ambiguous business practices will seem more (vs. less) ethical.

*Embodied versus referential transfer of meaning*

Color can prime concepts due to both embodied and referential transfer of meaning (Labrecque, Patrick, & Milne, 2013). Embodied meaning refers to “attributes embodied in the aesthetic stimulus, independent of context and the semantic content it may evoke” (Labrecque, Patrick, & Milne, 2013; pp. 188; Zeltner, 1975, pp. 41–42). Referential meaning, on the other hand, “emerges from the network of semantic associations or real-world concepts that are drawn out by exposure to aesthetic stimuli” (Labrecque, Patrick, & Milne, 2013; pp. 192). What is interesting about embodied meaning is that consumers transfer embodied meaning between different domains (Yee, Ahmed, & Thompson-Schill, 2012). For example, in one study that drew participants’ attention to the color of an object such as a cucumber, exposing them to the word cucumber primed them toward another object (e.g., emerald) that shared the same diagnostic color as the cucumber. In contrast, referential transfer of meaning facilitates the activation of a new concept that shares the actual color in semantic memory (Zhu & Meyers-Levy, 2005). This suggests that activation spreads from one domain to another based on transfer of embodied meaning.

Evidence suggests that individuals use both visual and verbal information to form judgments (Childers, Houston, & Heckler, 1985). However, individual differences in processing style determine which mode of processing (visual vs. verbal) is favored. Thus, we reasoned that logo colors should influence visual processors though embodied meaning. Verbal processors
should be more influenced by referential meanings. On the basis of this reasoning we anticipate that:

**H2a.** The effect of logo color on judgments of an ethically ambiguous retail practice should be contingent upon an individual’s processing style, such that visual (vs. verbal) processors will use embodied (vs. verbal) meaning in forming judgments of ethicality.

Preference for visual versus verbal information depends not only on processing style, but on the stimuli presented. Hence if we were to manipulate the mode of presentation of information regarding a retailer, we predict that ethicality judgments should result from embodied transfer of the meaning of an eco-friendly color, which is visual, and not from referential transfer of meaning, which is semantic.

**H2b.** Visual exposure to an eco-friendly color (vs. verbal exposure to the word used to describe the color) will influence ethical judgments of an ethically ambiguous retail practice.

*Color and perceived eco-friendliness*

According to CMT, as a culture evolves, complex metaphors are formed and used in everyday language (Boers, 2003). Take the example of the metaphor “the mind is a computer.” Unlike simple metaphors that link a social concept (e.g., power) to the physical representation (e.g., height; Schubert, 2005; Sundar & Noseworthy, 2014), complex metaphors are culture-dependent and are informed by the elaborate way in which society interprets the metaphor (Boers, 2003). Hence the metaphor “the mind is a computer” evolved after the workings of a
computer were known. Importantly, the use of the metaphor in describing complex processing of the human mind, which prevailed long before the invention of the computer, only occurred after the ubiquitous use of computers.

In this regard, the universal use of green to represent eco-friendliness suggests that it should be possible to evoke the concept of eco-friendliness with mere exposure to the color. The term green is rooted in environmentally ethical considerations (Crane, 2001; Mazar & Zhong, 2010) and is used to describe eco-friendly practices, products, and customers (Mazar & Zhong, 2010). Thus, the color green in a logo, makes the retailer appear more eco-friendly and may further convey a connotative meaning that the retailer is not just eco-friendly, but is socially responsible as well. When shoppers see a retailer’s logo, a more eco-friendly color should cause consumers to infer a more ethical retailer.

Convergent literature streams note that when a concept is visually represented by a brand or product, individuals develop a sense of the brand that influences their understanding of brand communication. In one study, Huang, Li, and Zhang (2013) showed that situating an image of a consumer adjacent to an advertised product primes the concept of intimacy. Similarly, setting the image of the consumer above the image of the advertised product primes the concept of power (Huang, Li, & Zhang, 2013). Positioning a product to the right of an advertisement primes the concept of the future in cultures that map time from left to right, which can influence product evaluations (Chae & Hoegg, 2013). Placing the image of a product on the bottom or right hand corner of a package reinforces the concept of weight, which influences consumption (Deng & Kahn, 2009). Locating a logo on the top of the face of packaging evokes the concept of brand power, which influences brand preferences (Sundar & Noseworthy, 2014). These examples suggest conceptual metaphors used to prime brand concept can shape downstream judgments.
Accordingly we argue that when a logo representing a retailer uses an eco-friendly color, the color primes an eco-friendly concept that becomes associated with the retailer. The perceived eco-friendliness of the retailer then causes downstream effects on judgments, in this case judgments of the retailer’s ethicality. Consequently, we hypothesize that the underlying mechanism of color influencing ethical ratings is due to color informing the perceived eco-friendliness of a retailer. Hence:

**H3.** Perceived eco-friendliness of a retailer will mediate the effect of color on ethical judgments about the retailer’s actions.

**Overview of studies**

The core proposition of the current research is that when a retailer’s logo uses colors that are perceived as eco-friendly, it should result in favorable judgments of ethicality when a retail practice is ethically ambiguous. We test the prediction that ethical ratings are affected when the influence of color is visual (embodied transfer), but not verbal (referential transfer). We also test the prediction that the underlying mechanism of color’s impact on ethical ratings is perceptions of retailer eco-friendliness. We test these predictions and assess alternative explanations in a program of five studies.

**Pretests**

*Pretest 1a*
We conducted two pretests to develop the stimuli used in the studies. The first pretest exposed participants \( n = 239 \) to a logo featuring one of 16 different colors adopted from various retailer logos, selected to represent the full range of the color spectrum. Participants were first asked to review the following profile of a fictitious retailer:

DAVY Grocery Store operates 109 supermarkets in the Houston, Austin, and Dallas-Fort Worth areas under the DAVY Flagship banners. DAVY employs more than 10,000 associates. Most stores include fresh seafood, floral, cosmetic, bakery and film processing departments. The premium DAVY Flagship DAVY stores have expanded their take-out departments to provide fresh made pizza, pasta and barbecue. Many locations offer bank branches, ATMs, coffee shops, one-hour photograph processing, drive-through pharmacy windows, fueling stations and full-service counters where a customer can purchase lottery or movie tickets, pay utility bills and car license renewals.

This profile was accompanied by a colored logo. Each participant saw only 1 of the 16 colors tested, in a between-subjects design. A professional designer created a test logo in which the graphical composition was ambiguous with respect to eco-friendliness. Based on a circular template, half the logo consisted of the outline of a cogged wheel, the other half consisted of the outline of a globe (see Appendix).

Results

Responses of self-identified colorblind participants were eliminated from the analysis. We present the mean eco-friendly ratings in Table 1. The retailer was rated as most eco-friendly when represented by a logo featuring blue \( (M = 5.00, SD = 1.22) \). The two colors rated lowest in terms of eco-friendliness were both shades of red: Trader Joe’s red \( (M = 3.85, SD = 1.61) \) and
Target red \((M = 3.78, SD = 1.84)\). Thus, we used blue and red as the high and low eco-friendly colors because they differed statistically in terms of perceived eco-friendliness \((t(25) = 2.06, p < 0.05)\). These two colors were used in Studies 1, 2 and 3. In Study 4, we used blue and green \((M = 4.87, SD = 1.02)\), which did not differ statistically \((p = .77)\). See Table 1 for results.

*Pretest 1b*

To rule out the possibility that any of the colors used in the studies would be associated with a specific, identifiable retailer, we conducted a follow up pretest \((n = 154)\) with the three colors mentioned above (blue, green and red). After eliminating 6 responses due to self-identified color blindness, we examined 148 responses \((43.2\% \text{ female}, M_{\text{age}} = 20.08, SD = 3.56)\). The six stimuli used consisted of the words red, green, blue, or visual exposure to the actual color. Each participant was exposed to one of the six stimuli in a randomized, between-subjects design. After viewing the stimuli, participants were asked to perform a sentence completion task: “I associate this color with retailers such as _______ (list one or more stores).” This item was presented among filler items, with order of presentation randomized.

Results indicated that participants associated no one retailer with the words used to describe the colors. The result of participants being exposed to the actual color (versus the word used to describe the color) were similar, such that no one retailer was associated with a given color by the majority of participants\(^1\). Hence these colors were carried forward to the studies as exemplars of high (blue and green) and low (red) eco-friendly colors.

*Pretest 2*

\(^1\)The largest percentage of associations were as follows: word red: 19\% associated it with Target; color red: 21\% associated it with Target; word blue: 15\% associated it with Wal-Mart; color blue: 16\% associated it with Wal-Mart and 15\% associated it with Kroger; word green: 19\% associated it with Dollar General; color green: 12\% associated it with Dick’s Sporting Goods
We conducted a pretest ($n = 226$) to determine ethical perceptions of common retail practices that could be construed as ethically controversial. The goal of this pretest was to select exemplars of ethically ambiguous (mid-scale) practices for use in the studies that followed. Ten statements describing common, ethically controversial retailer practices formulated from consumer blog sites (see the Appendix). Participants were randomly assigned to read one statement in a between-subjects design. Participants were told “This common retail practice is perfectly legal. However, opinions differ widely concerning how ethical the practice is. How would you rate this practice in terms of ethics?” (1 = “not ethical at all” and 7 = “very ethical”; adopted from Dabholkar & Kellaris, 1992).

Results

Results are summarized in Table 2. On the basis of these results, we selected two statements that averaged neither high nor low ($M_s = 4.65, 4.82$), and were thus deemed to be ethically neutral, as stimuli for Study 1. These two statements were:

Supermarkets and grocery stores typically have floor plans that place dairy, eggs, produce, bread, and meat (“staples”) at the periphery of the store. Other products, such as snacks, candy, and seasonal items, are placed in areas shoppers must pass through on their way to find staples or checkout lanes. Stores have learned through experience that such floor plans help maximize sales by increasing the probability of shoppers making unplanned purchases.

Shelf design is an important aspect of retail store design. Products can be at, below, or above eye level. Eye level shelf spaces are often reserved for higher priced products. Less expensive alternatives are often displayed on lower shelves.
This program of pretesting resulted in exemplars of low and high eco-friendly colors and descriptions of ethically ambiguous retail practices for use in the studies that follow.

**Study 1**

Study 1 offers an initial test of H1 concerning the main effect of color on ethical ratings. To test the hypothesis we designed an experiment in which logo colors were varied and ethical judgments of an ethically ambiguous retailing practice were measured.

**Method**

Students ($N = 80$) participated in a brief online study in exchange for extra credit. This study used a between subjects design. Participants were exposed to a profile of a fictitious retailer accompanied with a logo featuring either a high or low eco-friendly color.

Participants were told that the study was about common retail practices; they would be presented with information about a retailer and then answer a series of questions regarding a retailing practice about which they would read. Participants were then exposed to the retailer profile (per Pretest 1). This retailer information was accompanied by a colored logo that was pretested to be either high or low in eco-friendly ratings.

After reviewing the retailer profile and accompanying logo, participants were asked to read a description of a retailing practice pretested to be ethically neutral. To increase construct validity, we used multiple exemplars of ethically neutral retailing practices. Each participant read only one exemplar in a counterbalanced design. Participants were told “This common retail practice is perfectly legal. However, opinions differ widely on how ethical the practice is. How
would you rate this practice in terms of ethics?” (anchored by 1 = “not very ethical” and 7 = “very ethical”; adopted from Dabholkar & Kellaris, 1992). This question was embedded among several other filler questions. After this, participants completed a color-blindness test (Birch, 1997) and provided demographic information.

**Results**

We dropped six responses that indicated color blindness from the analysis. We then analyzed the pooled responses from the remaining sample (\( N = 74 \), 43.2% female, \( M_{\text{age}} = 20.7 \)). As predicted, participants reported that the ambiguous practice was more ethical when the practice was presented with a logo featuring a high eco-friendly color (\( M = 5.59 \), \( SD = 1.32 \)) than when presented with a logo featuring a low eco-friendly color (\( M = 4.38 \), \( SD = 1.76 \); \( t(1, 72) = 3.35, p < .001 \)). These findings provide support for H1.

**Discussion**

The results of this study are consistent with the hypothesis that colors in retailer logos should influence ethical judgments. Exposure to a logo featuring a more eco-friendly color made an ambiguous retail practice seem more ethical. Exposure to a logo featuring a less eco-friendly color made the same practice seem less ethical. To evaluate if the effect would obtain when the eco-friendliness of colors is communicated semantically (versus visually), we conducted Study 2. In this study, we examine embodied transfer of meaning (via visual processing) versus referential transfer of meaning (via verbal processing).

**Study 2**
The objective of Study 2 is to evaluate how the meaning inherent in color is processed by individuals to inform ethical judgments. To do this, we conducted an experiment in which logo colors were varied and ethical judgments of an ethically ambiguous retailing practice were measured. Additionally, we measured perceived eco-friendliness of a retailer represented by the test logo and individual differences in (visual/verbal) processing styles. Our prediction is that the embodied meaning of color should inform the judgments about an ethically ambiguous retailing practice among visual processors (vs. verbal processors; H2a). We also predicted that perceived eco-friendliness of a retailer should mediate the effect of color on ethical judgments about the retailer’s actions (H3).

Method

Participants and procedure. Students (n = 171) participated in the study in a behavioral lab in exchange for course credit. This study used a between subjects design. Participants were exposed to a retailer profile accompanied with a logo featuring either a high or low eco-friendly color. They were told that the study was about their opinions on common retail practices. Procedures were similar to Study 1. We also captured ethical ratings of an ethically ambiguous retailing practice per Pretest 1 and Study 1. In addition to repeating the measures used in Study 1, we captured perceived eco-friendliness by asking participants “How eco-friendly do you suppose DAVY Grocery Store is?” (anchored by 1 = “not at all eco-friendly” and 7 = “very eco-friendly”). Participants were then asked to fill out the Style of Processing Scale (Childers, Houston, & Heckler, 1985), which measures one’s natural inclination to process information
visually or verbally. Finally, participants completed a color-blindness test (Birch 1997) and provided demographic information.

*Results*

*Ethical ratings.* We removed responses of participants who failed the color-blindness test and analyzed the remaining responses ($N = 159$, 38.4\% female, $M_{\text{age}} = 21.4$). We computed a visual-verbal score for each participant by summing responses to the visual items and subtracting responses to the verbal items. We then centered this score (Aiken and West 1991; Cohen et al. 2003). We used the visual-verbal score and logo color (dummy coded: 1 = high eco-friendly color, and 0 = low eco-friendly color) in a standard regression analysis to predict ethical ratings. The predicted model was statistically significant ($F(3,158) = 3.42, p < .05$) and accounted for approximately 6.2\% of the variance in ethical ratings. A main effect emerged for visual-verbal score ($b = 0.06, p < .05$). There was no main effect for the logo color, but germane to our concerns, a two-way interaction between visual-verbal score and logo color emerged ($b = -0.08, p < .01$). We decomposed this interaction using a spotlight analysis at one standard deviation above and below the mean visual-verbal score. At one standard deviation above the mean visual-verbal score (i.e., visualizers), participants perceived the retailer as more ethical when the retailer profile was accompanied by a blue logo ($M = 5.08; SD = 1.50$) than when the retailer profile was accompanied by a red logo ($M = 3.58; SD = 1.66; F(1,55) = 6.68, p < .05$). This difference was not significant for the verbalizers.

*Eco-friendliness ratings.* We used the visual-verbal score and logo color in a standard regression analysis to predict eco-friendliness ratings. The predicted model was statistically significant
(F(3,158) = 3.65, p < .05) and accounted for approximately 6.6% of the variance. A main effect emerged for the visual-verbal score (b = 0.05, p < .001). There was no main effect for logo color, but similar to ethical ratings, a two-way interaction between visual-verbal score and logo color emerged (b = –0.05, p < .05). We decomposed this interaction using a spotlight analysis at one standard deviation above and below the mean visual-verbal score. At one standard deviation above the mean visual-verbal score (i.e., visualizers), consumers perceived the retailer as more eco-friendly when the retailer profile was accompanied by a blue logo (M = 4.33; SD = 1.15) than when the retailer profile was accompanied by a red logo (M = 3.52; SD = 1.06; F(1,55) = 3.44, p < .06). However, this difference was not significant for the verbalizers. Despite the marginal difference in eco-friendly ratings or visualizers, we proceeded with a moderated mediation analysis because the main interaction was significant.

Moderated mediation. To determine whether eco-friendliness ratings accounted for ethical ratings, we conducted a mediated moderation analysis (Hayes, 2012; Model 8 bootstrapped with 5,000 draws). As predicted, eco-friendliness mediated the relationship between the logo color and ethical ratings for visualizers (95% confidence interval [CI]: –.53, –.004), but not for the verbalizers (95% CI: –.09, .43).

Discussion

The results are consistent with our general conceptualization of the role that color plays in shaping ethical judgments about retailers. As hypothesized, in contrast to verbalizers, visualizers differed on ethical ratings as a result of exposure to logo colors. Thus, the findings support H2a. Processing style moderated the effect of color on ethical judgments. In support of
H3, we find that the influence of color on judgments of retailer ethicality was mediated by perceptions of the retailer’s eco-friendliness. Given the self-reported nature of the indices used, it could be argued that the measure reflects the preference for mode of presentation for information processing, not the effect of metaphoric transfer that the color instigates. Thus, in Study 3, we manipulate the presentation of color in visual versus verbal modes.

**Study 3**

In Study 3, we seek additional evidence for the notion that metaphoric transfer of meaning inherent in color influences ethical ratings. To this end, we manipulated the mode in which the color of the logo was presented. We used the same colors used in Studies 1 and 2. We predicted that the embodied meaning of color (i.e., when color is presented visually), and not referential meaning of color (i.e., when color is presented verbally), will influence ethical judgments about the retailer, due to metaphoric transfer. Given that the color chosen for the more eco-friendly color is blue, reading the word will not transfer the meaning of eco-friendliness and thus will not lead to more positive judgments about an ethically ambiguous retailing practice.

**Method**

*Participants and procedure.* Participants (n = 191) were recruited from an online panel in exchange for monetary payment. Participants were randomly assigned to conditions in a 2 (presentation mode: visual vs. verbal) × 2 (logo color: highly eco-friendly vs. low eco-friendly) between-subjects experimental design. The retailer profile was presented first. Manipulation of color in the visual presentation mode was similar to Studies 1 and 2. However, when the
presentation of color was verbal, a detailed description of the retailer’s logo was provided along with the company description. After reviewing the retailer information, participants were asked to carefully read one of two randomly assigned neutral retailer practices. We captured ethical ratings of the practice by asking participants, “How would you rate this practice in terms of ethics?” (anchored by 1 = “not very ethical” and 7 = “very ethical”; adopted from Dabholkar & Kellaris, 1992). In addition, we captured perceived eco-friendliness by asking participants, “How eco-friendly do you suppose DAVY Grocery Store is?” (anchored by 1 = “not at all eco-friendly” and 7 = “very eco-friendly”). Finally, participants completed a color-blindness test (Birch, 1997) and provided demographic information.

Results

Ethical ratings. As eleven participants indicated color blindness, they were omitted from the analysis. We submitted the ethical ratings of the remaining sample (N = 180, 59.4% female, M_age = 33.6) to a 2 × 2 analysis of variance (ANOVA) with presentation mode and logo color as the independent variables. This analysis revealed no main effect for the mode of presentation (p = .35) and a marginal effect of logo color (F(1,176) = 3.48, p = .06). Critical to our analysis, a significant interaction of presentation mode and logo color emerged (F(1,176) = 4.42, p < .05). When statements were presented visually, participants assessed the retail practice as being more ethical when the logo color was blue (M = 5.19, SD = 1.10) than when the logo color was red (M = 4.43, SD = 1.06; F(1,176) = 8.05, p < .005). There was no significant difference between the ethical ratings when the logo was described in the verbal presentation (p = .86). Viewed differently, when the logo was seen in blue, the retailer was perceived as more ethical (M = 5.19, SD = 1.10) than when the logo described as being blue (M = 4.61, SD = 1.45; F(1,176) = 4.61, p
However, there was no significant difference between the ethical ratings when the retailer logo was visually presented in the color red or verbally described as being red in color ($p = .41$).

**Perceived eco-friendliness.** We submitted perceived eco-friendliness to a $2 \times 2$ ANOVA with presentation mode and logo color as the independent variables. This analysis revealed a main effect for the mode of presentation ($F(1,176) = 5.58, p < .05$), but no main effect of logo color ($p = .13$). Critically, the analysis yielded a significant interaction of presentation mode and logo color ($F(1,176) = 3.69, p < .05$). When statements were presented visually, the retailer was rated as more eco-friendly when the logo color was blue ($M = 4.50, SD = .96$) than when the logo color was red ($M = 3.96, SD = 1.05; F(1,176) = 5.96, p < .05$). There was no significant difference between perceptions of eco-friendliness of the retailer when the logo was described in the verbal presentation ($p = .76$). A contrast analysis across logo color revealed that when the logo appeared in blue, the retailer was perceived as more eco-friendly ($M = 4.50$) than when the logo was described as being blue ($M = 3.82, SD = 1.45; F(1,176) = 9.18, p < .001$). However, there was no significant difference between perceptions of eco-friendliness of the retailer when the retailer logo was visually presented in the color red or verbally described as being red in color ($p = .75$).

**Moderated mediation.** To determine whether eco-friendly ratings accounted for ethical ratings, we conducted a moderated mediation analysis (Hayes, 2012; Model 8 bootstrapped with 5,000 draws). As we predicted, eco-friendliness mediated the relationship between logo color and ethical ratings for visualizers (95% CI: $-.52$, $-.08$), but not for the verbalizers (95% CI: $-.17$, $.30$).
Discussion

Consistent with Study 2, the results of Study 3 support H2b’s prediction that visual exposure to an eco-friendly color (vs. verbal exposure to the word used to describe the color) would influence ethical judgments of an ethically ambiguous retail practice. Further, H3’s prediction that the influence of color on judgments of retailer ethicality is mediated by the perceptions of the retailer’s eco-friendliness was also supported. That is, when people see the color of a logo, their perceptions of retailer ethicality are more favorable when the color is more eco-friendly. Thus, the results of Studies 2 and 3 demonstrate that the effect is consistent when people see the color of the retailer’s logo, but not when the color of a retailer’s logo is described to them. In uncovering this pattern, Study 3 identifies an important boundary condition, namely, that the perception of eco-friendliness is due to embodied transfer rather referential transfer. However, this study evaluated the referential transfer of the word blue and not green. We know that the concept of eco-friendliness is often associated with the word green. To understand whether the word green would promote referential transfer of the concept of eco-friendliness, we conducted Study 4.

Study 4

Method

In this study, we wanted to evaluate the effect of the embodied vs. referential meaning of green on ethical ratings. To do so, we tested the effect of visual vs. verbal transfer of meaning of the color green compared with another eco-friendly color, blue.
Participants and procedure. Participants from an online panel \((n = 147)\) were recruited in exchange for monetary payment. Participants were randomly assigned to one of four conditions in a 2 (presentation mode: visual vs. verbal) \(\times\) 2 (logo color: blue vs. green) between-subjects design. The procedures and measures were similar to Study 2 and Study 3. The retailer profile was first presented. Manipulation of color in the visual presentation mode was similar to Studies 1–3. We captured ethical ratings of the ambiguous retailing practice with the item, “How would you rate this practice in terms of ethics?” (anchored by 1 = “not very ethical” and 7 = “very ethical”; adopted from Dabholkar & Kellaris, 1992). Finally, participants completed a color-blindness test (Birch, 1997) and provided demographic information.

Results

Ethical ratings. We removed responses of participants who failed the color-blindness test and analyzed the remaining responses \((N = 139, 43.9\%\) female, \(M_{age} = 33.1\)). An ANOVA with ethical ratings or eco-friendliness ratings as a function of presentation and logo color did not yield a significant interaction. The only significant effects were the distinction between ethical ratings and eco-friendly perceptions in the verbal mode. Describing a retailer’s logo with the word green also influenced ethical ratings such that the practice was rated as more ethical \((M = 5.38; SD = 1.49)\) when the retailer described as having a green logo in comparison to when the retailer was described as having a blue logo \((M = 4.63; SD = 1.47; t(1, 66.8) = 2.10, p < .05)\). The logo described as green was perceived as more eco-friendly \((M = 5.32, SD = 1.32)\) than the logo described as blue \((M = 4.69, SD = 1.30; t(66.8) = 2.02, p < .05)\). Hence, the word green influenced eco-friendliness ratings and ethical ratings of the retailer more than the word blue.
However, the visual exposure to either color evoked similar perceptions of eco-friendliness ($p = .80$) and ethical judgments ($p = .95$). This finding provides evidence that while metaphorical effects of the color green and the color blue are informed by the perception of color, semantic variations in the presentation of the word evoke distinct reactions to the color metaphor.

The findings in this study demonstrate that although the colors green and blue influence the concept of eco-friendliness, when it comes to semantically coding the meaning of color, the words used to describe the two colors operate differently. The study demonstrates that the word green evokes the concept of eco-friendliness but the word blue does not. Critically, the embodied meaning of green vs. blue did not impact ethical judgments differently.

There could, however, be alternative explanations for the observed phenomenon. For example, recent research has highlighted the influence of color on emotion (Chan & Ng, 2009; De Bock, Pandelaere, & Van Kenhove, 2013). Colors such as red have been associated with fury or anger (Elliot et al., 2009), and colors such as green have been associated with success (Moller, Elliot, & Maier, 2009). Thus, to rule out such alternative explanations, we conducted Study 5.

**Study 5**

The objective of this study was to rule out alternative explanations. Furthermore, we wanted to evaluate whether color or mode of presentation prime distinct concepts differently. Participants were randomly assigned to a between-subjects condition in a 2 (presentation: visual vs. verbal) × 3 (logo color: red vs. blue vs. green) experiment.

*Method*
Participants and design. Students ($n = 160$) took part in the study in exchange for course credit. Participants were randomly assigned to one of six conditions. Participants first read the following instructions: “Different colors evoke different thoughts and associations. For example, colors may convey different levels of Eco-friendliness (environmentally friendly or unfriendly colors). How would you rate the following color in terms of Eco-friendliness it conveys?” Then, a square appeared on the screen that corresponded to the condition to which they were assigned.

Participants were then asked to rate the color they just reviewed on the following items: eco-friendly ($1 =$ “not very eco-friendly,” and 7 = “very eco-friendly”), warm ($1 =$ “cold,” and 7 = “warm”), like ($1 =$ “dislike,” and 7 = “like”), pleasant ($1 =$ “not very pleasant,” and 7 = “pleasant”), strong ($1 =$ “weak,” and 7 = “strong”), and positive ($1 =$ “negative,” and 7 = “positive”). Finally, participants completed a color-blindness test (Birch 1997) and provided demographic information.

Results

We removed the responses of participants who failed the color-blindness test and analyzed the remaining responses ($N = 152, 52.6\%$ female, $M_{age} = 21.79$). Of the dependent variables tested, the interaction of color and mode of presentation was significant only for the adjective “warm” ($F(1,146) = 3.96, p < .05$), such that only for the color red did participants rate the color ($M = 5.58$) as warmer than the word ($M = 4.48; F(1,146) = 5.71, p < .05$). Contrast comparisons did not indicate a significant difference between mode of presentation for either green ($p = .55$) or blue ($p = .16$) colors. Thus, we can conclude that with the exception of the adjective “warm,” no other adjectives were primed when exposed to the three colors chosen for this study. However, if the adjective warm were to influence the results, we would find an
opposite of the results observed in the study. Therefore, we conclude that the effects observed in the studies are not a result of having primed such adjectives.

**General Discussion**

Across five studies, we found evidence suggesting that logo color can evoke the conceptual metaphor of eco-friendliness, and thereby influence perceptions of retailer ethicality. Study 1 shows that when participants viewed a profile of a retailer represented by a logo featuring an eco-friendly color, they rated the retailer that performed an ethically neutral practice as more ethical compared with a retailer represented by a logo featuring a less eco-friendly color. Furthermore, exposure to an eco-friendly (vs. non-eco-friendly) color was affected by mode of presentation. The findings show that perceptions of eco-friendliness mediate the effect of color on ethical judgments when a logo is presented visually (vs. described verbally). Study 3 replicates the prior studies and confirms that the underlying mechanism is perceptions of eco-friendliness. In addition, the results of Study 4 reveal that the color green is an exception, because it evokes eco-friendliness through both embodied and referential transfer of meaning.

**Theoretical Implications**

This research advances the literature on color in CMT (Boyatzis & Varghese, 1994; Fetterman, Robinson, & Meier, 2012; Hemphill, 1996) by demonstrating that the eco-friendliness concept is inherently grounded in intuitive associations with the colors green, blue, and red. Furthermore, this research shows that although a similar meaning is inferred from exposure to the colors blue or green (eco-friendly), only the word green evokes that concept
referentially, demonstrating the power of design to shape responses without the reinforcement of words. This research demonstrates that the metonymic transfer of the meaning of eco-friendliness is possible due to the conative meaning inherent in the color green. The color green is associated with environmentalism (Garner, 1996). Thus, although the word green has been used in rebranding strategies as a way to evoke inferences about a company’s environmental sensitivity, the influence of the color of a logo in identity branding has far reaching effects.

Managerial Implications

This research can help retailers with their corporate branding strategy. Branding research has emphasized color as an integral part of corporate identity (Lindström, 2005). Retailers often adopt the color green to reinforce an eco-friendly image (Imkamp, 2000). However, if an eco-friendly identity is not part of the retailer’s image it could hurt the brand (Bottomley & Doyle, 2006). Importantly, this research demonstrates that colors evoke conceptual metaphors that can influence intuitive judgments. Adding to the literature that indicates that color can influence downstream effects such as price perceptions (Puccinelli, Chandrashekaran, Grewal & Suri, 2013), this research is the first to demonstrate that color can play an important role in the way that shopper’s make ethical judgments about retailers. When the colors of eco-friendliness are used in logos, consumers draw inferences about the retailer represented by the logo. An ambiguous action is deemed more acceptable when performed by an eco-friendly organization and less acceptable when performed by a non-eco-friendly organization. Thus, color cues influence ethical judgment by priming embodied transfer of the meaning of eco-friendliness.

This research yields useful insights for marketers and designers engaged in identity branding. Building on prior literature on logo and typeface design in branding (Henderson,
Giese, & Cote, 2004), the studies reported here inform the role of eco-branding in the architecture of a brand’s positioning. Not all companies are positioned to be eco-friendly. However, given the metaphorical connections that consumers make with the color green and eco-friendliness, this research indicates that companies should be cautious in their use of the colors green or blue. Although using the color green to position the company as an eco-friendly company could certainly work in favor of the retailer, marketers must be mindful of the original positioning of the company. Marketers might choose to make use of the positive attributions that the color provides, but how eco-friendliness aligns with the overall strategy of the firm must be considered.

Further research could identify contradictory elements in conceptual metaphors that reinforce visual brand identity. Specifically, research would be useful on metaphors that reflect the core values of the retailer that do not always fall in line with eco-friendliness. Consumer expectations are evaluated against brand promises that retailers explicitly or implicitly communicate (Punjaisri & Wilson, 2007). Starbucks, for example, is not positioned as a green company, but would certainly benefit in situations that call for ethical judgments. Following the same reasoning, companies such as Kohl’s and Trader Joe’s, which incorporate eco-friendliness in their practices, may not be given as much credit due to erroneous branding.
Appendix

Logo Colors Used in Pretest 1

Aldi Blue 1        Aldi Blue 2        Aldi Orange 1        Aldi Orange 2

Food Lion Blue     Old Food Lion Yellow   Kroger Blue     Sam’s Blue

Sam’s Green        Target Black       Target Red       Trader Joe’s Beige

Trader Joe’s Red   Wal-Mart Blue      Wal-Mart Orange    Whole Foods Green
References


Table 1: Eco-friendly ratings

<table>
<thead>
<tr>
<th>Retailer color</th>
<th>$M = 4.64, SD = 1.21$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aldi blue 1</td>
<td>$M = 4.07, SD = 1.71$</td>
</tr>
<tr>
<td>Aldi blue 2</td>
<td>$M = 4.40, SD = 1.04$</td>
</tr>
<tr>
<td>Aldi orange 1</td>
<td>$M = 4.35, SD = 1.66$</td>
</tr>
<tr>
<td>Aldi orange 2</td>
<td>$M = 4.40, SD = 1.05$</td>
</tr>
<tr>
<td>Food Lion blue</td>
<td>$M = 4.50, SD = 0.96$</td>
</tr>
<tr>
<td>Kroger blue</td>
<td>$M = 4.60, SD = 1.54$</td>
</tr>
<tr>
<td>Sam’s blue</td>
<td>$M = 4.42, SD = 1.08$</td>
</tr>
<tr>
<td>Sam’s green</td>
<td>$M = 4.52, SD = 1.54$</td>
</tr>
<tr>
<td>Target black</td>
<td>$M = 4.11, SD = 1.21$</td>
</tr>
<tr>
<td>Target red</td>
<td>$M = 3.78, SD = 1.84$</td>
</tr>
<tr>
<td>Trader Joe’s beige</td>
<td>$M = 3.85, SD = 1.61$</td>
</tr>
<tr>
<td>Trader Joe’s red</td>
<td>$M = 5.00, SD = 1.22$</td>
</tr>
<tr>
<td>Wal-Mart blue</td>
<td>$M = 4.44, SD = 0.90$</td>
</tr>
<tr>
<td>Whole Foods green</td>
<td>$M = 4.16, SD = 1.50$</td>
</tr>
</tbody>
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Table 2: Ethical Ratings for Business Practices

<table>
<thead>
<tr>
<th>Retailer Practice</th>
<th>Ethicality Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supermarkets and grocery stores typically have floor plans that place dairy, eggs, produce, bread, and meat (“staples”) at the periphery of the store. Other products, such as snacks, candy, and seasonal items, are placed in areas shoppers must pass through on their way to find staples or checkout lanes. Stores have learned through experience that such floor plans help maximize sales by increasing the probability of shoppers making unplanned purchases.</td>
<td>$M = 4.65$, $SD = 1.74$</td>
</tr>
<tr>
<td>Shelf design is an important aspect of retail store design. Products can be at, below, or above eye level. Eye-level shelf spaces are often reserved for higher-priced products. Less expensive alternatives are often displayed on lower shelves.</td>
<td>$M = 4.82$, $SD = 1.18$</td>
</tr>
<tr>
<td>In-store lighting is an important aspect of store design. It helps improve general visibility and can be used to illuminate products to advantage. Special lighting can be used to showcase focal displays; to differentiate shopping areas; and to make produce look very fresh, vivid, and appealing.</td>
<td>$M = 5.08$, $SD = 1.41$</td>
</tr>
<tr>
<td>End-of-aisle displays are commonly used to showcase products that are new, on sale, or otherwise on promotion. Popular wisdom holds that such displays increase store revenues by encouraging unplanned purchases.</td>
<td>$M = 5.50$, $SD = 1.18$</td>
</tr>
<tr>
<td>Shopping carts facilitate shopping by making products easy to gather and transport to the checkout counter. Experience has taught retailers that the size of carts can influence how much the average shopper buys. For example, when grocery carts are bigger, people tend to buy more. Thus, retailers often use carts that are larger than necessary to encourage additional, unplanned purchases.</td>
<td>$M = 5.17$, $SD = 1.19$</td>
</tr>
<tr>
<td>Retailers sometimes offer “special deals” to increase sales of inventory they wish to move. A common example is the “10 for $10” deal. Shoppers do not have to purchase ten of the promotional item to get the $1 per unit price; however, in practice, many consumers automatically buy 10 units when they see this offer.</td>
<td>$M = 4.83$, $SD = 1.61$</td>
</tr>
<tr>
<td>Retailers often use promotional fliers to highlight products that are on sale. Such fliers may also feature information on new products that are available, seasonal items, and so forth. Not everything featured on a flier is necessarily on sale at a reduced price. Yet many consumers naturally assume that any product featured on a promotional flier is on sale.</td>
<td>$M = 4.26$, $SD = 1.21$</td>
</tr>
<tr>
<td>Retailers commonly work with suppliers to determine the best in-store location to showcase a product. Consider the case of SunnyD. This product is primarily water, high fructose corn syrup, and dyes, with less than 2% orange juice. It does not have to be refrigerated; however, the supplier prefers the product to be placed next to Tropicana and Florida’s Natural in open refrigerator cases, such that it</td>
<td>$M = 3.70$, $SD = 1.52$</td>
</tr>
</tbody>
</table>
will catch the attention of consumers looking for the lowest-price alternative.

Retailers often play background music in stores. Background music can help create a pleasant atmosphere, thereby making shopping a more pleasant experience. However, music also ties up a portion of shoppers’ cognitive resources, such that less brain power is available to evaluate products. This may increase the probability of shoppers making unplanned purchases.

Grocers routinely spray fresh vegetables with cold water. This helps maintain the freshness and appearance of the produce. However, it can also increase the weight of the produce, making it cost more at checkout.
ESSAY 2

Design Complexity and Overestimations of Informativeness

Abstract

Although studies have investigated the effect of misleading packaging claims, perceptual variations in package design such as design complexity can cause consumers to assume increased informativeness. In three studies, complexity of design on packaging is isolated to evaluate misperceptions of informativeness. This paper demonstrates that perceptual complexity results in an increase of perceived informativeness and that the underlying mechanism is ease in processing. This only happens under high involvement, not under low involvement. Importantly, this effect is attenuated when correction instructions are provided. Implications for marketers and policy makers in the packaging industry are discussed.
In addition to protecting the product, packaging is a means for marketers to communicate information about the product to the consumer (Mazis & Staelin, 1982; Soldow, 1985). When it comes to categories such as food, toys, pharmaceuticals, or chemicals, packaging may arguably be the most important medium in adding to the pragmatic value of packaging (Bone and Corey, 2000). After all, consumer safety is an important consideration not just from an ethical standpoint but also from a financial standpoint (Cullen et al., 1989). However, packaging is also the platform that marketers use to advertise the product and signal information about the brand (Orth & Malkewitz, 2008). Therefore, marketers are motivated by a variety of strategies in the way graphics on packaging are designed.

To date, the literature on packaging ethics has focused on misleading marketing claims on packaging (Polonsky et al., 1998), explicit pictorial warnings (Kees et al., 2010), nutritional symbols (Andrews et al., 2011), and misleading or untruthful advertising claims on packaging (Hastak & Mazis, 2011). Pieters et al. (2010, p. 59) note that an unexplored area of research that influences the stopping power of packaging is complexity. This is because in a competitive marketplace, manufactures are known to use complex graphic designs on packaging to gain attention (Pieters et al., 2010). Indeed, more complex information on packaging leads to increased attention (Pieters et al., 2010).

The research presented in this paper suggests that instead of just increasing attention toward a product, complexity in design can actually mislead consumers into believing that complex graphics on package design contain more information about the product. Specifically, by adopting a conceptual metaphor lens, we present evidence that complexity can indeed be perceived as more information (Gibbs, 2011; Lakoff & Johnson, 1980). We further demonstrate that involvement is in fact critical in making inferences. Specifically, because complex design on
packaging tends to elicit most elaborate cognitive processing (Schoormans & Robben, 1997), we show that when consumers are highly involved in consumption contexts, they are in fact more susceptible to making this error in inference. Critically, ease of processing is established as the underlying mechanism. We conclude by demonstrating that correction instruction can break the effect that complexity has on perceived informativeness. When combined, the results establish the link between complex packaging designs and consumer involvement in the purchase situation. We conclude with a discussion for marketers and policy makers by suggesting that they can direct consumer attention to sensitive information that is important in product consideration.

CONCEPTUAL BACKGROUND

When designers compose information or graphics on packaging, they do so with the intent to communicate meaning about the product (Dondis, 1993). However, “seemingly trivial peripheral elements in communication may be used simply for their entertainment or decorative value in fact can exert crucial and potent influences” (Meyers-Levy & Zhu, 2010, p. 504). Visual information on packaging or aesthetic stimuli can communicate distinct meanings to a consumer (Meyer, 1994; Meyers-Levy & Zhu, 2010). Conceptual Metaphor Theory (CMT) posits that, in general, distinct concepts are reinforced in intuitive domains, which inform meaning (Landau et al., 2010). An image can be a visual representation of a metaphor that can explain or demonstrate a concept (Wyer et al., 2008, p. 278). Indeed, many concepts can be represented visually (Krishna & Schwarz, 2014). Take the example of verticality. Concepts such as power, status, and happiness can visually be represented by the spatial representation of verticality (Keltner &
Haidt, 2003; Meier & Robinson, 2004; Schubert, 2005; Sundar & Noseworthy, in press). Hence, visual information can communicate meaning that represents a concept grounded in cognition (Gibbs, 2011; Lakoff & Johnson, 1980).

Furthermore, meaning that is developed in response to aesthetic stimuli can be either embodied or referential (Meyers-Levy & Zhu, 2010). Importantly, both kinds of meaning are learned from experience (Lakoff & Johnson, 1980). Embodied meaning is learned by biological associations, and knowledge of referential meaning is a result of learned associations informed by culture (Labrecque et al., 2013). In addition, embodied meaning arises from the level of stimulation or arousal (Dowling & Harwood, 1986; Dondis, 1993) that the stimuli instigate. In contrast, referential meaning is informed by the semantic associations of a real-world concept (Meyer-Levy & Zhu, 2010). When a packaging has perceptual complexity, many colors, shapes, and textures of visual elements are used to make the composition (Dondis, 1993). Hence, although the referential meaning on packaging would utilize the different contexts of product usage in creating the graphics, the embodied meaning communicated by the package would depend on the design elements such as the shapes, texture, and so on displayed on the package.

Complexity in general is intriguing. However, when it is used to compose a package, it gives an observer an opportunity at discovery (Janiszewski & Meyvis, 2001). The concept of complexity can further be distinguished as design based or feature based (Pieters et al., 2010). Design-based complexity refers to structured variations of shapes—objects in the arrangement of visual information—whereas feature-based complexity refers to an unstructured way of increasing detail in a visual composition (Pieters et al., 2010). Compositions on packaging that are design based can deliberately increase or decrease the level of complexity but do not communicate visual clutter (Pieters et al., 2010). Pieters and colleagues highlight the need to
evaluate the effect of complexity on downstream effects that drive product evaluations. Although package design considerations typically consider noticeability on the shelf, the informativeness of packaging can be compromised in such a situation. Hence, in this research, we were interested in the effects of design-based complexity that evoke moderate levels of perceptual processing.

Research indicates that when presented with information that is irresolvable, consumers make spontaneous inferences (Kardes et al., 2004), which are based on an individual’s predisposition to evaluate the presented information (Wedel & Pietres, 2007). Design-complexity uses structural variations of a given composition. In line with research that demonstrates that when peripheral cues hinder a consumer’s ability to process information on packaging deeply (Ha & Litman, 1997; Nordhielm, 2002), we propose that participants will perceive complex visual information on packaging as more informative than packaging with just a minimal amount of product information. Consumers would use other peripheral cues to make inferences about informativeness. Given that visual information content affects the way information in a visual stimuli is processed (Burton & Lichtenstein, 1988), inferences of informativeness are formed based on the information that a consumer encounters (Sujan & Dekleva, 1987). This is because content does not necessarily need to be actual script or written information. Critically, content can at times be uninformative due to a variety of reasons such as redundancy or the mere presence of graphics rather than actual information needed to evaluate the product (Kirmani, 1990). Kirmani showed that in the absence of explicit written information on the product, consumers adopt peripheral cues (e.g., advertising costs) as hints to a brand’s quality (Kirmani, 1990).

Extending this logic, we propose that in the absence of any referential meaning, visual information on packaging based on design-based complexity can be interpreted using the
embodied meaning of visual graphics. Because perceptually simple stimuli are easier to memorize than stimuli with increased perceptual complexity are (Eng et al., 2005), we propose that complexity in stimuli is assumed to contain more information than are simple stimuli. Hence, we propose that when consumers are presented with packaging that has an increased design-based complexity, the complexity in the stimuli will be interpreted as being more informative. Hence,

**H1:** Design-based complexity on packaging will result in higher-perceived informativeness than will no complexity on packaging.

*Involvement and Brand Evaluations.* When consumers are presented with information, the extent to which they are involved is an indicator of the amount of resources spent in processing (Kardes, 1988). When involvement is high, consumers spend more resources on processing a message, and when involvement is low, fewer resources are used on the same task (Petty & Cacioppo, 1986). Furthermore, Kardes (1988) notes that if a consumer needs to make a conclusion based on effortful processing, his or her coming to a decision more spontaneously is more likely under conditions of high involvement. Therefore, we predict that when involvement is high, inference of informativeness based on perceptual information will spontaneously occur. In contrast, when involvement is low, we will find an attenuation of this effect. When consumers are asked to evaluate the product, spontaneous inferences will be more likely when involvement is high. Design-complexity will inform evaluations, such that when the packaging is thought to be more informative, evaluations of the product will be better.

**H2a:** When involvement is high rather than low, complexity in packaging will result in higher-perceived informativeness of the package.
**H2b:** When involvement is high rather than low, complexity in packaging will result in more extreme brand evaluations.

*Ease of Processing*

Ease of processing enables the identification and assimilation of information presented (Reber et al., 2004). Although it has been shown to vary across the duration of presentation, the number of exposures to the stimuli, and the visual clarity of the stimuli, researchers note that the ease with which information is extracted and processed from a presented stimulus primarily depends on the complexity of the perceptual information of the stimuli (Reber et al., 2004). Hence, when the duration, number of exposures, and clarity are controlled, an increase in design-based complexity will result in an increase in ease of processing. Importantly, ease of processing is concerned with the identification and assimilation of the information presented rather than perceptual fluency, which it also can influence (Reber et al., 2004). Hence, ease of processing is a measure of the ease with which information presented is processed rather than feelings of familiarity about the stimuli. It is important to note that increasing the perceptual complexity presented on packaging is distinct from the actual information about the product (Palmer, 1991). Therefore, by keeping the information about the product as a constant, we hypothesize that

**H3:** Ease of processing will mediate the effect that design-based complexity has on perceived informativeness.

In exploring moderating conditions of the observed effect, one way that marketers and policy makers can have a say is with correction instructions. Correction instructions are effective when the proposed explanation causes reinterpretation of presented information (Wegener and Petty, 1995). Furthermore, the amount of correction depends on the strength of belief in the association of concept and the inference made by the consumer (Deval et al., 2013). We propose
that when correction information is present (versus absent), consumers will evaluate the 
packaging critically and not misinterpret complexity for information based on spontaneous 
inferences on complexity.

**H4:** Correction instructions will cause participants to evaluate the packaging critically, 
and they will not misinterpret complexity for information.

The following studies were designed to test the above predictions. Study 1 was conducted 
as a field experiment to set up the phenomenon. Specifically, we evaluated the effect of design-
based complexity on perceptions of informativeness. Study 2 demonstrates the moderating role 
that consumer involvement has on perceptions of informativeness on packaging. Additionally, 
this study also examines the underlying mechanisms of ease of processing that causes packaging 
that is complex to seem more informative. In Study 3, we evaluate a boundary condition by 
studying the role that correction instructions have on the observed effect. In all three studies, the 
packages designed as stimuli incorporated design-based complexity that evokes moderate levels 
of perceptual processing (Pieters et al., 2010).

**Study 1**

Study 1 offered an initial test of our informativeness hypothesis in a field setting. 
Specifically, we investigated whether complexity of the design on the package could result in the 
increased perceptions of informativeness, when the actual information on packaging was the 
same across conditions.

*Method*
Participants and Design. Consumers ($N = 64$; 57.8% females; $M_{age} = 40.5$) were recruited through mall intercept during the Christmas holiday season and were given a $5$ gift card for participating in the study. The criterion that participants were screened for was that they were visiting the mall shopping for toys as gifts for children. The study was administered under the guise that we were testing preference for a new toy on the market. An experimenter blind to our hypothesis approached individuals in the mall and asked them whether they would be willing to participate in a market research study. Participants were told that a new toy was being released soon and that this study was being commissioned on behalf of the company to evaluate the product’s new packaging. A Lennox toy packaging was used for this study. The packaging was presented as a prototype of what might be considered.

In the control condition, the front of the package only consisted of the image of the product (see Figure 1). The sides and rear of the package consisted of standard information concerning the product and warnings of choking hazard that was adopted from similar toy products. Just one image of the toy was presented. In the complex condition, there was no change to the information on the sides and rear of the package. The package had the same information printed, as did the control condition. However, on the front of the package, complexity varied by increasing design complexity as specified by Pieters et al. (2010). Using the principle of increasing quantity of objects, five replicates of the image of the toy were situated on the package. Past research indicates that design complexity is higher when the advertisement contains more rather than fewer objects (Kosslyn, 1976; Palmer, 1999). Hence, although there was no variation to the actual information that was presented on the package, there was an increased design complexity of visual elements presented on the package. The complex background adopted was according to the operationalization of design-based complexity, as
elaborated on by Pieters et al. (2010). A pretest ($n = 32$) of the two packages was conducted to measure complexity and clutter of the graphics on packaging, during which participants were asked the package design is (anchored: 1: very simple; 7: very complex) and the package design is (anchored: 1: very cluttered; 7: very uncluttered). According to Pieters et al. (2010), design complexity is complex but not cluttered. Participants were then asked to fill out the attractiveness, aesthetic index for each package (anchored: 1: ugly; 7: pretty and 1: unattractive and 7: beautiful; Honea & Horsky, 2012). The difference in complexity was significant ($M = 3.84; M = 4.53; t(1, 31) = 2.20, p < .05$). Furthermore, the two designs did not vary on perceptions of clutter ($Ms = 2.81$ and 2.66; $t(1, 31) = .59, p < .55$) or aesthetic index ($r = .72; Ms = 4.25$ and 4.19; $t(1, 31) = .52, p < .60$).

First, participants were asked the following: “Please rate how informative you found the information on the package to be” (anchored: 1 = not very informative and 7 = very informative), and “Please indicate how precise you found the information on the package to be” (anchored: 1 = very vague and 7 = very precise). These measures were adopted from Sujan and Dekleva (1987) to measure package-informativeness. Product evaluations were then measured (good/bad, favorable/unfavorable, positive/negative; Sujan & Dekleva, 1987). Then manipulation checks of complexity and clutter were captured similar to those used in the pretest. Finally, demographic information was captured. Then, participants were debriefed, thanked for their participation, and given the incentive for their participation.

**Manipulation Check.** Similar to the pretest, the difference in complexity of the two packages was significant ($M = 2.59; M = 4.25; t(1, 62) = 4.26, p < .001$). Furthermore, the two designs did not vary on perceptions of clutter ($Ms = 3.67$ and 3.25; $t(1, 62) = 1.02, p < .30$). Hence, the manipulation of design complexity had worked as intended.
**Results and Discussion.** As predicted, participants reported that the package with the complex design was more informative \((M = 4.46)\) than was the package that was less complex \((M = 3.50; t(1, 61.4) = 2.26, p < .001)\). Moreover, evaluations of the package designed to be more complex were better \((M = 4.85)\) than were evaluations of the package that had a less complex design \((M = 4.14; t(1, 61.9) = 2.26, p < .05)\).

This result provides initial evidence for the notion that an increase in design complexity can foster a greater sense of informativeness.

**Study 2**

The results of Study 1 were consistent with our hypothesis that a greater design complexity on packaging can increase inferences on informativeness. As outlined previously, considerable research demonstrates that, in general, increasing the level of involvement can cause stronger inferences, which would not be observed when involvement was low. Thus, we predicted that when involvement was low (versus high), there would be no effect of design complexity on informativeness or evaluations of the product. This study was designed to test this prediction.

**Method**

**Procedures and Dependent Measures.** We conducted the study under the guise of testing various package designs. The study was conducted in a behavioral lab, and students \((N = 118; 57.6\% \text{ female}; M_{age} = 21.77; SD = 3.56)\) participated in this study in exchange for course credit. Participants were randomly assigned one of four conditions in a 2 (design complexity: control versus complex) \(\times\) 2 (involvement: high versus low) between-subjects factorial design. The product used for this study was a household cleaner (Appendix B).
In the high-involvement condition, participants were asked to imagine that they were purchasing a household cleaner for their own use. Participants in the low-involvement condition did not receive this instruction. Participants were first asked to review the product information. Then perceived informativeness of the packaging and product evaluation were captured similar to what occurred in Study 1 (using scales similar to Sujan & Dekleva, 1987). Perceptual ease in processing information presented was captured using three 7-point items (The packaging is easy to process; the packaging is very easy on the eye; the packaging is attractive; anchored: 1 = strongly disagree; 7 = strongly agree; Labroo et al., 2008). Similar to Study 1, a manipulation check of complexity was also measured. Finally, demographic information was collected.

Results. Manipulation Check—Complexity. An analysis of measured complexity as a function of package design and involvement yielded a main effect of design such that participants perceived greater complexity after seeing the more complex package ($M = 2.85$) than after seeing the control ($M = 2.31$; $F(1, 114) = 5.41, p < .05$). There was no effect of involvement on perceived complexity. Critically, the interaction did not approach significance ($p = .74$). Hence, the manipulation of package design varied perceptions of complexity as intended, but the design did not interact with involvement.

Perceived Informativeness. An analysis of participants’ perceived informativeness, as a function of design and involvement, yielded a significant interaction between the two $F(1, 114) = 4.69, p < .05$). Simple effects confirmed that participants in the high-involvement condition perceived the complex design as more informative ($M = 3.63$) than the control was ($M = 2.70$; $F(1, 114) = 6.25, p < .01$). Critically, participants in the low-involvement condition did not make the distinction between the more complex package design ($M = 2.70$) and the control ($M = 2.90$);
These results reaffirm hypothesis 1, confirming that under conditions of low involvement, design complexity did not influence perceived informativeness.

**Evaluations.** An analysis of evaluations of the product, as a function of design and involvement, yielded a significant interaction between the two ($F(1, 114) = 6.02, p < .05$). Simple effects confirmed that when involvement was high, participants evaluated the product with the complex design ($M = 3.92$) better than they did the control ($M = 2.97; F(1, 114) = 6.92, p < .01$). Critically, participants in the low-involvement condition did not make the distinction between the package with a complex design ($M = 3.47$) and the control ($M = 3.76; p = .41$).

Hence, we find support for hypothesis 2. Further, it was predicted that ease of processing would mediate the effect that design complexity and involvement had on perceived informativeness.

**Ease.** An analysis of perceived ease ($\alpha = .85$) yielded a significant interaction between the two ($F(1, 114) = 4.61, p < .05$). Simple effects confirmed that when involvement was high, participants reported that the more complex design was easier to process ($M = 4.56$) than was the control ($M = 3.58; F(1, 114) = 7.31, p < .005$). Critically, participants in the low-involvement condition did not make the distinction between the control and the package with a complex design ($p = .75$). To determine whether perceived ease accounted for the variations in participants’ inferences of informativeness, a mediated moderation analysis was conducted (Hayes, 2012; Model 8; bootstrapped with 5,000 draws). As hypothesized (H3), perceived ease mediated the relationship between the package design and involvement on participants’ inferences of informativeness. Specifically, perceived ease explained why some participants reported greater informativeness in the high-involvement condition (95% CI: .05; .41), but not when involvement was low (95% CI: -.18; .14).
Discussion

Study 2 not only replicated the phenomenon observed in Study 1 but also further confirmed the underlying mechanism of perceptual ease in processing as the reason that high complexity in packaging was perceived as more informative when involvement was high. The results of this study suggest that participants were indeed mistaking the design complexity as meaningful information about the product. However, given that there was no additional information in the packaging designed with greater graphic complexity, we find that the ease in processing the more complex design was indeed misguided participants toward a sense of greater perceived informativeness. To evaluate whether this bias was correctable, we conducted the next study.

Study 3

The objective of Study 3 was to expose a real-world boundary condition for the observed relationship between design complexity and involvement. Given the results of Study 2, it seems that the observed link between design complexity and involvement as it influences perceived informativeness may be correctable. In comparison with when no correction information is provided, correction instructions lead to subsequent inferences that are less influenced by the context (Wegener & Petty, 1995). Furthermore, the amount of correction depends on the strength of belief in the association of concept and the inference made by the consumer (Deval et al., 2013).

Method
**Participants and Design.** Participants \((N = 253; 47.8\% \text{ female}; M_{\text{age}} = 35.71; SD = 12.85)\) were recruited from an online panel of self-identified parents and participated in this study in exchange for a nominal fee. Participants were randomly assigned one of eight conditions in a 2 (design complexity: control versus complex) \(\times\) 2 (involvement: high versus low) \(\times\) 2 (correction instructions: present versus absent) between-subjects factorial design. The images of the toy packaging used in Study 1 were used in this study.

**Procedures and Dependent Measures.** We conducted the study under the guise of testing various package designs. Participants in the correction condition received the following message: “Please try to make sure that you do not mistake the graphics on the package for actual information on the product. Keep this in mind as you evaluate the package.” In the control condition, no correction information was presented. This manipulation was similar to the one used by Deval and colleagues (2013). As in Study 1, participants in the high-involvement condition were given a scenario in which they were to imagine purchasing a toy for someone they knew. Participants in the low-involvement group did not receive this instruction. Perceived informativeness of the packaging and ease of processing measures were captured similar to that done in Study 2. A manipulation check of complexity was also collected. Finally, demographic information was collected.

**Results**

**Manipulation Check: Complexity.** An analysis of measured complexity as a function of package design, involvement, and correction instructions yielded a main effect of design such that participants perceived greater complexity after seeing the more complex package \((M = 3.74)\) than after seeing the control \((M = 2.90; F(1, 245) = 8.85, p < .01)\). There was no effect of involvement or correction instructions on perceived complexity. No other effects approached significance \((ps\)
> .12). Hence, the manipulation of complexity worked as intended, and critically, correction information did not vary with the manipulation of package design complexity.

Perceived Informativeness. An analysis of participants’ perceived informativeness ($r = .85$) as a function of package design, involvement, and correction information yielded a significant interaction ($F(1, 245) = 4.94, p < .05$). As hypothesized (H3), correction instructions altered the relationship between design complexity and involvement. Specifically, when no correction instructions were provided, the design complexity × involvement interaction replicated as before ($F(2, 245) = 3.83, p < .05$). As illustrated in Table 1, simple effects confirmed that when involvement was high, the package was more informative when design complexity was high ($M = 4.38$) as opposed to low ($M = 3.44; F(1, 245) = 7.61, p < .01$). However, when involvement was low, this difference was not significant ($M_{\text{Complex}} = 4.21$ vs. $M_{\text{Less Complex}} = 4.25; F(1, 245) < .1$). However, with correction instructions, the interaction between design complexity × involvement was not significant ($p = .23$).

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Insert Table 1 about here

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Ease. An analysis of perceived fluency ($\alpha = .85$) yielded a significant three-way interaction ($F(1, 245) = 4.65, p < .05$). Specifically, when correction instructions were provided, the design complexity × involvement interaction replicated as before ($F(2, 245) = 4.53, p < .05$). Simple effects confirmed that when involvement was high, the package was reported to be easier to process when the package was more complex ($M = 5.06$) as opposed to when the package was less complex ($M = 4.23; F(1, 245) = 5.62, p < .05$). However, when involvement was low, this
difference was not significant ($M_{\text{Complex}} = 4.68$ vs. $M_{\text{Less Complex}} = 3.91$; $F(1, 245) < .1$). Yet, with correction instructions, the interaction between design complexity $\times$ involvement was not significant ($p = .38$).

To determine whether perceived fluency predicted variations in perceived informativeness, we conducted a conditional mediated moderation analysis (Hayes, 2012; Model 12; bootstrapped with 5,000 draws). The results indicated that when no correction information was provided, fluency mediated the effect of package complexity on perceived informativeness when involvement was high (95% CI: .06; .92). Similar to Study 2, in low-involvement conditions, ease did not mediate the process (95% CI: -.51; .16). Importantly, correction information seemed to break the ease of processing, which did not mediate the effect of complexity either in the high-involvement (95% CI: -.67; .18) or low-involvement conditions (95% CI: -.40; .41). Hence, correction instructions seemed to cause participants to evaluate the packaging critically and not misinterpret complexity for information.

**General Discussion**

**Discussion and Conclusion**

Marketers have established the distinct role of conceptual metaphors as visual cues in informing judgment and decision making. Concepts such as time (Chae & Hoegg, 2013), power (Huang et al., 2012; Sundar & Noseworthy, in press), and weight (Deng & Kahn, 2009) have downstream effects on consumer decisions and preferences. In this paper, we extend the literature on conceptual metaphor by demonstrating the use of the metaphor inherent in complex visual stimuli. Specifically, we demonstrate that meaning inferred from complexity, we demonstrate, can misguide the consumer into thinking that more information about the product is provided on the packaging. Study 1 demonstrated that the embodied meaning inherent in
complex visual stimuli results in increased perceptions of informativeness. Study 2 demonstrated that the effect only occurs under high consumer involvement and was driven by an ease in the processing of the visual stimuli presented. Study 3 demonstrated that the effect was attenuated when correction instructions were provided.

This paper contributes to the research on packaging ethics by isolating a single concept of complexity of packaging. Complexity on packaging is a strategy that marketers frequently adopt to gain consumer attention in stores (Pieters et al., 2010). However, the current research demonstrates that although this may be an effective strategy in competing with other products, marketers might be missing the opportunity to communicate critical product information. Consumer safety, which is important from an ethical and financial standpoint, may hence be overlooked (Cullen et al., 1989).
References


Appendix

STUDY 1 STIMULI (Toy Package)

Control

Complex Design

STUDY 2 STIMULI (Chemical Cleaner)

Control

Complex Design
ESSAY 3

Color Harmony on Perceived Variety and Consumption Quantity

Abstract

Construal level has been shown to systematically promote self-control. However, this paper demonstrates that when the coherent organization of a presented assortment is reduced, the influence of a construal mind-set is reversed. The author shows that lower estimates of consumption associated with broader goal-level implications in choice can be disrupted with the visual effects of an increased assortment size. Furthermore, the underlying mechanism for this shift in preference of consumption is the perceived lack of organization and variety derived from the number of disparate colors in the assortment. Given this finding, the author then demonstrates an important boundary condition by varying the level of harmony in the colors of the assortment. The results demonstrate that food consumption can be influenced by a combination of individual goals, assortment size, and the colors used in the assortment.

Implications for theory, consumers, and marketers are discussed.

Keywords: product assortment, construal-level theory, consumption
Self-regulation research on consumption indicates that abstract or high-level construal can reduce consumption (Fujita & Carnevale, 2012). Construal-level theory (CLT) posits that when thought is abstract, consumers are able to process the implications of their behavior in a way that is broadly applicable (e.g., the way it influences wellness goals). However, incidental information, such as that provided by color, is also accessible, and this can influence self-regulation motives as well. The self-monitoring literature also suggests that by regulating visceral self-responses, it is possible to induce self-control motives (Loewenstein, 1996). Accordingly, the immediate experience of visceral factors has a disproportionate effect on behavior and can block all goals other than the motivation to cater to the visceral need. Indeed, Loewenstein (1996) notes that people tend to under weigh or discount the effects of visceral factors.

This paradigm is apparent when marketers use color to entice consumers. Product colors are used to increase appeal, to distinguish a product from its consideration set, and to gain consumers’ attention in an otherwise busy marketplace. Color in food is appealing (Clydesdale, 1993) and is used to promote consumption. According to CLT, consumption depends on abstract goals motivating the process rather than considerations of product appeal (Fujita & Roberts, 2010). The current research suggests that incidental information, such as color of the assortment, can inform not only estimates of consumption but actual consumption and taste perceptions as well. Specifically, by adopting a gestalt view of color as a means to organize visual perceptions (Coren & Girgus, 1980), the current research demonstrates that size of the assortment and number of colors depicted on packaging can influence actual consumption motives. The underlying mechanism for the effects of perceived variety is akin to the gestalt theory’s notion of a lack of structure, which the colors on packaging or in an assortment can promote. Finally, this
research also demonstrates that the perception of structure, and thus perceived variety, can be made fuzzy by adopting a harmonious palette of assortment colors. Specifically, a sense of structure provided by the visual perception of disorganized colors contributes to consumption estimates, and actual taste perceptions. Taken together, the results of the studies presented herein establish a link among color assortment, package design, and consumption and connects CLT with gestalt principles through package design.

**CONCEPTUAL FRAMEWORK**

**CLT and Consumption Estimates**

Exercising restraint in consumption involves the activation of an abstract construal mind-set involving higher-order goals. According to CLT, the same event or object can be understood in different ways (Trope & Liberman, 2003). Compared with low-level construal, a higher-level, self-control motivation have been shown to align with more “global” considerations in a situation (Fujita & Carnevale, 2012). High-level construal enhances people’s appreciation for global goal-relevant implication in choices, whereas low-level construal directs people’s consideration to secondary, incidental features that are a hindrance to self-control (Fujita & Roberts, 2010). Thus, people in a high-construal mind-set (vs. a low-construal mind-set) are prone to consume less (Fujita & Carnevale, 2012). The high-construal effect on abstract thinking results a greater ability to resist temptation or otherwise overindulge (Fujita & Roberts, 2010).

**Effects of Assortment on Variety**
In general, when consumers are offered variety in a given assortment, consumption increases (Van Herpen & Pieters, 2002). When there is an increase in subcategories of presentation, coupled with an increase in the overall assortment size, consumers perceive more variety than when the overall assortment size is limited (Broniarczyk, Hoyer, & McAlister, 1998). This is because of the importance of organization for a given assortment in a given space. When a given assortment lacks organization, consumers find it difficult to recognize the full extent of the variety offered (Kahn & Wansink, 2004). Although consumption increases with the number of offerings, a disorganized (vs. an organized) assortment moderates the effect of the number of offerings on consumption preferences (Kahn & Wansink, 2004).

Perceived variety has been defined as a benchmark that consumers use to inform their consumption decisions (Hoch, Bradlow, & Wansink, 1999; Kahn & Wansink, 2004). Studies indicate that consumers show increased satisfaction with assortment choice when more subcategories are presented. This is known as the “mere categorization effect” and has been shown to affect not only satisfaction but also actual consumption (Mogilner, Rudnick, & Iyengar, 2008, p. 203). When consumers are able to clearly distinguish among subcategories, they perceive greater variety, which results in increased consumption; in contrast, when consumers are not able to discern among subcategories, they do not perceive as much variety and thus do not consume as much. In color-related studies, research indicates that when options in presented stimuli are harmonious, a concept known as visual wholeness is evoked (Ehrenfels, 1937). This concept is similar for both shape-based and color-based harmony. Hence I posit that harmony should affect perceived variety and organizational structure.
Assortment colors in food products can affect consumption (Rolls et al., 1981). This is because heightening perceptions of variety through structure, symmetry, or entropy (Kahn & Wansink, 2004) moderates the effect of variety on consumption. Increasing the number of colors in an assortment promotes the perception that the food has more variety, thus leading people to consume more.

Color Harmony in an Assortment and Perceptions of Organizational Structure

The role of harmony is an important aesthetic consideration (Ghyka, 1977; Huntley, 1970; Lawlor, 1982; Livio, 2002; Raghubir & Greenleaf, 2006; Svensson, 1977). Visual harmony has been described in numerous ways. Raghubir and Greenleaf (2006) describe it as the golden ratio in package form. Research in visual aesthetics demonstrates that smoothness and uniformity in shapes can define harmony in a brand’s logo (Henderson, Gise, & Cote, 2004). Structurally speaking, symmetry and balance around a central axis of the logo are also identified as factors that contribute to visual harmony (Orth & Malkewitz, 2008). In addition to research that demonstrates form-based contributors to harmony, evidence also exists as to how colors can create a sense of visual harmony. For example, in one study (Study 1), consumers who selected colors for their shoes indicated an increased preference for colors that contributed to the gestalt principles of similarity (i.e., where two colors were similar in hue), which in turn contributed to their perception of color harmony.

Color harmony has been shown to affect both product and design preferences. Kim (2006) defines harmony as the degree to which the visual resources of a composition’s design form a coherent and unified pattern. Research indicates that consumers consistently prefer
products designed to be aesthetically harmonious rather than disharmonious (Bell, Holbrook, & Solomon, 1991). Indeed, consumers indicate a high level of harmony in atypical products, indicating the innate preference for aesthetic balance in the unusual (Kumar & Garg, 2010). People’s need for harmony is so robust that even in art, when faced with a canvas of random paint strokes, people tend to look for meaningful and harmonious wholes (Hekkert, 2006).

Harmony in Color

When it comes to the perception of color, quantitative models of color harmony in visual experiments are well defined (Szabo, Bodrogi, & Schanda, 2008). It is generally accepted that harmony in color is a combination of colors that work well together among various color combinations (Schloss & Palmer, 2011). Different strategies in color matching (e.g., colors that provide a sense of completeness, colors that are complementary, colors that are balanced and unambiguous) guide the selection of color schemes that people consider harmonious (Ou & Luo, 2006). In essence, color harmony provides consumers with a sense of completeness. As such, a review of the gestalt principle’s notion of the whole is important.

The Gestalt View of the Whole

Visual and spatial perceptions follow gestalt laws in formal organization (Coren & Gurgus, 1980). For example, the law of proximity explains how visual information pertaining to form is developed by clustering visual stimuli from the viewer’s surrounding that might otherwise be considered scattered. Each cluster is perceived as a meaningful unit to the viewer.
Other laws that operate on the level of visual form are the laws of similarity, closure, and good continuation. Organizing information into meaningful wholes is considered “good gestalt” (Saariluoma, 1992). Good gestalt organization of information operates in other modes of information, such as music and color composition (Ehrenfels, 1937). In the case of music and color composition, good gestalt is referred to as harmony. Therefore, harmony in color is akin to a composition’s spatial or organizational wholeness.

If consumers’ perception of variety is affected by formal spatial organization, then harmony in color as a visual organization tool should have a similar affect as spatial organization. Thus, when color is an important component of the subcategorization of a given assortment, consumers will use color harmony to organize assortment variety in a way that affects consumption quantity. However, the difference in the impact of organization between form and color will be that the effect of structure and organization on consumption will work in reverse for color harmony. The rationale for this assertion is that just as structure and organization contribute to perceived variety, disharmony in color combinations will increase perceived variety. Conversely, harmony in color will lower the perception of variety in the presented assortment.

I propose that assortment size and perceived variety is influenced by the harmony of colors in the assortment. Specifically, disharmony in color will reinforce the effect of spatial organization of the color pallet on consumption, and harmony in color will attenuate the effect of spatial organization of the color pallet on consumption. Stated formally,

**H1:** There will be a significant interaction between construal level and assortment size on self-control, such that when the assortment size is small,
consumers with a low-construal mind-set will consume more than those with a high-construal mind-set. Conversely, when presented with a larger assortment size, consumers with a high-construal mind-set will consume more than those with a low-construal mind-set.

**H2**: Perceived variety of the assortment will mediate the interaction between construal level and assortment size on consumption estimates.

**H3**: The overall harmony of the assortment’s color pallet will moderate the interaction between assortment size and construal level, such that the predicted increase in consumption for a small (large) assortment when construal level is low (high) will not manifest when the consumer sees the assortment in a harmonious color pallet.

The three studies that follow evaluate the hypotheses and explore a boundary condition. Specifically, Study 1 tests the basic phenomenon (hypothesis 1), Study 2 isolates the mechanism (hypothesis 2), and Study 3 confirms the mechanism by moderating the perception of variety through color harmony.

**Study 1**

The core objective of study 1 is to evaluate the foundational premise that assortment size can alter consumption estimates due to different construal levels. Specifically, this study examines whether consumption estimates for a small assortment are higher when construal level
is low versus high and, in contrast, whether consumption estimates for a large assortment are higher when construal level is high versus low.

Method

Participants and Design. Consumers (N = 86, 46.5% female, M_{age} = 35.17) were recruited through an online panel in exchange for a nominal fee. Participants were told that the study consisted of evaluating a new product on the market. Participants were randomly assigned to one of two assortment size conditions in a between-subjects factorial design. In the small-assortment condition, participants saw an image of a jelly beans box with four colors. In the large-assortment condition, participants were shown an image of a jelly beans box with twelve colors (see Appendix A). This method of varying assortment size was similar to prior research (Kahn & Wansink, 2004).

Procedures and Dependent Measures. Two jelly bean boxes were custom-designed. As Appendix A illustrates, the packaging featured the product. The only thing that varied in the two conditions was whether four colors of jelly beans appeared on the package or twelve colors. Information about the product was adapted from comparable products in the market. Both packages included consistent nutritional and weight information.

The study began with administering the Behavioral Identification Form (BIF). Participants completed the BIF (Vallacher & Wegner, 1989), a personality measure of how abstractly or concretely people represent action. The BIF scale reveals differences in people’s natural mind-set (Liberman & Trope, 1998; Study 1). The scale consists of 25 items, and each
question requires participants to describe an activity (e.g., “reading”) by choosing an option that represents the action either abstractly (“gaining knowledge”) or concretely (“following the lines of print”). The reason for first capturing the items on the scale was to ensure that the estimation task did not influence the situational mind-set. Participants then reviewed the jelly bean package with either the large or the small assortment size. Participants were asked to imagine a situation in which this box of candy was just presented to them. Then, they were asked, “How many of these would you snack on? Only enter the number of pieces below.” The questionnaire concluded with basic demographic questions.

Results

_Hypothesis Testing._ A composite BIF score was determined by the number of high-level alternatives chosen on the BIF (Vallacher & Wegner, 1989). An analysis of the number of pieces that the participants reported they would consume, as a function of BIF score and assortment size, yielded a significant interaction \((F(1, 82) = 4.04, p < .05)\). A spotlight analysis of participants at one standard deviation above and below the mean indicated that, as hypothesis 1 predicted, when the assortment size was small, participants reported greater consumption estimates when chronic construal level was low \((M = 29.60)\) versus high \((M = 15.84; F(1, 52) = 4.47, p < .05)\). Critically, the pattern of effects were reversed when participants were exposed to a larger assortment size \((M_{Low\,Construal} = 10.81 \text{ vs. } M_{High\,Construal} = 21.70; F(1, 52) = 4.09, p < .05)\). These results also show that differences in consumption estimates between the small assortment \((M = 20.60)\) and the large assortment \((M = 10.81; F(1, 52) = 9.80, p < .01)\) were observed only
when construal level was low. The difference in consumption estimates were not significant for participants predisposed to a high construal level \( (p = .30) \).

Discussion

The results of Study 1 confirm that consumers indeed demonstrate greater self-control in consumption when they construe events more abstractly (i.e., high-level construal), a finding that is consistent with Fujita and Roberts (2010). Notably, however, this study provides strong evidence that assortment size can reverse this effect because consumers predisposed to construe events more concretely (i.e., low-level construal) indicated a desire to consume less than those with a higher level of construal when assortment size was large. Thus, it seems that assortment size can indeed influence people predisposed to a low-construal mind-set to consume less when variety was increased.

**Study 2**

The core objectives of Study 2 are (1) to replicate the observed effects from Study 1 and (2) to isolate whether the phenomenon results from the perceived variety of the assortment. Hypothesis 2 predicts a mediating role of perceived variety. Specifically, perceived assortment variety will predict consumption estimates under conditions of low construal when the assortment size is small. Similarly, perceived assortment variety will predict consumption estimates under conditions of high construal when assortment size is large.
Method

**Participants and Design.** Participants (*N* = 147, 55.1% female, *M* <i>age</i> = 38.77) were recruited through an online website and were paid a nominal fee. The chosen target product was chocolate candy. The study was conducted under the guise that a local confectionary company wanted to enter the market and was therefore testing different package designs before release. Different colors of candy were presented on the package. Participated were randomly assigned to one of four conditions in a 2 (assortment size: six vs. eighteen) × 2 (construal level: high vs. low) between-subjects factorial design. A fictitious brand, “Drops,” was used to avoid any prior associations with the product (see Appendix B).

**Procedures and Dependent Measures.** Consumers were recruited from an online panel under the previously mentioned guise. They were informed that the company has allocated considerable resources to find the best packaging style for its launch.

**Construal-Level Manipulation.** Participants first completed a “why versus how” construal-level manipulation, in which they generated either superordinate ends or subordinate means for a particular action (Freitas, Gollwitzer, & Trope, 2004). Participants in the high-level condition responded to the question, “Why do I improve and maintain my health?” After responding, participants answered another question of the same form. This question referenced the participant’s prior response in the new question target. Thus, by responding “to avoid becoming obese,” participants would next respond to question “Why do I want to avoid being obese?” Participants went through four iterations of this question–response process. Those in the
low-level condition completed the same procedure, except the four questions answered were of the form “How do I … [X],” beginning with the same action prompt as before.

**Dependent Variables: Consumption Estimates.** Participants were then provided with a pamphlet of the company’s profile and history under the guise that it was important to the current management that the company’s history be reflected in its brand positioning. (Appendix B). Immediately after reading the company profile, participants were permitted to examine one of the two packages corresponding to their assigned condition for 30 seconds. Following the 30-second examination period, participants filled out a brief questionnaire. Participants were asked to imagine a situation in which the bag of candy was just presented to them. Then, they were asked, “How many of these would you snack on? Only enter the number of pieces below.”

**Calorie Estimates.** Amid five randomly generated filler questions asking participants to evaluate the new product, participants were asked to estimate how many calories were in one serving of 15 pieces of candy (adapted from Schuldt, Muller, & Schwarz, 2012). Then, participants were asked how many calories were in the same serving of the product compared with other similar brands (Schuldt, Muller, & Schwarz, 2012). Responses to this question were provided on seven-point scales (anchored by 1 = *many fewer calories* and 7 = *many more calories*).

**Perceived Variety.** Participants were asked to report how many pieces of candy they believed there were in the package they reviewed and how many different colors in total there
were (Kahn & Wansink, 2004). These measures were intended to capture perceived variety in the assortment.

Results

*Consumption Estimates.* An analysis of participants’ consumption estimates, as a function of construal-level manipulation and assortment size, yielded a significant interaction between the two \(F(1, 143) = 8.37, p < .005\). Simple effects confirmed that when the assortment size was small, participants reported a higher consumption estimate when construal level was primed to be low \(M = 15.23\) rather than high \(M = 9.38; F(1, 143) = 3.64, p < .05\). Similar to Study 1, the pattern of effects were reversed when participants were exposed to a larger assortment size \(M_{Low\, Constral} = 9.77\) vs. \(M_{High\, Constral} = 16.51; F(1, 143) = 4.76, p < .05\).

*Calorie Estimates.* An analysis of calorie estimates in one serving, as a function of construal-level manipulation and assortment size, yielded a significant interaction between the two \(F(1, 143) = 5.35, p < .05\). Simple effects confirmed that when the assortment size was small, participants did not have significantly different calorie estimates when primed to be in a high- versus low-constral mind-set \(p = .48\). However, when the assortment size was larger, participants made higher calorie estimates when construal level was high \(M = 160.81\) versus low \(M = 110.72; F(1, 143) = 6.57, p < .01\). The combined effect of mind-set manipulation and assortment size yielded only a marginal effect on the estimates of calories compared with other brands \(p = .06\).
Perceived Variety. An analysis of perceived variability \((r = .76)\) as a function of construal-level manipulation and assortment size yielded a significant interaction between the two \((F(1, 143) = 17.99, p < .01)\). Simple effects confirmed that when the assortment size was small, participants with a low-construal mind-set perceived greater variety \((M = 5.35)\) than participants with a high-construal mind-set \((M = 4.75; F(1, 143) = 10.89, p < .01)\). In contrast, when the assortment size was large, the estimates reversed, with participants with a high-construal mind-set perceiving greater variety \((M = 6.56)\) than those primed with a low-construal mind-set \((M = 6.06; F(1, 143) = 7.28, p < .01)\).

A mediated moderation analysis (Hayes, 2012, Model 8, bootstrapped with 5,000 draws) tested whether perceived variety accounted for participants’ consumption estimates. As hypothesis 2 predicted, perceived variety mediated the relationship between assortment size and participants’ consumption estimates in both the large and the small assortment size conditions. Specifically, perceived variety mediated the effect between assortment size and consumption estimates when participants were primed to have a low-construal mind-set (95% confidence interval [CI]: –4.15, –.04) but not when they were primed to have a high-construal mind-set (95% CI: –9.19, .13).

Discussion

Study 2 not only replicates the phenomenon observed in Study 1 but also further confirms the underlying mechanism. The findings are consistent with the notion that variety is directly related to consumption estimates and thus is correlated with size of the assortment. Although
compelling, perceived variety can be influenced not only by the size of an assortment but the nature of colors in the assortment as well. The next study tests this prediction.

**Study 3**

The core objective of Study 3 is not only to replicate the observed effects in Study 2 but also to evaluate actual consumption and further control the mechanism of perceived variety by varying the harmony of the color palette used in the assortment. If the observed effect is derived from the notion that disharmonious colors lead to the perception of greater variety for consumption, harmony in the color of the assortment should attenuate, if not reverse, the observed effect.

**Method**

*Participants and Design.* Students \( N = 106, 34.9\% \text{ female}, M_{age} = 20.46 \) participated in an experiment in a behavioral lab in exchange for extra credit and were randomly assigned to one of four conditions in a 2 (assortment size: four vs. twelve) × 2 (color harmony: high vs. low) between-subjects factorial design. Differences in participants’ natural mind-sets were also measured (Liberman & Trope, 1998).

*Stimuli: Harmony in the Assortment.* An initial pretest \( N = 62 \) was conducted to establish the color palette of the assortment presented. With available colors of M&M candies in mind, two palettes with twelve colors each were created based on research in colorimetry that
describes the value of each color in a palette of colors that is harmonious or disharmonious (Szabo, Bodrogi, & Schanda, 2010). A researcher who was unaware of the purpose of the study matched different colors of candy to the two pallets. For the pretest, the individual palette of M&Ms was used to create three more sets of four pieces of candy each for the small assortment size. Thus, there were four test sets with an equal number of candy (twelve pieces) but consisted of colors that matched either the harmonious palette or the disharmonious palette. Participants reviewed a white bowl of candy with the twelve pieces from one of the test sets. They were then asked to rate the palette on the basis of two statements: “The assortment of candy colors in this bowl is harmonious,” and “The assortment of candy colors in this bowl forms a coherent, unified whole” (anchored by 1 = strongly disagree and 7 = strongly agree). These two measures were adapted from prior literature on perceived harmony (Kumar & Garg, 2010). The results confirm that participants perceived the two palettes ($r = .87$) as significantly different, such that the harmonious palette ($M = 5.06$) was indeed perceived as harmonious compared with the disharmonious palette ($M = 3.67$; $t(60) = 3.65, p < .001$). This was true for both assortment sizes. Thus, the four test palettes were carried forward as the operationalization of color harmony.

**Procedures and Dependent Measures.** The study was conducted under the guise of a taste test. Participants reviewed a candy box with a transparent cover. Twenty-four pieces of candy varying in assortment size and color harmony were placed in each box, and the boxes were numbered. Upon arrival in the lab, students sat in front of a computer and were shown some advertisements of a new candy product. They were then instructed to review the actual package with the candy. After initial reactions regarding the packaging and candy were captured, participants rated the harmony of the assortment (similar to the pretest). Then, they completed
filler questions on calorie estimates and their reactions to the packaging. Next, they were asked to taste the product and to consume as much or as little as they wanted. Participants then entered the number of pieces of chocolate they consumed and completed taste-related measures: “Please rate how decadent the chocolate is” (anchored by 1 = not very decadent to 7 = very decadent, or I did not try), and “Please rate how chocolaty the product is” (anchored by 1 = not very chocolaty to 7 = very chocolaty, or I did not try). These measures were adapted from prior research (Sundar & Kardes, under review). Finally, demographic information was captured. After participants completed the study and left the room, the research assistant counted and coded the number of chocolate pieces consumed.

Results

Manipulation Check: Harmony of the Assortment. As in Study 1, a composite BIF score was determined by the number of high-level alternatives chosen on the BIF (Vallacher & Wegner, 1989). An analysis of perceived harmony of the assortment ($r = .87$), as a function of assortment size, colors, and composite BIF score, yielded a main effect of color harmony, such that participant’s perceived variety varied on their perception of the more harmonious palette ($M = 5.63$) versus the less harmonious palette ($M = 4.11; F(1, 98) = 6.71, p < .01$). No other effects approached significance ($p > .16$). Thus, the selection manipulation of color harmony worked as intended, and more important, these perceptions did not vary by either assortment size or the BIF score.
Consumption. An analysis of chocolate pieces consumed as a function of assortment size, BIF score, and harmony of the assortment yielded a significant three-way interaction ($F(1, 98) = 10.74, p < .001$). As hypothesis 3 predicted, the level of harmony in the assortment altered the relationship between assortment size and construal level on consumption. A spotlight analysis at one standard deviation from the mean BIF score revealed that consumption varied by construal level. Specifically, when construal level was low, the interaction between assortment size and harmony of the assortment was significant ($F(1, 32) = 4.77, p < .05$). The nature of the interaction was such that the difference in assortment size affected consumption only when the colors of the assortment were disharmonious ($M_{\text{Large Assortment}} = 10.71$ vs. $M_{\text{Small Assortment}} = 15; F(1, 36) = 4.31$). When colors in the assortment were harmonious, no significant differences in consumption patterns emerged ($p = .44$). Furthermore, when construal level was high, the interaction between assortment size and harmony of the assortment was again significant ($F(1, 32) = 11.21, p < .01$). The nature of the interaction was such that consumption difference was again significant. However, the effect of assortment size was again reversed, such that participants consumed more when the assortment size was large ($M = 14.42$) versus small ($M = 8.28; F(1, 36) = 12.20, p < .001$). Harmony in the assortment attenuated the effect ($p = .43$).

Taste Estimates. An analysis of the taste ($r = .81$) of the candy product as a function of assortment size, BIF score, and harmony of the assortment yielded a significant three-way interaction ($F(1, 98) = 4.86, p < .03$). A spotlight analysis at one standard deviation from the mean BIF score revealed that taste varied by construal level. Specifically, when construal level was low, the interaction between assortment size and harmony of the assortment was significant ($F(1, 32) = 7.34, p < .01$). The nature of the interaction was such that the difference in assortment
size affected taste ratings only when the colors of the assortment were disharmonious ($M_{Large Assortment} = 6.28$ vs. $M_{Small Assortment} = 4.75$; $F(1, 36) = 5.37, p < .05$). When colors in the assortment were harmonious, there were no significant differences in consumption patterns ($p = .21$). When construal level was high, the interaction between assortment size and harmony of the assortment was not significant ($p = .23$).

**Perceived Variety.** An analysis of chocolate pieces consumed as a function of assortment size, BIF score, and harmony of the assortment did not yield a significant three-way interaction, but it did yield a main effect of assortment size ($F(1, 98) = 31.33, p < .001$) and an interaction between assortment size and harmony of the assortment ($F(1, 98) = 3.90, p < .001$). A spotlight analysis at one standard deviation from the mean BIF score revealed that consumption varied by construal level. Specifically, when construal level was low, the interaction between the assortment size and harmony of the assortment was marginally significant ($F(1, 32) = 4.05, p < .05$). The nature of the interaction was such that, when construal level was low, the perceived variety from a greater number of colors ($M = 3.50$) was evident ($M_{Small Assortment} = 1.00$; $F(1, 36) = 16.16, p < .01$). When colors were harmonious, the effect was attenuated ($p = .26$). When construal level was high, the interaction between assortment size and harmony of the assortment was again significant ($F(1, 32) = 4.61, p < .05$). This time, however, the assortment of the harmonious colors was perceived to be significantly different ($M_{Small Assortment} = 3.50$ vs. $M_{Large Assortment} = 2.16$; $F(1, 36) = 4.33, p < .05$) but not the less harmonious colors ($p = .11$).

Discussion
The results of Study 3 support the prediction that the observed effects in studies 1 and 2 are due to perceived variety driving the quantity of consumption. Participants in the low-construal mind-set condition consumed more candies when fewer options were provided. However, this was not the case for participants in the high-construal mind-set condition. This effect was attenuated when the colors in the assortment were harmonious.

GENERAL DISCUSSION

Harmony is not just a visual organizing principle; it is a sense that people feel of wholeness. Harmony is the perceptual indication of organization and completeness. In this respect, consumption estimates anchored on perceived structure can be made fuzzy. The results of three studies suggest that assortment size and color can alter perceived variety, which in turn can influence consumption and taste. Specifically, Study 1 reveals that under high construal levels, self-control motivations are salient. However, when the size of the assortment increases, this finding reverses, demonstrating the effect of increasing disorganization through assortment size. Study 2 not only replicates the phenomenon but also confirms that the underlying mechanism of perceived variety drives consumption estimates by varying perceptions of assortment structure. Study 3 then confirms that the results are indeed tapping perceived variety by introducing color harmony to attenuate the accessibility of assortment structure. Color harmony can induce gestalt notions of a whole in transmitting perceptions of an unstructured assortment.

Theoretical Implications
The current research provides several important insights into the effects of construal level on consumption. Prior research has shown that a high construal level promotes behavior that is consistent with the broader, goal-relevant implications of people’s choices (Fujita, 2011; Fujita & Han, 2009; Fujita & Roberts, 2010; Fujita & Sasota, 2011; Fujita et al., 2006). The current research demonstrates a moderating condition imposed by assortment size. By increasing the assortment size under consideration, this research shows that the effect of abstraction on consumption estimates actually reverses, with participants wanting to consume more. Increasing the perception of variety makes consumption more desirable, but only when thought is abstract. Consistent with literature on self-regulation, the current research demonstrates that the immediate effects of harmony in color should override the influence of abstract thought. This research contributes to the body of literature in CLT by demonstrating that perceptual considerations of color inform thought. Navon’s paradigm (Navon & Norman, 1983) demonstrates this in terms of spatial locations, but the current research is the first to do so involving colors.

This paper is also the first in the marketing literature to view harmony as an organizing tool. Although considerable research exists demonstrating harmony as a means to achieve aesthetic pleasure (Kumar & Garg, 2010; Raghubir & Greenleaf, 2006), the gestalt view adopted here makes harmony a quantifiable, distinct consideration in inference formations based on assortment size.
References


IMPLICATIONS FOR MARKETERS AND DESIGNERS

In three essays the research presented in this dissertation demonstrates the visual elements of design can impact downstream effects such as judgments of ethics about a retailer, informativeness of a package and actual consumption. The research presented in essay 1 showed that the colors used in retail branding can evoke powerful conceptual metaphors. Five studies presented showed that shoppers perceived the colors blue and green as more eco-friendly than the color red. Exposure to a retailer’s logo featuring an eco-friendly color makes an ethically ambiguous practice seem more ethical; however, exposure to a logo featuring a non-eco-friendly color makes the same practice seem less ethical. This effect is due to the embodied meaning of color and did not stem from referential meaning associated with the names of colors presented. Perceptions of a retailer’s eco-friendliness mediated the relationship between color and ethical judgments. Further, although the word “green” appears to influence ethical ratings of retail practices more than the word blue, visual exposure to either color evokes similar perceptions of eco-friendliness and influences downstream effects on ethical judgments of retail practices. Alternative explanations for this effect were ruled out leading to the conclusion that logo colors could be used to shape consumers’ perceptions of retailer ethicality.

The research demonstrated in essay 2 showed that although studies have investigated the effect of misleading packaging claims, perceptual variations in package design such as design complexity could also make consumers to assume an increased informativeness. In three studies, complexity of design on packaging is isolated to evaluate misperceptions of informativeness. Perceptual complexity resulted in an increase of perceived informativeness and that the underlying mechanism identified was ease in processing. This only happened under high
involvement, not under low involvement. Importantly, this effect is attenuated when correction instructions were provided.

Essay 3 presented in this research demonstrated that when the coherent organization of a presented assortment was reduced, the influence of a construal mind-set was reversed. Hence lower estimates of consumption associated with broader goal-level implications in choice were disrupted with the visual effects of an increased assortment size. Furthermore, the underlying mechanism for this shift in preference of consumption is the perceived lack of organization and variety derived from the number of disparate colors in the assortment. This essay also demonstrated that food consumption was influenced by a combination of individual goals, assortment size, and the colors used in the assortment. Implications for theory, consumers, and marketers are discussed.

Implications for marketers

The underlying premise of communicating brand position using visual brand language is that images offer faster and more automatic access to their meanings than words or names (Carr et al., 1982). Research indicates that in contrast to words, images facilitate more emotional processing (Lee, Amir and Ariely 2009). When we consider that branding strategies are essentially motivated to make emotional connections to the consumer (Fournier, 1998), one would think that in general, visual communication is an effective way to brand a company. To this end, the research presented in this dissertation tries to uncover the potential of visual branding of color, graphics and the visual organizing principle of harmony on downstream effects and has important implications for marketers.
There are many instances where visual rather than verbal persuasion can be effective. Townsend & Kahn (2014) recently cautioned that the preference for visual heuristics can be over applied. In line with this research, this dissertation demonstrates instances where the visual cues of a brand, assortment or graphics can mislead consumers. Essay 1 and 2 has larger policy and ethical implications where visual information, when used as a branding strategy could mislead the consumer. Consumption of food products is well researched and in addition to the abundant halo effects that result in increased consumption (e.g. low calories, fair-trade etc., Schuldt, Muller & Schwarz 2012; Chandon and Wansink 2007), findings of essay 3 suggest that color could be a heuristic that cues consumption. Further research needs to evaluate the joint role of color and flavors on consumption.

**Implications for designers**

The motivation of the three essays in this dissertation was aesthetic principles that guide the discipline of design. Designers rely on intuition to guide their designs. Further, whether a product launch, a newly created (or redesigned) branded identity etc. or any other product of design is successful or not depends on the interpretation of the consumer. Visual elements of design have the ability to impact and persuade the consumer viscerally, emotionally or cognitively. Identifying the way in which to communicate to the consumer is hence critical. For example, findings reported in essay 1, suggest that consumers in general view the color blue favorably (e.g. given its symbolic association to the eco-friendly concept). Bagchi & Cheema (2013) find that when the background of a bidding website is in the color red (vs. blue) it increases bids made by the consumer. The authors explain that the color red increases arousal
which increases bids on the website. When designers are in tune with the different effects of visual element on the consumer, targeted and effect design is possible.

References


