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Package color saturation and food healthfulness perceptions☆

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ABSTRACT

Vivid, highly saturated colors are often perceived as exciting and arousing, making them popular in branding and package design. However, are foods packaged in vivid colors also perceived as unhealthful? Across four experiments, we demonstrate that consumers appear to perceive foods in vivid, highly color-saturated food packaging as less healthful than foods in muted, less color-saturated packaging. Further, we demonstrate that conceptual fluency mediates the effect, subjective nutrition knowledge weakens the effect, and restrained eating behavior strengthens the effect. We contribute to the color literature that explores the distinct effects of different color elements on consumer perceptions. We also advance the food well-being literature by identifying a new heuristic that affects food well-being, and in doing so, join other researchers who have connected learned color associations to substantive consumer outcomes. Finally, we offer food marketers new insights into consumers' evaluations of their products.

1. Introduction

Vivid, highly saturated colors are often perceived as exciting (Aaker, 1997; Labrecque & Milne, 2012) and arousing (Gorn, Chattopadhyay, Yi, & Dahl, 1997), making them popular in branding and package design. However, in the context of packaged food, could package color saturation also serve as an incidental cue that also affects consumers' evaluation of the food item's healthfulness? For example, when grocery shopping, consumers are repeatedly exposed to food packages with varying degrees of color saturation, from vivid and vibrant (high saturation) to muted and washed-out (low saturation). However, vivid or muted colors do not, at least anecdotally, appear to be evenly distributed among all types of packaged food products. Rather, unhealthful foods are often displayed in vivid, highly saturated packages, while healthful foods are often showcased in muted, less color-saturated packages. Could repeated exposures to chips, candies, and sodas displayed in vivid, highly saturated packages cause consumers to conceptually link vivid, highly saturated colors with less healthful foods? Could such a conceptual link unknowingly bias consumers' evaluation of packaged food items? Would all consumers be equally affected by such a bias? Following the perspective of Bublitz et al. (2013) that it is critical for researchers to identify, and for consumers and marketers to understand, any factor that may undermine the nutritional assessment of food, we attempt to answer these questions.

In this research, we investigate and identify a previously unknown bias that affects consumers' perceptions of food healthfulness, the vivid packaging equals unhealthful heuristic. While previous research has identified how color can bias consumers' perceptions of food attributes (Huang & Lu, 2016; Levy, Riis, Sonnenberg, Barraclough, & Thorndike, 2012; Mai, Symmank, & Seeberg-Elverfeldt, 2016; Temple et al., 2011), this research investigates how one important parameter[1] of color, saturation, or the vividness or purity of a color hue, biases food healthfulness perceptions. Across four experiments, we demonstrate that package color saturation can influence consumers' perceptions of food healthfulness across a variety of color hues. Further, we reveal that the heuristic affects healthfulness perceptions of both healthful and unhealthful products, and we provide evidence that conceptual fluency accounts for the relationship between package color saturation and healthfulness perceptions. We also examine how the concepts of package color vividness and unhealthfulness may have become associated, and we identify subjective nutrition knowledge and restrained eating behavior as moderating factors that respectively weaken or enhance the effects of the vivid packaging equals unhealthful heuristic on consumers' food perceptions.

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[1] As noted in Labrecque and Milne (2012) and Labrecque, Patrick, and Milne (2013), saturation (vividness, sometimes also referred to as intensity or purity) is one of several color appearance parameters. A color's saturation refers to the amount of neutral gray “mixed” into a hue. A color's hue refers to its tone, or place on the color wheel. A color's lightness measures the relative amount of white or black that has been “mixed” into a given hue. While at first glance these terms may appear somewhat interchangeable, they refer to specific elements of color appearance.

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Our work contributes to the literature in several ways. First, we identify the unknown and distinct effect of one specific element of color, color saturation, on consumer outcomes, broadening our understanding of how specific color elements affect consumers' perceptions. Second, we theoretically investigate and empirically demonstrate that conceptual fluency is the mechanism underlying the effect. In doing so, we advance the color literature by demonstrating how a color association (vivid equals unhealthful) can feel accurate and expected within a context (indulgent food), thereby influencing consumers' perceptions. Third, we support this theorizing by demonstrating two boundary conditions of the vividness equals unhealthful heuristic. Fourth, we advance the food well-being literature by identifying an unknown heuristic that affects food well-being. In doing so, we contribute to the work of other researchers who have connected learned color associations to substantively important outcomes (e.g., Elliot, Maier, Moller, Friedman, & Meinhardt, 2007). It is our hope that with an increased awareness of this bias, consumers may be better positioned to correct for its effect. Finally, for food marketers, we provide new insights into factors that influence consumer evaluations of their products, allowing these marketers to make more informed use of color saturation in package designs (Bublitz & Peracchio, 2015).

The remainder of this manuscript proceeds as follows. Section 2 provides a brief conceptual review in the areas of package design and color as they relate to food item perceptions. Further, we draw from research in memory, conceptual fluency, restrained eating, and subjective knowledge to develop our hypotheses. Section 3 details our experimental work and findings. Section 4 offers conclusions, limitations, and potential areas of further research.

2. Conceptual background

2.1. The influence of package cues and color in biased food judgments

Many consumers lack the knowledge, time, or motivation to process nutritional information deliberately and accurately (Cornish & Moraes, 2015; Raghunathan, Naylor, & Hoyer, 2006). As such, consumers often employ evaluative shortcuts or heuristics, triggered by product or packaging cues, to inform food purchase decisions (Bublitz et al., 2013). However, such heuristics can systematically bias consumers' judgments, often with negative outcomes for consumer well-being. For example, heuristics can lead consumers to infer that organic foods are healthful (Sundar & Kardes, 2015), assume unhealthful foods are filling (Suher, Raghunathan, & Hoyer, 2016), equate nutrition information displayed in green with healthfulness (De Bock, Pandelaere, & Van Kenhove, 2013), or misjudge the healthfulness of products in portion control packages (i.e., small 100 calorie packs; Coelho do Vale, Pieters, & Zeelenberg, 2008; Scott, Nowlis, Mandel, & Morales, 2008).

Prior research has demonstrated that certain package colors or color properties of food packaging can lead to biased judgments about a food's attributes and can affect related behaviors. For example, consumers perceive food in red-colored packaging as sweeter than food in blue or green packaging (Huang & Lu, 2015) and as less healthful than food presented in blue-colored packaging (Huang & Lu, 2016). Similarly, consumers have been found to associate green labels with healthful foods (Temple et al., 2011) and red labels with unhealthful foods (Levy et al., 2012). Research has also demonstrated that consumers perceive darker colors as heavy, which can lead consumers to assess food items as calorically heavy, affecting perceptions of food healthfulness and taste (Mai et al., 2016). In total, it seems clear that consumers often infer certain food item attributes based on package color cues, yet, the specific influence of package color saturation remains unknown.

Vivid, highly saturated colors can generate arousal (Gorn et al., 1997) and perceptions of excitement (Aaker, 1997; Labrecque & Milne, 2012). Therefore, it is not surprising that marketers frequently use such colors on the packages of unhealthful foods. As a result, consumers may have repeatedly been exposed to unhealthful foods presented in vivid packages, and those exposures may have created a previously unidentified association between the two concepts (Elliot et al., 2007). Further, perhaps to evoke a contrast with unhealthful foods packaged in vivid colors (Babin & Babin, 2001), many food marketers appear to favor muted, less color-saturated packages for more healthful packaged foods. Given that food item assessment, choice, and consumption are tied to consumers' well-being and health (Bublitz et al., 2013; Koenigstorfer, Groeppel-Klein, & Kamm, 2014), and that well-being and health are areas of significant theoretical and substantive focus, we attempt to address how package color saturation can bias consumer perceptions and potentially undermine the pursuit of health goals. Specifically, we propose that vivid, highly color-saturated packaging may prime the concept of unhealthful foods in consumers' memory, which may bias their perceptions of a food item.

2.2. Memory and consumer perceptions

Marketers have long recognized that memory plays a key role in consumer choice and decision-making (Bettman, 1979). For example, concepts stored in memory can be activated or primed to affect product choice and other consumer responses (Sela & Shiv, 2009). Further, research has shown that memory activations spread through networks of associations, linking seemingly unrelated concepts, like vivid colors and unhealthfulness, together in chains of connectedness (Balota & Lorch, 1986). Even seemingly unrelated concepts can become connected through repeated and frequent co-occurrences (Berger & Fitzsimons, 2008; Elliot et al., 2007). Indeed, researchers have uncovered memory connections among color hues and concepts. For example, consumers often perceive the color green as positive and the color red as negative (De Bock et al., 2013). Consumers' association between green labels and healthful foods (Temple et al., 2011) and red labels with unhealthful foods (Levy et al., 2012) may be driven in part by consumers' association of green with “safety” or “go” and red with “risk” and “stop” (Koenigstorfer et al., 2014; Schuldt, 2013). Similarly, we propose that consumers have encoded a link between package color saturation and unhealthfulness in memory. Thus, when consumers see foods packaged in vivid colors, the concept of indulgent, unhealthful foods may also be retrieved and passed into working memory, which may influence consumers' perceptions of the food. As such, we contend that:

H1. Consumers will perceive food items as less (more) healthful if they are displayed in packaging with higher (lower) color saturation.

2.3. Conceptual fluency

Further, when memory associations are frequently encountered and reinforced, the association between two stimuli may begin to evoke a sense of conceptual fluency (Berger & Fitzsimons, 2008; Lee & Labroo, 2004). When associations are conceptually fluent to consumers, the associations fit with what consumers already know about the world around them (Kidwell, Farmer, & Hardesty, 2013). Fluent concepts and associations feel familiar and accurate (Whittlesea, 1993), and fluent associations are easily processed, categorized, and integrated into consumers' established networks of associations (Winkielman, Schwarz, Fazendeiro, & Reber, 2003).

Previous research has demonstrated that a sense of conceptual fluency can result from recent or frequent exposures to stimuli (Berger & Fitzsimons, 2008; Lee & Labroo, 2004). However, recent and frequent exposure can also result in a priming effect, when two stimuli are presented together, which can indicate the presence of such an association. Yet, the influence of conceptual fluency goes beyond that of a priming effect alone (Alter & Oppenheimer, 2009; Schwarz et al., 1991). Primed associations that are also conceptually fluent are more likely to be perceived as true and accurate (Alter & Oppenheimer, 2009). As such, the sense of truth and accuracy that accompanies