THE ROLE OF COLOR IN ENVIRONMENTAL MESSAGES AND CLAIMS:

GREEN CAN BE BOTH BENEFICIAL AND MISLEADING

by

Joon Yong Seo

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STATEMENT OF DISSERTATION APPROVAL

The dissertation of **Joon [redacted] Seo**

has been approved by the following supervisory committee members:

Debra Scammon	, Chair	**June 11, 2010**
[redacted] Carson	, Member	**June 11, 2010**
Himanshu Mishra	, Member	**June 11, 2010**
Arul Mishra	, Member	**June 11, 2010**
David Sanbonmatsu	, Member	**June 11, 2010**

and by [redacted], Chair of

the Department of [redacted]

and by Charles A. Wight, Dean of The Graduate School.

ABSTRACT

With the growth of environmental concerns and increasing competition among firms, it is important for (social) marketers to create more effective environmental messages and claims. On the other hand, with the increase in number and types of environmental claims, consumer confusion regarding environmental claims has also increased. These changes suggest that it is increasingly important to understand how consumers interpret environmental claims and whether some elements of environmental claims can mislead consumers.

In this dissertation I provide insights about these issues by studying the role of color in environmental messages and claims. On the basis of the processing fluency literature, I propose that consumers base their evaluations of environmental messages and claims not only on the information they receive, but also on how easy it is to process the information. Specifically, I propose that information about environmental products or behaviors is more fluently processed when it is presented with green, rather than other colors, because the color green matches the meaning of the target information. As a result, consumers will respond to environmental messages and claims more positively when these messages are presented with green than other colors. This effect has two important consequences. On one hand, the use of green can enhance consumer evaluations of environmentally superior products and activities. On the other hand, the use of green can

potentially mislead consumers by enhancing their evaluations of products that are not truly environmentally superior.

The structure of this dissertation is as follows. In Chapter 1, I introduce background issues and make propositions. In Chapters 2 and 3, I review related research and develop a theory to examine the role of color in information processing. In Chapter 4, I investigate whether using green (vs. red) as part of pro-environmental information will result in more favorable responses to the target information. I also examine whether the positive impact of green is driven by enhanced conceptual fluency. In Chapter 5, I examine whether consumers perceive a product with an environmental claim as environmentally superior when its package is green (vs. red). Further, I test alternate explanations of the effect of green. In Chapter 6, I discuss implications of this work.

To My Parents

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CHAPTER 1

INTRODUCTION

Consumer interest in sustainability has increased tremendously over the last two decades and is expected to grow further in the future. An increasing number of consumers are worried about more than just environmental protection; their decisions regarding product purchase, usage, and disposal are often driven by a desire to preserve nature's ecological balance (Carlson, Grove, and Kangun 1993). Governments, policymakers, and nonprofit agencies have developed programs and campaigns designed to raise consumer awareness and interest in pro-environmental behaviors. The growing environmental concern has also attracted the attention of marketers. To gain customer attention and approval under the pressure from increasing competition, a number of companies have placed green marketing at the center of their marketing strategies. Accordingly, there has been a dramatic increase in the number and types of green products, claims, and advertisements (Federal Trade Commission 2007). As environmental claims for products are pervasive, however, concern over green washing has also increased (Newell, Goldsmith, and Banzhaf 1998). Green washing can be defined as "the act of misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service" (TerraChoice 2007, p. 2).

A substantial amount of research has examined deceptive and misleading environmental claims because of their prevalence in the market and their potential consequences. Existing research has investigated deception in environmental claims (Carlson, Grove, and Kangun 1993; Kangun, Carlson, and Grove 1991; Newell, Goldsmith, and Banzhaf 1998), consumer comprehension of environmental claims (Morris, Hastak, and Mazis 1996), believability of environmental claims (Carlson, Grove and Kangun, 1993), level of environmental claims' compliance with established FTC and Environmental Protection Agency (EPA) guidelines (Scammon and Mayer 1995), and skepticism toward environmental claims (Mohr, Eroglu, and Ellen 1998). These studies, in general, suggest that due to the complex nature of environmental issues, ambiguous terms, and/or lack of environmental knowledge, consumers are often confused or mislead by environmental claims.

More recently, a 2009 study of 2,219 products making 4,996 environmental marketing claims in North America found that all but twenty-five of the products made claims that were demonstrably false or misleading (TerraChoic 2009). These claims include overstating environmental attributes, making vague or unsubstantiated claims, and using false claims of third-party certification, among others. These results imply that current environmental advertising and claims include practices that are discouraged by the FTC's Green Guides which were intended to "protect consumers and increase confidence in environmental claims; reduce marketer uncertainty; and encourage production and promotion of products less harmful to the environment" (Gray-Lee, Scammon, and Meyer 1993, p. 79). The FTC recently called for more research in this area. Since the FTC revised the Green Guides in 1998, there has been a remarkable

increase in environmental claims (FTC 2007). For example, a number of new types of environmental claims have appeared, including claims about sustainability, size of the product's or company's carbon footprint, and products made from renewable resources (FTC 2007). As updated regulations may be required to prevent consumer confusion and misperception, Federal Register Notices issued by the FTC in 2007 and 2008 solicited public comments relating to its regulatory review of the Green Guides to examine developments in green packaging claims and consumer perceptions of such claims.

With the growth of concern about the environment and sharp competition among companies, it is increasingly important for marketers to design more persuasive environmental messages and claims. At the same time, as consumer confusion regarding environmental claims is growing with the increase of number and types of environmental ads and claims, it is critical to understand how environmental claims are understood by consumers and whether some elements of environmental claims can mislead consumers.

In this dissertation I aim to provide useful insights on these issues by investigating the role of color in consumers' responses to environmental messages and claims. Color is a compelling visual cue for persuasive communications, and can confer identity, meaning, or novelty to an object or idea (Garber and Hyatt 2003). Yet, color is an underexplored aspect of marketing (Elder et al. 2010; Gorn et al. 1997). Further, there is very little (if any) empirical research that examines the role of color in environmental messages. Green, for example, is commonly used in messages that promote pro-environmental products or behavior. While using the color green as part of communications for such purposes may be effective, there is scant empirical evidence supporting this possibility. Can green increase message persuasiveness, or does it have

only aesthetic values with little impact on how consumers respond to the message? If there is an effect, how can that be explained? Are there any situations in which green can have unexpected, or potentially negative, impacts? Answers to these questions are important since green color may influence consumers' responses to environmental messages or claims in positive or negative ways.

I propose that, on one hand, the use of green color can enhance consumer evaluations of environmentally superior products and activities. On the other hand, I also propose that its use can potentially mislead consumers by enhancing their evaluations of products that are not truly environmentally superior. I first examine whether messages promoting pro-environmental behaviors or products have stronger appeal to consumers when they are presented with green than with other colors. In more general terms, I examine the role of color (e.g., in background) in evaluative judgments of target information, which has rarely been investigated by marketing researchers. I then explore the role that color can play in marketers' environmental claims for products. In response to mounting concerns about consumer protection and the FTC's recent solicitation of public comments, I explore the possibility that consumers may be misled by the use of green color in the marketing of products making environmental claims. Specifically, I examine whether environmental claims on a green product package (vs. packages of other colors) will receive more positive evaluations in terms of the product's environmental impacts. If the use of the color green has a positive impact on the persuasiveness of environmental claims, green may mislead consumers when it is used in conjunction with products that are not truly environmentally superior.

In addition to examining these possibilities, I explore possible theoretical explanations for the role of color with regard to responses to environmental messages and perceptions of a products' environmental impact. Specifically, I consider several psychological explanations for consumers' responses. Conceptual fluency is the primary lens for examining the impacts of color. I examine whether the positive impact of green is driven by the conceptual association in consumers' minds between the color green and the contents of target messages, which in turn may facilitate the processing of the target information. Alternative perspectives include perceptual fluency, color preference, mood, and regulatory focus, and I test these alternative explanations for the color effect across several studies.

The structure of this dissertation is as follows. In Chapters 2 and 3, I review related research and develop a theory to examine the potential beneficial and misleading role of the color green in environmental messages and claims. In the following chapters, I present results from six experiments that test my propositions and explore the psychological mechanism behind the color effect. In Chapter 4, I investigate the role of color in environmental messages and provide evidence supporting the proposed account of conceptual fluency. In Chapter 5, I examine the influence of package color on perceptions of a product's environmental impact. I also test alternate explanations of this effect. In Chapter 6, I close by discussing implications of this work for social marketers in the area of environmental campaigns, marketers of green products, public policy makers, and consumers.

CHAPTER 2

THEORETICAL BACKGROUND

In this chapter, I first review theoretical perspectives on the role of color in information processing. I then provide an overview of the psychological functions of color in marketing communications. I conclude by highlightening the importance of a deeper understanding of the role that color can play in marketing.

Processing Fluency

In this section, I review recent research on processing fluency since this theory provides useful insights into the role of color in environmental messages and claims. Recent research suggests that "our thought processes are accompanied by metacognitive experiences, such as the ease or difficulty with which some information can be brought to mind or the fluency with which new information can be processed" (Schwarz 2004, p. 338). In particular, processing fluency is one metacognitive cue that pertains to the subjective experiences of ease or difficulty with which people process given information (Schwarz 2004). The premise behind processing fluency is that any stimulus may be processed with different degrees of speed, accuracy, and effort. These fluency experiences are informative in their own right as people draw on them in forming judgments and preferences.

Research suggests that processing fluency plays an important role in human judgment and reasoning across a broad range of social dimensions, such as liking, confidence, truth, and frequency judgments (Alter and Oppenheimer 2009). Processing fluency also takes a number of different forms. In a comprehensive review of the various cognitive mechanisms that create processing fluency, Alter and Oppenheimer (2009) propose that fluency experiences arise from a wide array of cognitive processes, such as perception, memory, embodied cognition, linguistic processing, and higher-order cognition. Indeed, researchers have manipulated processing fluency using a variety of approaches, including semantic priming (e.g., Kelley and Lindsay 1993), visual clarity (e.g., Reber and Schwarz 1999), and phonological complexity (e.g., Alter and Oppenheimer 2006). Each manipulation influences a different cognitive system: semantic priming induces conceptual fluency; visual clarity induces perceptual fluency; and phonological simplicity induces linguistic fluency. In these studies participants rated fluent stimuli as more true or accurate than similar but less fluent stimuli. Thus, despite the diversity of the manipulations and cognitive processes, processing fluency seems to lead to similar judgmental consequences.

Taken together, these findings suggest that people's responses to marketing messages may be based not only on the contents of given information, but also on how easy it is for them to process given information. Therefore, we can better understand consumers' responses to a message by taking the interaction between declarative and experiential information into consideration. In the following sections, I review research on perceptual fluency and conceptual fluency, since these two types of fluency are most relevant to understanding the role of color in environmental messages and claims.

Perceptual Fluency

Perceptual fluency reflects the ease with which people can perceive a physical form of a target stimulus. For example, perceptual fluency is influenced by physical features of the target stimuli, such as symmetry, figure-ground contrast, or prototypicality (Reber et al. 2004). The basic psychological mechanism is that the more easily or quickly a physical form of a target stimulus is recognized, the more fluently it is processed. This means that color, which is a physical feature of information presentation, may influence the perceptual fluency with which people process a given message. Reber and Schwarz (1999), for example, manipulated the perceptual fluency of written statements by varying the contrast between the statements and the background. They show that statements with a high figure-ground contrast, compared to the same statements with a low figure-ground contrast, are more likely to be accepted as true.

The font manipulation has been one of the most popular perceptual fluency manipulations (e.g., Novemsky et al. 2007; Simmons and Nelson 2006). In these studies, researchers typically present target stimuli with either an easy-to-read font (e.g., sample) or difficult-to-read font (e.g., *sample*). Novemsky et al. (2007), for example, manipulated decision conflict by altering the font in which the choices were presented. Participants were more likely to postpone making a choice when the options were presented in a difficult-to-read font than when the same options were presented in an easy-to-read font.

While perceptual fluency can be manipulated by altering the physical features of the target stimuli, such as the figure-ground contrast or font, it can also be manipulated by changing presentation duration. Target stimuli are easier to perceive when they are presented for longer periods of time. Reber, Winkielman, and Schwarz (1998)

manipulated perceptual fluency through changes in exposure time of the target stimulus. They found that people evaluate the same stimulus more positively when it is presented for a longer time. They reason that longer exposures increase perceptual fluency.

In sum, perceptual fluency is influenced by surface features of the target stimulus and varies according to how easily stimuli are identified or how long they are presented. Perceptual fluency appears to impact consumers' information processing by changing how easy it is for them to recognize a given stimulus. However, since perceptual fluency deals with low-level perceptions of physical features of target stimuli, it has little impact on higher level perceptions, such as grasping the meaning of a given message. Thus, we need to go beyond the surface level of design features of a message to gain a better understanding of the potential role of color in helping consumers make meanings from the information contained in a message.

Conceptual Fluency

Conceptual fluency is concerned with the processing of meanings and reflects the ease with which the target comes to mind. Conceptual fluency effects have frequently been demonstrated with priming similar constructs (semantic priming, e.g., Fazendeiro et al. 2005; Lee and Labroo 2004) or predictability manipulations (semantic predictability, e.g., Lee and Labroo 2004; Whittlesea 1993; Winkielman and Fazendeiro 2003). Variables such as semantic priming, semantic predictability, and the consistency between the stimulus and its context influence high-level processes concerned with the understanding of stimulus meaning and its relation to semantic knowledge structures. Regardless of the diversity of manipulations of conceptual fluency, the common

psychological mechanism is that the target information that comes to mind more readily, and thus its meanings are more easily grasped, is easier to process (Lee and Labroo 2004).

As discussed above, there are various routes by which conceptual fluency can be enhanced. First, conceptual fluency can be obtained by priming participants with semantically-related concepts. The spreading-activation theory of semantic processing (Collins and Loftus 1975) suggests that activation of one construct leads to indirect activation of related constructs in the associative network. As a result, subsequent target stimuli that are semantically related to the previously activated concepts are easier to retrieve from memory and process. Similarly, the theory of conceptual fluency suggests that priming people with a conceptually related construct leads to more favorable evaluations of the target. Fazendeiro et al. (2005) manipulated conceptual fluency through semantic primes by presenting semantically related or unrelated pictures or words of common objects (i.e., studied items). For example, in the high fluency condition, the picture (e.g., of a lock) was preceded by a matching word (“lock”) or a related word (e.g., key) while in the low fluency condition the picture was preceded by an unrelated word (e.g., “snow”). The results showed that pictures that were preceded by matching words or related words were liked more than pictures preceded by unrelated words.

Another route by which conceptual fluency can be obtained is through semantic predictability. Whittlesea (1993) manipulated conceptual fluency with which target words (e.g., book) could be processed by embedding them in a predictive semantic sentence stems (e.g., “The librarian reached for the book”) or nonpredictive stems (e.g., "She saved her money and bought a book."). Words embedded in the predictive context were pronounced faster than words embedded in a nonpredictive context, indicating higher

conceptual fluency. Further, the rate of false recognition of test words was higher when test words were preceded by predictive semantic contexts than when preceded by nonpredictive semantic contexts. Moreover, this semantic predictability influenced affective judgments of the target words. Participants reported more liking of the target words when the target words appeared in an associated context than not. Lee and Labroo (2004) extended these findings to the consumer domain and obtained similar results. They manipulated conceptual fluency by asking participants to evaluate products after reading conceptually-related or conceptually-unrelated advertisements. Specifically, in one of their studies, participants reported more positive attitudes toward ketchup when they were previously exposed to an ad that showed a fast food restaurant, rather than an ad that showed supermarket shelves. This is presumably because semantic predictability was higher when the ketchup followed the ad showing a fast food restaurant, rather than the ad showing supermarket shelves.

Processing Fluency and Positive Affects

As suggested in the studies reviewed above, the robust and consistent influence of processing fluency on judgments of liking and preferences indicates that processing fluency itself is experienced as hedonically positive (Winkielman et al. 2003). The positive affective response, in turn, serves as a basis for judgments and fluently processed stimuli tend to be more positively evaluated than are less fluently processed ones (Reber et al. 2004). This is true regardless of whether it is perceptual fluency or conceptual fluency (Alter and Oppenheimer 2009).

Further, there is evidence that the influence of processing fluency can also be captured with psychophysiological measures. Winkielman and Cacioppo (2001) showed participants line drawings of everyday objects that were preceded by either matching or nonmatching visual priming. Then, they measured participants' affective responses through the resulting activity of various facial muscles. This methodology relies on the observation that positive affective responses increase activity over the region of the zygomaticus major ("smiling muscle"), whereas negative affective responses increase activity over the region of the corrugator supercilli ("frowning muscle") (Cacioppo, Petty, Losch, and Kim 1986). The results of this psychophysiological test indicated that participants showed more positive affective reactions to the drawings that were preceded by matching (vs. nonmatching) visual priming, presumably because they were more fluently processed. In another experiment, these authors showed a positive relationship between presentation duration and activation of muscles associated with positive affect, such that longer presentation duration of the target item induced more positive affect. In sum, all of these findings provide convergent evidence that the same stimulus is evaluated more positively when it is processed with more fluency. Several researchers (e.g., Reber et al. 2004) have argued that this is because the fluency signal itself is affectively positive in nature.

To summarize, perceptual fluency reflects the ease of low-level processing concerned with the identification of physical features of the stimulus, while conceptual fluency reflects the ease of high-level processing concerned with the identification of stimulus meaning. High processing fluency is associated with positive affect and leads to more positive target evaluations. The fluency experience results in similar influences on

judgments regardless of how it is generated. Because there are two possible routes to enhanced fluency, an interesting question is whether a surface feature of a target stimulus, such as color, which has been shown to increase (or decrease) perceptual fluency, can also enhance evaluative judgments of the target information by facilitating conceptual fluency. Can a feature that has been thought to enhance perceptual fluency also enhance conceptual fluency? It is important to answer this question to fully understand the role of color in marketing communications. By understanding the impact of color on conceptual fluency, that is, the ease of identification of the meaning of a given message, marketers can maximize the benefit of color in designing messages. In this dissertation, I address this issue by focusing on the impact of color on conceptual fluency in the context of environmental messages and claims.

Psychological Functions of Color in Marketing

In this section, I review marketing-specific color research that has examined the psychological functions of color. Early color studies in marketing focused on the difference between the effects of long- and short-wavelength colors and between color and black-and-white. Bellizzi and colleagues (Bellizzi, Crowley, and Hasty 1983; Bellizzi and Hite 1992) investigated consumer color preferences for store atmospherics. They found that blue, compared to red, retail environments lead to more positive retail outcomes, such as greater intentions to shop, browse, and buy. They explain that this is because consumers feel more positive and pleasant in blue retail environments than in red ones.

Some researchers compared the effectiveness of color versus black-and-white in print ads. Sparkman and Austin (1980) analyzed empirical data on actual sales and found that color newspaper ads sell more than black-and-white ads. Schinder (1986), however, pointed out that indiscriminant use of color in magazine ads can sacrifice contrast, reducing legibility, and decreasing the effectiveness of ads. Meyers-Levy and Peracchio (1995) extended this stream of research by exploring the role of motivations and cognitive resources in ad processing. They show that when consumers' processing motivation is low, color ads lead to more positive responses than black-and-white ads. Under high motivation, however, consumers' responses depend on an interaction of ad color and ad resource demands (i.e., the extent to which the processing of the ads requires cognitive resources). Specifically, when processing the ad places high demands on cognitive resources, black-and-white ads lead to more favorable attitudes. By contrast, when processing of the ad requires fewer cognitive resources, color ads result in more positive attitudes.

Recent research has moved from demonstrating that different colors have different impacts to attempting to explain why these differences occur. At the same time, marketing researchers began to approach color in a more systematic way. Gorn et al. (1997) decomposed color into its constituent elements—hue (e.g., blue, red, etc.), chroma (i.e., the degree of saturation), and value (i.e., the degree of darkness or lightness) —and tested their respective effects on arousal, affect, and recall in print ads. They found that higher-value colors (i.e., whitish colors) in an ad produce greater liking for the ad, because these colors elicit greater feelings of relaxation. They also found that using higher-chroma colors (i.e., highly saturate colors) in a print ad elicits greater feelings of

excitement, and this in turn increases liking for the ad. Drawing upon these findings and research that establishes the link between feelings of relaxation and time perception, Gorn et al. (2004) investigated the effects of color on perceived download speed of Web pages. They show that background colors that induce more relaxed feeling states (e.g., blue hues, lower-chroma colors, and higher-value colors) lead to greater perceived quickness of downloading on a web page.

Mandel and Johnson (2002) examined how visual priming affects external search for information as well as internal retrieval in the context of on-line commerce. They demonstrate that background colors and images on a website could act as primes that influence attribute importance and product preferences. For example, the background on a car website featuring green with small dollar signs primed price, and participants were more likely to prefer a car that excelled on price. On the other hand, a website background featuring red and orange flames primed safety, and participants preferred a car with more safety. However, it is important to note that in this research color was used with images to prime a concept, and thus it is not clear whether it was the color or the image or both that served as conceptual priming. In the current dissertation, I focus exclusively on the influence of color on the processing of meanings of information.

Miller and Kahn (2005) focused on names of color, rather than color *per se*, as part of product features. Drawing upon incongruency theory which suggests that consumers prefer moderate levels of incongruity (Mandler 1982), these authors show that consumers respond to ambiguous, unusual color names (e.g., blue haze or Alpine snow) more favorably than to common, informative color names. They explain that this is because people assume that marketing messages convey useful information. These

authors further argue that if the message is not informative or does not conform to expectations, consumers engage in search for the reason it was provided. This leads to additional (positive) attributions about the product, which in turn results in more favorable evaluation and increased likelihood of purchase.

Another stream of research investigated the congruity between products and colors. In a very early study, Schiller (1935) investigated consumer perceptions of product colors. For example, he found that soap and breakfast foods were considered most appropriate in green-yellow combination which was most strongly associated with 'economical' and 'cleanliness.' Extending this study, Bottomley and Doyle (2006) examined what colors are considered appropriate for certain product categories. Specifically, based on consumers' perceptions, they first categorized colors into functional colors (e.g., blue) or sensory-social colors (e.g., red). Then, they showed that brands of functional products (e.g., car tires) are considered more appropriate when presented in functional colors, while sensory-social products (e.g., amusement park) are considered more appropriate in sensory-social colors. The researchers contend that colors have connotative meanings, and products that are connotatively congruent with colors are considered more appropriate.

The study of Bottomley and Doyle (2006) is most relevant to the current work in that it paid attention to the intrinsic meanings of color and the associations between color meanings and product meanings. However, the findings of these authors do not help in understanding the mechanism by which such associations impact consumer responses to marketing communications. Further, as Bottomley and Doyle acknowledge, their studies suffer from several limitations. First, the researchers used only within-subject designs

that usually increase the focus on manipulations. As a result, color was the main distinguishing feature among a set of almost identical logos among which participants made multiple comparisons. Second, appropriateness was the only dependent variable, and no downstream variables, such as evaluative judgments and behavioral intentions, were measured. Third, these authors neither explore nor demonstrate the psychological mechanism. As a result, it is unclear why some products are considered more appropriate with certain colors. I will overcome these limitations by using between-subjects designs and including evaluative judgments and behavioral intentions as dependent variables. Further, I focus exclusively on the role of color in environmental messages and claims and demonstrate the impact of certain color(s) on the persuasiveness of environmental messages and claims. Most importantly, I explain and demonstrate the psychological mechanism of the color effect, drawing upon processing fluency theory.

In summary, a handful of marketing researchers have studied color. In general, these studies investigated limited aspects of color, such as black-and-white vs. color, short vs. long wavelength, and high vs. low saturation, and the impacts of these factors on feelings, preferences for retail environments, and responses to ads. Importantly, these studies often overlook the meanings of color and the context in which color is presented. Scientists and philosophers have been talking about the meanings of colors since the time of Socrates in the fifth century B.C (Solomon 2008). Yet, only a few marketing studies (e.g., Bottomley and Doyle 2006) have considered the meanings of color and explored associations between color and products. Even these studies do not elaborate on the psychological mechanism underlying the effect of color on persuasive communications. As a result, the effects of color in persuasive communications and the explanations of the

processes that lead to more positive responses to marketing communications have been left largely underexplored. In particular, what is lacking in the current marketing literature on color is an understanding of the influence of conceptual fit between color and message contents on information processing and message persuasiveness.

Moreover, the color and marketing literature is silent with respect to the role of color in environmental messages, which is of critical importance in designing environmental messages and claims and understanding consumers' responses to them. In the following chapter, I develop a theory that explores the linkage between color and processing fluency in the context of environmental messages and claims.

CHAPTER 3

CONCEPTUALIZATION: COLOR, FLUENCY, AND PERSUASIVENESS

Conceptualization

Processing fluency theory suggests that any given information is processed with differing degrees of fluency (e.g., easiness, speed, etc.), and this experiential information affects consumers' responses to the information by changing how easily that information comes to mind and can be processed. For the purpose of this dissertation, it is important to distinguish conceptual fluency from perceptual fluency. As discussed in the previous chapter, perceptual fluency reflects how easy or difficult it is to identify a physical form of the target stimulus, while conceptual fluency reflects the ease or difficulty of higher level processing concerned with the meaning of the target stimulus. Previous research suggests that color, which creates a figure-ground contrast, can influence perceptual fluency. However, to the best of my knowledge, there is no research that explores the impact of color on conceptual fluency. The major theoretical interest of this dissertation, therefore, lies in whether a physical feature of information presentation that has been shown to influence perceptual fluency can also impact conceptual fluency.

In this dissertation, I examine the role that color plays in consumers' information processing. On the basis of the processing fluency literature, I propose that judgments of the target information are based, in part, on the conceptual association between the target

information and color. Applied to the context of pro-environmental messages and marketers' environmental claims, consumers will base their evaluations of pro-environmental messages and environmental claims not only on the information they receive, but also on how easy it is to process the information. The ease of processing will be influenced by the color used in the information presentation. Specifically, I propose that information about pro-environmental products or behaviors will be more fluently processed with green, rather than other colors, because the color green and the target information are part of a network of meaningful associations in memory. This conceptual fit between the target information and color, in turn will facilitate the processing of meanings of the target information. In other words, the color green will enhance the conceptual fluency with which the environmental information or environmental claim is processed, because the color green matches the meaning of the environmental message. This experience of fluent processing is a hedonically positive one (Winkielman et al. 2003); therefore, consumers' responses to the conceptually more fluent messages will be more favorable. This conceptualization is illustrated in Figure 1.

Note that in this conceptualization what facilitates processing of the target information is conceptual fluency, rather than perceptual fluency. The conceptual relatedness between the color green and a pro-environmental message or claim will

Figure 1: Proposed Conceptualization

facilitate processing of the meaning of the target information, rather than facilitate physical identification of the target information. In other words, the conceptual fit between the color and the target information will enhance conceptual fluency, not perceptual fluency. However, there is still a possibility that color can influence perceptual fluency. Therefore, once I demonstrate the positive impact of the color green on consumers' responses to pro-environmental messages and environmental claims, I demonstrate that the color effect is driven by conceptual fluency, rather than perceptual fluency.

Alternative Possibilities

It might seem intuitive that people would respond to a pro-environmental message more favorably when the message is presented with green. In spite of the intuitive appeal of this perspective, a stream of research calls this intuition into question, suggesting instead that a pro-environmental message might be evaluated more favorably when it is presented with an incongruent color (e.g., yellow, red) than with a congruent color (green). Incongruency theory suggests that when people encounter an object that is incongruent with their expectations, they engage in more elaborative processing to resolve the incongruity. Similarly, Mandler (1982) argues that moderate incongruity leads to more extensive processing as people try to resolve and find meaning in the incongruity, and such incongruity can make objects appear more interesting, leading to positive evaluations. Further, such items may receive a positive boost as a consumer feels good for having "solved" the incongruity. In fact, there is supporting evidence in various areas. For example, the novelty of a product package relative to consumers' expectations can

increase the likelihood that the package will evoke an involuntary attentional response (Kahneman 1973). Further, a positive relationship between novelty and preference has been demonstrated in the empirical aesthetic literature (Berlyne 1974) and the psychology of visual perception literature (Bruce and Green 1990). As reviewed in Chapter 2, Miller and Kahn (2005) investigated the effects of color names, using incongruency theory.

Applied to the context of pro-environmental messages and color, incongruency theory suggests that when consumers encounter a pro-environmental message presented with an incongruent color which is counter to their expectation that an environmental message would come with the color green, they may try harder to process the information, resulting in more positive evaluations of the target message and positive feelings of having resolved the incongruity. On the other hand, an environmental message presented with green color does not require resolution, which may produce limited attention to and interest in the message. Another possibility is that American consumers' frequent exposures to environmental messages with green color may even induce boredom, resulting in a decline in their responses to the environmental message presented with green. In short, different theories predict different results with regard to the role of color in processing environmental information, and it is not clear which theory will operate.

Alternative Explanations for the Effect of Color

In the previous section, I proposed that using the color green in environmental messages or claims will result in more positive consumer responses because the conceptual fit between the color green and the target information will enhance conceptual

fluency. However, there can be alternative explanations of the positive impact of green on consumers' responses to pro-environmental messages and marketers' environmental claims. In this section, I briefly review other psychological mechanisms that may explain the effect of color in pro-environmental messages and claims.

Influence of Color on Perceptual Fluency

Color in environmental messages and claims can influence perceptual fluency, which in turn may impact consumers' responses to the environmental messages and claims. As reviewed earlier, extant research suggests that various physical aspects of stimuli, such as figure-ground contrast, can influence perceptual fluency. Reber, Winkielman, and Schwarz (1998), for example, showed that people like stimuli in higher figure-ground contrast more than in lower figure-ground contrast, because it is easier to process the stimuli in higher (vs. lower) figure-ground contrast. Although these researchers focused on one aspect of color (figure-ground-contrast), rather than the overall effect of color, their finding suggests that different colors can induce different degrees of figure-ground-contrasts, resulting in different levels of perceptual fluency. For example, a message printed in black ink may be easier to perceptually identify on a white background than a grey background. A light background will lead to higher perceptual fluency than a dark background, and this enhanced perceptual fluency is likely to result in more positive responses to the target message.

Influence of Color on Mood

It is widely accepted that human mood can be affected by color. Color has been shown to influence arousal (e.g., Mikellides 1990), excitement (e.g., Apter 1982), and relaxation (e.g., Gorn et al. 1997). For example, it is generally accepted that red is an exciting color, while blue is a relaxing color (Tom et al. 1987). Indeed, Walters et al. (1982) demonstrated a link between red and felt excitement, and blue and felt relaxation.

Marketing researchers have long been aware that consumers behave differently when they are in good moods versus bad moods. In particular, most theories predict that more positive moods lead to more positive judgments. The mood-congruent recall approach (Bower 1981), for example, predicts more positive judgments under positive (e.g., happy) moods, because positive moods affect judgments through the selective recall of positive information or associations from memory. On the other hand, the feelings-as-information approach (Schwarz and Clore 1983) suggests that individuals draw on their affective experience as a source of information. That is, people use their feelings toward a target as information in forming an evaluative judgment.

Previous research also suggests that color can influence human judgment and decision making by temporarily changing mood. Soldat and Sinclair (2001) examined the influence of blue and red on processing strategy. They propose that a blue background leads to systematic processing and a red background leads to nonsystematic processing. Supporting this proposition, participants who read arguments on a blue paper elaborated the arguments and, therefore, were persuaded by strong arguments only, while participants who read the same arguments on a red paper did not elaborate and were persuaded by both strong and weak arguments. The authors explain that blue serves as a

negatively valenced affective cue (e.g., sad) and red as a positively valenced affective cue (e.g., happy). In short, these findings suggest that color conveys different affect, and these affective cues lead to differential processing strategies.

In sum, color can affect mood which in turn can influence consumers' information processing and evaluative judgments. This suggests that people's responses to marketing messages may depend on the influence of color on moods.

Color and Regulatory Focus

Color theorists have suggested that longer wavelength colors (e.g., red, yellow) are arousing while shorter wavelength colors (e.g., green, blue) are calming (Stone and English 1997). Researchers have recently examined the relationship between color and regulatory focus (e.g., Elliot et al. 2007; Mehta and Zhu 2009). Regulatory focus theory (Higgins 2000) suggests that self-regulation functions differently when people serve different types of needs, such as the distinct survival needs of nurturance (e.g., nourishment) and security (e.g., protection). This theory posits that nurturance-related regulation adopts a promotion focus, that is, a regulatory state oriented toward ideals or accomplishment with a heightened sensitivity to the presence or absence of positive outcome. In contrast, security-related regulation adopts a prevention focus, which is a regulatory state oriented toward safety or responsibility with a heightened sensitivity to impediments to goal attainment.

According to regulatory fit theory (Higgins 2000), a match between one's regulatory state and a task can lead to regulatory fit while a mismatch leads to a nonfit. People tend to consider outcomes or features that are consistent with their regulatory

states relatively more important than outcomes or features that are inconsistent with their regulatory states (Higgins 2000). Whenever there is a fit between one's regulatory state and the features or outcomes of a task (e.g., reading a persuasive message), consumers experience subjective feelings of "rightness" which in turn is used as a diagnostic cue (Avnet and Higgins 2006; Higgins 2000). Consequently, regulatory fit can influence how individuals respond to persuasive messages (Aaker and Lee 2006).

On the basis of the color literature and regulatory focus theory, recent research suggests that red evokes a prevention-focus while blue induces a promotion-focus. Elliot et al. (2007), for example, argue that red is associated with the danger of failure in achievement contexts and evokes a prevention focus. Mehta and Zhu (2008) show that a red background induces primarily a prevention focus and enhances performance on a detail-oriented task, whereas a blue background activates a promotion focus and enhances performance on a task that requires creativity.

Altogether, these findings suggest that color may influence an individual's response to environmental messages and claims through changing the person's regulatory state or interacting with the person's dominant regulatory focus. Thus, regulatory focus may be an alternative explanation for differences in consumers' responses to marketing messages that incorporate color.

Overview of Experiments

In this dissertation I use experimental methods in which I manipulate color presented with environmental messages and claims and measure evaluative judgments, perceptions, mood, and behavioral intentions to explore the impact of color on

consumers' information processing and the psychological mechanism underlying the effect of color. In the next two chapters, I present results from studies framed by conceptual fluency and studies designed to rule out alternative explanations.

Previewing briefly, in experiments 1-3, I show that using green (vs. red) as part of pro-environmental information leads to more positive responses to the environmentally friendly behavior recommended in the target information. In addition, in experiment 2 and 3, I present evidence that the positive impact of green is driven by enhanced conceptual fluency. In experiments 4-5, I demonstrate that consumers perceive a product with an environmental claim as environmentally superior when the claim is presented on a green (vs. red) package. Further, I rule out the possibility that this effect is driven by mood, perceptual fluency, or color preference. In experiment 6, I test and rule out an explanation of the color effect based on, regulatory focus.

CHAPTER 4

COLOR AND RESPONSES TO ENVIRONMENTAL MESSAGES

Chapter 4 presents three studies that examine the influence of color on consumers' responses to pro-environmental messages. These studies are designed to test whether colors can enhance responses to messages by enhancing conceptual fluency.

Experiment 1

The main purpose of experiment 1 was to investigate whether a pro-environmental message presented with green will be evaluated more favorably than the same message with a different color. To this aim, I examined the effect of different colors on evaluative responses to pro-environmental behaviors. Following the conceptualization from processing fluency theory that the conceptual fit between color and target information enhances conceptual fluency, I hypothesized that using green, rather than other colors, as part of an environmental message will lead to more favorable responses to the target pro-environmental activity. This is because the conceptual relatedness between the target activity (e.g., recycling) and background color (green) will facilitate processing of the target information. Specifically, I investigated the influence of background colors (green vs. red) on responses to using a reusable bag in shopping trips.

Red was chosen since green and red are often considered to be opposite colors (Fehrman and Fehrman 2004) while these two colors are similarly popular in the U.S. culture.

H1: Pro-environmental messages will be more persuasive when they are presented with green than with red.

Pretest

To support the conceptual fluency explanation of the positive impact of green on message persuasiveness, it is important to show that there is a better conceptual fit between environmental messages and the color green than red. Therefore, a pretest was conducted to examine whether the target environmental message was more conceptually related to the color green than red.

Procedure

Sixty-nine undergraduate students from a large U.S. university participated in this study for partial course credit. First, participants read an article that encouraged using a reusable bag in shopping trips, instead of plastic or paper bags, and informed how it could save energy and the environment (Figure 2). The background color of the message was white for the purpose of this pretest. Then, participants were asked "Imagine that you will see this article at another place. Please indicate the extent to which you expect to see this article on a red or green background" on a seven point rating scale anchored at 1 with "absolutely red," 4 with "not sure," and 7 with "absolutely green." Participants also reported how related they believed the article was to the color *green* on a seven-point rating scale anchored at 1 with "not related at all" and 7 with "related very much." They

Figure 2: Environmental Message (Experiment 1 – Pretest)

also indicated how related they believed the article was to the color *red* on the same scale. The order of these two questions was counterbalanced.

Results

The results showed that participants expected to see the target article on a green (vs. red) background ($M = 5.67$, $t(1, 68) = 9.81$, $p < .001$). Consistent with this result, participants also believed the article was more related to the color green than red ($M_{Green} = 6.13$ vs. $M_{Red} = 2.70$, $p < .001$, $t(1, 68) = 14.24$). The order of questions did not predict participants' answers, nor did it interact with other factors ($Fs < 1$). These results suggest that there is stronger conceptual relatedness between the target article and the color green than red.

Main Study

In the main study, I tested the first hypothesis that a pro-environmental message will be more persuasive when it is presented with green than with red. In this study, I manipulated background color presented with an article about environmental tips. To prevent potential confounds, only hue (i.e., green or red) was manipulated while two other dimensions of color, that is, chroma (high vs. low saturation) and value (darkness vs. lightness) were kept constant (Gorn et al. 1997; Thompson, Palacios, and Varela 1992).

Procedure

Seventy-five undergraduate students from a large university participated in the main study for extra credit. They first read the same environmental message as the one used in the pretest. The background color of the title of the article was either green or red (Figure 3).

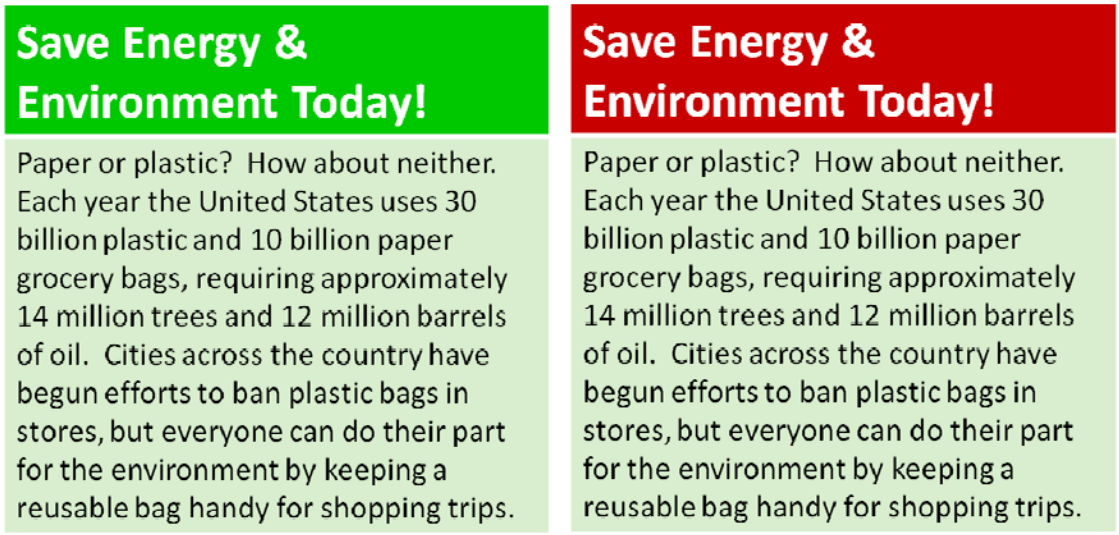


Figure 3: Environmental Message (Experiment 1 - Main Study)

Participants then reported their intentions to use a reusable bag and how worthwhile and important it is to use a reusable bag. Each of these was measured on a seven-point scale. After completing a filler study, participants provided demographic information and indicated whether or not they were color-blind.

Results and Discussion

Only those who reported that they were not color-blind were included in the analyses; seven participants were excluded from the data. As predicted, overall evaluations of using a reusable bag were more favorable in the green (vs. red) condition. Participants in the green (vs. red) condition reported that using a reusable bag in shopping trips is more important ($M_{Green} = 5.20$ vs. $M_{Red} = 4.12$, $p < .05$, $F(1, 67) = 6.90$) and more worthwhile ($M_{Green} = 5.20$ vs. $M_{Red} = 3.94$, $p < .01$, $F = 9.44$). Moreover, participants were more willing to use a reusable bag in shopping trips in the green than red condition ($M_{Green} = 4.60$ vs. $M_{Red} = 3.70$, $p < .05$, $F = 4.06$). Age and sex did not predict any of these items, nor did they interact with other factors ($Fs < 1$).

In summary, supporting H1, participants showed more positive responses to the target environmental message and higher intentions to follow the pro-environmental behavior when the message was presented with green than red. The results from the pretest confirmed that there was stronger conceptual relatedness between the target message and the color green than red. These results suggest that the positive impact of green on responses to the target message was driven by the fact that the color green, compared to red, was conceptually more related to the target message. However, this is only indirect evidence of conceptual fluency, and there is a possibility that the effect of

color was driven by other factors. In the following studies, I provide more direct evidence demonstrating that the effect is driven by conceptual fluency.

Experiment 2

The purpose of experiment 2 was to provide more direct evidence of conceptual fluency by demonstrating that people indeed experience an ease of understanding (i.e., conceptual fluency) when there is good conceptual fit between the target information and color. If conceptual fluency drives the positive effect of the color green, then we should observe high conceptual fluency when the target information is closely related conceptually to the color green. When the target information is not closely related conceptually to the color green, however, the use of color green should not enhance conceptual fluency. In other words, the enhanced conceptual fluency resulting from the conceptual fit between the target information and the color green should disappear when the target information is not closely related conceptually to the color green. Accordingly, I predicted that participants would experience more fluent processing of the target information when there is conceptual fit between the target information and color than where there is not.

H2: The color green (vs. red) will lead to higher conceptual fluency when consumers process a message that has a close conceptual relation with the color green (e.g., environmental message) than when they process a message that does not have a close relation with the color green (e.g., nonenvironmental message).

To test this hypothesis, I designed a 2 (green vs. red) X 2 (environmental vs. nonenvironmental message) between-subjects experiment. I created two target messages:

an environmental message and a nonenvironmental message. The contents of these two messages were similar in that both messages encouraged energy saving behavior and contain the same household energy saving tips. This was to minimize unnecessary differences between different color conditions that may allow alternative interpretations. I differentiated the target messages by manipulating the purpose of energy saving. For the environmental message the goal of energy saving was protecting the environment, while for the nonenvironmental message it was saving money. My assumption was that protecting the environment is conceptually related to the color green more than is saving money. Nonetheless, prior research suggests that the color green is also associated with money. Mandel and Johnson (2002), for example, show that the color green with dollar signs can prime price, influencing attribute importance in product choice. Therefore, I pretested whether protecting the environment is more conceptually related to the color green than is saving money.

Pretest

Fifty-one students from a large U.S. university participated in the pretest for partial course credit. Adapting the procedure developed by Lee and Labroo (2004) to test the conceptual relatedness between two constructs, I asked participants to indicate how related they believed protecting the environment is to the color green. I also asked them to indicate how related saving money is to the color green. Participants answered these questions with seven-point scales anchored at 1 = not related at all and 7 = very related. The order of these two questions was counterbalanced.

The results showed that in participants' minds protecting the environment, compared to saving energy, is more conceptually related to the color green (M = 5.67 vs. M = 3.96, t = 6.84, $p < .001$). The order of the questions had no effect on participants' ratings ($p > .60$). This result confirms the assumption that protecting the environment has stronger conceptual relatedness to the color green than does money saving.

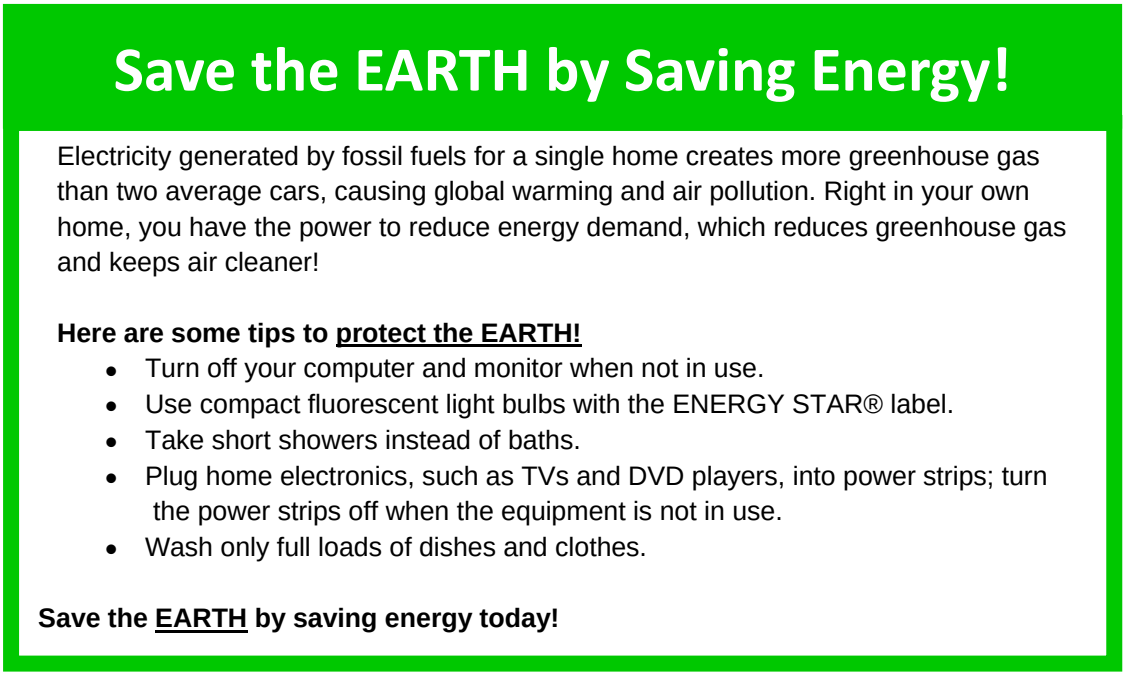
Main Study

Procedure

For the main study, eighty students were recruited on the campus of a large U.S. university. Participants first read a target environmental message that included energy saving tips. About half of the participants read the environmental message and the rest of them read the nonenvironmental message. The background of the message heading was either green or red, and the body of the message was surrounded by a rectangular frame of the same color as the title background. This procedure produced four different target messages. Figure 4 illustrates two of the four target messages.

To measure conceptually fluency, I developed a four-item conceptual fluency scale that reflected how easy or difficult it was conceptually to process the target information. Specifically, participants rated how easy it was to understand the meaning of the message (anchored at 1 = very difficult and 7 = very easy), how much effort they spent to understand the message (1 = very little and 7 = very much, reverse coded), how clear the meaning of the message was (1 = very unclear and 7 = very clear), and how quickly they got the idea from the message on a seven point scale (1 = very slowly and 7 = very quickly).

a. Environmental Message (Green Condition)



b. Nonenvironmental Message (Red Condition)

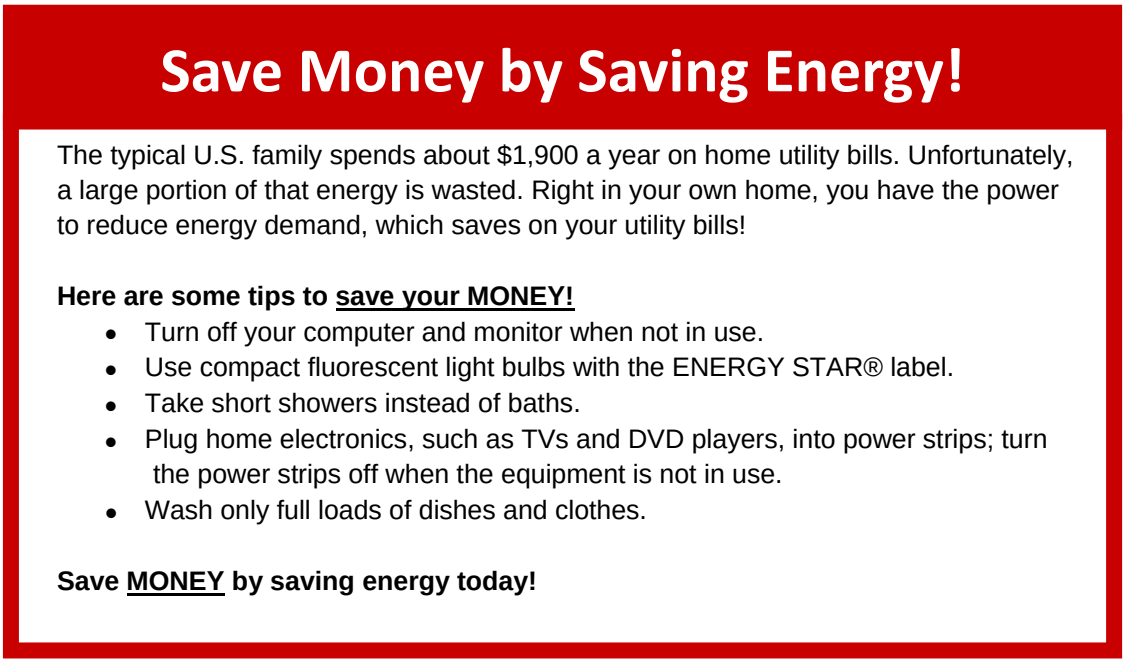


Figure 4: Examples of Target Messages (Experiment 2 - Main Study)

Results

Only those who reported they were not color-blind were included in the analyses; three participants were excluded from the data (n = 77). After verifying the reliability of the conceptual fluency scale (α = .69), the four conceptual fluency items were averaged to create a single conceptual fluency index. Higher scores indicate more fluent processing of the target information. The results showed that when participants read the environmental message, they experienced more fluent processing of the target message in the green (vs. red) condition (M_{Green} = 6.74 vs. M_{Red} = 6.37, $p < .05$, F (1, 37) = 6.45). However, when participants read the nonenvironmental message, there was no difference in conceptual fluency between the two color conditions (M_{Green} = 6.55 vs. M_{Red} = 6.69, $p > .40$, F (1, 34) = .73). The two-way interaction was significant ($p < .05$, F (1, 71) = 5.48). These results are illustrated in Figure 5.

Discussion

The results from experiment 2 provide direct evidence that the color green can facilitate processing of meanings of environmental messages. Supporting the conceptual fluency account of the positive influence of the color green, participants experienced more fluent processing of the environmental message when it was presented with green (vs. red). However, the color green did not have a significant influence on experienced conceptual fluency when participants read the nonenvironmental message. These results support H2.

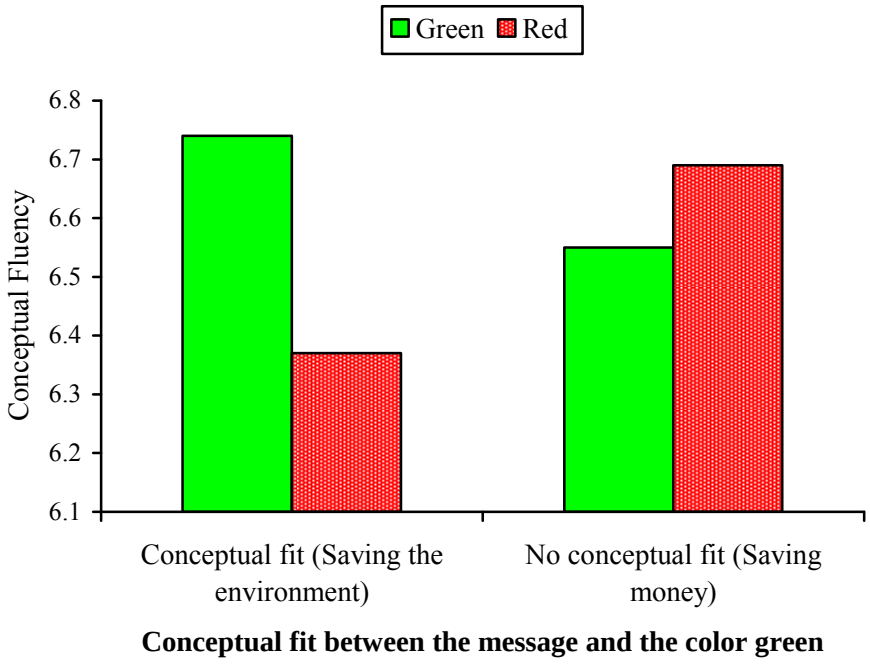


Figure 5: 2 (Green vs. Red) X 2 (Environmental vs. Nonenvironmental Message) Effect on Conceptual Fluency (Experiment 2)

Experiment 3

The main purpose of experiment 3 was to test whether the enhanced conceptual fluency from experiment 2 resulting from the conceptual fit between color and the target message will lead to more positive responses to the target message. Consistent with the conceptual fluency account and the results from experiment 2, I expected participants to exhibit more positive responses to the environmental message presented with the color green (vs. red), while their responses to the nonenvironmental message would be similar across the two color conditions. If conceptual fluency drives the positive impact of green, then the positive influence of the color green should be observed only when the target information is closely related to the color green conceptually. However, if the positive effect of green is driven by other factors, such as color preference, the effect of color on

mood and perceptual fluency, or other unknown factors, using green should lead to more positive responses to the target information, regardless of the contents of the target information. In short, I expected that the positive influence of the color green is limited to the responses to target information that is conceptually related to the color green. Therefore, the hypothesis was that:

H3: The color green (vs. red) will have a more positive influence on responses to the message that has a close conceptual relation with the color green (i.e., environmental message) than a message that does not have a close relation with the color green (i.e., nonenvironmental message).

Procedure

I used a similar design and procedure to those used in experiment 2. The major difference was that after reading the target information, participants reported their behavioral intentions to initiate the environmentally friendly behavior promoted by the target message, instead of completing the conceptual fluency scale used in experiment 2. One hundred and seven students were recruited on a university campus. After reading the target message, participants reported how willing they were to follow the energy saving tips on a seven-point scale anchored at 1 = not willing at all and 7 = very willing.

Results

Four participants who either identified themselves to be color-blind or did not answer this question were removed from the data analyses. The data were analyzed on the basis of a 2 (green vs. red) X 2 (environmental vs. nonenvironmental message)

between-subjects ANOVA. The two-way interaction was significant ($p < .001$). Decomposition of the interaction revealed that when the target message was closely related to the color green (i.e., environmental message), participants' willingness to follow the energy saving tips was higher in the green (vs. red) condition ($M_{Green} = 5.65$ vs. $M_{Red} = 4.73$, $p = .05$, $F(1, 51) = 3.99$). However, this effect reversed when the target message was not closely related to the color green (i.e., nonenvironmental message) ($M_{Green} = 5.00$ vs. $M_{Red} = 5.71$, $p < .06$, $F(1, 50) = 3.86$). These results support H3 that the responses to the environmental message will be more positive when the message is presented with green (vs. red), but the responses to the nonenvironmental message will not differ between the two color conditions. Figure 6 graphs these results.

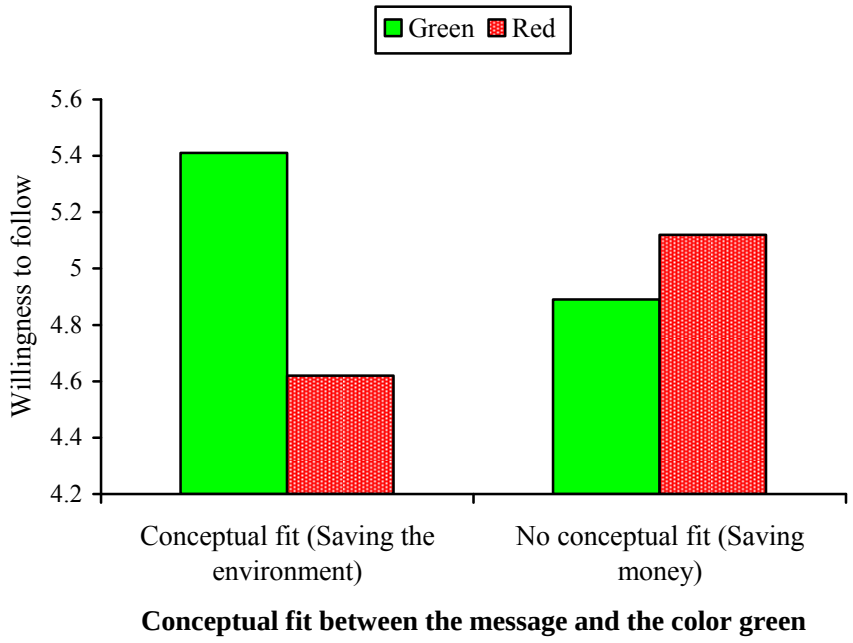


Figure 6: 2 (Green vs. Red) X 2 (Environmental vs. Nonenvironmental Message) Effect on Willingness to Follow Energy Saving Tips (Experiment 3)

Discussion

The results from experiment 3 add to the previous studies in two ways. First, the results provide additional evidence that the color green can enhance the persuasiveness of environmental messages. The positive impact of green was reflected in the higher behavioral intentions in the green condition. Second, the results support the conceptual fluency account, but not other alternate accounts. Consistent with H3, the positive effect of green was observed only when there was a strong conceptual fit between the target information and the color green. The competing accounts, such as perceptual fluency, mood, or color preference, cannot explain this significant two-way interaction, because if the effect had been driven by any of these factors, then the color green would have had a positive effect on responses to both the environmental and nonenvironmental message. The two-way interaction can be best explained by the conceptual fit between the target message and the color green, thus supporting the conceptual fluency account. In addition, the patterns from experiment 3 closely match the results from experiment 2 which shows that the color green has a positive impact on conceptual fluency when the message has good conceptual fit with the color green. Combining the results from experiments 2 and 3, it can be argued that the conceptual fit between an environmental message and the color green leads to more fluent processing of the message, which in turn results in more positive responses to the target message.

In Chapter 4, I demonstrated that the use of green as a background or frame can lead to more positive evaluations of pro-environmental activities. In Chapter 5, I examine whether the use of green will influence consumer perceptions of a product's environmental impact. In addition, I test alternate explanations of the color effect.

CHAPTER 5

THE INFLUENCE OF COLOR ON RESPONSES TO ENVIRONMENTAL CLAIMS AND TEST OF ALTERNATE ACCOUNTS

In the previous chapter, I focused on demonstrating the positive impact of the color green on consumer responses to pro-environmental messages. In this chapter, I examine the role of color in perceptions of environmental impact of a product. At the same time, I test alternate accounts of the color effect that are based on perceptual fluency, mood, color preference, and regulatory focus.

Experiment 4

In experiments 1-3, I showed that the use of green color can generate a more persuasive pro-environmental message. In experiment 4, I examined whether this effect will be extended to consumers' responses to products with an environmental claim. Specifically, I tested whether a product with an environmental claim in a green (vs. red) package is considered environmentally superior. I expected that consumers would evaluate a product with an environmental claim as environmentally superior when its package is in green rather than in red. Again, following the conceptual fluency account, this is because there is a better conceptual fit between the environmental claim and the green (vs. red) package, and this fit, in turn, will facilitate processing of the

environmental claim. This fluency experience will make the environmental claim more appealing and the manufacturer look more environmentally friendly. Thus, the hypothesis was:

H4: A product with an environmental claim will be considered environmentally superior when its package is in green (vs. red).

Another goal of this experiment was to test alternative explanations of the color effect. The results from experiment 2 and 3 support the conceptual fluency account, rather than the alternative accounts of perceptual fluency and mood. In experiment 4, I further rule out these alternate accounts by measuring the influence of different colors on perceptual fluency and mood. If the positive impact of green were driven by perceptual fluency or mood, there should be differences between the green and red conditions in terms of participants' ratings of these factors. However, the proposed account (conceptual fluency) would predict no differences in perceptual fluency or mood.

In sum, the first goal of experiment 4 was to demonstrate the influence of package color on consumer perceptions of environmental impact of the product. The second goal was to rule out the possibility that the positive influence of green is driven by perceptual fluency or mood, rather than conceptual fluency.

Procedure

Thirty-five students from a large U.S. university participated in this study for partial course credit. Participants were instructed that they would evaluate a new product that was to be introduced in the market. They were told that the researchers were interested in how consumers would perceive each part of the product's package and they

would see part of the package. The part of the package shown to participants included a short description of the product (granola bar) and an environmental claim that the manufacturer supports the Nature Conservancy, a leading conservation organization working around the world. This type of environmental claim with a company image orientation is commonly used by marketers (Carlson et al. 1996). To increase external validity, I adapted this specific claim from a food product available in the marketplace. The product package shown to participants was either green or red on which the product information and environmental claim were presented (Figure 7). After reading the product package information, participants rated the product in terms of its environmental impact with two items. With the first item participants evaluated the extent to which the product has negative or positive environmental impact on a seven-point scale anchored at 1 with "very negative impact" and 7 with "very positive impact." The second item measured participants' perceptions of how environmentally friendly the product was on a seven-point rating scale anchored at 1 with "very unfriendly" and 7 with "very friendly." Participants then completed a perceptual fluency scale that was developed for this study. Specifically, they reported how easy it was for them to process the product information perceptually (i.e., ease of reading) with three items on seven point scales ($\alpha = .73$): how easy it was to read the product package (anchored at 1 = difficult and 7 = easy), how readable the product package was (anchored at 1 = not readable and 7 = readable), and how visible the product package was (anchored at 1 = not visible and 7 = visible). Then, respondents reported their current mood with three items (bad vs. good, unhappy vs. happy, and annoyed vs. pleased) on seven point scales ($\alpha = .90$). Finally, participants answered demographic questions and indicated whether they were color-blind or not.

a. Green Product Package

b. Red Product Package

Figure 7: Product Packages (Experiment 4)

They also were asked to report if they guessed the purpose of the study or the researchers' hypotheses.

Results

One participant reported being color-blind and was removed from the data. No participants guessed the study purpose or hypotheses correctly, but one participant mentioned the potential relationship between background color and viewers' attention. This participant was removed from the analyses, but including this participant in the analyses led to almost identical results. The two items that measured participants' perceptions of the product's environmental impact were averaged to form a single index as they were closely related ($r = .80$, $p < .001$).

As expected, the perceptions of environmental impact of the product were more positive in the green (vs. red) background condition ($M_{Green} = 4.66$ vs. $M_{Red} = 3.85$, $p < .05$, $F(1, 32) = 4.96$). There were no significant differences in perceptual fluency ($p > .50$) or mood ($p > .40$), ruling out these variables as alternate explanations of the positive influence of green color on perceptions of the product's environmental impact.

Discussion

In summary, experiment 4 demonstrated that a green product package in combination with an environmental claim can enhance consumer perceptions of the product's environmental impact. The results also suggest that neither mood nor perceptual fluency can explain the influence of color on the perceptions of the product's

environmental impact. These results support H2 and are consistent with the conceptualization based on conceptual fluency theory.

Experiment 5

I had three main purposes with experiment 5. The first goal was to examine whether the results from experiment 4 were driven by the color green alone or the combination of the environmental claim and the color green. Since the target stimulus in the green condition in experiment 4 included both the color green and an environmental claim, it is not clear which was driving this effect. One possibility is that a green package without an environmental claim can generate the perception that the product is environmentally friendly. This kind of reaction to the product with a green package can come from learned associations. In the US and many other countries, the color green is often associated with nature. Therefore, it is possible that consumers automatically perceive products with a green package as more environmentally friendly than products with different package colors. Another possibility supported by the conceptual fluency explanation is that a green package alone may not be enough to create the perception that the product is environmentally friendly. In other words, the color green may have a positive impact on perceptions of the product's environmental impact only when it is used in conjunction with an environmental claim. If green alone is enough to result in more positive perceptions of the product's environmental impact, then the positive impact of green should be observed even without the presence of an environmental claim on a product package. On the contrary, if the positive impact of green is driven by the combination of green and an environmental claim, then more positive perceptions of the

product's environmental impact should be observed only when an environmental claim is presented with a green package.

The second goal was to examine the possibility that the positive impacts of green in the previous studies were driven by color preferences. The results from experiment 4 ruled out alternate accounts of this effect that are based on perceptual fluency or mood. Yet, it is still possible that the effect was driven by color preference. That is, if people prefer green to red, that color preference may translate into more positive responses to the target information or object presented with the color green. I test this color preference account in a pretest.

The last goal of this experiment was to examine whether the influence of package color on consumer perceptions of the product's environmental impact would vary by consumers' concern about environmental protection. One might expect that consumers highly concerned about environmental protection would be more knowledgeable about products' environmental impact and thus this would be less likely to be influenced by package color. Indeed, Shrum, McCarty, and Lowrey (1995) showed that environmentally concerned consumers have a high awareness of marketers' environmental claims and firms' environmental actions, and thus they show little trust in green advertising claims. Consistent with this finding, Newell, Goldsmith, and Banzhaf (1998) hypothesized that consumers with higher levels of environmental concern would be better able to detect misleading or deceptive environmental claims than consumers with lower levels of environmental concern. Unexpectedly, however, they found that a consumer's level of environmental concern had no effect on their ability to detect misleading or deceptive claims. Accordingly, these authors concluded that mere concern

for the environment does not enable consumers to detect misleading or deceptive ad claims. This finding suggests that in the present study, concern about environmental protection may not moderate the effect of package color on perceptions of a product's environmental impact.

On the other hand, some research has shown that association-based errors can be increased by higher incentives and the degree of elaboration (Arkes 1991). For example, Johar (1995) found that highly involved consumers are more likely to be deceived by implied advertising claims, because involvement increases the likelihood of making invalid inferences from incomplete-comparison claims. Following this stream of research, I hypothesize that participants who are more conscious about environmental protection are more likely to be misled by package color in judging the environmental influence of the product.

Pretest

Before the main study, I pretested the product package to ensure that there were no differences in color preference, perceptual fluency, and mood between the different color conditions, thus these factors cannot explain the influence of color on perceptions of the product's environmental impact. The product package designs were similar to those used in experiment 4 with two exceptions. First, color was varied by presenting the target information within a rectangular frame that was either green or red, rather than varying the background color as in experiment 4. This was to minimize the possibility that the color manipulation influences perceptual fluency. Like background colors, color frames are frequently used in consumer product packages. Unlike experiment 4, all the

information was presented on the same background color, thus there should be no difference between the two color conditions in terms of perceptual fluency. Second, I used a different product and environmental claim to generalize the results from experiment 4.

Procedure

Seventy-seven students from a large U.S. university participated in this study for extra course credit. As in experiment 4, participants were instructed that they would see part of a new product package and evaluate the product. The product package contained a short description of an energy drink. Energy drink was chosen since it is a popular product among university students (Shiv, Carmon, and Ariely 2005). The product description was presented on a white background surrounded by either a green or red rectangular frame (Figure 8). Participants then completed the perceptual fluency scale used in experiment 4 and a color preference scale. To report a color preference, participants answered "how much do you like the color of this package?" (1 = don't like at all and 7 = like very much) and "how attractive is the color of this package?" (1 = not attractive at all and 7 = very attractive). These two items were averaged to form a single color preference index ($r = .71$, $p < .01$). Finally, participants were asked to indicate their current mood using an adapted form of the Peterson and Sauber (1983) Mood Short Scale. This scale consisted of four bipolar measures rated on seven-point scales (sad/happy, bad mood/good mood, irritable/pleased, and depressed/cheerful). After the reliability of this scale was verified ($\alpha = .80$), the items were averaged.

Results

The data were analyzed with simple ANOVAs. The results revealed no significant differences between the green and red package condition in terms of color preferences (M_{Green} = 4.35 vs. M_{Red} = 4.01, $p > .30$), perceptual fluency (M_{Green} = 4.96 vs. M_{Red} = 5.01, $p > .80$), and mood (M_{Green} = 3.92 vs. M_{Red} = 3.61, $p > .25$). These results suggest that the color manipulation did not result in any significant differences in these factors and ensure that these factors cannot explain the influence of package color on perceptions of the product's environmental impact.

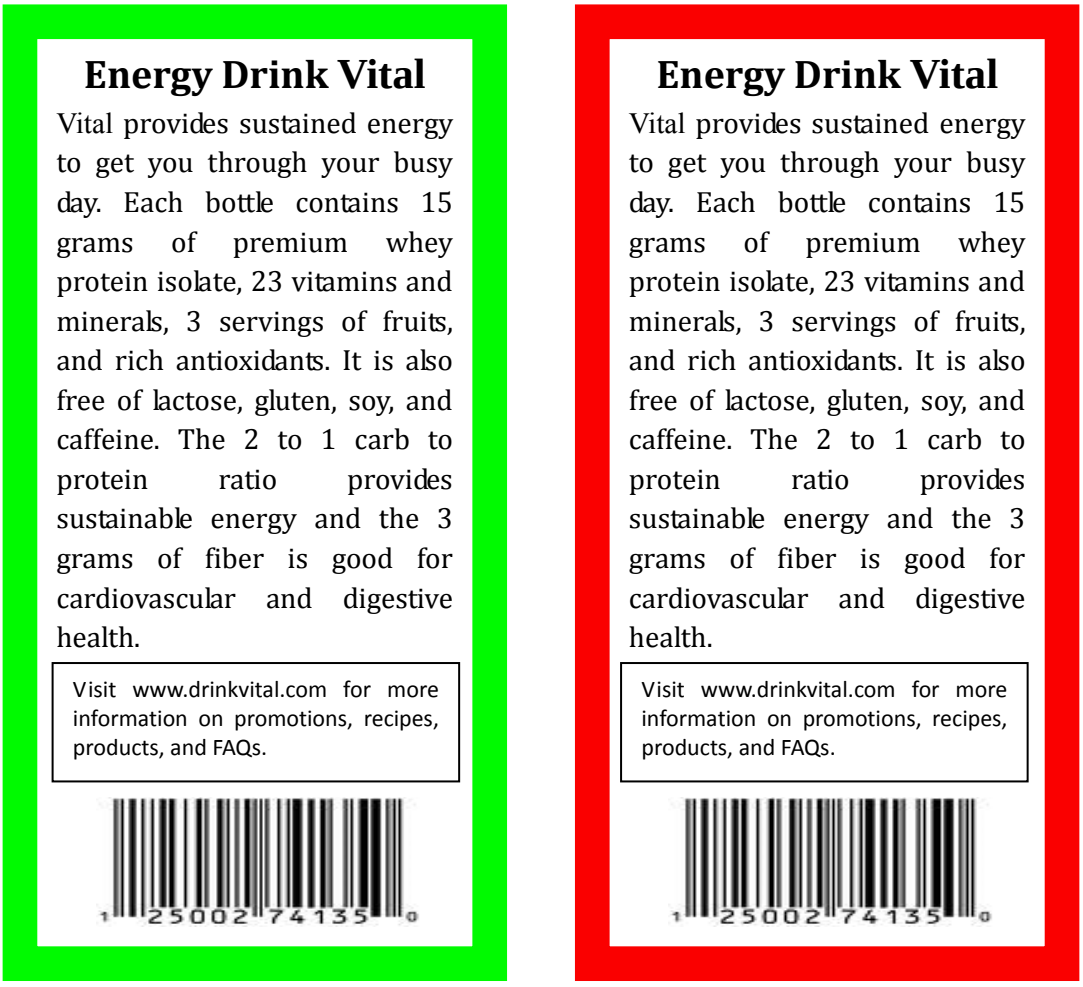


Figure 8: Product Packages with No Environmental Claim (Experiment 5 - Pretest)

Main Study

Procedure

One hundred and sixty-two students participated in the main study for partial course credit. A 2 (environmental claim vs. no environmental claim) X 2 (green vs. red package) between-subjects design was used, and participants were randomly assigned to one of the four conditions. In the no environmental claim condition, I used the same product package designs as the ones used in the pretest. In the environmental claim condition, I added an environmental claim to the product package, which stated that the manufacturer supports the Sierra Club's efforts to preserve and protect the earth. In all the conditions, the product information and environmental claim were presented on a white background surrounded by either a green or red rectangular frame. Participants then rated the product in terms of its environmental impact, using the scale that was used in experiment 4.

Next, supposedly in a different study, participants indicated their concern about environmental protection. A four-item index was developed with items measured on a 7-point scale: "How conscious are you about protecting the environment?" (1 = not conscious at all and 7 = very conscious) "How important is it for you to protect the environment?" (1 = not important at all and 7 = very important) "How often do you recycle papers?" (1 = never, 4 = sometimes, and 7 = regularly) and "How often do you recycle plastic?" (1 = never, 4 = sometimes, and 7 = regularly).

Results

Only those who reported they were not color-blind were included in the analyses; seven participants were excluded (n = 155). The data were analyzed with a 2 (environmental claim vs. no environmental claim) X 2 (green vs. red package) between-subjects ANOVA. The results showed that there was a significant two-way interaction ($p < .05$, $F(1, 154) = 4.07$). Participants' perceptions of the product's environmental impact were more positive in the environmental claim condition ($M = 4.94$) than in the no environmental claim condition ($M = 4.15$, $p < .001$, $F(1, 154) = 19.05$). There was no main effect of package color ($M_{Green} = 4.64$ vs. $M_{Red} = 4.47$, $p > .35$). Then, I decomposed this interaction by conducting simple ANOVAs across the environmental and the no environmental claim condition. In the environmental claim condition participants' perceptions of environmental impact of the product were more positive in the green (vs. red) package condition ($M_{Green} = 5.21$ vs. $M_{Red} = 4.68$, $p < .05$, $F(1, 80) = 4.70$). In the no environmental claim condition, however, there was no significant difference in the perceptions of the product's environmental impact between the green and red package condition ($M_{Green} = 4.05$ vs. $M_{Red} = 4.25$, $p > .45$, $F(1, 74) < 1.0$). Figure 9 graphs these results.

Additional analyses were conducted to examine whether perceptions of the product's environmental impact would vary by participants' environmental consciousness. To identify the factor structure of the environmental consciousness scale, exploratory factor analysis with principal component analysis and varimax rotation was conducted. The KMO measure of sampling adequacy was .63 and Bartlett's test of sphericity was significant (χ^2 (df 6) = 303.95, $p < .001$). These measures indicate that factor analysis is

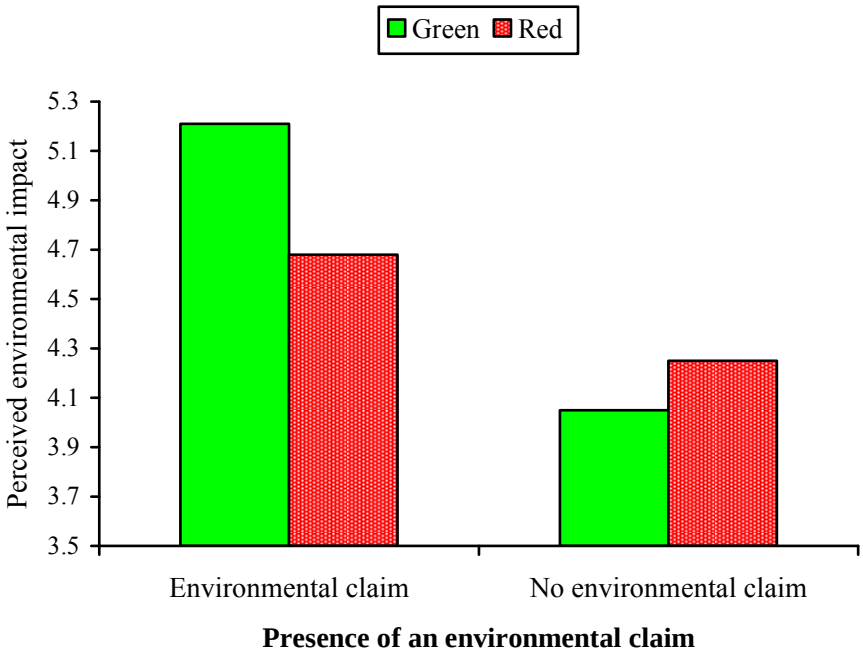


Figure 9: 2 (Green vs. Red) X 2 (Environmental Claim vs. No Environmental Claim) Effect on Perceptions of Product's Environmental Impact (Experiment 5)

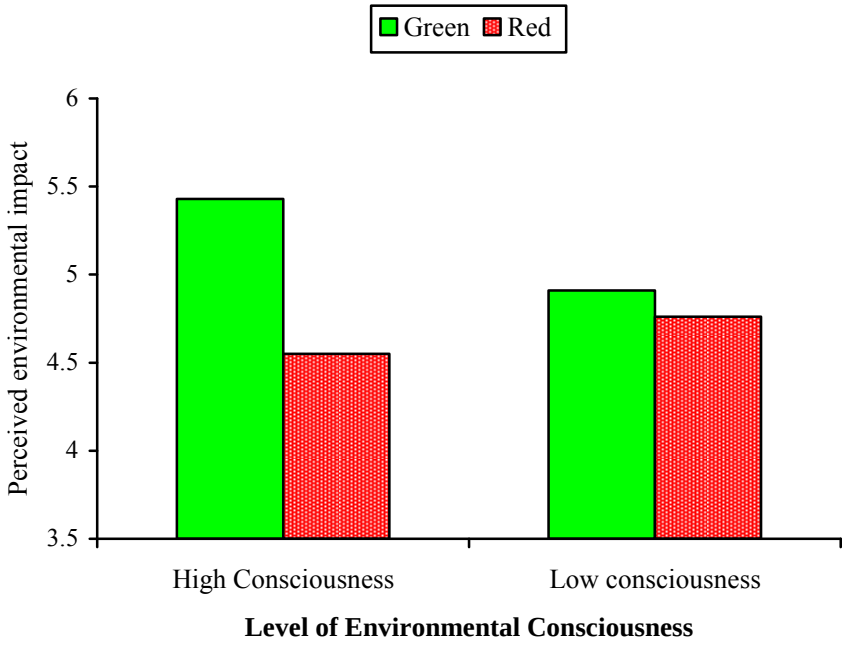
acceptable. The analysis resulted in only one factor, which accounted for 69.1% of the total variance in the data. Accordingly, the four items were averaged to form a single index of environmental consciousness. Subsequently, participants were categorized into a low or high environment conscious groups via a median split (median = 4.75). This procedure resulted in a 2 (environmental claim vs. no environmental claim) X 2 (green vs. red) X 2 (high vs. low environmental conscious) between-subjects design. I first analyzed the data from participants who saw the product package with the environmental claim (n = 77). I conducted simple ANOVAs across the high and low environment conscious group with color as the independent variable. The influence of color on the perception of environmental impact was significant in the high conscious group, indicating that participants highly conscious about the environment reported more positive

environmental impact of the product when the product package was green (M_{Green} = 5.43 vs. M_{Red} = 4.50, $p < .05$, F = 6.69). On the other hand, participants who were less conscious about the environment were not influenced by the package color when judging the environmental impact of the product, indicating that their perceptions of the environmental impact of the product were similar across different package color conditions (M_{Green} = 4.91 vs. M_{Red} = 4.83, $p > .80$). There were no other main or interaction effects. Next, using the same procedure, I analyzed the data collected from the participants who received the product package with no environmental claim (n = 69). The results showed that the package color did not affect perceptions of the product's environmental impact regardless of the participants' environmental consciousness level (*p*s > .10). These results are displayed in Figure 10.

Discussion

To summarize, the results from the pretest revealed no significant differences between the green and red package with regard to color preferences, perceptual fluency, and mood. Therefore, these variables can be ruled out as explanations for the positive influence of green color on perceptions of the product's environmental impact. In the main study, I estimated the joint influence of color and an environmental claim on perceptions of the environmental impact of the product. When the product package did not contain an environmental claim, the color green did not result in different perceptions of the product's environmental impact than did the color red. Only when an environmental claim was added to the product package, was there a significant difference in the perceptions of environmental impact of the product between the green and red

a. Environmental Claim Condition



b. No Environmental Claim Condition

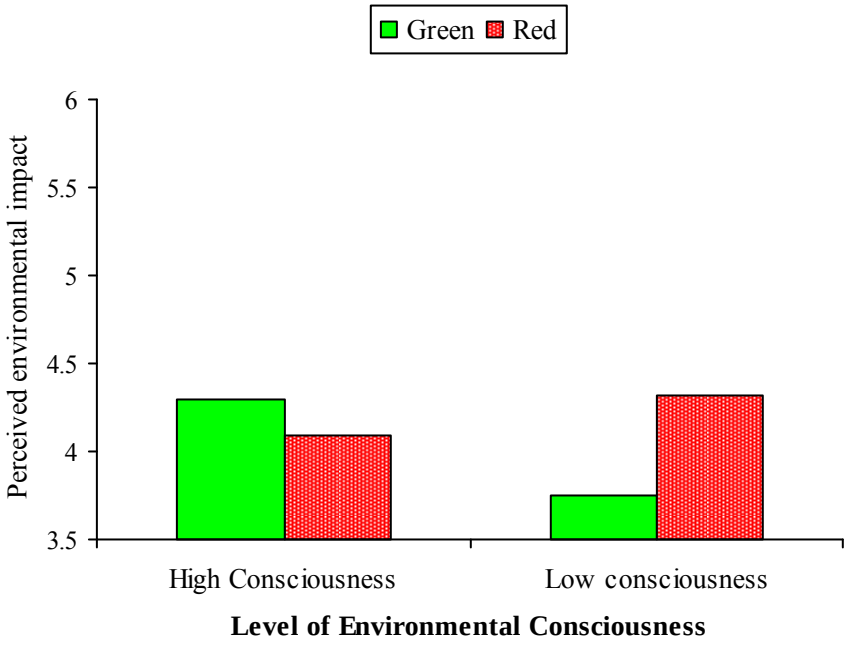


Figure 10: 2 (Green vs. Red) X 2 (Environmental vs. No Environmental Claim) X 2 (High vs. Low Consciousness) Effect on Perceptions of Product's Environmental Impact

package conditions.

These results lead to two major points. First, a green colored package alone does not enhance consumer perceptions of a product's environmental impact. A package of green color has a positive impact on perceptions of the product's environmental impact only in combination with an environmental claim. Second, these results support the conceptual fluency account of the effect, but argue against the alternate accounts. The conceptual fluency account suggests that what makes a product look more environmentally friendly is the conceptual fit between an environmental claim and green package color, rather than the package color alone. In contrast, the mood, perceptual fluency, and color preference accounts completely depend on the impact of green color alone, and having an environmental claim is not a necessary condition for green to have a positive impact. The results from experiment 3 show that the color green alone did not lead to more positive perceptions of the product's environmental impact. The green package had a positive influence on perceptions of the product's environmental impact only in conjunction with an environmental claim. Thus, these results provide additional evidence that the positive impact of green is likely driven by conceptual fluency, rather than mood, perceptual fluency, or color preference.

In addition, I examined whether the influence of package color on perceptions of products' environmental impacts varied by individuals' environmental consciousness. The results indicate that the impact of package color on perceptions of a product's environmental impact is stronger among participants who are highly conscious about environmental protection. This suggests that those who are more interested and involved in environmental protection might be more vulnerable to the potentially misleading

influence of a green package on the perceived environmental impact of the product. On the other hand, the results also suggest that when there is no environmental claim on a product package, the environmental consciousness level does not play a role in consumers' perceptions of a product's environmental impact.

Experiment 6

As reviewed in Chapter 3, recent research (e.g., Mehta and Zhu 2009) explores the relationship between color and regulatory focus and shows that short-wavelength colors (e.g., blue) induce a promotion-focus while long-wavelength colors (e.g., red) induce a prevention-focus. This finding suggests the possibility that the results from earlier studies might have been driven by regulatory focus. One may argue that in the earlier studies green activated a promotion focus and red induced a prevention focus. Further, regulatory fit theory suggests that people will experience a subjective feeling of "rightness" when they process promotion-focused information on a green or blue background and prevention-focused information on a red or yellow background. Therefore, regulatory fit theory predicts that responses to promotion-focused information will be more favorable on a green background while reactions to prevention-focused information will be more positive on a red background. If motivation of environmental protection is typically driven by a promotion (vs. prevention) focus, or if pro-environmental information usually maps onto a promotion (vs. prevention) focus, there should be regulatory fit between a pro-environmental message and the color green. If this is the case, the more positive responses to the pro-environmental messages and environmental claims in the green condition could have been due to this regulatory fit,

rather than a conceptual association between the color green and message contents. However, pro-environmental messages or pro-environmental motivation can be promotion- or prevention-focused, depending on the reason for environmental protection (e.g., to enhance human welfare vs. to protect the earth), the nature of the outcome (e.g., positive vs. negative outcome), or other characteristics of the context. In other words, it is not clear whether better regulatory fit exists between pro-environmental messages and green (vs. red or yellow). Testing the regulatory fit account was the major purpose of experiment 6.

Another important goal of experiment 6 was to test the influence of the color green on individuals' attitudes toward the natural environment. In the earlier studies, I examined how participants respond to pro-environmental messages or environmental claims that are presented with different colors. In experiment 6, I examine whether the positive impact of green will extend to overall attitudes toward nature.

To this aim, I used the revised New Environmental Paradigm (NEP) Scale (Dunlap et al. 2000: refer to Appendix A for the scale items). This scale measures attitudes toward the environment and consists of two dimensions: positively framed items and negatively framed items. Although the authors did not relate these two dimensions to regulatory focus, I found the two dimensions map onto the two regulatory systems very well: promotion and prevention focus. Specifically, eight items of this scale describe positively framed promotion-focused outcomes, such as "Humans have the right to modify the natural environment to suit their needs" and "Humans will eventually learn enough about how nature works to be able to control it." Disagreement with these statements indicates a pro-ecological view. For the purpose of the current work, I call

these items promotion-focused items. The other seven items pertain to negatively framed prevention-focused concerns so that agreement indicates a pro-ecological worldview. These items include, for example, "When humans interfere with nature, it often produces disastrous consequences" and "The balance of nature is very delicate and easily upset." I label these items as prevention-focused items. Respondents indicated their agreement with each of these items on a seven-point scale anchored at 1 = strongly disagree and 7 = strongly agree.

Pretest

To test whether the two dimensions of the NEP scale map onto two different regulatory states, I conducted a pretest, adopting the measure of regulatory focus developed by Pennington and Roese (2003). As a measure of regulatory focus, participants (n = 46) were presented with each item of the scale and rated the extent to which the statements focused on "achieving something humans want" (anchored by 9) which represents a promotion-focus or "preventing something humans don't want" (anchored by 1) which represents a prevention-focus. Supporting my assumption, the results showed that positively framed items mapped onto a promotion-focus (M = 6.30) while the negatively framed items mapped onto a prevention-focus (M = 3.22; F (45) = 122.80, $p < .01$). These two scores differed significantly from the middle value 5.0 ($ps < .001$).

Main Study

In the main study, participants completed all the items from both the dimensions on either a green or orange sheet, resulting in a 2 (green vs. orange: between-subjects) X 2 (prevention- and promotion-focused items: within-subject) mixed design. I selected orange, instead of red, because orange is a less extreme background than is red, but still a long-wavelength color like red. In addition, orange is often the color for warnings to indicate caution. The Homeland Security Advisory System uses a color-coded threat level system, and orange is used to indicate an elevated or high national threat level. Another reason I chose orange was to rule out the possibility that the results from the earlier experiments were only specific to the green vs. red contrast.

If regulatory fit drives participants' responses, scores from the promotion-focused items will be higher in the green condition, because green will induce a promotion focus and there should be better regulatory fit between the promotion-focused items and the color green. For the prevention-focused items, following the same logic, scores will be higher in the orange condition, because the color orange will activate a prevention-focus, and there should be better regulatory fit between prevention-focused items and the color orange. However, according to the conceptual fluency account, scores from both the promotion- and prevention-focused items will be higher in the green (vs. orange) condition. This is because the natural environment should be more easily associated with the color green than orange, and this conceptual association will lead to more fluent processing of the statements. As a result, participants will display more favorable responses to the statements in the green (vs. orange) background condition. In short, the regulatory fit account predicts a two-way (color X regulatory focus) interaction

effect, while the conceptual fluency account predicts a more positive influence of green (vs. orange) on responses regardless of whether the items are promotion-focused or prevention-focused.

Procedure

Seventy-two undergraduate students participated in this study for extra credit. First, participants were randomly assigned to either a green or orange background condition. They completed both promotion-focused and prevention-focused items. Approximately half of the participants received the scale on a green sheet, and the rest of them on an orange sheet. Ratings of the promotion-focused items were reverse-coded, so higher scores from all the items suggested more pro-ecological attitudes. After verifying the reliability of the promotion-focused items ($\alpha = .71$) and the prevention-focused items ($\alpha = .83$), participants' responses to the items in each dimension were averaged.

Results

The data were analyzed on the basis of 2 (green vs. orange background: between-subjects) X 2 (promotion- and prevention-focused items: within-subject) mixed ANOVA. The results showed that the two-way interaction of background color and regulatory focus was not significant ($p > .50$). Participants' average score from the promotion-focused items was higher in the green (vs. orange) condition ($M_{Green} = 3.09$ vs. $M_{Orange} = 2.60$, $p < .05$). Likewise, the average score from the prevention-focused items was higher in the green (vs. orange) condition ($M_{Green} = 4.83$ vs. $M_{Orange} = 4.19$, $p < .05$). In sum,

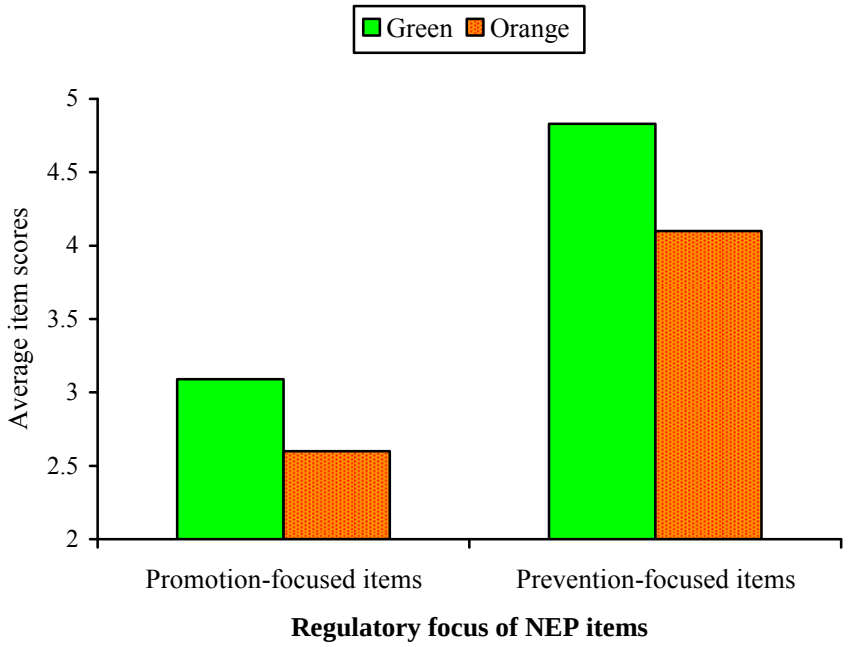


Figure 11: 2 (Green vs. Orange) X 2 (Promotion- vs. Prevention-focused Items) Effect on Attitudes toward the Environment (Experiment 6)

these results indicate that participants exhibited more positive attitudes toward nature when the NEP scale items were presented on the green, rather than orange, background, regardless of the items' regulatory focus. Figure 11 graphs these results.

Discussion

In the pretest, it was shown that the two dimensions of the scale map onto two different regulatory states. The regulatory fit account predicts that scores from the promotion-focused items will be higher on the green sheet, while the scores from the prevention-focused items will be higher on the orange sheet. However, the results contradicted this prediction. The color green had a positive impact on the responses even when the statements mapped onto a prevention-focus. The absence of a two-way

interaction effect rules out the regulatory fit account; the regulatory fit account cannot explain the positive influence of the color green across the two regulatory focus conditions.

Another key finding from this experiment is that the positive impact of green is not limited to consumers' responses to pro-environmental messages or claims. The influence of green was so strong that it even influenced personal attitudes toward the natural environment. The result that people showed more favorable attitudes toward the natural environment when the scale was presented on a green, rather than an orange, background illustrates the power of green and provides additional evidence of the conceptual fluency account.

CHAPTER 6

DISCUSSION, IMPLICATIONS, AND FUTURE RESEARCH

General Discussion

With the growth of public concern about the environment and mounting competition among firms pursuing green marketing strategies, it is increasingly important for marketers to design more persuasive environmental messages and claims. At the same time, due to the widespread occurrence of green washing and confusion among consumers regarding environmental claims, it is critical to understand factors in environmental claims that can mislead consumers. Such understanding can help marketers avoid practices that may mislead consumers and consumers avoid falling into a trap of green washing. The current work provides useful insights into these issues by exploring the role of color in consumer processing of pro-environmental information and claims.

In this dissertation, I proposed that messages promoting pro-environmental behaviors or products have more positive impacts on consumers' responses when they are presented with green than with other colors. Drawing upon recent research on processing fluency, I further proposed that this effect is likely driven by the conceptual fit between the target information and color, which in turn facilitates the processing of the target information. Across several experiments, I provided converging evidence that supports

this proposition. I also provided consistent evidence that rules out alternative explanations that are based on perceptual fluency, mood, color preference, or regulatory focus.

In experiment 1, participants were more willing to use a reusable shopping bag when the target message was presented with green (vs. red). In experiments 2 and 3, I focused on providing evidence that this effect is likely driven by the conceptual fit between the target information and color. In experiment 2, participants reported to have experienced higher conceptual fluency when the target information was conceptually related to the color green than when the target information was not closely related conceptually to the target information. Mirroring these results and supporting the conceptual fluency account, the results from experiment 3 showed that presenting energy saving tips with green increased willingness to follow the tips when there was a good conceptual fit between the target information and the color than when there was not.

Extending the implications of these findings to public policy, I investigated the influence of a green package on consumer perceptions of a product's environmental impact. In experiment 4 and 5, I showed that consumers perceive products with an environmental claim as environmentally superior when their packages are in green rather than in red. This effect was observed only when the green package was combined with the environmental claim; the green package alone did not result in this effect. Notably, the results also showed that consumers who are more concerned about environmental protection are more vulnerable to the influence of package color on judgments of environmental impact. In experiment 6, I ruled out an explanation of these findings by

regulatory fit. I also showed that the conceptual fit between the target information and color can activate environmentally friendly attitudes.

Taken together, these findings indicate that consumers base their evaluations of pro-environmental messages and environmental claims not only on the information they receive, but also on how easy it is to process the information as a function of color used in the information presentation. The findings are consistent with the conceptualization based on processing fluency theory and demonstrate that color is more than a physical feature of communications that can enhance perceptual fluency; it also helps consumers grasp the meaning of messages when there is a conceptual fit between the color and the message.

As noted in Chapter 3, incongruency theory predicts that an environmental message presented with color slightly incongruent with the message may result in more positive evaluations of the message. This prediction was not supported in the current studies. The congruency, rather than incongruency, between the target message and color seems to have a stronger appeal to consumers at least in the context of pro-environmental information and environmental claims. Indeed, previous research suggests that consumers are attracted by innovative visuals in products and packaging but will respond more positively only if their meanings are consistent with the product category (Garber and Hyatt 2003). Following these results, it may be that the use of the color red or orange with the environmental messages was so incongruent with the environmental messages that it did not influence consumers.

Marketing Implications

This work has clear implications for social marketers in the area of environmental protection by providing empirical evidence that the color green can add to the persuasiveness of pro-environmental messages. The power of green could be harnessed by social marketers to enhance consumers' responses to pro-environmental activities. Although green is frequently used in environmental messages, social marketers may not fully appreciate the power of the color green. Green can be used to promote pro-environmental behaviors in a number of ways. For example, a number of local governments are trying to persuade citizens to use public transportation, instead of driving their own cars. One of the points commonly made by local governments to persuade citizens to use public transportation is that it can save energy and the environment. An opportunity may be missed by not using the color green on buses or metro trains to reinforce messages about environmental protection.

This work also has important implications for marketers of sustainable products. The findings show that using green in combination with an environmental claim can enhance perceptions of the product's environmental impact. This means that marketers of green products should consider making use of the power of green when they promote environmental benefits of products. For example, a number of reusable shopping bags with various colors are available today. However, an opportunity for consumers to purchase or use a reusable bag may be forgone when the bags are in colors other than green since reusable bags with other colors may not reinforce with consumers that its use can save the environment.

The findings also provide useful insights for creating a green corporate image. Both BP (British Petroleum) and Exxon have made major investments in campaigns that promote a green corporate image. My findings suggest that BP might be in a better position than Exxon to present the corporation as environmentally friendly, because its logo has green while Exxon has only red. Although it may not be realistic to redesign company logos with green, firms such as Exxon should consider more visual use of the color green in mass media when they promote a green corporate image.

Not every product or company should use green color to promote features that are environmentally superior or an environmentally friendly corporate image. Some products or brands have unique associations with certain colors, and it is not easy to use green instead of the unique color that has been used for a long time. For example, Eastman Kodak has used its trade dress of yellow and black for decades, and using green, instead of these colors, to promote environmentally friendly product features or corporate image may create more problems than benefits. In such a case, marketers can use green color in specific and limited parts of the product package where an environmental claim is located. As demonstrated in the current studies, using a frame or background color as part of information presentation is one way to do this.

This work also provides important caveats to marketers of green products and social marketers. First, the findings suggest that green color alone (e.g., a green product package) is not enough to generate the perception that a product is environmentally friendly. A green package has a positive impact on consumer perceptions only in combination with an environmental claim. In order to maximize the impact of green, therefore, marketers of green products should combine the color green with an

environmental claim. Second, the findings suggest that using green in a message promoting pro-environmental activities, such as saving electricity, may not enhance persuasiveness unless the message is explicitly associated with environmental protection. These results provide useful guidance in designing pro-environmental messages. Prior research suggests that the meaning of color is highly situational and depends on the context in which the color is presented (e.g., Bruce and Green 1990). Accordingly, the effect of color should be highly interactive with other features of information, all of which are integrated before the meaning of the information to the viewer is established. The results from the current studies are consistent with these findings. Using green to promote a pro-environmental behavior may backfire unless the behavior is effectively related to saving the environment. This finding is somewhat surprising, considering that energy saving is widely perceived as a pro-environmental behavior. Therefore, social marketers in the area of environmental protection should pay careful attention to the fit between messages promoting pro-environmental behavior and the color used for the message. To maximize the impact of green in pro-environmental information, it is important for viewers to perceive that the target behavior promoted indeed contributes to saving the environment. For example, in the Energy Savers Booklet recently published by the U.S. Department of Energy, saving energy and saving money are promoted in the same space with a green background. My findings suggest that the persuasiveness of these messages can be improved by presenting the energy saving message with green and the money saving message with another color (e.g., red).

Implications for Public Policy and Consumer Protection

This work has significant implications for the regulation of environmental claims and consumer protection. The use of the color green (in combination with an environmental claim) can mislead consumers by enhancing their perceptions of products that make environmental claims but are not actually environmentally superior. Note that the environmental claims used in the current studies did not clearly articulate substantive environmental benefits of the product; rather, they included only a statement about the company supporting an environmental organization. Nevertheless, the participants' perceptions of the products' environmental impact were more positive when the product package was in green (vs. red). This result indicates that consumers may mistakenly conclude that products with an environmental claim on a green package are environmentally superior to other products when they are not truly environmentally superior.

There has been a remarkable increase in the number and types of environmental claims on packaging. At the same time, the practice of "green washing" has received a lot of attention lately. The current work suggests that apart from the information contained in an environmental claim, the use of green on product packages has the potential to enhance consumers' perceptions of the environmental impacts of a product. This can be a problem if green color is used in combination with products that are not truly environmentally superior, because it can potentially mislead consumers. The current FTC Green Guides do not regulate the package color of consumer products. The Green Guides were intended to reduce confusion by helping consumers understand the basis for environmental claims and to increase consumer confidence in such claims so they would

be more likely to make product comparisons and choices using environmental criteria. Considering that it is not very plausible for the FTC to regulate the package colors, I suggest that governmental or public policy action in the form of marketer and consumer education is called for.

For consumers, the findings suggest that it is important to understand that the color of a product package does not provide any factual information about the environmental impact of the product. The findings further suggest that the level of consumers' environmental concern has a significant effect on the degree of bias created by the use of the color green in environmental claims. Specifically, the results indicate that this bias is stronger among consumers who are more concerned about and involved in environmental protection. This suggests that those consumers who are most likely to be attracted to products with an environmental claim are most vulnerable to the influence of package color on their perceptions of products' environmental impacts. To counter this potential for misperception, consumers need to be cautioned that the color does not necessarily indicate environmental superiority. It is important to educate consumers to be more careful when assessing the environmental benefits of products with an environmental claim.

Theoretical Contributions

This work builds on the recent research on processing fluency in important ways. First, the findings suggest a previously unexplored route by which conceptual fluency may confer favorable responses to the target information. It demonstrates that judgments of the target information are based, in part, on the conceptual association between the

target information and color. When the color and the target information are part of a network of meaningful associations in memory, this fit facilitates fluent processing of the target information, which in turn enhances evaluative judgments of the target information. Second, prior research suggests that visual features of information presentation, such as figure-ground contrast, can enhance perceptual fluency (ease of reading). However, there is scant research that examines whether and how color can influence conceptual fluency (ease of understanding) with which people process target information. The current work demonstrates that color, which is a physical feature of information, can also enhance conceptual fluency (e.g., ease of understanding).

The current work also adds to the color research in marketing. Although marketers intuitively understand that color should enhance the appeal of marketing communications such as ads, color has remained an understudied aspect of marketing. In particular, it seems that there is very little empirical evidence with regard to the effects of color as a persuasive communications tool and explanations for the color effect. My findings suggest that the role of color in marketing communications is not limited to aesthetic value. Rather, they show that a carefully chosen color can enhance message persuasiveness.

Limitations and Future Research

Like other studies, the current work is not free from limitations which provide several fruitful directions for future research. The establishment of relevant boundary conditions for the effects obtained herein could be an interesting topic for future research, since it will have useful implications for marketers and policy makers. A relevant

boundary condition may pertain to the types of green products and environmental claims. The current set of studies examined food and beverage products and environmental claims about support for an environmental cause. Since there has been a dramatic increase in the types of green products and claims, further research might test other types of products and environmental claims. The color green may have a stronger impact on consumer perceptions of the product's environmental impact with certain types of environmental claims. For instance, a green package may have stronger or weaker effect on perceptions of a product's environmental impact when it is used in conjunction with an environmental claim that provides information about a product's features. Similarly, some products (e.g., food) with an environmental claim will benefit from a green package, but other products (e.g., durables) may not.

Previous research shows that the fluency experience can influence not only affective judgments, but also cognitive judgments, of the target object. In a study that was conducted but not reported in this dissertation, I examined the impact of green on cognitive judgments of statements that were related to nature or environmental issues. The hypothesis was that these statements are more likely to be accepted as true when they are presented with the color green than when they are presented with another color (red). The results, however, did not support this hypothesis. By no means does the result from this single study preclude the possibility that the fluency experience resulting from a conceptual fit between target information and color can influence cognitive judgments of the target information. Future research should examine this possibility with different stimuli and different types of cognitive judgments, such as response time or thought generation.

Another issue worthy of exploration is the cultural universality of the green effects observed in this research. The color literature suggests that the meanings of some colors vary across cultures (e.g., Jacobs et al. 1991; Madden, Hewett, and Roth 2000). Hence, it is not clear whether the present findings will generalize to other cultures. Further cross-cultural research can add to the understanding of the effect of color by exploring conditions in which the effect of color generalizes across cultures and contexts in which they are likely to be culture specific.

In the current set of experiments it is not clear whether the target evaluations were influenced by a facilitation of conceptual fluency in the green condition, an impediment in fluency in the red or orange condition, or both. Further studies with a neutral color condition could shed more light on this issue.

The consistent results across several studies suggest that there is a strong association in consumers' minds between the color green and the natural environment or eco-friendly activities. An intriguing question is whether the same result will be observed with nonconscious priming of the color green. For instance, will people who are exposed to green subliminally show more pro-environmental behavioral intentions? This test will add to the growing body of literature about unconscious processing by indicating that a subliminal exposure to color can influence motivation without one's awareness.

The current work is grounded in the empirical findings of laboratory studies with university students. Future research should move beyond self-report data and a lab setting to expand these findings. More realistic field studies with behavioral measures, such as real product choices or purchase behaviors, will advance marketing and public policy implications. However, for the present time, marketing managers and public policy

makers should be aware that the color green can have negative or positive impacts on consumers' responses to environmental information or claims, depending on the context in which it is presented.

Finally, this work focused on the role of green in environmental messages and claims. To generalize the finding that the conceptual fit between target information and color can enhance conceptual fluency, future research will need to test this with other colors in different contexts. For example, will a black (vs. white) background lead to more positive attitudes toward an antismoking message? Or will a red (vs. green) frame lead to more positive attitudes toward blood donations? Another way to generalize the findings will be to examine the influence of conceptual fit between color and product information on product evaluations.

Conclusions

This dissertation shows consistent evidence that a well-chosen color can enhance conceptual fluency, leading to more positive responses to messages. Color, which has previously been thought of as a superficial feature of marketing communications, adding contrast and attracting interest, is shown to facilitate processing of meanings when the color has a conceptual fit with the message content. Applying this finding to the context of pro-environmental messages and marketers' environmental claims produces ironic, but interesting results. Color can have both a beneficial or damaging effect on consumers' responses to environmental messages or claims, depending on the context in which it is used.

APPENDIX

THE NATURAL ENVIRONMENTAL PARADIGM SCALE (EXPERIMENT 4)

Promotion-focused items

1. Humans have the right to modify the natural environment to suit their needs.
2. Human ingenuity will insure that we do NOT make the earth unlivable.
3. The earth has plenty of natural resources if we just learn how to develop them.
4. Plants and animals have as much right as humans to exist.
5. The balance of nature is strong enough to cope with the impacts of modern industrial nations.
6. The so-called "ecological crisis" facing humankind has been greatly exaggerated.
7. Humans were meant to rule over the rest of nature.
8. Humans will eventually learn enough about how nature works to be able to control it.

Prevention-focused items

1. We are approaching the limit of the number of people the earth can support.
2. When humans interfere with nature it often produces disastrous consequences.
3. Humans are severely abusing the environment.
4. Despite our special abilities humans are still subject to the laws of nature.
5. The earth is like a spaceship with very limited room and resource.
6. The balance of nature is very delicate and easily upset.

7. If things continue on their present course, we will soon experience a major ecological catastrophe.

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