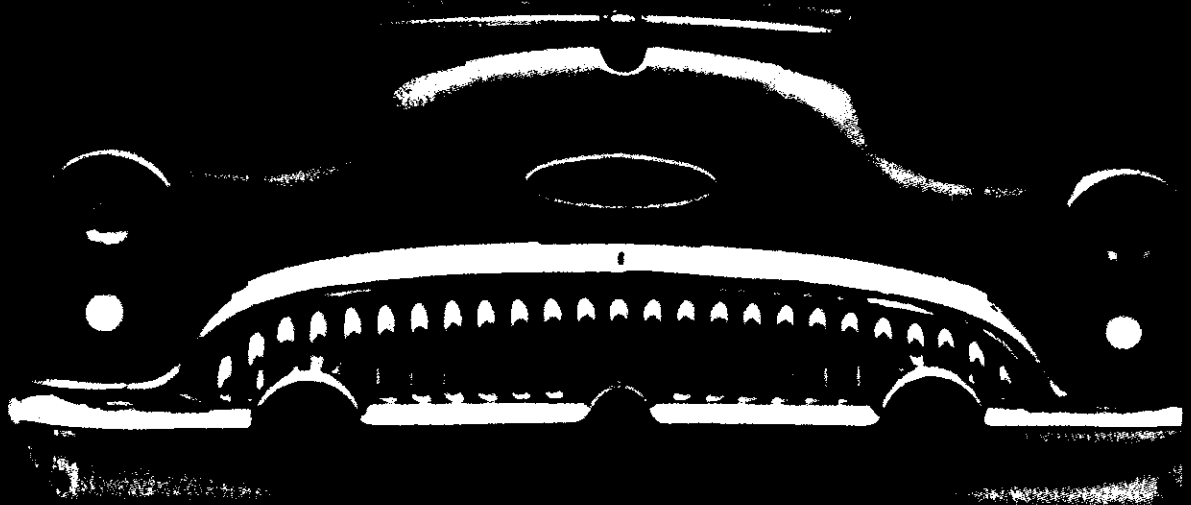


PERSUASIVE IMAGERY

Edited by
Linda M. Scott • Rajeev Batra



Copyright © 2003 by Lawrence Erlbaum Associates, Inc.

All rights reserved. No part of this book may be reproduced in any form, by photostat, microform, retrieval system, or any other means, without prior written permission of the publisher.

Lawrence Erlbaum Associates, Inc., Publishers
10 Industrial Avenue
Mahwah, NJ 07430

Cover design by Kathryn Houghtaling Lacey

Library of Congress Cataloging-in-Publication Data

Persuasive imagery : a consumer response perspective / edited
by Linda M. Scott, Rajeev Batra.

p. cm. — (Advertising and consumer psychology)

Includes bibliographical references and index.

ISBN 0-8058-4202-0 (alk. paper)

Imagery (Psychology) 2. Persuasion (Psychology) 3. Advertising—
Psychological aspects. I. Scott, Linda M. II. Batra, Rajeev. III. Series.

BF367 .P464 2002

153.8'52—dc21

2002021630

Books published by Lawrence Erlbaum Associates are printed on acid-free paper,
and their bindings are chosen for strength and durability.

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

Color as a Tool for Visual Persuasion

Lawrence L. Garber, Jr.

Eva M. Hyatt

Appalachian State University

Color is considered to be the most salient and the most “resonant and meaningful” visual feature of those seen in early vision (Hilbert, 1987, p. 2; Sacks, 1995). This makes color a compelling visual cue for persuasive communications purposes, such as conferring identity, meaning, or novelty to an object or idea.

An interesting example that illustrates the powerful and complex workings of color in a persuasive communications context is Pepsico’s early 1990s introduction of a clear form of Pepsi, called Crystal Pepsi (cf. Triplett, 1994). It failed. Pepsi was trying to take advantage of a new product color phenomenon, clearness, pioneered at that time by Ivory dishwashing liquid. Ivory had successfully changed the color of its liquid soap from its signature milky white color to a clear form, in order to capitalize on the very eye-catching-ness and excitement of this vivid and surprising departure from the familiar and expected. Pepsico, along with many other consumer packaged good companies in a variety of product categories, believed it could piggyback on the clear visual phenomenon by hurrying its own clear product, Crystal Pepsi, onto the market. However, Pepsi had failed to understand that product color conveys more than sensory experience, as, in this case, clearness connotes more than a distinctive, eye-catching appearance to the cola drinker. Among other things, it creates flavor and other performance expectations. Consumers expected a clear cola to have a lighter, cleaner flavor with fewer calories. However, upon tasting Crystal Pepsi, consumers’ expectations were disconfirmed: They got the original Pepsi Cola strength of taste rendered unpalatable by a mere change of color! Even loyal Pepsi fans didn’t like it! The moral of the story is that there is a relationship between food color and flavor in color-associated foods, and to change one is to risk changing the other. Ivory Liquid had succeeded because the new color did not change the meaning of the brand: clearness in a dishwashing liquid meant purity and mildness to the consumer, as did the milky color of Ivory before it.

This example illustrates that, as much as color is a powerful and salient persuasive communications tool, it is as well a complex, multidimensional phenomenon, poorly understood yet difficult to examine, making individual response to color exposure notoriously hard to explain or predict (Sharpe, 1975). Given that all individuals are also consumers, marketing communications, whose constant intent is persuasion, provide a good domain, a natural experiment, from which to study the general effects of color as a persuasive communications tool. Marketers intuitively understand that color should enhance the appeal of and satisfaction with products, especially foods, for which we seem to have a particular acuity (Bruce & Green, 1990, pp. 200, 343; Danger, 1969, p. 128).

In particular, although color may only be a single visual element, color experience is more than sensory phenomenon (Duncker, 1939; Garber, Burke, & Jones, 2000; Hine, 1996; Scott, 1994a), though many would assume otherwise (Scott, 1994a); for example, in a packaging context, color is also a cultural artifact that holds (often subtle and deep) personal meanings for an individual, due to a lifetime of prior experience (Scott, 1994a). Color is known to carry important symbolic and associative information about the product category and about specific brands (Hine, 1996, p. 216). Such meanings overlay direct sensory experience, thereby mediating, and at times dominating, color response (Garber, Hyatt, & Starr, 2000). This duality to the color phenomenon means that both its sensory and cognitive aspects must be considered for color as a persuasive communications tool to be correctly understood or properly framed (Marr, 1982). In this chapter, as an aid to the researcher and the practitioner, we review the conceptual issues that arise over the effects of persuasive color, particularly those stemming from color's dual nature, and present a research method that disentangles and separately measures color's sensory and cognitive aspects. In particular, we: (a) review the literature on color; (b) present research results in a food color context that graphically illustrate the cognitive processing of color and show the dominating role that prior knowledge can play in perception and choice; (c) present two conceptual frameworks that explicitly consider the respective roles that the sensory and cognitive aspects of color play in specific contexts; and (d) present an empirical methodology that decomposes and estimates the sensory and cognitive effects of color exposure.

LITERATURE REVIEW

Color Thought

In seeking to understand the role of color for persuasive communications purposes, one might think that it would be helpful to understand what color is, in general. Unfortunately, color is still not fully understood (Marr, 1982). A very old but ongoing discussion concerns whether color is primarily a physical phenomenon

endowed in the object that is being viewed, or a product of the lengths of the reflected light waves that strike the retina (Helmholtz, 1962; Marr, 1982; Newton, 1979), or a subjective phenomenon that is endowed in the viewer, making it a product of our sensory apparatus and/or of the processing and interpretation that takes place in the brain (Goethe, 1988; Land, 1977; Locke, 1975; Zeki, 1980). For good overviews of this discussion from writers in various disciplines, see Bruce and Green (1990), Crick (1994), Hilbert (1987), Sacks (1995), and Swirnoff (1989).

Concerning the latter point, that color is the product of the brain's interpretation of the visual sensory information that it receives, Scott (1994a), while speaking of visual imagery in an advertising context, made an elegant argument for how and why applied researchers have overlooked this dual nature to visual stimuli. Scott pointed out that visual imagery (and, we argue, color, too, as one of several visual elements that the brain integrates to compose recognizable objects and images) acquires (at times very rich) meaning through learned contexts and schemas that are culturally and historically based:

To understand the message, consumers must interpret the picture as a symbolic summary of a past event . . . visuals are social, rather than logical, code and an elaborated rather than restricted system. Therefore, we would not expect exact, concrete correspondences of meaning but rather provisional, contextually situated, meanings that are highly sensitive to differentiation and relationships. . . . Consumers draw on a learned vocabulary of pictorial symbols and employ complex cognitive skills even in the simplest response. Thus, advertising images can be understood in a discursive form, like writing, capable of subtle nuances in communication, or, like numbers, capable of facilitating abstractions and analysis . . . consumer research reflects a bias in Western thinking about pictures that is thousands of years old: the assumption that pictures reflect objects in the real world. From the vantage of this ethnocentric stance, the frankly rhetorical nature of advertising imagery is either purposively overlooked or criticized as a distortion of reality. (pp. 252, 264-265)

Such interpretation in the processing of advertising imagery is also evident in the processing of food color in marketing communications (Garber, Hyatt, & Starr, 2000) and color used in marketing communications (Garber, Burke, & Jones, 2000). (For a trenchant and definitive discussion of the processing of visual information, see Marr, 1982.)

The Complexity of Color

Complicating matters is the fact that color is a highly interactive, relative, and context-dependent phenomenon, reliant for its effects on the entire visual field in which it is perceived, the larger sensory environment in which it is encountered, and the circumstances, situation, disposition and cognition of the viewer. Land (1977), for instance, demonstrated that color determination depends, "not . . . solely on the wavelengths entering the eye from that patch but also on the wavelengths entering from the other regions of the visual field" (Crick, 1994, p. 53).

In particular, color has been shown to depend for its effect on an interaction with adjacent colors (Albers, 1963; Cheskin, 1957; Swirnoff, 1989). For example, red is made to look redder when it is surrounded by green, its complement, as when a red Lava Soap pack sits next to a green pack of Irish Spring. And red appears less salient when surrounded by red, its analogue, as when Lava soap sits next to a red Lifebuoy pack.

Moreover, color effect is highly interactive with the other visual features of which an object is composed, all of which must be integrated before an object or image can be recognized and its meaning to the viewer established (Bruce & Green, 1990; Crick, 1994; Davidoff, 1991; Marr, 1982; Triesman, 1991; Triesman & Gelade, 1980). An example would be Crystal Pepsi, discussed earlier, whose change of color caused consumers to reformulate their thoughts about product performance, as well as the product itself. For example, transparency makes the bottle form appear lighter in weight, whereas regular Pepsi, with its opaque dark color, appears heavier and denser than its erstwhile counterpart (Garber & Buff, 2000). Indeed, there are those who argue that color cannot be perceived and understood independently of form (Collinson, 1992, p. 145).

In addition, there are cultural, social, and personal dimensions to color and its meaning. Hine (1996) described the cultural dimension as visual conventions that have built up over time in respective societies. The usual example of differences in the symbolic meaning of color across cultures is that black is the color of death in Western societies, whereas the color of death is white in many Asian countries. And in Japan, brighter colors are reserved for packages representing products from foreign countries, whose people the Japanese consider to be brash in nature, and the more subtle, soft gray hues are reserved for their own products. The meaning of color is also highly situational, changing over time, as in fads and fashion (Danger, 1969; Sharpe, 1975), and depends on the subject category in whose context it is considered (Bruce & Green, 1990, p. 190; Marr & Nishihara, 1978). To illustrate the latter, Hine (1996, p. 221) reported that a 1987 study showed that residents of four American cities believed in general that red means love, safety, danger, strength, and warmth; however, when asked to think about red in relation to products, they stated that it means Coca-Cola.

Finally, color, along with visual perception in general, is known to interact with the other senses, in that color sensation may make an impression in another sense altogether, an effect known as synesthesia (Ball, 1965; Bullough, 1910; Nelson & Hitchon, 1995; Sharpe, 1975). Therefore, the effect that a color has on a person may be couched in terms of temperature (red is hot, blue is cool), weight (dark colors are heavy, light colors are light), sound (loud, soft), or smell (fresh, stale).

A deliberate approach to the selection of color for persuasive communications purposes must consider all these dimensions, for they are expressed, though not altogether clearly, in the receiver's response to color exposure. For example, in a commercial frame, color exposure may come in the context of ads, store atmospherics, and point-of-purchase displays, including products and packages, server uniforms, sales rep appearance, trade show displays, and so on. There are any

number of trade publications in the areas of packaging, advertising and commercial design that offer copious marketing-specific examples that clearly illustrate both how powerful correct color can be (Cheskin, 1957; Danger, 1969; Dichter, 1975; Hine, 1996; Sharpe, 1975) and how the complexities of color render its selection so problematic. None, however, offer concrete guidance to the communicator beyond suggesting that he or she hire a color consultant.

In a noncommercial frame, an equivalent selection problem comes in the form of choice of color for personal belongings such as clothing, car, house, furnishings, stationery, flowers, cakes, and such, or in the artist's choice of color in a painting. Guidance for such choices comes in the form of, for example, trade house and garden magazines, or how-to art books; however, such guidance typically draws upon standard rules for color selection, or other conventions such as those colors that have been agreed on as being "hot" for the current fashion season, rather than on a scientific knowledge of color and its sensory and cognitive effects (Garber, Burke, & Jones, 2000).

Empirical Color Research

Considerable empirical research into the persuasive effects of color has been done in the last 100 years (for an early review, see Ball, 1965). Primary findings show a general preference for short-wavelength colors (blue, green), which people find quiet and serene, over long-wavelength colors (red, orange), which people find arousing and hot (Guilford & Smith, 1959). Further research shows some response differences between groups—primarily in degree of response, but with similar overall patterns—divided by culture (Adams & Osgood, 1973; Lee & Barnes, 1990), gender (Aaronson, 1970; Golden, 1974), personality type (Bjerstedt, 1960) and situation (Fisher, 1974). However, these findings on color are too broad and simple to be of much value in a persuasive communications context. In particular, a great deal of the meaning that viewers attribute to color comes from context, and most of these prior empirical studies expose subjects to color in a format that is without context. For example, people may say that in general they prefer blue to red, but this does not explain the successful use of red by organizations and brands like Coca-Cola, McDonald's, Campbell's, Colgate, the Cincinnati Reds, KFC, Harvard, Marlboro, Big Red chewing gum, H. J. Heinz, *Time* magazine, Nabisco, and Betty Crocker. The short answer to this apparent contradiction is, of course, that it is often constructive marketing practice to divert and arouse the consumer, and to associate the intrinsic meaning of "redness" with one's brand. Moreover, not everything can be blue; novelty and contrast are also appreciated (and, it is to be noted, these latter qualities in themselves hold meaning for the consumer).

Color Research in the Food Sciences

There have been a number of studies in the food sciences investigating the effects of color on food (flavor) perceptions. In these studies, taste test experiments are

used in which food color has typically been manipulated at three levels, which we shall call characteristic, uncharacteristic and ambiguous. *Characteristic color*, sometimes referred to in prior research as "correct" or "appropriate" color, is the color one would normally expect to be associated with a given flavor (i.e., orange color with orange flavor). *Uncharacteristic color*, sometimes referred to in prior research as "atypical" or "unusual" color, is a color that one would not normally associate with a given flavor (i.e., orange color with grape flavor). *Ambiguous color*, at times referred to as "masked" color or "no color," is a color that conveys no flavor information whatsoever (i.e., a clear or colorless liquid, such as Crystal Pepsi). These studies generally find that characteristic color facilitates the ability to correctly identify flavor; ambiguous color does not facilitate correct flavor identification; and uncharacteristic color degrades correct color identification (DuBose, Cardello, & Maller, 1980; Hall, 1958; Hyman, 1983; Stillman, 1993). Oram et al. (1995) found the effects of color on flavor identification more pronounced with children than adults, indicating that the association of food color with flavor is learned early, and that the reliance on color as a flavor signal is greater when product and flavor knowledge is limited (and meaningful flavor and food associations are therefore suppressed).

Particular to the purposes of this chapter, food color helps form flavor expectations that affect flavor and other food performance perceptions, and thereby affect a food's meaning. Several studies show that color affects perceptions of flavor intensity—specifically, the more saturated the color, the more intense the flavor perception (Pangborn, 1960). Maga (1974) and Pangborn (1960) take a decompositional approach, showing that differences in color perception can vary along separate dimensions such as sweet and sour: For example, longer wavelength colors are generally rated sweeter and less sour, and shorter wavelength colors are rated more sour and less sweet. A few studies examine the role of color on acceptability or preference within given food categories. The overall acceptability of beverage and cake products is more closely associated with ratings of flavor acceptability than with ratings of color acceptability (DuBose et al., 1980). Saturated yogurt colors are preferred to less saturated, natural yogurt colors (Norton & Johnson, 1987). A shortcoming of this research is that food and flavor attributes are typically evaluated on a single dimension representing concrete flavor attributes, thereby not measuring any multidimensional, symbolic meanings that color may attribute to foods, and which may also affect response (Garber, Hyatt, & Starr, 2000).

Color Research in Commercial Settings

The persuasive effects of color are vastly underresearched in commerce, surprising given color's powerful role in identifying and distinguishing brands, and its ability to confer symbolic and associative meaning to them, particularly in a world that is becoming ever more graphic in nature. What little marketing-specific color

research there is mostly confirms the long-wavelength, short-wavelength dichotomy just described. Bellizzi and Hite (1992) and Bellizzi, Crowley, and Hasty (1983) tested consumer color preferences for retail store designs and found that blue is soothing and preferred, and red is arousing and less well liked. Gorn, Chatopadhyay, Yi, and Dahl (1997) decomposed color into its constituent elements—hue, chroma, and value—and tested their respective effects on arousal, affect and recall in print ads. They extended the notion that red is exciting by noting that any highly saturated color also tends to be arousing, and that paler colors tend to be relaxing.

Several studies compare the effectiveness of color versus black-and-white in print media. Sparkman and Austin (1980) looked at print advertising, finding that color ads sell more than black-and-white ads. Click and Stempel (1976) reported that newspaper readers prefer the front pages of newspapers with color. Meyers-Levy and Peracchio (1995) demonstrated that black-and-white ads have greater impact when few cognitive resources are devoted to the processing of a print ad photo, or when too few resources are available for the viewers to process the photo as elaborately as they would like. Schindler (1986) pointed out that the use of color in an ad can sacrifice contrast, reducing legibility and readability.

A serious limitation to this research is that color as a visual stimulus is treated atheoretically as a purely sensory phenomenon, and the cognitive processing of visual stimuli is largely overlooked or ignored. This is a reason why this research as a whole does not present a consistent set of findings (Scott, 1994a), nor does it really extend our knowledge of what color is or how it works in a communications context (Garber, Hyatt, & Starr, 2000).

THE COGNITIVE PROCESSING OF COLOR

A particular point in the preceding discussion that is often overlooked in practice is that the effect of color on the viewer will vary depending on context, as indicated by a review of the empirical color research literature from psychology and commerce. Yet the researchers or practitioners often presume otherwise, thereby naively treating visual stimuli as purely sensory in nature, or perhaps, though knowing better, still choosing to treat visual stimuli as purely sensory because they know of no way to address the dual nature of visual stimuli empirically.

The Cognitive Processing of Food Color

The following research into food color by Garber, Hyatt, and Starr (2000) is an exception to research previously reported in that it does explore response to food color in a multidimensional, multiattributed manner, therefore allowing for the measurement of the cognitive aspects of the processing of color. Therein, food color's effect on perceived flavor and preference formation provides a dramatic

example of the (at times) dominant contribution of the cognitive processing of color exposure to stimulus evaluation and preference formation. Food color is a good example of this phenomenon, because the individual's sensory and cognitive faculties for the processing of food information are particularly acute and well formed.

Due to the individual consumer's experience with natural and processed foods, and due to the fact that color contributes to the individual's first judgment of the product, color interacts with "gustatory, olfactory and textural cues to determine the overall flavor acceptability of the product" (DuBose et al., 1980, p. 1393; Sharpe, 1975, p. 129). Color frames an individual's expectations of the sensory properties of foods before they are tasted. These signals operate in complex ways, as color can indicate many attributes, including variety, ripeness, sweetness, degree of cooking (a steak may be red, pink or brown in the middle), texture (is the banana green or brown?), and so forth.

Color is a cue that moderates perceptions of a food's taste or condition: The signals that color sends are not invariant. Interactions between food type and color determine the ultimate meaning at the individual level (Zellner, Bartoli, & Eckard, 1991; for a general discussion of the role of categorization as a means of reducing the task of recognition and interpretation to a set of plausible labels, see Marr, 1982; for a similar discussion as applied to the use of pictures in print ads, see Edell & Staelin, 1983). Thus, a red apple is presumed ripe and sweet, and a red steak raw and unappetizing; a green apple is unripe or tart, green grapes are ripe and sweet, and a green orange is moldy; a brown steak is cooked, a brown kiwi fruit can be in prime eating condition, but a brown apple is rotten. In some cases, we must rely on subtleties of color. Capsicums, orange-sized fruit from South America and Asia, can be purchased in green, red, yellow, orange, or purple varieties, with the ripeness of each type determined by separate and subtle cues.

In many food categories, therefore, product and package color have traditionally and specifically been used to signal flavor. Current practice favoring the use of characteristic colors as flavor signals in color-associated foods, a noncompetitive, commoditizing use of powerful promotional tool, raises many interesting questions. Is using color to signal flavor in a generic way the best use of color for persuasive purposes? Might the use of a unique color not normally associated with a given food draw attention? Might a company that makes all its flavors the same color, thus associating itself with that color and creating a sizable monolithic color block on the shelves, be more favorable as a strategy? And if so, what is the effect on people's enjoyment of the product? Will they know the flavor? Will they like the flavor or the drink as well? What about the notion that a novel color incongruent with flavor may be interesting to people? Is the potential dissonance interesting and involving? Or is it confusing and irritating? Will people even notice the discrepancy? Or will one stimulus (color or actual taste) dominate the other, allowing consumers to resolve the conflict in favor of the dominant carrier of flavor information?

FRAMEWORKS FOR COLOR EFFECTS IN CONSUMER CHOICE

Heretofore, we have made a case for the need to consider both the sensory and cognitive aspects of color processing to correctly understand and analyze color's persuasive effects. In particular, we assert the importance of the cognitive processing of color, which has often been overlooked, and whose effects can be dominant relative to sensory processing. In this section, to aid those who would now wish to operationalize these ideas in an applied or experimental context, we present, as examples, two conceptual frameworks, brand equity theory and consumer choice, in which the dual nature of color is explicitly represented in individual response to a color stimulus. Much of the following discussion is taken from Garber, Burke, and Jones (2000), and the reader should refer to that manuscript for a fuller exposition.

Color as a Carrier of Brand Equity

Brand equity has generally been defined as the added value endowed by the brand to the product (Farquar, 1989), and consists of the brand's recognition by and familiarity to the consumer, as well as the meaning associated with the brand (Agarwal & Rao, 1996; Keller, 1993; Park & Srinivasan, 1994). Color can either enhance or diminish this equity by facilitating or inhibiting identification and the retrieval of positive associations. The importance of the color's visual representation is acknowledged in the brand equity literature (Biel, 1993) and in the trade literature. For example, when asked what red means with respect to soft drinks, most will say Coca-Cola, a color-brand association that Coke has worked hard for many years to establish, a perfect example of how a good package can so powerfully convey the image and identity (the equity) of a brand. As a consequence, Pepsi is currently trying equally hard to associate itself with the color blue.

Color is one of several visual elements (the others being size and shape) that the consumer must perceive and integrate in order to recognize and interpret an object (i.e., a product, package and/or store display) in its visual field (Triesman, 1991; Triesman & Gelade, 1980). By extension, brand equity theory suggests there are at least four roles for product color as a carrier of brand equity in the store, some of which may conflict with one another, as described by Garber, Burke, and Jones (2000). These include: identifying the category to which the product belongs (i.e., white paper bags for flour); identifying the brand (i.e., Corning Insulation pink); conferring meaning to the brand or reinforcing or heightening existing meanings and symbolic associations (i.e., the carnival-like yellow and red of McDonald's); and providing contrast to make the brand more distinctive in and of itself, or more eye-catching and salient with respect to its competitors (i.e., the iMac computer, which comes in five candylike colors, distinctive and liberating in a product category known for its monochrome uniformity).

These four roles invite both sensory and cognitive processing of color, although, respectively, in characteristic manners and proportions. For example, referring once again to the four brand equity roles for color from Garber, Burke, and Jones (2000), it would seem that the sensory component of color processing would predominate over the cognitive with respect to category and brand identification, and in the presentation of novelty and contrast, whereas the cognitive would predominate with respect to product or package comprehension.

Category identification is a matter of a brand's declaring its membership in its category, and its candidacy for notice and purchase consideration. For the successful brand, any distinctive or differentiating qualities must be carefully nested within this inclusive aspect. Examples of product categories where the visual conventions of the category are rather closely adhered to, so that declaration of category membership is the primary message offered by individual packages, would be flour, where most every brand comes in a white bag, and tuna in squat white cans. These visual conventions are familiar to most of us as category identifiers, branding each adherent within the category as a member, but doing nothing to distinguish individual members. On a sensory level, category identifiers help us to distinguish and locate the product categories for which we are searching. On a cognitive level, category identifiers may signify any number of product-category-specific meanings, as well as higher order, non-category-specific meanings such as "familiar" and "reassuring" for those who are regular shoppers in a given product category (Dichter, 1975). The relative importance of the sensory and the cognitive aspects in influencing the individual would greatly depend on individual context, such as the individual's familiarity with the category. For example, if the individual has little category-specific knowledge, then the meaning that would be attributed to the category by its characteristic product or package colors would rely more on noncategory references, and would be more idiosyncratic in nature.

Brand identification refers to the consumer's ability to recognize and uniquely identify a package as belonging to a particular brand. Certain characteristics of the package, such as the brand name, its logo, color, package shape, type style, and graphics, may be used for identification. For example, Reese's Peanut Butter Cups and all of its brand extensions use the color orange, while Hershey's products are chocolate brown. On a sensory level, brand identifiers help us to distinguish between brand alternatives within a category, and may call our attention to new brand alternatives for our purchase consideration. On a cognitive level, brand identifiers may signify any number of brand-specific meanings, relating to product performance or having symbolic associative content (image), much of which may carry over from prior experience, or prior communications such as advertising or word of mouth. Again, as with category-specific identifiers, the meaning of such colors will vary with the individual. Those less familiar with the category would attribute more non-category-specific meanings to the colors presented, and for those familiar with the category, loyalties would model the meanings of the colors representing individual brands: Not only would there be brand-specific meanings,

but non-brand-specific meanings, such as "this is my brand, and my family's brand," versus, "This is the brand of others," or "This is America's Brand," would also enter into the consideration and choice process. *Package comprehension* refers to the meaning that a product's package conveys to the customer. A package communicates through explicit claims and illustrations that describe a product's attributes, benefits, ingredients, and promotional offers. It also communicates implicitly by triggering associations in consumer memory through visual, verbal, and tactile elements of the package (such as the brand name and logo, package size, shape, color, texture, and graphics). When designing a new package, a manufacturer can borrow on the visual conventions established by existing brands in the category. For example, a new dishwashing liquid may use the color green, similar to Palmolive, to communicate gentleness, so that the colors of hand dishwashing liquids have come to represent key performance attributes—yellow for lemony, blue for grease-cutting, green for mild-to-the-hands, and orange for antibacterial. This approach has the virtue of reassuring the shopper by fulfilling expectations of what a brand in the category should look like, thus providing a measure of legitimacy and credibility (Dichter, 1975). Consistent with this, Loken and Ward (1990) reported that consumers prefer products that tend to match their expectations.

Another approach based on the cognitive processing of brand-specific information (identifiers) is to bring new concepts and imagery into the category. The use of a well-chosen visual metaphor can capture, through association, desirable values associated with a brand (King, 1989). For example, Gateway was the first company to use the black-and-white cow pattern on its packaging in order to communicate its South Dakota heritage and spur the interest of family buyers. The strength and concreteness of positive associations increase the likelihood that the brand will be considered for purchase.

Package novelty and contrast refer to the package's ability to stand out visually from its surroundings, to draw attention to itself through its novel appearance. Novelty and contrast are defined in relative rather than absolute terms. They are a function of both a package's distinctiveness relative to the other brands on the store shelf (Veryzer & Hutchinson, 1998), and its departure from consumer expectations based on past shopping and consumption experiences. The contrast effects discussed earlier, exemplified by the Lava soap example, pertain to this package function as well.

The novelty of a package relative to consumers' expectations and its contrast relative to the competitive context will increase the likelihood that the package will evoke an involuntary attentional response (Kahneman, 1973), that aspect of novelty that many recognize as being the sole effect of color in a point-of-purchase context, given their presumption that color is a purely a sensory experience (Scott, 1994a). But, again, we see that there is a cognitive component to novelty, in that "newness" has its own non-brand-specific meanings that may be attributed to a brand, such as "innovative," "contemporary," or "cutting-edge." Such attributions may explain evidence in the empirical aesthetics literature (Berlyne, 1974), the

attention literature (Kahneman, 1973), and the psychology of visual perception literature (Bruce & Green, 1990) that a positive relationship between novelty and preference exists. Schema theory suggests that consumers prefer moderate levels of incongruity (Mandler, 1982; Meyers-Levy & Tybout, 1989), suggesting that consumers are attracted by innovative visuals in products and packaging but will respond by purchase only if its meaning is consistent with the product category (Garber, Burke, & Jones, 2000).

Referring to the prior discussion concerning food color, flavor identification and interpretation become a fifth function for color, in color-associated food/flavor categories. Interestingly, from a competitive strategy standpoint, color when used in this manner does *not* convey brand identity, unique meaning, or contrast. It merely conveys category identity or, in the case of food products that offer more than one flavor, it declares itself for consideration by those who are seeking that flavor. However, due to competitive circumstances and the need to differentiate product appearance at the point of purchase, so as to convey rich new meanings to a brand in order to appeal to and engage the viewer visually, food color is in some product categories (such as beverages and condiments) moving away from mere flavor identification to a superior form of persuasive communication. An example is Heinz's recent introductions of green (and now purple!) ketchup(s).

A Staged Model of Individual Choice

To encompass the several, diverse roles that package/product appearance in general and package/product color in particular can play in consideration and choice, we adopt and extend the theoretical framework developed by Roberts (1989). Roberts (1989, p. 749) cast choice as a phased process consisting of three sequential stages: "The probability of brand choice (given category purchase) can be thought to have three elements; the probability of being aware of brand *j*; the probability of considering brand *j*, given awareness of it; and the probability of choosing brand *j*, given awareness and consideration." This framework forms the backbone of the extended model shown in Fig 16.1.

As illustrated in Fig. 16.1, consumers proceed through a series of stages when identifying and evaluating brands for purchase. Package color can have an impact at several stages in this process (Garber, Burke, & Jones, 2000). In most retail stores, similar products (i.e., items sharing the same physical characteristics and/or satisfying the same consumer need) are grouped together in product categories. At the first stage (Stage 0), consumers enter the store with a set of goals and attempt to identify product categories that satisfy their requirements. As the consumer walks through the store, one or more product categories come into view. From this vantage point, the shopper can resolve only the largest physical and graphical features of the products. However, the information is sufficient to allow the individual to identify relevant and desired product categories and to set a course down the aisle.

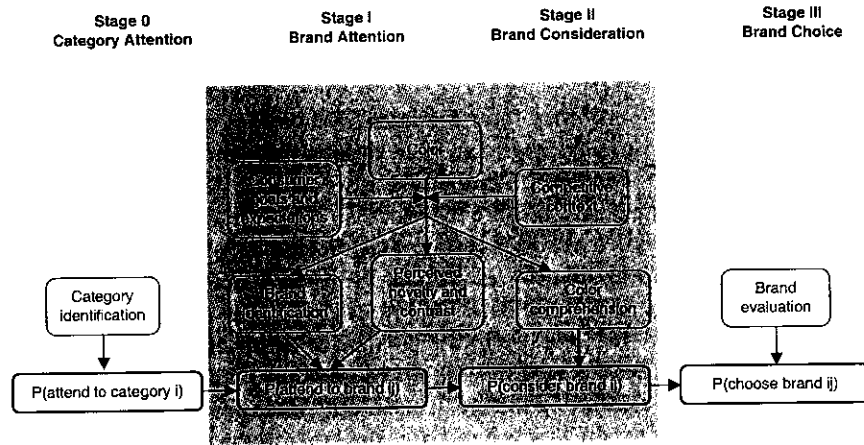


FIG. 16.1. The effect of color on brand attention and purchase consideration. *Note.* Empirical model explicitly considers Stages I and II. Adapted from model of effects of visual package type shown in Garber, Burke, and Jones (2000), with permission.

When the consumer has located and entered a relevant category, he or she attends to one or more brands on the shelf (Stage I). The consumer's likelihood of attending to a brand is a joint function of his or her ability to identify the brand as a familiar and desirable product, and the perceived novelty and contrast of the package. Consumers are most likely to attend to those brands that they can readily identify as a result of prior advertising exposure, purchase, and/or consumption, and those brands that stand out from the competitive clutter because of their new and different appearance.

Once the consumer attends to a selection of products on the shelf, he or she considers a subset of these brands for purchase (Stage II). At this point, the shopper may pick up one or more brands to acquire detailed information from the package. Information acquisition occurs in gradations or stages, with earlier processing limited to the coarser visual features such as size, shape, and color, and later stages focusing on detailed brand information. The number of brands the shopper considers depends on his or her motivation and ability to process product information and the amount of time available. More brands will be considered if the shopper is new to the category, seeks variety, notices something new or different on the shelf, and/or has a liberal time budget.

In the final decision step (Stage III), the consumer selects one or more brands from the consideration set for purchase. This choice process has been discussed in detail in prior publications (e.g., Bettman, Johnson, & Payne, 1991; Meyer & Kahn, 1991) and is not reviewed again here. However, we should note that package factors such as color that increase consumer attention to and consideration of brands

are also likely to increase the probability of choice, everything else being equal. Brand attention and consideration are necessary but not sufficient conditions for choice.

For example, a producer may choose to introduce a new product into an existing category with primary package color that departs from the established visual conventions and therefore consumer expectations for that category. Surprise on the part of the consumer on exposure to this novel color at the point of purchase is translated into selective attention. However, purchase consideration will only be gained if the meaning that that color confers to the brand is consistent with category benefits. Therefore, likelihood of brand purchase is increased by novel package color only if that color supports positive behavior at each stage of the consumer choice process. Scott (1992) pointed out that such positive behavior regarding visual signs, including color, will occur only when prior associations and their appropriateness for the task at hand come together in the minds of the target audience.

As with our examination of the respective sensory and cognitive effects of response to visual presentation that exist within each of the four roles of brand equity, so too can we point out the dual effects of color at each of the stages of the individual-level choice model just presented. For example, the role of color during the attentional stage of the model may be construed by many to be a sensory effect, and may well be the more significant effect at this stage of early vision, but meaning can still be construed to take place, especially since we attribute meaning to the processing of individual visual elements such as color. However, it is clear that there must be a strong cognitive component to color's role in the later stages of the model, particularly the consideration stage, which has a strong evaluative component to it. Here, color's meaning within its role as contributing to the recognizability and meaning of the integrated object that is a product or its package, and the image it conveys, may contribute information to the evaluation process.

AN EMPIRICAL METHOD FOR THE DECOMPOSITION AND SEPARATE MEASUREMENT OF THE SENSORY AND COGNITIVE EFFECTS OF EXPOSURE TO VISUAL STIMULI

Background

There is limited precedent in the marketing or psychology literature for methods applicable to visual experimentation. Most of the scant empirical research on the effects of visual processes or the appearance of objects in marketing addresses specific problems such as the utility of certain package forms (Wansink, 1996), the effect of particular design elements (Verzyer & Hutchinson, 1998), or the effectiveness of color versus black-and-white in newspaper ads (Meyers-Levy & Peracchio, 1995) without much ability for generalization, or is broadly conceptual without

much ability for concrete application. An example of the latter is Bloch (1995), who offered a conceptual model of product design. The purpose of the model is to bring "needed attention to the subject of product design and enable researchers to better investigate design issues" (p. 17). Unfortunately, this research does not address the design selection problem itself. Bloch wrote, "Research is needed to determine which product form elements trigger cognitive responses among consumers" (p. 25). A method for doing so has been proposed by Garber, Burke, and Jones (2000) and is described therein. It adds experimental power by suggesting a systematic means of inventing, altering, calibrating, and selecting visual elements to obtain true and plausible representative visual types for experimental purposes. Of relevance to this chapter is that method's ability to separate the sensory effects of a visual experience from the effects of prior experience, and we confine our discussion to that aspect. For a complete description, refer to Garber, Burke, and Jones (2000).

The sensory/cognitive dichotomy intrinsic to the processing of visual information represents a longstanding confounding problem in all of sensory research, as indicated by Duncker (1939), who early on was concerned about the influence of past experience on perceptual properties:

What, after all, is the effect of past experience upon present experience? More precisely: how do traces influence the phenomenal appearance of perceived objects? . . . How, under what conditions, and to what extent, is this realm of "pure" perception affected by past experience? (p. 255)

The issue exists to this day. The method referred to here addresses it, however, by using a combination of similarity scaling and correspondence analysis to disentangle these effects.

Heretofore, a common experimental means of handling this confound in applied visual research has been to simplify the problem by merely assuming that visual experience is purely immediate and sensory, thereby ignoring the fact that viewers also comprehend visual information. For example, Scott (1994a) pointed out how the intrinsic meaning of the visuals used in advertising has traditionally been ignored by most commonly employed consumer research paradigms, thereby diminishing their ability to explain or predict ad effectiveness—particularly with respect to those ads employing stylized, symbolic, or rhetorical images that invite complex processing. Complex processing, as Scott (1994a) pointed out,

includes imagination and judgment, as well as memory. . . . In processing complex symbolic materials—such as paintings, photographs, and advertisements—cognitive participation is a necessity, and the reliance on learning crucial. The reason is that pictures are unavoidably artifactual. (pp. 260, 265)

As was pointed out earlier, the same can also be said of color because although it is only a single visual element among others comprising more complex forms including pictures and other objects, it too, being a vivid, affect-loaded, and memorable visual stimulus, also evokes complex cognitive processing.

For example, our intent with the food color examples (i.e., Clear Pepsi, and the experiment in which we manipulated the color of orange drink) is to impress the naive reader (of which we have learned there are many) with the fact that color is not simply a sensory experience, but also has meaning that can be a powerful influence on color response. For example, marketers completely overlooked the fact that changing the color of Pepsi Cola also affects its perceived taste, as well as other product attributes such as calories. When we gave subjects purple orange drink, the vast majority thought it was grape and evaluated it as such: less sweet, more tart, and so on. These results underscore on an empirical level the point that Scott (1994a) made, albeit in a simpler frame.

The Method

This method is taken from Garber (1995) and Garber, Burke, and Jones (2000), who apply it to the problem of selecting a new package for an existing product. It is appropriate for testing the effects of any visual element, such as color, or the visual effects of some stimulus object, such as a package, when presented in a relative context. By relative context, we refer to any situation where the target stimulus is embedded in a visual field with a number of distracter objects, as in the case of a product or package on a store shelf, or even an ad jammed into a commercial break with other ads on television.

Color Manipulation. As indicated by prior discussion and illustrated by the model in Fig. 16.1, the relevant dimensions of the effect of color in a relative context are degree of dissimilarity (i.e., familiarity and novelty) and color comprehension (i.e., consistency of meaning with respect to perceived product benefits). To test the effects of some color stimulus in a consumer context (or to test the effective appearance of a candidate marketing object such as a product, package or ad), the color must be typed according the degree of dissimilarity and meaning it exhibits, relative to some product category prototype.

Steps in the pretesting procedure to derive the various levels of similarity and consistency are explained using the color alteration and calibration of a Gold Medal Flour bag as an example. We borrow this example from Garber, Burke, and Jones (2000), who manipulated the color of the white Gold Medal flour bag (typical of packaging for that category), along with the packages of several other selected target brands from other food categories, in order to obtain the necessary levels of similarity and consistency for their package appearance experiment.

Creating and Classifying the Color Manipulation. In the packaging study, the original Gold Medal flour packages were scanned into the computer and the colors of selected package elements were systematically altered to create several new looks. The original package was also edited to remove any extraneous promotions or offers, but most other visual features (including lines, borders, logos, char-

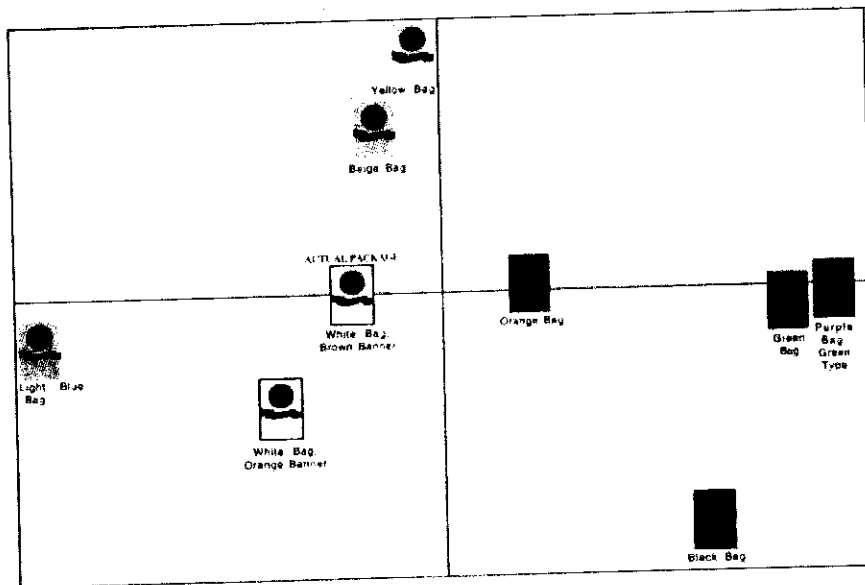


FIG. 16.2. Perceived similarity of alternative Gold Medal flour packages. From Garber, Burke, and Jones (2000), with permission. (See Color Panel D)

acters, and other graphic elements) were retained in order to preserve brand identification. In total, 25 new packages were created for Gold Medal Flour, to assure that all necessary color levels were represented. In so doing, we were careful to represent a sufficient range of the three dimensions that comprise color: chroma, hue, value (for an explanation of these color dimensions, see Gorn et al., 1997).

Three judges evaluated the candidate packages that carried the color manipulations: an industrial designer and two graphic designers. The judges were asked to select a subset of the package candidates based on the design's credibility as a professionally executed, commercial package and the degree to which it could be easily recognized and identified as representing the target brand. The judges selected nine Gold Medal flour bags packages for further testing.

The last steps in pretesting were to calibrate the new packages on the dimensions of perceived dissimilarity, consistency of meaning, and preference, and to select packages representing each of the experimental conditions (see Garber, 1995).

Twenty respondents first rated the perceived dissimilarity of each pairwise combination of packages. These data were analyzed using the KYST multidimensional scaling algorithm (Kruskal, Young, & Seery, 1973) as implemented in PC-MDS 5.1, from which were generated one- and two-dimensional perceptual maps (see, e.g., Fig. 16.2). The maps represent package alternatives as points in a common, perceptual space, where the Euclidean distance from the original ("actual") package to each of the color-altered packages indicates the dissimilarity

or novelty of the new package. New designs that were perceived to be most similar to the original package (white bag with brown banner) in both the two- and three-dimensional scaling solutions were classified as "very similar" (e.g., white bag with orange banner, beige bag, orange bag). Candidates that were the farthest away were classified as "very dissimilar" (e.g., the black and purple bags). Packages that fell between these two extremes were categorized as "somewhat dissimilar."

Second, respondents were asked to indicate which of nine all-purpose flours characterized each of the packages. They were told to base their evaluations solely on package appearance. The frequencies with which packages were associated with attributes were mapped onto a common, multidimensional space using the SIMCA correspondence analysis package (Greenacre, 1993). As shown in Fig. 16.3, the original Gold Medal package was seen as being "fresh quality," "good value," "naturally pure," and "good tasting." New packages with similar benefit profiles (like the beige bag) were classified as having "consistent meaning." New designs with very different benefit profiles (such as the black bag, which was seen as being "inexpensive") were coded as having "inconsistent meaning." By combining the results from the similarity and attribute scaling procedures, we were able to assign each package alternative to one of the four visual categories. Examples of the various package alternatives created for Gold Medal Flour are shown in Fig. 16.4.

Finally, pretest respondents were asked to rate the degree to which they liked or disliked each of the test packages. Packages with low evaluations were eliminated from the set.

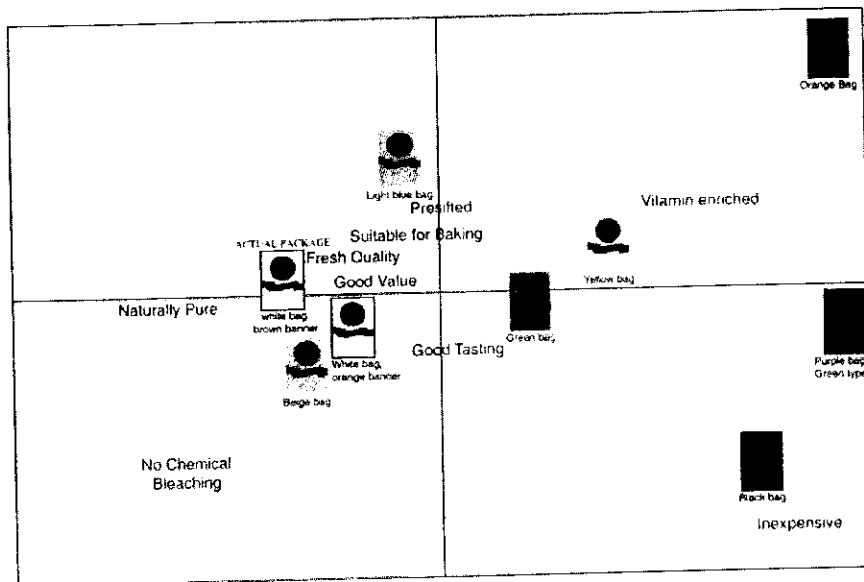


FIG. 16.3. Attribute associations for alternative Gold Medal flour packages. From Garber, Burke, and Jones (2000), with permission. (See Color Panel E)



**Berge Bag: Very Similar
Visual Type**



**Light Blue Bag: Moderately
Dissimilar**



**Green bag: Very Dissimilar
and Consistent**



**Black Bag: Very Dissimilar and
Inconsistent**

FIG. 16.4. Selected Gold Medal package variations for the flour category. (See Color Panel F)

One finding from the Garber, Burke, and Jones (2000) packaging study relevant to this chapter showed that that large color changes to an existing package can increase the likelihood that new customers will consider and choose the product, but *only when the meaning conveyed by package color is consistent with the brand's original positioning*—underscoring the importance of considering cognitive processing in modeling the viewer's response to a visual stimulus such as color. Elaborating on the role of meaning in evaluating response to a visual stimulus, this finding is evocative of Scott's (1994b) similar point about advertising conventions, and how they form expectations for an image, and frame the viewer's response to it:

Our expectations for these [advertising] elements to contain certain information, as well as our culturally informed expectation that someone is trying to persuade us here, lead us well into a reading strategy [i.e., "rules of reading" particular to the advertising genre, recognizable to the reader due to the reader's prior experience with advertising, that informs the process of reading ads; presumably, there are respective "rules of reading" for packaging, food color and all other commercial and noncommercial genres] before any pictures or words are comprehensible [i.e., only individual visual elements such as color (Triesman & Gelade 1980)]. In actual experience, we are also cued to invoke this schema by the placement of advertisements in certain previously agreed-upon places in media space or time. (p. 464)

FUTURE RESEARCH

Given the relative lack of color and visual research extant, there are many opportunities for interested researchers. In terms of color research specifically, although Garber, Burke, and Jones (2000) examined the effects of large color changes to an existing package in terms of chroma and value, their research needs to be extended to other product categories, and should consider the effects of more subtle changes to hue, given chroma and value (for an explanation of these terms, see Gorn et al., 1997). More work also needs to be done to examine individual differences and cultural and cross-cultural effects, and to nail down the underlying cognitive processes that mediate color effects.

Moreover, similar research is necessary to examine the effects of the other visual elements, including size, shape, graphic elements, motion, and their interaction. Other important research would examine the interaction of these visuals and other marketing mix variables.

It is also unclear whether the interaction of individual visual elements is sufficient to explain the effects of the appearance of integrated objects. The small amount of work done examining the effects of color in newspapers, store atmospherics, and packaging needs to be expanded and extended to other objects whose appearance serves as cues in marketing. Moreover, this work may also be extended to include other elements of point-of-purchase displays: trade shows, logos, stationery, web sites, trucks, and company uniforms.

In particular, a great deal of work needs to be done regarding the symbolic nature of visual elements as imagery. There is a deeper level to how visual elements "mean," as pointed out by those involved with visual rhetoric. This is an area that needs much exploration and integration into other aspects of visual research, before we will have complete understanding of how we respond to visual stimuli.

REFERENCES

- Aaronson, B. S. (1970). Some affective stereotypes of color. *International Journal of Symbolology*, 2, 15-27.
- Adams, F. M., & Osgood, C. E. (1973). A cross-cultural study of the affective meanings of color. *Journal of Cross Cultural Psychology*, 4, 135-156.
- Agarwal, M. K., & Rao, V. R. (1996). An empirical comparison of consumer-based measures of brand equity. *Marketing Letters*, 7, 237-248.
- Albers, J. (1963). *Interaction of color*. New Haven, CT: Yale University Press.
- Ball, V. K. (1965). The aesthetics of color: A review of fifty years of experimentation. *Journal of Aesthetics and Art Criticism*, 23, 441-452.
- Bellizzi, J. A., & Hite, R. E. (1992). Environmental color, consumer feelings and purchase likelihood. *Psychology and Marketing*, 9, 347-363.
- Bellizzi, J. A., Crowley, A. E., & Hasty, R. W. (1983). The effects of color in store design. *Journal of Retailing*, 59, 21-45.
- Berlyne, E. E. (1974). *Studies in the new experimental aesthetics*. New York: John Wiley and Sons.
- Bettman, J. R., Johnson, E. J., & Payne, J. W. (1991). Consumer decision making. In T. Robertson & H. Kassarian (Eds.), *Handbook of consumer behavior* (pp. 85-123). Englewood Cliffs, NJ: Prentice Hall.
- Biel, A. L. (1993). Converting image into equity. In D. Aaker & A. Biel (Eds.), *Brand equity & advertising: Advertising's role in building strong brands*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Bjerstedt, A. (1960). Warm-cool color preferences as potential personality indicators: Preliminary note. *Perceptual and Motor Skills*, 10, 31-34.
- Bloch, P. H. (1995). Seeking the ideal form: Product design and consumer response. *Journal of Marketing*, 59, 16-29.
- Bruce, V., & Green, P. R. (1990). *Visual perception: Physiology, psychology and ecology*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Bullough, E. (1910). The perceptive problem in the aesthetic appreciation of simple color combinations. *British Journal of Psychology*, 406-447.
- Cheskin, L. (1957). *How to predict what people will buy*. New York: Liveright.
- Click, J. W., & Stempel, G. H. III. (1976). Reader response to front pages with four-color halftones. *Journalism Quarterly*, 53, 736-738.
- Collinson, D. (1992). Aesthetic experience. In O. Hanfling (Ed.), *Philosophical aesthetics*. Cambridge: Open University.
- Crick, F. (1994). *The astonishing hypothesis: The scientific search for the soul*. New York: Simon and Schuster.
- Danger, E. P. (1969). *How to use color to sell*. Boston: Cahnern.
- Davidoff, J. (1991). *Cognition through color*. Boston: MIT Press.
- Dichter, E. (1975). *Packaging: The sixth sense? A guide to identifying consumer motivation*. Boston: Cahnern.
- DuBose, C. N., Cardello, A. V., & Maller, O. (1980). Effects of colorants and flavorants on identification of perceived flavor intensity, and hedonic quality of fruit-flavored beverages and cakes. *Journal of Food Science*, 45, 1393-1399, 1415.

- Duncker, K. (1939). The influence of past experience upon perceptual properties. *American Journal of Psychology*, 52, 255-265.
- Edell, J. A., & Staelin, R. (1983). The information processing of pictures in print advertisements. *Journal of Consumer Research*, 10, 45-61.
- Farquar, P. H. (1989). Managing brand equity. *Marketing Research*, 24-33.
- Fisher, J. D. (1974). Situation-specific variables as determinants of perceived environmental aesthetic quality and perceived crowdedness. *Journal of Research and Personality*, 8, 177-188.
- Garber, L. L., Jr. (1995). *The role of package appearance in consumer choice*. Unpublished doctoral dissertation, University of North Carolina at Chapel Hill.
- Garber, L. L., Jr., & Buff, B. (2000). *The effects of package shape and actual size on perceived size*. Unpublished manuscript, Appalachian State University.
- Garber, L. L., Jr., Burke, R. R., & Jones, J. M. (2000). *The role of package appearance in consumer purchase consideration and choice*. Marketing Science Institute Working Paper Series, Report No. 00-104. Boston: MSI.
- Garber, L. L., Jr., Hyatt, E. M., & Starr, R. G., Jr. (2000). The effects of food color on perceived flavor. *Journal of Marketing Theory and Practice*, 8, 59-72.
- Goethe, J. W. von: (1988) Theory of color. In D. Miller (Ed. & Trans.), *Scientific studies* (vol. 12, Goethe: Collected Works in English). New York: Suhrkamp.
- Golden, C. J. (1974). Sex differences on the performance in the Stroop color and word test. *Perceptual and Motor Skills*, 39, 1067-1070.
- Gorn, G. J., Chattopadhyay, A., Yi, T., & Dahl, E. W. (1997). Effects of color as an executional cue: They're in the shade. *Management Science*, 43, 1387-1400.
- Greenacre, M. J. (1993). *Correspondence analysis in practice*. New York: Academic Press.
- Guilford, J. P., & Smith, P. C. (1959). A system of color-preferences. *American Journal of Psychology*, 4, 487-502.
- Hall, R. L. (1958). Flavor study approaches at McCormick and Company, Inc. In A. Little (Ed.), *Flavor research and food acceptance*. New York: Reinhold.
- Helmholtz, H. von (1962). *Treatise on physiological optics* (Vol. 3) (J. Southall, Ed. & Trans.). New York: Dover. (Original work published 1866)
- Hilbert, D. R. (1987). *Color and color perception: A study in anthropocentric realism*. Palo Alto, CA: Center for the Study of Language and Information.
- Hine, T. (1996). *The total package*. New York: Little, Brown.
- Hyman, A. (1983). The influence of color on the taste perception of carbonated water preparations. *Bulletin of the Psychonomic Society*, 21, 145-148.
- Kahneman, D. (1973). *Attention and effort*. Englewood, NJ: Prentice Hall.
- Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. *Journal of Marketing*, 57, 1-22.
- King, S. H. M. (1989). Branding opportunities in financial services. *Proceedings of the Market Research Society conference on advertising and marketing financial services*. London: MRS Press.
- Kruskal, J. B., Young, F. W., & Seery, J. B. (1973). *How to use KYST, a very flexible program to do multi-dimensional scaling and unfolding*. Murray Hill, NJ: Bell Laboratories.
- Land, E. H. (1977). The retinex theory of color vision. *Scientific American*, 237, 108-128.
- Lee, S., & Barnes, J. H., Jr. (1990). Using color preferences in magazine advertising. *Journal of Advertising Research*, 29, 25-30.
- Locke, J. (1975). *An essay concerning human understanding* (Edited from the fourth [1700] and fifth [1706] editions by P. Nidditch). New York: Oxford University Press. (Original work published 1690)
- Loken, B., & Ward, J. (1990). Alternative approaches to understanding the determinants of typicality. *Journal of Consumer Research*, 17, 111-126.
- Maga, J. A. (1974). Influence of color on taste thresholds. *Chemical Senses, Flavor*, 1, 115-119.
- Mandler, G. (1982). The structure of value: accounting for taste. In M. Clark & S. Fiske (Eds.), *Affect*

- and cognition: *The 17th annual Carnegie Symposium* (pp. 3-36). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Marr, D. (1982). *Vision: A computational investigation into the human representation of processing of visual information*. San Francisco: W. H. Freeman.
- Marr, D., & Nishihara, H. K. (1978). Representation and recognition of the spatial organization of three-dimensional shapes. *Proceedings of the Royal Society of London, Series B*, 207, 187-216.
- Meyer, R. J., & Kahn, B. E. (1991). Probabilistic models of consumer choice behavior. In T. Robertson & H. Kassarian (Eds.), *Handbook of consumer behavior* (pp. 85-123). Englewood Cliffs, NJ: Prentice Hall.
- Meyers-Levy, J., & Peracchio, L. A. (1995). Understanding the effects of color: How the correspondence between available and required resources affects attitudes. *Journal of Consumer Research*, 22, 121-138.
- Meyers-Levy, J., & Tybout, A. M. (1989). Schema incongruity as a basis for product evaluation. *Journal of Consumer Research*, 16, 39-54.
- Nelson, M. R., & Hitchon, J. C. (1995). Theory of synesthesia applied to persuasion in print advertising headlines. *Journalism & Mass Communication Quarterly*, 346-360.
- Newton, I. (1979). *Optiks*. New York: Dover.
- Norton, W. E., & Johnson, F. N. (1987). The influence of intensity of colour on perceived flavour characteristics. *Medical Science Research*, 15, 329-330.
- Oram, N., Laing, D. G., Hutchinson, J. O., Greenville, R., Freeman, M., & Newell, G. (1995). The influence of flavor and color on drink identification among children and adults. *Developmental Psychobiology*, 28, 234-246.
- Pangborn, R. M. (1960). Influence of color on the discrimination of sweetness. *American Journal of Psychology*, 73, 229-238.
- Park, C. S., & Srinivasan, V. (1994). A survey based method for measuring and understanding brand equity and its extendability. *Journal of Marketing Research*, 21, 271-288.
- Roberts, J. H. (1989). A grounded model of consideration set size and composition. *Advances in Consumer Research*, 16, 749-757.
- Sacks, O. (1995). The case of the color blind painter. In *An anthropologist on Mars: 7 Paradoxical tales*. New York: Vintage.
- Schindler, P. S. (1986). Color and contrast in magazine advertising. *Psychology and Marketing*, 3, 69-87.
- Scott, L. (1992). Playing with pictures: Postmodernism, poststructuralism, and advertising visuals. In J. Sherry & B. Sternthal (Eds.), *Advances in Consumer Research* (pp. 596-612). Provo, UT: Association for Consumer Research.
- Scott, L. (1994a). Images in advertising: the need for a theory of visual rhetoric. *Journal of Consumer Research*, 2, 252-273.
- Scott, L. (1994b). The bridge from text to mind: Adapting reader-response theory to consumer research. *Journal of Consumer Research*, 21, 461-480.
- Sharpe, D. T. (1975). *The psychology of color and design*. Chicago: Nelson-Hall.
- Sparkman, R. R., Jr., & Austin, L. M. (1980). The effect on sales of color in newspaper advertisements. *Journal of Advertising*, 9, 39-42.
- Stillman, J. A. (1993). Color influences flavor identification in fruit-flavored beverages. *Journal of Food Science*, 58, 810-812.
- Swirnoff, L. (1989). *Dimensional color*. Boston: Birkhauser.
- Triesman, A. (1991). Search, similarity, and integration of features between and within dimensions. *Journal of Experimental Psychology: Human Perception and Performance*, 40A, 201-237.
- Triesman, A., & Gelade, G. (1980). A feature-integration theory of attention. *Cognitive Psychology*, 14, 107-141.
- Triplet, T. (1994). Consumers show little taste for clear beverages. *Marketing News*, 28, 2.
- Veryzer, R. W., & Hutchinson, J. W. (1998). The influence of unity and prototypicality on aesthetic responses to new product designs. *Journal of Consumer Research*, 24, 374-394.

- Wansink, B. (1996). Can package size accelerate usage volume. *Journal of Marketing*, 60, 1-14.
- Zeki, S. (1980). The representation of colors in the cerebral cortex. *Nature*, 284, 412-418.
- Zellner, D. A., Bartoli, A. M., & Eckard, R. (1991). Influence of color on odor identification and liking ratings. *American Journal of Psychology*, 4, 547-561.