Product Experience

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THE MEDIATING EFFECTS OF THE APPEARANCE OF NONDURABLE CONSUMER GOODS AND THEIR PACKAGING ON CONSUMER BEHAVIOR

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Vision has primacy in our sensory world (Schifferstein, 2006) such that information to our brains mediated by the visual sense comes to have a particularly powerful impact on, for example, consumers' experience of nondurables. In a retail frame, this means that visual information and processes play a key role in the impact of nondurable products and packages on the consumer at the point of purchase. Moreover, the nature of typical food and convenience store layouts, and how consumers are caused to move through and shop them, elevates the impact of visuals by dictating to consumers the physical spaces they must cross, the paths they must follow, and the spaces they must occupy in order to browse product categories and consider brands for purchase. For example, consumers moving down long store aisles first see category facings from a distance and at an angle, and therefore begin processing the grosser elements of appearance well before they can process finer details or read text (the latter also being visual processes). These first visual impressions may therefore condition the product or package information that can only be processed later, and may predispose the consumer towards certain ultimate actions such as consideration and choice (Garber, Burke and Jones, 2000).

Even though product or package appearance has long been understood to mediate such consumer information processes as attention, comprehension, and consideration, as well as actions such as purchase, consumption, and disposal of nondurable goods, surprisingly little research in marketing or related disciplines has been done to understand how appearance, or those various visual elements that go to make up total appearance, has its effect on consumer behavior. Such limited research on a clearly important factor in consumer behavior has two reasons. First, marketers are by and large untrained visually, even though. They are called upon to make product and package selections for appearance surprisingly often. Standard business curricula simply do not typically include courses in art and design. This gap is becoming all the more glaring as new electronic media move us toward an evermore visual world and marketplace. Secondly, artists and designers, being nonscientists, have formed and tend to rely on various rules of thumb relating to visual responses that, though they may largely be correct, have not been scientifically tested; nor have their behavioral underpinnings been investigated.

In this chapter, we review the literature on product and package appearance, looking specifically at the effects of the main visual elements that comprise appearance – color, shape, and size (Treisman and Gelade, 1980; also see elsewhere in book where research on proportion is discussed). Then we discuss those many important aspects of the effects of product and package appearance, which forms a rich field for future visual researchers. And, given that much research interest may have been retarded by the fact that many marketing researchers simply do not know how to approach experimental visual problems, we propose a visual research methodology that may have general application to many visual problems.

1. APPEARANCE AS A CARRIER OF BRAND EQUITY

Appearance and its several visual components (color, size, shape, and motion) are what consumers must perceive and integrate in order to recognize and interpret a commercial
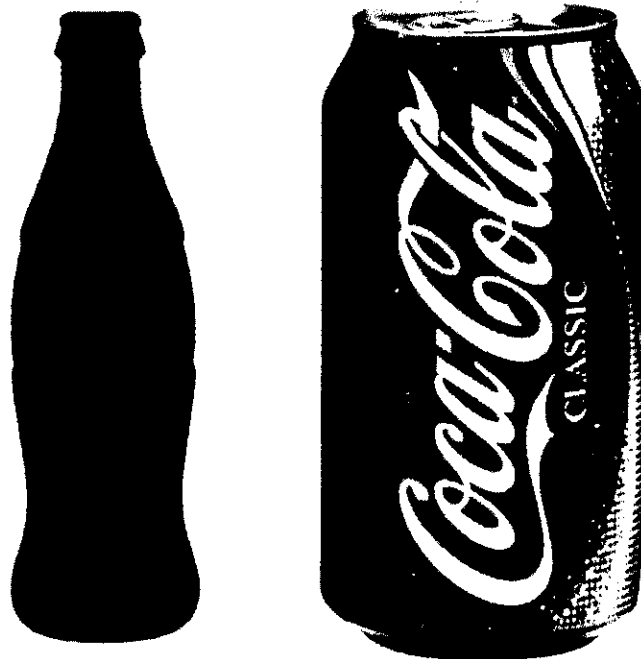

FIGURE 25.1 Coke's visual package conventions.

object, e.g. a product, package and/or store display, in their visual fields (Treisman and Gelade, 1980; Treisman, 1991). Appearance as a mediator of the purchase process is designed by marketers to be a visual stimulus, or set of visual stimuli, that are vivid, affect-laden and memorable (Cheskin, 1957), giving it great power as a promotional tool (Francis, 1977), and therefore as a contributor to brand equity. For example, The Coca-Cola Company has worked very hard to establish visual conventions around the world that most all consumers associate with this cola brand, including Coke red, the signature curvilinear bottle, the wave graphic, and the familiar cursive font, as can be seen in Figure 25.1. Not only do these various visual elements, singly and in combination, identify the Coke brand, but they also convey meaning to the brand, in the form of positive associations, including symbolic meanings, metaphors and stories, such as what is connoted when we watch polar bears on television drinking Coke in the snow at Christmas time.

1.1. Four roles for package appearance

By extension, brand equity theory suggests there are at least four roles for appearance as a carrier of brand equity in the store (Garber, Burke and Jones, 2000). As shown in Figure 25.2, these would include: (1) identifying the category to which the product belongs (e.g. white paper bags for flour); (2) identifying the brand (e.g. the barbell-shaped Listerine bottle); (3) conferring meaning to the brand or reinforcing or heightening existing meanings and associations (e.g. the festive, carnival-like yellow and red of McDonald's that connotes fun particularly to a child's sensibilities, or the small size of caviar jars or expensive perfumes, meant to convey preciousness); and (4) providing novelty or contrast to make the brand more distinctive in and of itself, or more eye-catching and salient with respect to its competitors (e.g. Obitz soft drinks, with gelatin balls floating in liquid, which provide a novel mouth feel as well as visual experience!).

Any given product or package design must fulfill all four functions simultaneously. The package represents the product to all consumer segments, serving the needs of disparate groups and serving disparate purposes across all stages of the choice process. But some of these functions may be in conflict with others. For example, a package shape, size or color that is highly associated with a category may do a good job of denoting a new product as a category member, but may not allow it to stand out sufficiently to get notice or purchase consideration.

When designing a new package, a manufacturer can borrow on the visual conventions established by existing brands in the category that connote typicality and familiarity. For example, a new dishwashing liquid may use the color green, similar to Palmolive, to communicate gentleness. 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) report that consumers prefer products which tend to match their expectations. Conversely, package novelty and contrast refer to the package's ability to stand out visually from its surroundings, and to draw attention to itself through its novel appearance, as discussed further in Section 2.2.

1.2. The role of color

Considerable empirical research into color response has been done in the last 100 years (for reviews, see Ball, 1965; Whitfield and Wiltshire, 1990). 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. Other research shows some response differences between groups – primarily in degree of
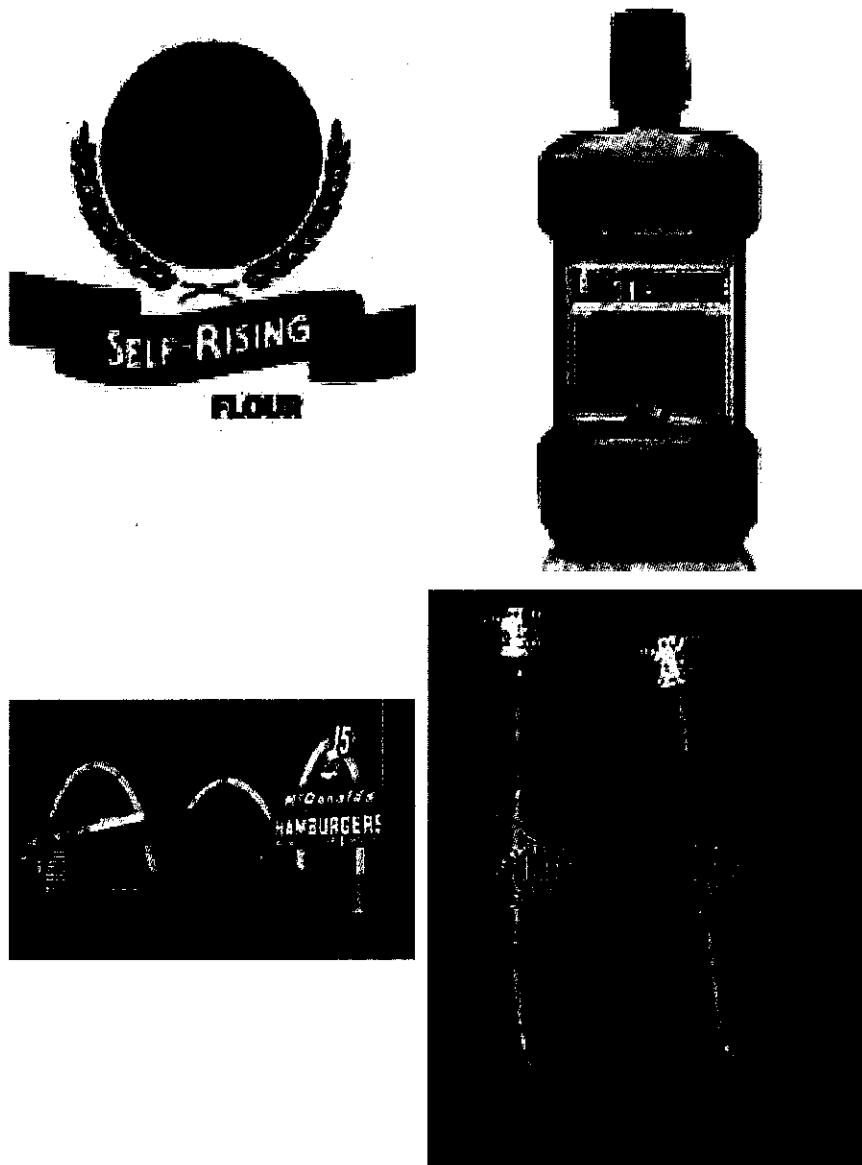
FIGURE 25.2 Four roles for package appearance.

response, but with similar overall patterns (Adams and Osgood, 1973; Lee and Barnes, 1990; Aaronson, 1970; Golden, 1974; Bjerstedt, 1960; Fisher, 1974). For example, Coca-Cola red may be perceived as such by Coke loyals and Pepsi loyals alike (indicating a homogeneity of perception across these groups), but may evoke a very different feeling, stronger for Coke loyals than Pepsi loyals (indicating a heterogeneity of preferences across groups). However, these findings on color are too broad and simple to be of much value in a marketing context. For example, people may say they prefer blue to red, all things being equal, 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, Kentucky Fried Chicken, Harvard, Marlboro, and Big Red chewing gum. Color preference clearly depends upon the type of object or product on which the color is placed

(Holmes and Buchanan, 1984), and also by circumstances and situation of the viewer. For example, concerning the latter, Kearney (1966) found that cooler hues (e.g. blues and greens) were preferred in warmer ambient temperature conditions, and warmer hues (e.g. reds and oranges) were preferred in cooler ambient temperature conditions. The short answer to this apparent contradiction is, of course, that it is often constructive marketing practice to divert and arouse the consumer. Not everything can be blue.

2. THE RELATIVITY OF VISUAL PHENOMENA

As much as appearance is a powerful and salient promotional tool, it is also a complex, multidimensional phenomenon not well understood in general, much less for application to marketing purposes, making consumer response to appearance notoriously hard to predict (Sharpe, 1975). Appearance mediates consumer behavior in response to advertising, at the point of purchase, and during product use. Marketers intuitively understand that appearance should enhance the appeal of and satisfaction with products, but little theory exists. Classical studies on visual perception are not useful to marketers, because they provide few guidelines to assist the marketing manager with the design selection problem. (Bruce and Green, 1990; Crick, 1994; Hilbert, 1987; Sacks, 1995; Swirnoff, 1989).

2.1. The relativity of color

Complicating matters is the fact that appearance, and in particular its visual components, are highly interactive, relative phenomena dependent for their effects on the entire visual field in which they are perceived. We use color to illustrate these points, drawn largely from a discussion by Garber and Hyatt (2000). 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 analog, as in a ketchup shelf facing in a grocery store display.

Moreover, color's effect is highly interactive with the other visual features of which an object is composed, all of which must be integrated before the total effect can be recognized (Crick, 1994; Davidoff, 1991; Treisman, 1991; Bruce and Green, 1990; Marr, 1982; Treisman and Gelade, 1980). An example would be the failed Crystal Pepsi, whose transparency caused the bottle form to appear lighter in weight and created different flavor expectations, whereas regular Pepsi, with its opaque dark color, appears heavier and denser than its erstwhile counterpart (Garber, Burke and Jones, 2000). Indeed, there are those who argue that color cannot be perceived and understood independently of form (Collinson, 1992, p. 145).

Color meaning is also relative to context. For example, Hine (1996, p. 221) reports that a 1987 study showed Americans to believe that red means love, safety, danger, strength, and warmth, but when asked to think about products, they state that it means Coca-Cola. In addition, there are cultural dimensions to color and its meaning. Hine (1996) describes 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, while it

is white in many Asian countries. And, in Japan, brighter colors are reserved for packages representing foreign products whose people they consider to be forthright 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 (Sharpe, 1975; Danger, 1969), and depends upon the subject category in whose context it is considered (Bruce and Green, 1990, p. 190; Marr and Nishihara, 1978).

And finally, color, along with visual perception in general, is known to interact with the other senses, in that visual color sensation may make an impression in another sense altogether (Ball, 1965; Nelson and Hitchon, 1995; Sharpe, 1975; Schifferstein and Tanudjaja, 2004). Therefore, the effect that a color has on a person may be involuntarily physically experienced as temperature (red is hot, blue is cool), weight (dark colors are heavy, light colors are light), sound (loud, soft) or smell (fresh).

2.2. The relativity of visual novelty

In visual marketing terms, novelty may be embodied in a surprising change to the familiar appearance of an existing product or package, or in the unconventional appearance of an altogether new product. It is a function of both a package's distinctiveness relative to the other brands on the store shelf (Veryzer and Hutchinson, 1998) – as shown in Figure 25.3, where Palmolive Lemon-Lime dishwashing liquid appears darker and greener in the company of lemon liquids, above, and lighter and 'lemonier' in the company of mild green liquids, below, – and its departure from consumer expectations based on past shopping and consumption experiences. Novelty and contrast are defined in relative rather than absolute terms. 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). There is also evidence in the empirical aesthetics literature (Berlyne, 1974), the attention literature (Kahneman, 1973), and the psychology of visual perception literature (Bruce and Green, 1990), that a positive relationship between novelty and preference exists (Hekkert, Snelder and van Wieringen, 2003). Schema theory suggests that consumers prefer moderate levels of incongruity (Mandler, 1982; Meyers-Levy and Tybout, 1989), which can be created by new or different packaging. For example, Heinz Ketchup was introduced several years ago in a green form, packaged in an eye-catching green bottle, nominally to appeal to the novelty-seeking tendencies of children, but was far too unpalatably incongruous to appeal to the more conventional sensibilities of adults.

Garber, Burke and Jones (2000) demonstrate that novel color draws the consumer's eye precisely because it is unexpected. However, they also show that that novel color, as eye-catching as it may be, will not affect purchase consideration unless it is also consistent in meaning with the product category, connoting an effective product that is not just attractive, but will work.

For example, in the US, baking flour is typically packaged in white paper bags. Therefore, a paper bag that is a color other than white would represent a departure from the color conventions for that flour category, and would likely be perceived as novel to the consumer who is familiar with that category. The more distinctive that color is relative to white, the more novel it will appear to the familiar consumer, the more likely it will stand out to the familiar consumer and that it will draw the consumer's eye. However, as Garber, Burke and Jones (2000) show, the greater attention that novel color garners will not be translated into greater likelihood of purchase consideration unless that color also evokes a meaning that is consistent with favorable product performance for that category. Therefore, the black or purple flour bags shown in Figure 25.4 will increase consideration
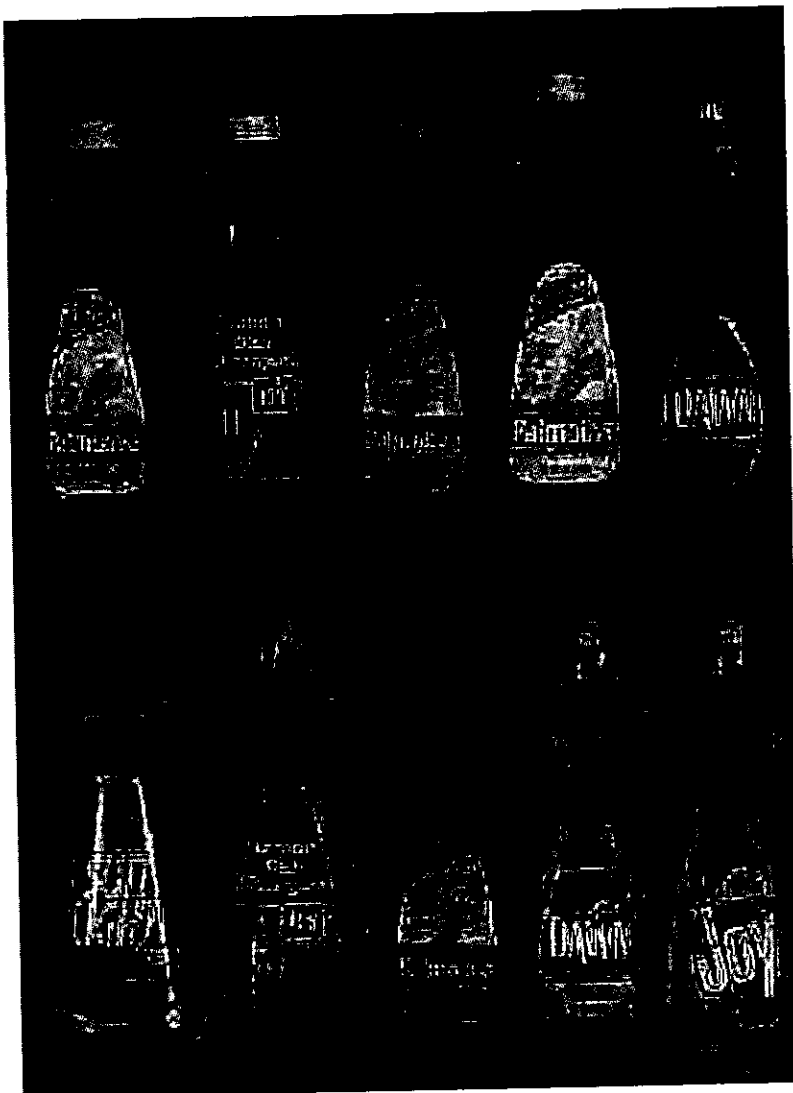
FIGURE 25.3 Contrast effects. These two photos show respective lineups of dishwashing liquids. The center bottle is the same in both, Palmolive Lemon-Lime dishwashing detergent. Its yellow-green color contrasts with the green liquids that surround it in the top photo, and contrasts as well with yellow liquids that surround it in the bottom photo. It is also interesting to note that the Palmolive Lemon-Lime bottle appears darker in the top photo than it does in the bottom photo. The lighting conditions were the same in each case. What causes this contrast effect are the respective colors that surround it.

and subsequent purchase, despite its attention-getting potential, only if consumers who notice it also conclude that the flour it represents will also be good for baking.

Another important finding for novelty is that its effect on the consumer may be mediated by differential attention. Differential attention refers to the notion that novel stimuli draw the eye away from more mundane stimuli, such as an unusually shaped package drawing the eye away from the more conventionally shaped package. Folkes and Matta (2004) find that novel appearance causes packages to appear larger in volume than packages whose appearance is more commonplace, and attribute this effect on volume perception to the fact that the consumer attends to the novel stimulus more actively, and works harder to comprehend it. Further research is needed to confirm the mediating effect of
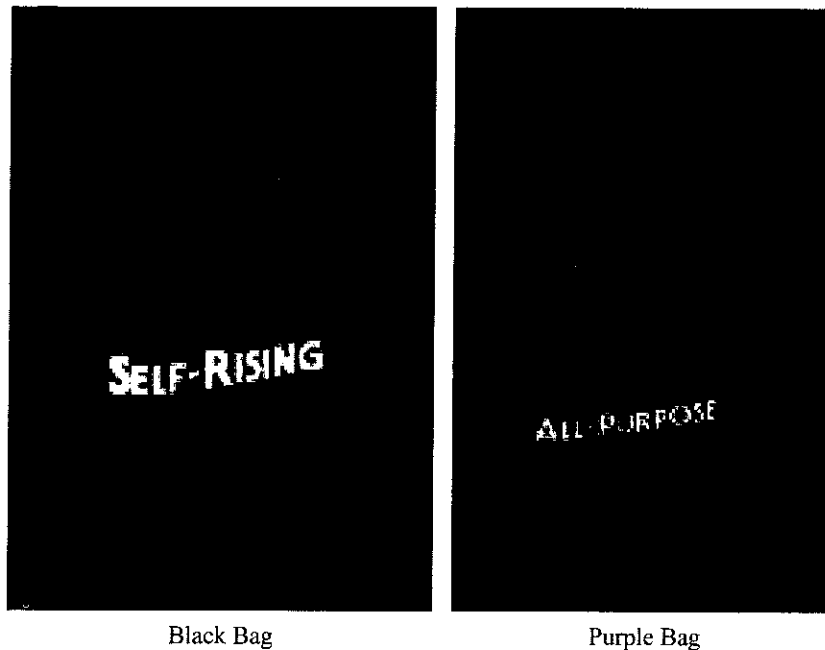
Black Bag   Purple Bag

FIGURE 25.4 Consistency of meaning within novelty. The black and purple flour bags above are both examples of altered packages that depart sharply from the white flour bag conventions established for this category, and to which most competitor brands in the United Stated adhere. As a result, these bags appear to be sharply contrasting, and bring attention to this particular flour brand. The question is, having caught the eye, will these bags be interpreted as representing a flour that will bake well? This latter quality, an example of how package appearance conveys meaning of the brand it represents, is a crucial next step in bringing the consumer to the point of considering a brand for purchase.

differential attention on volume perception, as well as explore other effects that it may have on the consumer. Folkes and Matta (2004) demonstrate these effects via novel package shape. Will other visual elements such as novel color or size also evoke similar results?

3. COLOR EXPERIMENTATION IN MARKETING

The persuasive effects of color are vastly under-researched 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. (It should be noted, however, that anecdotal evidence suggests that visual research of a proprietary nature is ongoing, though most of this is out of the public domain.) What little marketing-specific color research there is mostly confirms the long-wavelength, short-wavelength dichotomy described previously. Bellizzi and Hite (1992) and Bellizzi, Crowley and Hasty (1983) test consumer color preferences for retail store designs and find that blue is soothing and preferred, and red is arousing and less well liked. Gorn et al. (1997) decompose color into its constituent elements – hue, chroma, and value – and test their respective effects on arousal, affect, and recall in print ads. They extend 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) look at print advertising, finding that color ads sell

more than black-and-white ads. Click and Stempel (1976) report that newspaper readers prefer the front pages of newspapers with color. Meyers-Levy and Peracchio (1995) demonstrate 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 viewer to process the photo as elaborately as they would like. Schindler (1986) points 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. That is why this research as a whole does not present a consistent set of findings (Scott 1994), nor does it really extend our knowledge of what color is or how it works in a communications context (Garber, Hyatt and Starr, 2001).

Garber, Burke and Jones (2000) examine the effects of rather large color changes in existing packaging on brand consideration and consumer choice. An important extension to this research would be to consider the effect of rather more subtle color changes. Given that the human eye and brain are acutely aware of rather minute color differences, and that such differences are oftentimes all that separate the colors used by, for example, some leading brand and a competitor seeking to emulate the leader's appearance (i.e. a me-too color strategy), how dissimilar do colors have to be in order for viewers to perceive the difference? How similar do different colors have to appear in order for viewers to perceive similarities, and associate the respective brands they represent?

Other visual questions in marketing to be addressed would include the meaning of color when presented in contexts. Guilford and Smith (1959) studied the meaning of colors in general. For example, it is understood that long wavelength colors such as blues and greens are perceived to be cool, gentle, and serene, whereas short wavelength colors such as reds and oranges are perceived to be hot, exciting, sexy, and dangerous. But colors' meanings are also known to be very context dependent. For example, red in the context of the cola category means 'Coke'. But, apart from color's meaning as a simple identifier, what meaning might a color convey to the object it represents, such as a cola? Do category-specific colors adopted by brands as identifiers convey meanings to the brands they represent in accordance with the generalized meanings attributed to colors by Guilford and Smith (1959), or do colors take on new meanings in specific contexts such as product categories and brands? Do these meanings vary across categories? And, if so, what are they, and what determines them? Also, do colors mean different things to different people? Men versus women? Young versus old? Across more specifically defined target segments?

Research is also necessary to examine the effects of each of the visual elements that comprise an integrated package and other unified visual marketing elements, including the main effects of size, shape, graphic elements, motion, and their respective interactions. As much as there is limited research into the main effects of aspects of appearance, research examining interaction effects is particularly lacking. One study that tests such interactions compares the relative effects of one visual element with its interaction with other visual elements, by comparing masked and unmasked conditions (Garber, Hyatt and Boya, 2007). Consumer response to the main effect of a single visual element (in this case, package shape) was found to be the same regardless of whether packages were painted gray, thereby eliminating exposure to all other visual elements, or whether packages were left fully unmasked. This result suggests that the main effects of individual visual elements (e.g. size, shape, color, etc.) may be equally robust regardless of their interaction with other visual elements, lending external validity to all prior main effects tests. However, more work needs to be done, explicitly examining the strength of visual interaction effects of all types.

All the visual effects studied so far in marketing have used packages as visual test stimuli. Those effects found to be true for packaging need to be extended to other visual

marketing phenomena, including, for example, advertising of various types, store atmospherics and displays, trade show displays, trucks, uniforms, logos, websites, etc. Future research should examine the interaction of these visuals with other marketing mix variables. Most prior visual research in marketing has limited itself to examining the main effects of some visual element while controlling for variations in overall marketing strategy. This has allowed researchers to determine the effects of such visual elements, but not in the context of the marketplace. Further visual research, in which marketing strategies of various types are manipulated along with visual effects, would reveal much concerning strategy formulation surrounding appearance.

4. THE INTERACTION OF COLOR AND FLAVOR

Another set of interactions that seems to have piqued the interest of practitioners of late are multisensory effects, though research in the area is in its infancy. An exception is a well developed literature, most of it to be found in food sciences, examining the relationship between food color and flavor. Outside the food sciences, however, the impact of food color has been completely neglected (for reviews of this literature, see Cardello, 1996; Garber, Hyatt and Starr, 2001). Following is a brief review of the food color and flavor research.

Many foods today do not display their natural color (Tuorila-Ollikainen, 1982). In general, food producers commonly select, modify, heighten or standardize the colors that we see and come to associate with specific foods. Green for peppermint or brown for cola are examples. The effects of conditioned food color/flavor associations in color-associated foods become so ingrained that the unexpected pairing of a given food with a novel color renders it unpalatable (Maga, 1974). Recent violations of the previous, such as blue and purple ketchup (Heinz), or pink and blue margarine (Parkay), would seem to contradict prior assertions; however, it is to be noted that these novelly colored food products were being targeting to children whose color/flavor conventions are not well formed, and therefore were not available to be violated.

Prior research illustrates the multi-modal character of flavor and the interplay of visual elements with other sensory modes. One study investigates the role that food color plays in conferring identity, meaning, and liking to those foods and beverages that assume many flavor varieties. In a taste test experiment manipulating food color and label information, results indicate that food color affects the consumer's ability to correctly identify flavor and to form distinct flavor profiles and preferences (Garber, Hyatt and Starr, 2001). Similarly, the effects of color on odor perception have also been studied (Zellner, Bartoli and Eckard, 1991). Food color dominates all other flavor information sources, including labeling and taste. These results support the notion that food color is inextricably linked to expected flavor in the minds of consumers, making the selection of uncharacteristic food color problematical. Several new packaging strategies attempt the disconnection of the food color/expected flavor relationship by denying the consumer the ability to readily categorize the flavor cues that food color and labeling present, so that the consumer is induced into a mode of more elaborate information processing. This opens an opportunity for the presentation of promotional ideas, symbols, meanings, and associations through the medium of novel food color.

For example, Gatorade sought to extend their product line, but was limited by the fact that there are a finite number of fruit flavors, all of which can be found in competitor product lines. The Frost series, an example of which is shown in Figure 25.5, solved this problem by replacing the usual flavor references on the package with references to themes

FIGURE 25.5 Novel food color. The color of this 'Frost' drink is a cold blue, more readily associated with temperature than any fruit flavor.

of winter, with colors and names that evoked images of cold, ice and snow; images that are not inconsistent with themes normally positively associated with fruit beverages, but which are normally evoked in advertising and not by food color and flavor names. For example, Gatorade's Frost series includes 'Glacier Freeze', which comes in a clear strong blue color not unlike mouthwash, 'Whitewater Splash', which comes in a clear strong green, and one called 'Alpine Snow', which comes in a semi-translucent white. The consumer is therefore forced to consider and evaluate the Frost line of drinks in an entirely new context.

Other valuable future research would include replicating the color/flavor research while manipulating flavor along with food color and label information, so that any flavor-specific effects can be accounted for. Similarly, food category may also be manipulated in order to account for any food-category-specific effects. Future research should examine the specific meanings and associations that consumers have concerning clear or colorless

beverages, as well as the circumstances under which consumers may prefer less complete or less explicit product information.

Color–flavor interactions are one of the many possible multisensory interactions relevant to marketing and consumer behavior. Most other such interactions have heretofore been neglected, with the likely exception of proprietary research, and deserve future attention given their potential importance to understanding sensory marketing effects. For example, the new field of neuromarketing, which utilizes ever-improving instrumentation to map brain activity related to specific consumer tasks, holds much promise for understanding complicated multisensory effects.

5. THE INTERACTION OF SHAPE AND SIZE APPEARANCE

As with color, the full effects of other visual package elements, including size and shape, have not been fully explored. Interestingly, most of the work done so far looks at the effect of one of the visual elements, shape, on the other, size, with the general finding that humans err, at times grossly, in their package volume estimation judgments, and that complex container shape amplifies the error, and causes consumers to alter their estimation strategies. We begin by reviewing the literature on the interaction of these visual elements, though it may fairly be said that the more important effects of size and shape on identification, meaning, and contrast are less well-developed.

5.1. The importance of size to the consumer

The appearance of package size exerts an important, if problematical, influence on shoppers in the store. Size appearance is important because, in many package goods categories, there can be favorable connotations to consumers projecting a certain size appearance. For example, appearing small can be advantageous when 'small' favorably connotes high quality, elegance or ease of use, as it does with caviar, perfume, and cellular telephones. Conversely, appearing large can be advantageous when 'large' favorably connotes economy, value or long-lastingness, as it does with breakfast cereals and economy shampoos, such as Suave and Capri (the latter referred to in the trade as 'tanker' brands).

5.2. The importance of size appearance to the marketer

A complicating factor for the package designer or the manager that must create or select new packaging is that consumption-related utilitarian aspects place practical limits on how large or how small a package can actually be made to be, and, in turn, how large or how small it can or should be made to appear. For example, a big bottle or box that is attractive on the shelf can pall when it has to be lugged to the car, does not fit in the pantry, pours with difficulty, or spoils before it is used up. Conversely, a tiny box may lose its charm when its contents fail to live up to the quality or refinement that its precious size suggests, or its contents are used up in the blink of an eye.

Though consumers have size preferences, humans commonly and systematically err in their size estimations (Hundleby et al., 1993). It is therefore appearance of size, and not merely actual size, that affects the shopper. Actual size is therefore not as robust a predictor of perceived size as many might presume. Other visual characteristics of a container tend to confound the size estimation process, and can serve to deceive the viewer into believing that a container holds more or less than it actually does (Frayman and Dawson, 1981; Raghubir and Krishna, 1996). Those other visual factors that may confound

package size estimation may include height, shape, head space (whether actual or presumed), color, variegated color, value, container material, contents (whether actual or presumed), weight appearance, label elements including contrasting color and value (as in light or dark), text, logos, characters, photos, the size appearance of surrounding packages, and the viewer's degree of familiarity with any or all of the above. With respect to volume estimation, there is a sizable body of research also studying haptic effects, with the interesting result that there is an inverse relationship between perceived weight and perceived volume (Krishna, 2006).

5.3. Size/shape research

Given that size estimation research has a long history, about a hundred years, and that size consideration plays such an important role in consumer choice among packaged goods, it is surprising that it has been only recently that a few papers have appeared in the marketing literature addressing size estimation in a commercial context. These recent papers constitute a small stream, primarily investigating the effects of volume over-estimation on over-consumption in various consumption contexts. General findings indicate that people tend to consume more when they draw from what appears to them to be a larger rather than a smaller vessel (Raghubir and Krishna, 1999; Wansink, 1996; Wansink and van Ittersum, 2003).

Only two papers, Raghubir and Krishna (1999) and Folkes and Matta (2004), have examined volume estimation bias in a packaging context; the former in the context of cylindrical packages, the latter in context of tapered beverage bottles. Both demonstrate the significant main effect of package shape on volume estimation, and each illustrates one of the two main volume estimation strategies used by consumers, one dimension-based and the other shape-based. A dimensions-based approach, represented by Ragubir and Krishna, and referred to as the 'height-size illusion', presumes that people first seek out and estimate the linear dimensions of a container, and then infer size from them. For an example of the height-size illusion, see Figure 25.6. The elongation of the vertical dimension predominates over width and depth as an indicator of volume, and often is the only one used by consumers, who abhor covariance (Frayman and Dawson, 1981; Hundleby et al., 1993; Jenkins, McGahan and Richard, 1994; Krider, Raghubir and Krishna, 2001). A shape-based approach, represented by Folkes and Matta, presumes that humans view shape holistically and infer volume directly from package shape (Bingham, 1993; Jenkins, McGahan and Richard, 1994). This is the 'familiar size illusion'. Estimation error in this process may derive from the mental categorization that would underlie this process. For example, if a container being evaluated by a given consumer is thought of as mustard-jar-like, and if mustard jars hold a size meaning of, say, four ounces for that given consumer, then the consumer employing the 'familiar size' strategy may be inclined to assign a size of four ounces to the jar at hand, even when that jar is significantly smaller or larger than four ounces. A jar that is the same size but a very different though familiar size may fall into another shape category, and therefore may evoke an entirely different size reference, and subsequent size estimate. The 'familiar size' strategy therefore suggests that different package shape types may convey distinct size meanings, such that packages of the same size but different shapes may connote different sizes, appearing different in size from each other, as well as from their actual size.

What happens with more complex forms, where shape itself may serve to obscure linear dimensions, making them harder to discern as well as to estimate? According to Biederman (1987), complexity in geometric forms is a function of the number and prominence of its separate parts, and the number and prominence of the concavities that a

FIGURE 25.6 The height-size illusion. These 7-UP bottles encompass the same volume. The bottle on the right looks larger because it is taller, and has a larger cap.

Cap (head)

Neck

Shoulder

Body

Foot
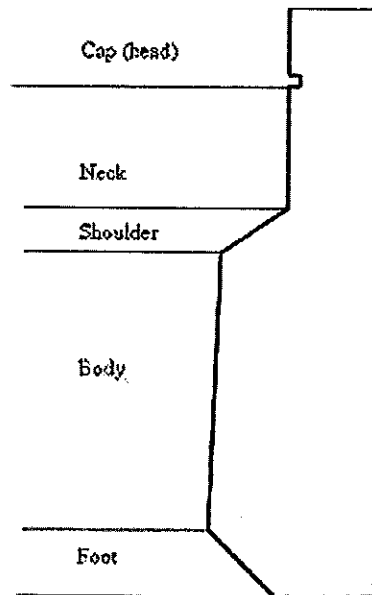
A taxonomy of bottle and jar parts is needed. Since most bottles and jars are symmetrical around the vertical axis (excluding handles), one can think of the distinct parts as stacked one on top of another; and analogous to the human form (though with bottles and jars, one or more of these parts may be missing!)

FIGURE 25.7 A taxonomy of package shape parts.

container displays. Compound complex forms, – containers made up of the conspicuous joining of two or more simple forms, as is the case, for example, with many salad dressing bottles, which commonly exhibit clearly delineated caps and necks, shoulders, bodies, and feet (see Figure 25.7), are commonly employed by package designers seeking unique and uniquely identifiable forms (Garber, Hyatt and Boya, 2007).

Biederman (1987), introduces what is now the prevailing theory of object recognition, which gives us clues as to how consumers may go about estimating the volumes of the

FIGURE 25.8 Package meaning.

most complex package containers of all, complex compound forms, where not only linear dimension, but simple shapes themselves, may be obscured. Called recognition-by-components theory (RBC), it provides a means by which we may define, measure and compare volumetric shape complexity. Recognition-by-components theory takes a decompositional approach to perceptual object recognition, and is (p. 115) '... conceptualized to be a process in which the image of the input is segmented at regions of deep concavity into an arrangement of simple geometric components, such as blocks, cylinders, wedges, and cones'. RBC .theory suggests that the recognition of objects comes from the prior processing of the simple volumes that comprise a compound complex form, which are subsequently integrated into whole objects by the brain. In Biederman's (1987) vernacular, these simple forms are called geons, and there are 32 of them. However, utility requirements constrain the range of shapes that packages may take, as well as the number and shape of its parts, and their means of joining, thus simplifying the demands for a package-specific shape part taxonomy. Such a taxonomy includes just five such simple package parts – cap, neck, shoulders, body and foot (Garber, Hyatt and Boya, 2007). Packages can then be characterized and categorized according to the presence of different levels of these separate shape parts.

Recent research on the shape/size relationship (Garber, Hyatt and Boya, 2007) indicates that the body of the package is the predominant indicator of perceived volume for consumers, suggesting that they infer container volume from their assessment of the most salient dimension of the most salient shape part. Clearly, though, package shape may have many more implications for store behavior than size appearance. In particular, shape may convey many intrinsic meanings, both symbolic and utilitarian, concerning the product it represents. For example, in a recent US promotional campaign by Perrier, the French sparkling water marketer, Perrier substituted like-sounding descriptors such as 'Sexier', Sassier', and 'Flirtier' for its own brand name on the package, as seen in Figure 25.8. Perrier gambled that other visual elements of their familiar, long-time, bottle would serve to identify the brand, while using the space normally reserved for brand name to connote and attribute new meanings and associations.

6. A METHOD FOR EMPIRICAL VISUAL RESEARCH

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, 1994), without much ability for generalization; or is broadly conceptual

without much ability for concrete application. An example of the latter is Bloch (1995), who offers 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. The method described in the following is intended to enable such experimentation. One reason for the lack of any far-reaching research on the visual elements of packaging may be that interested researchers do not know how to approach the problem empirically. Therefore, we propose a method of visual research taken from Garber (1995) and Garber, Burke and Jones (2000) that may enable such inroads to be made.

This method 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. Prior visual and point-of-purchase effects research (c.f. Burke et al., 1992) has typically relied on existing products, packages and displays to represent all manipulation levels for its experiments. Two exceptions are Veryzer and Hutchinson (1998), who physically alter photos of durable goods to achieve different levels of visual design elements including unity, harmony, to measure effects of aesthetic quality on consume choice; and Durgee and O'Connor (1994), who use the tissue box creations of an undergraduate design class to test the ability of designers to communicate intended messages to targeted consumers. However, in neither of these cases is there the attempt to create a standard process transferable or applicable to other visual research initiatives in marketing.

This method is appropriate for testing the effects of any visual element, 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.

A particular feature of this method is its ability to separate the sensory effects of a visual experience from the effects of prior experience. This confound is a longstanding problem in sensory research, as indicated by Duncker (1939, p. 255), who early on was concerned about the influence of past experience on perceptual properties. The method addresses such confounding, however, by using a combination of similarity scaling and correspondence analysis to disentangle these effects. Following, we provide a general description of this method, illustrated by visual stimuli generated and selected in Garber, Burke and Jones (2000).

6.1. Calibration for novelty of appearance

In a point-of-purchase marketing context, the sensory experience that is of interest is novelty. It is the surprising or unexpected visual stimulus that calls for (involuntary) attention; attention being the primary point-of-purchase goal of marketers, and therefore a primary role for package and product appearance. A typical convenience store layout puts competitor brands together into adjacent facings for comparison purposes. In that context, it is the package that departs significantly from the visual norms because it stands out from its more conventional neighbors.

In the method we describe, novelty is operationalized as the degree of dissimilarity of some changed package from an actual package for an existing familiar brand in an established product category. The following method allows the researcher to calibrate a set of visual stimuli according to the *relative* degree of novelty, relative to some base stimulus, that each of them exhibits.
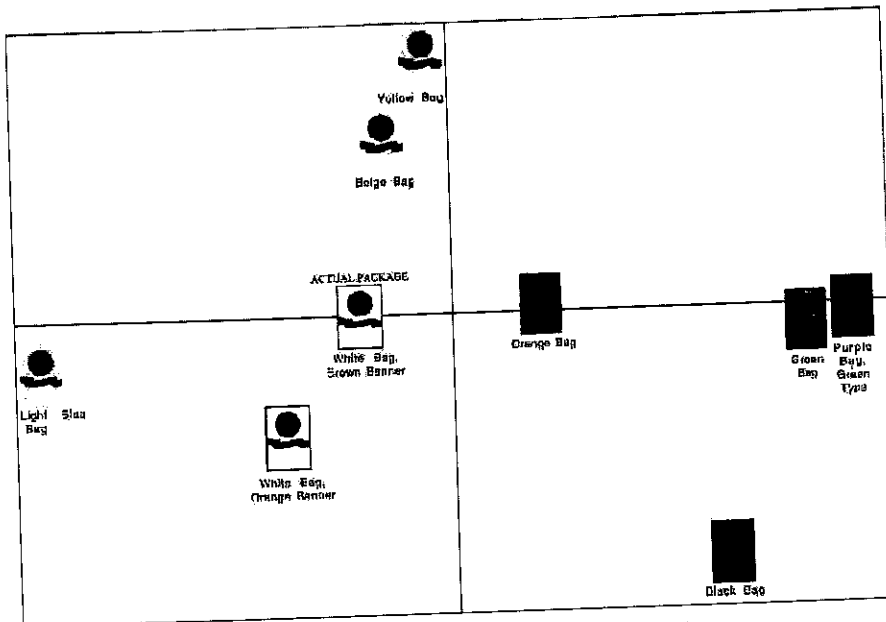
FIGURE 25.9 Perceived similarity of alternative gold medal packages.

In the case of our example, Gold Medal Flour bags, the actual bag, white in color, is our base stimulus. A number of altered bags were created exhibiting a range of different background colors, from beige and pale blue to purple and black, collectively representing a full span of alternatives along all the color dimensions of hue, value, and chroma (Gorn et al., 1997). (The more stimuli that are generated and tested, the more likely that final results will be robust. Since novelty is a relative stimulus, and evaluations come by means of comparison, the more comparisons that a subject makes, the more robust the final calibrations.) Each of the bag alternatives are paired with all other alternatives, on display cards, so that all pairwise combinations including those incorporating the actual bag are represented.

The subject task is to evaluate each of these stimulus pairs one at a time and rate the relative degree of similarity or dissimilarity, by appearance, within pairs. These data are then analyzed using the KYST multidimensional scaling algorithm (Kruskal, Young and Seery, 1973) as implemented in PC-MDS 5.1, or some other multidimensional scaling software from which low-dimension perceptual maps are generated, such as the map shown in Figure 25.9. 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 are perceived to be most similar to the base package in both the low-dimensional scaling solutions are classified as 'very similar', (e.g. white bag with orange banner, beige bag, orange bag). Candidates that are the furthest away from the original package are classified as 'very dissimilar' (e.g. the black and purple bags). Packages that fall between these two extremes are categorized as 'somewhat dissimilar'.

6.2. Calibration for meaning inferred from appearance

Visual cues are not simply direct sensory experience. Visual cues also trigger memory, leading to comprehension. The consumer therefore will draw upon past experience to process packages and products by their appearance. This describes the new role that

appearance takes on in the later stages of the decision process. Having come to a consumer's attention, appearance is used to confer meaning to the product it represents. It may also lead to forming expectations of how the product will perform.

In the method described, comprehension is operationalized as the brand performance profiles that consumers would associate with the products that each of the altered stimulus packages would represent and connote by their appearance. Researchers are able to calibrate a set of visual stimuli according to the performance-based meanings that each exhibits. Attributes become input to map the resulting brand and attribute sets onto a common, multidimensional space.

The subject task that generates the needed brand/attribute associations is as follows. The subject is presented with a matrix on which columns represent package appearance alternatives, including the base package stimulus, and rows represent a bundle of product performance benefits that consumers would consider when selecting brands for purchase. The top row of the matrix would include images of the brand packages visually representing each alternative being evaluated. The left-hand column would include each benefit attribute represented by a verbal descriptor, typically a sentence or two. The subject is asked to imagine and evaluate the product that each package variation contains, across the listed benefit attributes. The resulting input data is a frequency table indicating the number of subjects who associate a given package appearance alternative with a given benefit attribute.

The SIMCA correspondence analysis package (Greenacre, 1993), or some other correspondence analysis package, can be used to generate a map such as that shown in Figure 25.10, representing both the package alternatives and the attribute benefit sets as points in a low-dimensional space. The locations of the respective sets give meaning to specific locations within that space. From this, the researcher may infer and interpret, and ultimately compare, the individual performance profiles of each package alternative. The comparisons of interest are between each of the package alternatives and the actual, or base, package. Those packages that are placed physically close to the base stimulus may be interpreted in having a similar perceived performance profile, and therefore be similar in product performance meaning to the actual package; and, by extension, consistent in meaning with the category as a whole. Those packages that fall at a distance from the base package on any or several dimensions may be interpreted as having a profile that is inconsistent with the category.

For example, the actual Gold Medal bag is seen as being 'fresh quality', 'good value', 'naturally pure', and 'good tasting'. New packages with similar benefit profiles (like the beige bag) are classified as having meaning that is consistent with the category. New designs with very different benefit profiles (such as the black bag, which was seen as being 'inexpensive') are classified as being inconsistent in meaning.

Having used this pretest process to generate and calibrate as large a number of package appearance alternatives as possible independently for both novelty and meaning, the researcher is now able to select stimuli for the respective levels of novelty and consistency of meaning that each represents. Subsequent experiments that test the respective effects of novel appearance and consistency of meaning that a particular appearance connotes, on whatever set of dependent variables are of interest, are then able to be conducted. For example, Garber, Burke and Jones (2000) employed a computerized three-dimensional grocery simulation store developed by Burke (Burke, 1996; Burke et al., 1992) that uses 3D computer graphics to recreate the appearance of a grocery shelf on a 20-inch touch-screen monitor, as shown in Figure 25.11. Shoppers pan down the aisles of the store using a 3D trackball, 'pick up' products by touching their images on the screen, and rotate packages and magnify labels for closer inspection. To purchase a product, the consumer touches an image of a shopping cart and the package would fly into the basket. This
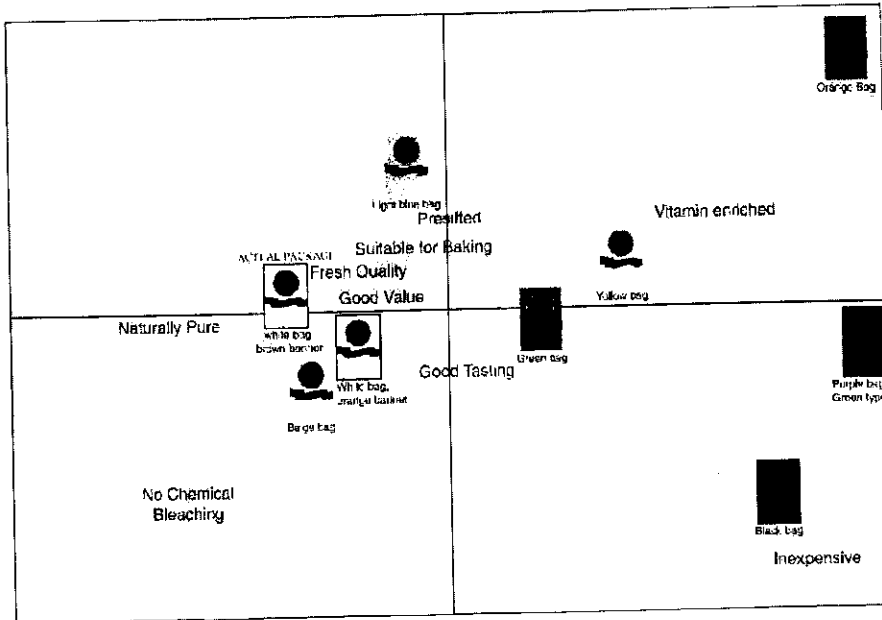
FIGURE 25.10 Attribute associations for alternative gold medal flour packages.
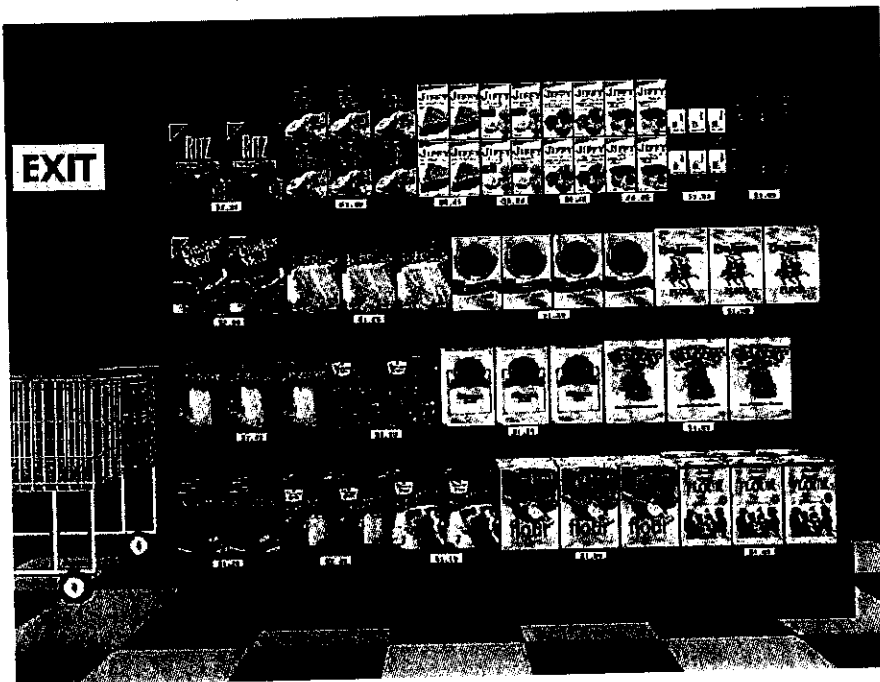

FIGURE 25.11 Burke's virtual reality grocery store.

simulation offers several advantages over existing methodologies. It provides the realism and visual clutter of an in-store experiment while delivering the control and process tracing measures of laboratory research. The computer unobtrusively records the amount of time consumers spent shopping in each category, the items they pick up, the amount of time taken to examine individual packages and labels, as well as the quantity of items

purchased. Consumer behavior in the virtual shopping simulation has been found to closely mirror behavior in the physical store (see Burke, 1996; Burke et al., 1992).

7. CONCLUSION

In summary, this chapter reviews the extant research on the effects of product and package appearance. It is organized in terms of the basic visual elements that comprise overall appearance, size, shape, and color (movement being an additional visual element that has to our knowledge received no treatment in the product and package literature). Research into these effects has received spotty attention at best, though it is generally understood that appearance is a strong mediator of attention, consideration and choice. A primary reason for this lack of attention may be because these visual elements, and appearance in general, are both hard to conceptualize in concrete terms and to test in empirical terms. A primary reason for both these inabilities is that these visual elements are strongly interacting, both with each other and their environment, making them hard to think about, because they are so hard to isolate, and their effects hard to test, because there are so many confounds to account for experimentally. We therefore also propose a method for dealing with these issues. We hope that this chapter will provide an impetus and a starting point for those who desire to do visual research of such an 'in-context' nature, and fill in the many gaps in a critical area for which there has been far too little research.

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