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articles

The interactive effects of colors and products on perceptions of brand logo appropriateness

Paul A. Bottomley
Cardiff Business School, UK

John R. Doyle
Cardiff Business School, UK

Abstract. *This article explores the role that color can play in building brand meaning with two experiments. Without prior conditioning, we demonstrate how an appropriately chosen color for a brand name (logo) can bring inherent and immediate value to a brand. Experiment 1 explores the notion of congruity, showing that it is more appropriate for functional products to be presented in functional colors, and sensory-social products in sensory-social colors. Experiment 2 examines the effect of red and blue on brands of products that can be classified as both functional and sensory-social, and the ability of color to enhance a brand's desired image. When people know how brands are attempting to position themselves, people consider colors congruent with those positions to be more appropriate.* ***Key Words*** ● *brand identity* ● *color* ● *connotative meaning*

Consumers associate certain brands with certain colors, such as Marlboro with red, Guinness with black, and Cadbury with purple (Grimes and Doole, 1998). Collectively, color, symbol, shape and lettering contribute to what Lightfoot and Gerstman (1998) define as *visual equity*. Visual equity is the value derived from 'visual form', that is the 'look and feel' of the brand. Visual equity contributes towards brand recognition, enabling a brand to stand out on the supermarket shelf (e.g. the iconic shape of the Coca Cola bottle). It also helps to communicate a brand's desired image (e.g. Prudential's Rock of Gibraltar logo with associations of strength; Keller, 1998). We focus here on the intrinsic meaning of color, that if

appropriately selected may bring, 'inherent and immediate value to the brand' (Kohli and LaBahn, 1997: 67), like a carefully chosen name.

But what makes a color appropriate for a product or conveying a brand identity, for instance in a logotype? Turning to the marketplace for guidance as to what constitutes an appropriate color-product combination may prove unhelpful on at least two counts. First, grocery store audits suggest that a package's primary color is often used to denote flavor (Garber and Hyatt, 2003). Second, based on a survey of 82 product categories, over 50 percent of store brands from two US supermarkets were found to imitate leading national brands' visual equity in terms of color, size and shape (Scott Morton and Zettelmeyer, 2000). While imitation may be the greatest form of flattery, the color selection decision for these copycat brands was essentially preordained, hence providing limited guidance regarding the color selection decision beyond 'follow the leader'.

This article investigates the role of color in brand image creation with two experiments. The first study explores the issue of congruity, showing that it is more appropriate for functional products to be presented in functional colors, and sensory-social products in sensory-social colors. The second study extends the first by exploring the ability of color to enhance or dilute brand identity and considers the interplay of visual (color) and verbal (benefit proposition) information. Finally, while prior studies have concentrated on single products, we use multiple product categories to empirically test, rather than merely speculate about, the generalizability of our findings.

The background literature

Keller (1998) defines brand elements as those trademarkable devices that help to identify and differentiate the brand. Color is only one element of a brand's projection endowed with inherent meaning, previous studies attesting to the influence of name (Keller et al., 1998; Klink, 2000), non-alphabetic logos (Henderson and Cote, 1998), and typeface (Childers and Jass, 2002). Whilst memory for the color of words is unusual during the normal course of reading (Light et al., 1975), color provides a valuable retrieval cue for adults (Tavassoli, 2001) and children (Macklin, 1996) when learning brand names. More importantly, colors evoke a variety of associations that, without prior conditioning, can be used to communicate a brand's desired image in the consumer's mind (Madden et al., 2000).

The inherent meaning of color has consequences, particularly in marketing applications. For instance, Bellizzi and Hite's (1992) work on store atmospherics suggests that people prefer blue rather than red retail environments, finding them more relaxing, encouraging longer periods of browsing, and greater purchase intention. Gorn et al. (2004) show that color influences how quickly a web page is perceived to download, and feelings of relaxation mediate this relationship. Similarly, Mandel and Johnson (2002) demonstrate that background colors and images on a website could act as primes influencing attribute importance and

product choice. Specifically, the 'wallpaper' on a car website featuring green with dollar signs successfully primed price, whilst red and orange flames primed safety.

Within branding, the inherent meaning of color has been examined using ad hoc collections of words describing various emotions, personality traits, and salient qualities for marketers (Grimes and Doole, 1998). For instance, Jacobs et al. (1991) found that US students associated black with expensive and powerful, blue with dependable, trustworthy and high quality, red with love, purple with progressive and inexpensive, gray with dependable and high quality and yellow with happy. Within the color psychology literature, more comprehensive frameworks have been utilized (Valdez and Mehrabian, 1994). For instance, Adams and Osgood (1973) surveyed people in 23 countries using Osgood et al.'s (1957) three dimensions of connotative meaning (Evaluation, Potency and Activity). They found that blue, green, and white were the most highly evaluated colors, whilst red and black were the most potent. Red was also considered the most active color, with black and gray the most passive.

Color preference studies suggest that, in general, hues are preferred in decreasing order of liking: blue, green, purple, red and yellow (Whitfield and Wiltshire, 1990), although liking of individual colors may be country specific. For instance, Madden et al. (2000) surveyed students from eight countries, and reported that while liking for black, green, red and white was culturally invariant, preferences for blue, brown, gold, orange, purple, and yellow were not. Just because you like a color does not necessarily make it appropriate for presenting a product or brand. However, researchers have found that favored colors are perceived to be favored across a wider range of situations than unfavored ones (Taft, 1997) thereby suggesting that they are more appropriate.

Color appropriateness: the notion of color-product congruity

We are interested in why people perceive that certain products should be displayed in certain colors. In an early study, Schiller (1935) had women rank the appropriateness of 20 color combinations for five products and five associations. Breakfast foods and soap (functional products) were best received in green-yellow, the color combination most strongly associated with economical and cleanliness (functional benefits). Similarly, dignity and luxury (sensory-social benefits) were most strongly associated with silver-black, the combination ranked second for perfume (sensory-social product). We contend that both colors and products have connotative meanings (sets of associations and overtones), and the greater their similarity, the more appropriate a color will be for a product or brand. Although the bases for similarity may differ, the notion of congruity has figured prominently in the advertising and persuasion literatures (e.g. Drolet and Aaker, 2002). In branding, Roth and Romeo (1992) showed that when country image is congruent with the benefits desired from product category use, purchase intention is enhanced. Likewise, Ruth (2001) found that brand evaluation is

enhanced with emotion-category congruity – the extent to which a brand's emotion benefit proposition matches the emotions associated with product usage.

A forerunner to our own line of enquiry is the work of Walker et al. (1986), who explored why certain typefaces are appropriate for some professions (products) and not others. They found that typeface appropriateness was determined by the extent a typeface shared inherent qualities with the concept it represented. For instance, Palatino Italic was judged feminine, bright, quiet and light, qualities associated with doctors and dentists ($r = .76$ and.77), whilst Braggadocio was considered masculine, rough and strong, qualities associated with builders ($r = .55$). In addition, Lewis and Walker (1989) observed notable behavioral consequences for conceiving of typeface as generating a second route to meaning, in addition to the word itself. Based on a pre-test, Palatino Italic was shown to have connotations of fast. In contrast Cooper Black connoted slow. People responded faster in an experimental task (pressing one of two keys to a simple semantic judgment) when the connotative meaning of the word matched that of the typeface (e.g. Cheetah in Palatino Italic; Tortoise in Cooper Black) than when word and typeface were incongruent.

Perceptual fluency refers to the ease with which a stimulus is processed. Research suggests that increasing perceptual fluency, for instance by prior 'mere exposure', increases our perceptions of a statement's truthfulness, a name's famousness, the duration of the stimulus, and how much we like it (Jacoby et al., 1989). Lee and Labroo distinguished between perceptual and conceptual fluency, which they defined as, 'the ease with which the target comes to consumers' minds and pertains to the processing of meaning' (2004: 151). Conceptual fluency, like perceptual fluency, leads to a more positive attitude towards the brand. Therefore, we infer that congruent color-product combinations will be processed more fluently (Lewis and Walker, 1989) and thus will be liked more, and rated as more appropriate, than incongruent combinations.

The framework

The normative framework of Park et al. (1986) provides a powerful means of classifying brands according to consumers' underlying purchase motivations. Brands can convey functional, sensory or social images. While functional brands fulfill consumers' utilitarian needs for problem solving or problem prevention, sensory brands fulfill needs for sensory pleasure and stimulation, including novelty and variety. Social brands fulfill symbolic needs for self-identity, group membership and affiliation. Roth (1995) explored the relationship between global brand image and performance using Park et al.'s framework. He found that brands were unlikely to emphasize both functional and sensory-social benefits as functional image ratings were highly negatively correlated with sensory ($r = –0.83$) and social ($r = –0.75$) ratings. In contrast, sensory and social image ratings were mildly positively correlated ($r = 0.25$), suggesting that brands may jointly emphasize such benefits. In addition, Park et al.'s purchase motivation typology broadly

corresponds to that used by Claeys et al. (1995) to classify products along the think-feel dimension of the FCB grid (Vaughn, 1980). Therefore, in the interests of parsimony, we shall aggregate products and brands into two categories: functional and sensory-social combined. Integrating, Park et al.'s (1986) normative framework with our notion of color-product congruity, we predict that:

> H1: It is more appropriate for functional (sensory-social) products/brands to be presented in functional (sensory-social) colors rather than sensory-social (functional) colors.

Assuming H1 is supported, this color-product interaction could be examined in many ways. We concentrate on the red-blue comparison because it is well documented, and the primary focus of previous marketing studies. Reanalysing Wexner (1954) provides evidence that red and blue have contrasting connotative meanings. She asked people to identify the most appropriate color, from a set of eight, to represent 11 mood-tones. Using frequency counts across this set of mood-tones, we constructed a color-by-color correlation matrix. As anticipated, blue and green were highly correlated ($r = 0.87$), while red and yellow were mildly related ($r = 0.18$). Most important, red and blue had the largest negative correlation ($r = –0.59$, $p < 0.05$), indicating that when red was judged appropriate for conveying a specific emotion (mood-tone), blue was judged inappropriate.

We likewise reanalysed Jacobs et al.'s (1991) cross-cultural color comparison (their Table 2). They asked people which color, from a set of eight, they most associated with 13 concepts, including emotions and personality traits, and reported whether 0–19 percent, 20–29 percent, 30–49 percent, or more than 49 percent of subjects made the color-concept association. From this information, we constructed a Spearman's rank correlation matrix. Once more, red-blue was the most negatively correlated pair of colors for American subjects ($r = –0.59$, $p = 0.03$). This finding also generalized, albeit weakly, across Japanese ($r = –0.35$), Korean ($r = –0.17$), and Chinese students ($r = –0.17$).

Madden et al. (2000) had students from eight countries rate 10 colors on 20 semantic differential scales. For each country a perceptual map was created. In general, blue, green, and white formed one cluster, black and brown another, while red was the only color to stand-alone. Madden et al. contend that drawing a straight line between red and the blue-green-white cluster creates, 'a spectrum of meaning (that) is evident across all countries' (2000: 98) running from active, hot and vibrant to calm, gentle, and peaceful. The remaining colors were located equidistantly from these endpoints. To summarize, we conclude that red and blue have contrasting connotative meanings based on evidence from different countries, collected at different points in time, and measured using different concepts and associations.

Evidence regarding the connotative meaning of products is limited, although many associations of colors appear to be highly germane to product category use. For instance, the connotations of blue with sincere, dependable and trustworthy (Jacobs et al., 1991) appear relatively more salient to the fulfillment of functional (e.g. a bank) rather than sensory-social needs (e.g. a night-club). In contrast, the connotations of red with exciting/stimulating, powerful/strong, cheerful/jovial

(Wexner, 1954), adventure and love (Jacobs et al., 1991) appear more relevant to the fulfillment of sensory-social needs. Thus, we predict:

H2: Blue will be more appropriate than red for functional products, and conversely, red will be more appropriate than blue for sensory-social products.

Pretest: distinguishing functional from sensory-social products and colors

A convenience sample of 15 academics and administrators identified functional and sensory-social products and colors. Participants considered purchasing a variety of products (40) and stated whether their decisions would be motivated by the fulfillment of functional or sensory-social needs using a scale with endpoints 'purely functional' (1) and 'purely sensory-social' (7). This procedure was adapted from Leclerc et al. (1994). Functional products were defined as, '. . . products that fulfill a need for problem solving or problem prevention'. Sensory-social products were defined as those 'that fulfill a need for personal expression, convey status, attain social approval . . . or sensory pleasure (look, taste or smell nice), variety or stimulation'. These definitions were adapted from Park et al. (1986).

There was good agreement as to the products' underlying benefits: median inter-subject correlation 0.75. To generalize our findings across materials and adequately sample the product space, the six most functional and six most sensory-social products were selected. The functional products chosen were: car tires (1.20), anti-freeze (1.27), electrician (1.40), kitchen roll (1.53), solicitors (1.60) and power tools (1.61). The sensory-social products were: perfume (6.47), expensive restaurant (6.20), nightclub (6.13), amusement park (6.07), chocolates (6.00), and ice cream (5.93). There was also good separation between the two product groups: power tools, the least functional of the functional products set, was rated lower than ice cream, the least sensory-social of the sensory-social products set (repeated measures $t(14) = -6.69$, $p < .001$).

An analogous analysis was conducted for color. People considered the associations evoked by 16 colors, judging the extent to which each color was 'purely functional' (1) or 'purely sensory-social' (7). Functional colors were defined as those that elicit 'associations that would be relevant for functional products, while sensory-social colors suggest associations that would be relevant for sensory-social products'. Not surprisingly, given the slightly unusual task, the inter-subject correlations were somewhat weaker, although still quite strong (median $r = 0.56$). Four functional (gray (1.47), black (2.40), blue (2.47) and green (3.13)) and four sensory-social (red (3.97), yellow (4.27), pink (5.40), and violet (5.67)) colors were selected. Again, there was good separation between the two color groups: green, the least functional of the functional colors set was rated lower than red, the least sensory-social of the sensory-social colors set (repeated measures $t(14) = -1.57$, $p = .06$, 1-tail test).

Method: subjects, procedure and materials

Thirty-five teachers and administrative staff (22 women) participated in the experiment in return for a donation to school funds. Subjects were tested individually in a room that was well lit by natural daylight, but out of direct sunlight, with beige walls and ceiling, and a neutral carpet. All sources of artificial light were switched off. Each person received a 13-page booklet. Page one introduced the task directing subjects to, 'Consider the fictitious company/brand Frampton. Take each version of what Frampton is or does, and rate the appropriateness of each color for that version of Frampton'. Ninety-six logos were presented (eight colors × 12 products), 10 on each page. Finally, manipulation checks assessed the needs satisfied by each product, and associations evoked by each color (1 = highly functional, 7 = highly sensory-social).

Each logo comprised the brand name set in a distinctive typeface and color, but devoid of secondary embellishments, an approach used by Sony, Boeing and Chanel (Carter and Higgins, 1999). Both the name and product (in parenthesis) were printed in the same color: Frampton's (night club). The logos were presented in maximum saturation and medium luminance resulting in a rich color, undiluted by black or white, and printed using Microsoft PowerPoint on a Hewlett-Packard DeskJet. Using the Windows color-definition system, the actual levels of hue, brightness and saturation were: black (0, 0, 0), gray (0, 128, 0), green (85, 128, 255), blue (170, 128, 255), red (0, 128, 255), yellow (40, 128, 255), dark pink (213, 128, 255) and purple (213, 66, 255).

Prior research indicates that names and fonts also possess inherent meaning (Keller et al., 1998; Klink, 2000; Walker et al., 1986). To minimize any font effect confounding the impact of color, all logos were presented in Broadway (24 point), and all instructions in Times New Roman (18 point). Doyle and Bottomley (2004) found, in a pretest of 25 fonts, that Broadway's average appropriateness ratings exhibited the least variance across 32 products, suggesting it was neutral. Similarly, two family names were selected (Frampton and Bamforth) and treated as a between-subjects factor. The names were relatively uncommon, given the number of telephone directory entries, and held no strong associations with any product or color, at least for these authors. Finally, to minimize any ordering effects, the logos were presented in two random orders. In summary, each subject rated the appropriateness of 96 logos, each displayed in a fully saturated color and neutral font, in one of two brand names, and in one of two random orderings.

Color appropriateness was measured on an 11-point scale with end-points 'highly appropriate' (10) and 'highly inappropriate' (0). Although many possible response variables could have been explored, including recall and recognition, most classic studies in color (Schiller, 1935) and typography (Walker et al., 1986) have used appropriateness, so one reason is simply to make contact with that literature. But, past studies have focused on appropriateness with good reason: it is a prime concern of anyone involved in selecting brand elements (color, name, font). Further, Doyle and Bottomley (2004) have found that people chose products (chocolate truffles that they actually consumed) more frequently when presented

in packaging with an appropriate font rather than an inappropriate font. Thus, there is evidence, albeit in a related domain, of a link between appropriateness and a response variable of central importance to marketers, namely brand choice.

Results

Manipulation checks

The effectiveness of the manipulations was checked using a single-item scale with the end-points 'highly functional' (1) and 'highly sensory-social' (7). There was good separation between the two product groups: the least functional of the functional products set was rated lower than the least sensory-social of the sensory-social products set ($M = 2.26$ vs. 5.60, repeated measures $t(34) = -8.24$, $p < .001$). Similarly, there was good separation between the two color groups: the least functional of the functional colors set was rated lower than the least sensory-social of the sensory-social colors set ($M = 4.34$ vs. 5.03, repeated measures $t(34) = -2.33$, $p < .026$). As anticipated, the associations evoked by functional colors were judged more relevant for the fulfillment of functional rather than sensory-social needs.

Main results

Whilst the principle of generalization to other subjects is well understood, researchers often neglect generalization to other materials (Clark, 1973). This provides an accurate description of color research in marketing which has relied on a few products and colors, but made little effort to combine these findings into formally justified statements regarding the population from which the samples were drawn. Our interest lies in generalizing to both subjects and materials. As our materials consisted of both a sample of colors and a sample of products, we conducted follow up analyses on a color-by-color and product-by-product basis.

H1: congruity between colors and products

According to H1, functional colors will be more appropriate than sensory-social colors for functional products, the converse being so for sensory-social products. To test this proposition, each subject's functional color appropriateness scores were averaged across the set of functional products and across the set of sensory-social products. Similar computations were performed for each subject's sensory-social color scores. The four new series were entered into a repeated-measures ANOVA. Product (functional vs. sensory-social), and color (functional vs. sensory-social) were treated as within-subjects effects, while name (Frampton vs. Bamforth) and problem order (order 1 vs. order 2) were treated as between-subjects effects. As the two between-subject factors and their higher order inter-

actions were not significant, we report results of a simplified analysis having excluding these factors from further consideration.

The main effects for color and product were not significant (F's < 1) but, as anticipated, the color × product interaction was ($F(1, 34) = 132.69$, $p < .001$), indicating that functional and sensory-social colors were not equally appropriate for functional and sensory-social products. Follow up within-product comparisons revealed that functional colors were more appropriate than sensory-social colors for functional products ($M = 5.75$ vs. 4.28; $F(1, 34) = 66.35$, $p < .001$). In contrast, sensory-social colors were more appropriate than functional colors for sensory-social products ($M = 5.75$ vs. 4.22; $F(1, 34) = 31.25$, $p < .001$). Similarly, the within-color comparisons revealed that sensory-social colors were relatively more appropriate for sensory-social products ($M = 5.75$ vs. 4.28; $F(1, 34) = 52.65$, $p < .001$), while functional colors were relatively more appropriate for functional products ($M = 5.75$ vs. 4.22; $F(1, 34) = 98.8$, $p < .001$).

Having shown the color-product interaction generalizes to different subjects (using the same materials), an obvious next question concerns the degree to which this interaction is true of all products and all colors sampled. This entails ruling out the following scenarios: (1) there exist a small number of functional (sensory-social) products for which functional (sensory-social) colors are relatively more appropriate than sensory-social (functional) colors; (2) there exist a small number of functional (sensory-social) colors for which functional (sensory-social) products are relatively more appropriate than sensory-social (functional) products; however the 'signal' from these few products (colors) may be sufficient to register a statistically significant interaction.

Adopting a product-oriented focus, taking each product in turn, we performed a repeated measures t-test comparing each subject's mean appropriateness ratings for (a) the set of functional colors with (b) the set of sensory-social colors. For functional products we expect (a) > (b), and for sensory-social products we expect (b) > (a). In 10 out of 12 cases the differences were significant ($p < .05$, 1-tail or better) and in the predicted direction. However, the supposedly functional kitchen roll was significant ($p < .05$), but in the wrong direction. While blue is associated with hygiene, black and gray are often linked with dirt and grime. When combined, this may have diluted the mean appropriateness rating for this set of functional colors. For detailed results, see Table 1.

Adopting a color-oriented focus, taking each color in turn, we performed a repeated measures t test comparing each subject's mean appropriateness ratings for (a) the set of functional products, with their mean ratings for (b) the set of sensory-social products. For functional colors we expect (a) > (b), whilst for sensory-social colors we expect (b) > (a). All eight differences were significant ($p < .05$, 1-tail or better) and in the predicted direction (see Table 2). Taken together these two sets of results indicate that colors considered functional are congruent with products considered functional, and judged to be more appropriate in which to display functional products. The same is true for colors and products considered sensory-social.

Table 1

Functional colors vs. sensory-social colors: a product-by-product analysis

Product	Functional colors	Sen.-soc. colors	Mean diff.	Std. error mean	Paired *t*-test	*p* value (1-tailed)
Functional						
Anti-freeze	5.71	4.36	1.34	0.33	4.07	.000
Car tires	6.11	3.59	2.52	0.27	9.20	.000
Electrician	5.87	4.39	1.48	0.27	5.46	.000
Kitchen roll	4.67	5.26	–0.59	0.29	–2.02	.026
Power tools	6.36	4.36	2.00	0.31	6.53	.000
Solicitor	5.77	3.73	2.04	0.32	6.41	.000
Sensory-social						
Amusement park	4.41	6.51	–2.10	0.34	–6.14	.000
Chocolates	3.49	5.08	–1.59	0.34	–4.65	.000
Ice cream	3.69	5.61	–1.91	0.32	–6.00	.000
Night club	5.08	6.30	–1.22	0.36	–3.39	.001
Perfume	3.91	5.82	–1.91	0.35	–5.39	.000
Restaurant (expensive)	4.73	5.16	–0.43	0.38	–1.14	.131

Note: Mean appropriateness ratings for each product averaged across functional (black, gray, green, blue) and sensory-social colors (red, yellow, pink, purple).

Table 2

Functional products vs. sensory-social products: a color-by-color analysis

Colour	Functional product	Sen.-soc. product	Mean diff.	Std. error mean	Paired *t*-test	*p* value (1-tailed)
Functional						
Black	6.24	3.95	2.29	0.33	6.97	.000
Gray	5.54	2.74	2.80	0.28	10.19	.000
Green	5.00	4.52	0.49	0.16	2.96	.003
Blue	6.21	5.67	0.54	0.23	2.38	.012
Sensory-social						
Red	5.16	6.14	–0.98	0.23	–4.29	.000
Yellow	3.06	3.99	–0.93	0.26	–3.57	.001
Bright Pink	4.34	6.56	–2.23	0.28	–7.76	.000
Purple	4.54	6.30	–1.76	0.23	–7.55	.000

Note: Mean appropriateness ratings for each color averaged across functional (anti-freeze, car tires, electrician, kitchen roll, power tools, solicitor) and sensory-social products (amusement park, chocolates, ice cream, night club, perfume, expensive restaurant).

H2: red vs. blue

Hypothesis 2 predicts red is more appropriate than blue for sensory-social products, the converse being so for functional products. Each subject's blue (red) appropriateness ratings were averaged across the six functional and the six sensory-social products separately. These four series were entered into a repeated measures ANOVA treating color and product as within-subjects factors. Whilst there was no main effect for color ($F(1, 34) = 2.13$, $p > .15$) or product ($F(1, 34) = 1.50$, $p > .23$), as anticipated, their interaction was significant ($F(1, 34) = 29.30$, $p < .001$). Follow up within-product comparisons revealed blue was more appropriate than red for functional products ($M = 6.21$ vs. 5.16; $F(1, 34) = 22.06$, $p < .001$), whilst red was marginally more appropriate than blue for sensory-social products ($M = 6.14$ vs. 5.67; $F(1, 34) = 3.17$, $p = .08$).

To assess the generalizability to other materials, we performed a product-by-product analysis comparing each subject's red and blue appropriateness ratings using a repeated measures *t* test. For functional products, we expect blue to be more appropriate than red, and for sensory-social products, red to be more appropriate than blue. In nine out of 12 cases these differences were significant ($p < .05$) and in the predicted direction. However, the supposedly sensory-social ice cream approached significance ($p < .1$), but in the wrong direction. Perhaps, the specific associations of blue with cold overwhelmed the more general hedonistic connotations of red. A summary of these results is presented in Table 3.

Table 3

Red vs. blue: a product-by-product analysis

Product	Blue	Red	Mean diff.	Std. error mean	Paired *t*-test	*p* value (1-tailed)
Functional						
Anti-freeze	6.91	5.63	1.29	0.66	1.95	.030
Car tires	5.63	4.49	1.14	0.38	3.04	.003
Electrician	6.20	5.54	0.66	0.38	1.71	.048
Kitchen roll	5.63	5.31	0.31	0.37	0.85	.200
Power tools	6.66	5.86	0.80	0.41	1.97	.029
Solicitor	6.23	4.14	2.09	0.43	4.84	.000
Sensory-social						
Amusement park	6.23	6.97	–0.74	0.36	–2.05	.024
Chocolates	4.51	5.66	–1.14	0.42	–2.73	.005
Ice cream	5.89	5.11	0.77	0.51	1.52	.069
Night club	6.31	7.17	–0.86	0.48	–1.79	.041
Perfume	5.14	6.17	–1.03	0.38	–2.70	.006
Restaurant (expensive)	5.94	5.74	0.20	0.41	0.49	.314

Discussion

Experiment 1 examined the impact of color when presenting a brand/product's logo. We offered two hypotheses. H1 predicted that functional colors would be more appropriate for functional rather than sensory-social products, whilst sensory-social colors would be more appropriate for sensory-social products. One specific aspect of this congruity hypothesis was further explored, namely the red-blue comparison, because it is well documented, and the primary focus of prior marketing studies. We predicted that blue would be more appropriate than red for functional products, whilst red would be more appropriate for sensory-social products. Both predictions were supported, suggesting that colors that are connotatively congruent with the product will be rated as more appropriate. Furthermore, the congruity hypothesis generalized to other subjects from the same population (by significance testing) and to other colors and other products (by replication) sharing the same selection characteristics as the ones used here.

Experiment 2

This study extends Experiment 1 in a number of important directions. Having found support for the notion of congruity, we now investigate the effect of color on products that can be classified as *both* functional and sensory-social. This 'bi-valence' gives these products greater flexibility in terms of brand identity, image, and positioning, which means they should also be easier to manipulate experimentally than products that are primarily functional or sensory-social. Based on H2, if blue is more appropriate than red for functional products, and vice versa for sensory-social products, then by inference red and blue should be judged as equally appropriate for these bivalent products. Second, while Experiment 1 focused on visual information, we examine here the interplay of visual (color) and verbal (benefit proposition) information. Third, brand logos will be evaluated holistically rather than explicitly considering color appropriateness per se. Thus, extrapolating H2 from products to brands, we predict:

> H3: Blue will be more appropriate than red for brands conveying a functional image, while red will be more appropriate than blue for brands conveying a sensory-social image.

Our review of the color meaning studies, such as Madden et al. (2000), would suggest that red and blue are maximally separated, being located at opposite ends of the color meaning spectrum. In contrast, our empirical results indicate that red and blue are minimally separated, with blue the least functional of the functional colors (M = 3.66, manipulation check) and red the least sensory-social of the sensory-social set of colors (M = 4.76). Acknowledging the different scales, time periods and countries as contributing factors to these contrary findings, we proceeded with the red-blue comparison because they met the desirable criterion of being judged equally appropriate across the set of 12 products considered in Experiment 1 (M = 5.65 vs. 5.94; see Table 3).

Pretest: identifying functional and sensory-social benefits

Pretest results from Experiment 1 revealed seven 'bivalent' products. Thus, a second pretest was conducted to identify functional and sensory-social benefits associated with these products. Twelve administrative personnel and graduate students evaluated the extent to which various attributes and benefits fulfilled functional rather than sensory-social needs on a single item scale with endpoints 'purely functional' (1) and 'purely sensory-social' (7) as previously defined. We selected the two most functional and two most sensory-social benefits to manipulate the desired brand image. For instance, the ability of shampoo to eliminate dandruff, and remove greasiness were considered highly functional benefits, whilst being invigorating and producing a radiant shine were considered highly sensory-social benefits; see Table 4.

Taking each product in turn, we performed a repeated measures *t* test comparing each subject's average score for (a) the pair of functional benefits with (b) the pair of sensory-social benefits (see Table 4, columns 3 and 5). Results revealed that each pair of functional benefits was rated lower than each pair of sensory-social benefits (all p's $< .01$). A series of independent measures *t*-tests also indicated that each pair of benefits differed from the scale midpoint ($p < .01$), with the exception of holidays and fun and spectacular locations that approached significance ($p < .07$). Thus, each pair of attributes was perceived as conveying functional or sensory-social benefits, but not both.

Experimental design: subjects, materials and procedure

Subjects were 126 business studies students. A two-page questionnaire was administered at the start of a lecture taking 10 minutes to complete. Although participation was voluntary, all completed questionnaires were entered into a prize draw. Materials consisted of seven choice problems. For each problem, subjects indicated the appropriateness of two logos for conveying a brand's desired image by allocating a budget of 100 points (a constant sum) between the two alternatives. As before, each logo comprised the name in a neutral font and a single color.

Presentation order was extensively counter-balanced. First, each product/brand conveyed a functional or sensory-social image. For example, brands of sofa were promoted as 'hardwearing with washable covers' or 'stylish with sumptuous fabrics'. Second, each product was presented in one of two family brand names: for example, Leighton's or Denbury's Sofas. A different pair of names was randomly allocated to each product. With seven problems, to limit the number of variants of the questionnaire to a manageable number, we adopted a split-plot design, creating two 'product sets' and two 'name sets' which were crossed. In Product Set A, brands of sofas, shampoo and holidays conveyed functional images, while brands of luggage, mountain bikes, sports watches, and health and fitness centers conveyed sensory-social images, and vice versa in Product Set B. Therefore, subjects evaluated brands with both functional and sensory-social

Table 4

Pretest results for experiment 2

Product category	Functional benefits	Mean of functional benefits (a)	Sensory-social benefits	Mean of sensory-social benefits (b)	Paired *t*-test (1-tailed) (a) vs. (b)
Health & fitness centres	Highly qualified instructors Scientific programs **	2.58	Beautiful décor Exclusive membership *	5.96	6.90 (.001)
Holidays	Reliable Efficient service *	2.88	Fun Spectacular locations **	4.79	2.93 (.007)
Luggage	Durable Lightweight **	2.08	Fashionable Color coordinated *	5.92	6.52 (.001)
Mountain bikes	Built to last Easy to maintain **	2.38	Raced by champions Adventurous *	5.63	6.08 (.001)
Shampoo	Eliminates dandruff Removes greasiness *	2.71	Invigorating Radiant shine **	4.92	6.61 (.001)
Sofas	Hardwearing Washable covers *	1.92	Stylish Sumptuous fabrics **	5.67	6.37 (.001)
Sports watches	Accurate Reliable **	2.79	Used by athletes Stylish *	5.29	3.63 (.004)

Note: In the main experiment, pairs of benefits labeled * appeared in Product Set A, while pairs of benefits labeled ** appeared in Product Set B.

images. Similarly, 14 family names were divided into two groups, Name Set 1 and Name Set 2, and a pair of names, one from each set, was randomly allocated to each product. In particular, Leighton, Hoyland, Bamforth, Colgrave, Newberry, Irving and Kersley (Name Set 1), were paired with Denbury, Montford, Timperley, Pettifer, Oldroyd, Amstey and Roycroft (Name Set 2), and allocated to sofas, shampoo, holidays, luggage, mountain bikes, sports watches and health and fitness centers respectively. Third, subjects judged the appropriateness of the blue logo relative to the red logo for conveying each brand's desired image by allocating a budget of 100 points between the two alternatives (a constant sum approach). In half the questionnaires, the red logo was always positioned above the comparable blue logo, and vice versa. Finally, in the interests of 'good housekeeping', the seven choice problems were presented in two random orderings.

To summarize, the experimental design was a 2 (brand image) × 2 (names) × 2 (color ordering) × 2 (problem ordering) mixed design. Subjects were randomly assigned to the 16 conditions. As in Experiment 1, the logos comprised the family brand name displayed in (Broadway, 24 point) and printed in a fully saturated color using PowerPoint. The actual levels of hue, brightness and saturation were: red (0, 128, 255) and blue (170, 128, 255). Finally, the dependent variable was the blue logo appropriateness score. (By definition, the red logo's appropriateness score is implicitly 100 minus the blue logo's score).

Results

Hypothesis 3 predicts that blue logos will be more appropriate than red logos for brands promoting a functional image, and vice versa for brands promoting a sensory-social image. To assess this proposition, we averaged each subject's blue logo appropriateness scores across their functional and sensory-social brands separately. Recall, Product Set A (B) was composed of three (four) functional and four (three) sensory-social brands. These two series were entered into a repeated-measures ANOVA with name (Name Set 1 or Name Set 2), problem order (watches or sofas first) and color order (blue before red logo or vice versa) as between-subjects factors.

As anticipated by H3, the within-subject benefit effect was significant ($F(1, 118) = 31.70$, $p < .001$) indicating that blue was more appropriate for brands promoting a functional rather than a sensory-social image ($M = 58.95$ vs. 48.29). The benefit effect was tempered by two marginally significant interactions with problem order ($F(1, 118) = 3.58$, $p = .061$) and color order ($F(1, 118) = 3.93$, $p = .050$). These interactions simply revealed that the main effect was not quite parallel, although clearly consistent with H3 in all cases. The average blue appropriateness scores for functional and sensory-social brands in problem order 1 were 59.5 vs. 45.49, and in problem order 2, 58.35 vs. 51.17. Similarly, the average blue appropriateness scores in color order 1 were 61.36 vs. 46.87, and in color order 2 were 56.61 vs. 49.64. No other main effects or higher order interactions were significant ($p > .15$).

Table 5

Blue logo appropriateness scores for brands promoting a functional vs. a sensory-social image: a product-by-product analysis (independent measures *t*-tests)

Product	Functional image	Sensory-social image	Mean diff.	Std. error mean	Unequal variance *t*-test	*p* value (1-tailed)
Health & fitness centres	54.52	65.30	−10.78	3.98	−2.71	.004
Holidays	53.32	29.84	23.68	3.95	5.96	.001
Luggage	58.00	48.95	9.05	3.63	2.49	.007
Mountain bikes	53.63	35.61	18.02	4.06	4.40	.001
Shampoo	64.78	37.74	27.04	3.92	6.90	.001
Sofas	62.73	60.16	2.57	3.85	.67	.253
Sports watches	64.84	59.30	5.54	3.67	1.51	.067

In the interests of generalization, a product-by-product analysis was conducted to determine whether the 'benefit effect' was true of all products sampled. For each product, an independent measures *t*-test was performed; see Table 5. In the case of shampoo, holidays, mountain bikes and luggage, the differences in blue logo appropriateness scores for functional brands compared to sensory-social brands were significant ($p < .05$, 1-tailed) and in the predicted direction, with sports watches marginally significant ($p < .07$). No difference was found for sofas. However, health and fitness centers were significant ($p < .05$), but contrary to expectations sensory-social benefits were judged more favorably in blue. It may be a case of 'two questions in one'. While health clubs (sensory-social) are associated with relaxation and pampering, qualities elicited by blue, fitness centers (relatively functional) are associated with strenuous physical exercise that is both hot and active, qualities elicited by red. In both cases, the specific associations run contrary to the general associations of functional products with blue and sensory-social products with red, and may have overwhelmed them on this occasion.

Nonetheless, taken as an ensemble, these results do confirm H3 even under the most unfavorable of conditions, namely an independent measures *t*-test (assuming unequal variance) of the blue logo appropriateness difference scores, conducted at the stimulus level ($n = 7$). The average gain of 10.70 appropriateness points per product was significantly different from zero ($p = .038$, 1-tailed). Thus, a brand's benefit proposition can make these 'bivalent' products as polar in terms of color choice, as the non-bivalent (functional *or* sensory-social) products analysed in Experiment 1.

Discussion and conclusions

Together, these studies respond to Garber and Hyatt's (2003) call for guidelines to assist marketing managers with the color selection decision. The initial study established that colors that are connotatively congruent with products are considered more appropriate. Specifically, functional colors are more appropriate for functional products, and sensory-social colors more appropriate for sensory-social products. Even red, the least sensory-social of our set of sensory-social colors, and blue, the least functional of our set of functional colors, supported this notion. The second study addressed within-product category heterogeneity, acknowledging that brands can adopt a variety of positioning strategies, and thus products may be more color tolerant than initially observed. Brands promoting a functional image were better received in blue, while brands promoting a sensory-social image were better received in red.

We have shown that colors and products have connotative meanings that are sufficiently shared by people to produce a systematic pattern of results consistent with our hypothesis, namely that congruent combinations will be judged more appropriate. However, these observed effects may have been amplified given: (1) the within-subjects nature of the task (multiple comparisons), (2) explicit instructions to rate appropriateness, and (3) color being the main distinguishing feature among a set of nearly identical logos. To assess the actual relevance and size of the congruity effect requires further study, ideally using downstream variables, such as brand attitude or brand choice, under conditions of incidental exposure, with richer stimuli, and a between-subjects design to minimize the extreme focus on color that characterizes the current tasks. Nevertheless, Doyle and Bottomley (2004) found that people chose chocolate truffles in a ratio of 3:1 from a box displaying an appropriate font for chocolates, rather than an inappropriate font. Thus, we are mildly confident that our results will have practical implications beyond our 'sterilized' world.[1]

To date, we have examined logos presented in a single color on a white background, yet many brands are associated with color combinations, such as FedEx with purple and crimson, BP with yellow and green. Work on the inherent meaning of color combinations has produced conflicting findings. For instance, Madden et al. (2000) asked people to select a color to partner a logo that consisted of a red, blue or green square. Colors with complementary meanings were paired with red; colors with consistent meanings were paired with blue; while green exhibited no obvious pattern across cultures. Having identified a color combination, the impact of foreground and background color might be explored using theories of color harmony (Morriss and Dunlap, 1987) that focus on issues of spatial balance and relative area to refine the meaning. While both Shell and McDonald's are associated with red and yellow, the colors are combined in different proportions. Do these differences contribute to subtle variations in connotative meaning?

From an international perspective, more research is required on color's cross-cultural meaning. For instance, Madden et al. (2000) suggested that blue, green,

red, white, black, and brown are culturally invariant, while purple, yellow and orange are not. Hupka et al. (1997) distinguished between primary emotions (anger, fear) that are genetically based with roots in evolution, and culturally based compound emotions (envy, jealousy). Colors associated with primary emotions were held more consistently across countries than colors with compound emotions, suggesting that brand images based on primary emotions offer more opportunities for standardization across countries. Consequently, we might expect IBM's logo (Big Blue) to convey a culturally invariant meaning, while FedEx's purple and orange trade-dress to be culturally variant, and requiring customization to ensure a consistent image in the global marketplace. Further, Tavassoli (2001) found that Chinese students had better memory for the color of logographs than American students did for the color of alphabetic words. With greater reliance placed on visual processing when reading logographs rather than words, the connotative meaning of color may be more important in communicating a desired brand image in eastern rather than western cultures.

From a methodological perspective, we treated connotative meaning as a uni-dimensional construct (functional vs. sensory-social), although multi-dimensional perspectives are popular within color psychology. For instance, Adams and Osgood (1973) measured color meaning in 23 countries using Osgood et al.'s (1957) three dimensions of connotative meaning (*E*valuation, *P*otency and *A*ctivity). Extending our notion of congruity, we might infer that potent products should be displayed in potent colors, active products in active colors, and good products in good colors. But, color is only one element of a brand's projection endowed with inherent meaning (Childers and Jass, 2002; Henderson and Cote, 1998; Keller et al., 1998). Future research should clarify whether the proposed approach for selecting colors for products and brands can be used in parallel fashion for selecting non-alphabetic logos (symbols), typefaces and names. We are confident it can be. While the relative effectiveness of our functional sensory-social measure compared to Osgood et al.'s (1957) framework remains a moot point, the latter is known to be robustly portable, having been successfully used to assess words, simple pictures and other non-verbal communications (Valdez and Mehrabian, 1994). What is clear is that future studies will need to integrate brand elements from several domains to advance understanding in this area.

Finally, our hypotheses were grounded in the empirical findings of laboratory studies on the inherent meaning of color 'chips'. This replication and extension of them to a different context suggests that this body of knowledge is not as insular or 'incestuous' as Whitfield and Wiltshire (1990) and others might suspect. As such, marketing managers wishing to explore the extensive literature on color psychology for purposes of brand building should take heart.

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Paul Bottomley is a Distinguished Senior Research Fellow at Cardiff University. Current research interests are in the areas of brand management, brand extensions, and visual equity, namely the value derived from the visual form, that is the look and feel of the brand. His previous work has been published in the *Journal of Marketing Research*, *International Journal of Research in Marketing* and *Organizational Behavior and Human Decision Processes.* Address: Cardiff Business School, Cardiff University, Aberconway Building, Colum Drive, Cardiff, CF10 3EU, UK. [email: bottomleypa@cardiff.ac.uk]

John Doyle holds a doctorate in experimental psychology and is a Distinguished Senior Research Fellow at Cardiff Business School. He has published in the *Journal of Marketing Research*, *International Journal of Research in Marketing*, *Management Science*, *Journal of Business Research*, *Organizational Behavior and Human Decision Processes*, and *Cognitive Psychology*. Research in progress relevant to this issue investigates the connotative impact of different aspects of a brand's visual projection (name, logo, colour, and font), their fit with purpose, and the psychological processes by which meaning is derived from them. Address: Cardiff Business School, Cardiff University, Aberconway Building, Colum Drive, Cardiff, CF10 3EU, UK. [email: DoyleJR@cardiff.ac.uk]