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Three-color Combinations for Effective Communication of Associated Adjectives in Laundry Detergent Packaging Design

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Abstract

Background Product packaging's function has evolved from merely protective to a critical tool for conveying brand identity and differentiation. While aesthetics was once secondary, they are central to the consumer experience, particularly in saturated markets. Of all the visual packaging design elements, color is paramount, strongly influencing consumers' first impressions and reflecting brand values. This study aims to identify packaging three-color combinations that effectively convey images through associated adjectives.

Methods This study was carried out in two stages. In the first stage, current laundry detergent packaging design trends were analyzed using the Munsell color system of hue, value, and chroma. In the second stage, a consumer survey was conducted to identify the color combinations that best communicated with certain associated adjectives. There were 173 participants. Participants were asked to respond to how well 30 stimuli's three-color combinations evoked images through associated adjectives using a 7-point Likert-type scale. Data was analyzed using chi-square tests, multiple regression analysis, and independent sample t-tests.

Results This study was carried out in two stages. In the first stage, current laundry detergent packaging design trends were analyzed using the Munsell color system of hue, value, and chroma. In the second stage, a consumer survey was conducted to identify the color combinations that best communicated with certain associated adjectives. There were 173 participants. Participants were asked to respond to how well 30 stimuli's three-color combinations evoked images through associated adjectives using a 7-point Likert-type scale. Data was analyzed using chi-square tests, multiple regression analysis, and independent sample t-tests.

Conclusions Consumer perceptions of laundry detergent associated imagery are strongly driven by label color, with hue having a more substantial influence than chroma. Color combinations on the label most strongly communicated product images and enhanced the product's market competitiveness, followed by the container and the cap.

Keywords Packaging Design, Color Combination, Associated Adjective, Color Image, Laundry Detergents

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1. Introduction

The growth of the e-commerce market, further catalyzed by events like the COVID-19 pandemic, has substantially changed consumer buying behaviors. Online platforms allow consumers to conveniently compare products without physical store visits (Gupta, 2015), while offline purchases allow hands-on product evaluation, fostering confidence in consumer choices (Wong, 2018). In this evolving landscape, packaging design has come to significantly influence consumer decisions along with various other factors, including personal preferences and external influences like branding and sensory experience (Wang et al., 2022). Thus, a product's visual appeal, primarily determined by its packaging, is pivotal. Color is often the initial visual product element consumers notice, so it is a critical communication tool and is an essential part of packaging design (Hurley et al., 2017). However, it is also vital to note that color, in isolation, cannot convey precise information. For this reason, associated adjectives paired with visual imagery play a crucial role.

Using colors to convey certain narratives is instrumental in molding consumer perceptions and can lead to greater sales, possibly leading to more purchases (Gabbas et al., 2021; Schwarz, 2022). Given the fact that colors evoke specific imagery, this study examined three-color combinations on laundry detergent packaging by analyzing design trends and conducting consumer surveys.

This study aims to establish packaging color guidelines by identifying the three-color combinations that most effectively convey associated adjectives, thereby communicating the intended images. Rather than assigning specific meanings to color combinations, we delved into how different experimental color combinations resonate with associated adjectives to convey distinct images and provide guidelines for their application. This study's research questions were as follows:

Research question 1. How should three-color combinations be used in packaging design to communicate associated adjectives effectively?

Research question 2. How do the hues, values, and chromas of three-color combinations in packaging design to convey the images associated with associated adjectives?

2. Literature review

2. 1. Visual elements in packaging design

Historically, the primary role of product packaging was protective, safeguarding its contents from potential harm with aesthetics being essentially an afterthought (Schifferstein et al., 2022). However, as the commercial environment evolved, so did the function of packaging. It began to play a critical role in product accessibility and logistical efficiency and had a greater influence over product image (Hurley et al., 2017). This shift caused packaging to not only protect products but also communicate brand messages to potential buyers (Yam et al., 2005; Orth & Malkewitz, 2008; Lydekaityte & Tambo, 2020).

Packaging transcended its essential protective function with changing market dynamics, becoming instrumental in establishing and differentiating brand identities (Chuang & Ou, 2001). Today, businesses recognize packaging's ability to shape the consumer experience. Many consumers regard aesthetic appeal as equally important, if not more so, than the protective utility of packaging (Boz et al., 2020).

Among the various visual elements of packaging, such as structure, typography, and graphics, color has the greatest influence on consumer perceptions (Ares & Deliza, 2010; Spence, 2016; Mutsikiwa et al., 2013). Color often forms the basis for a consumer's initial impression of a product (Kuo et al., 2021). Color has a strong influence over commerce (Labrecque & Milne, 2011; Krishna et al., 2017). Beyond attracting attention, color is intertwined with product narratives and brand values, communicating a brand's identity and trustworthiness. In today's competitive marketplace, where packaging aesthetics are pivotal to consumer decisions, visual elements have become integral to product marketing strategies. As a result, many brands integrate strategic design elements into their packaging that are designed to leave a lasting impact on consumers.

2. 2. Color image and associated adjectives

Packaging design shapes initial consumer interactions with the product and their subsequent perceptions, so color is not merely an aesthetic choice. It is a strategic tool that significantly influences product categorization, brand imagery, emotional connection with associated adjectives, perceived quality and value, and brand identity (Chuang & Ou, 2001; Garber & Hyatt, 2003; Bottomley & Doyle, 2006). Colors can elicit diverse emotional responses from consumers, from admiration to, at times, displeasure. The role of packaging color has a profound impact on brand communication and purchase decisions (Gabbas et al., 2021).

As a brand's visual language evolves, the use of associated adjectives to evoke imagery becomes more pronounced. These associated adjectives enhance the emotional and symbolic nuances of colors, increasing the likelihood that the target audience will receive the intended message (Sutopo, 2023). When the association between a color and its associated adjectives is strong, consumers consistently interpret the meaning of packaging colors as intended (Mogaji, 2021). For instance, red evokes vigor, while blue suggests calm and reliability (Schwarz, 2022). Given that certain colors are linked with specific associated adjectives, such as red with passion and blue with trustworthiness, leveraging these colors empowers brands to communicate their core values more effectively, such as being innovative or reliable (Jin et al., 2019). However, these associated adjectives must be genuinely manifested in the products. Discrepancies can cloud consumer understanding, potentially diminishing the product's appeal (Millis & King, 2001).

The importance of the relationship between colors and associated adjectives to branding cannot be understated. Packaging color palettes must be meticulously selected to reflect the brand's essence and distinctive features and increase its emotional appeal. Color combinations are crucial ways that brands can create a unique identity in crowded marketplaces (Gabbas et al., 2021). To harness the power of the relationship between colors and associated adjectives, brands' color palettes must be properly chosen to cause with associated adjectives, ensuring that consumer emotional reactions are powerful and targeted emotional reactions in consumers. While an exhaustive discussion on color combination dynamics, such as the merits of three-color combinations, is beyond the scope of this study, using the correct colors to communicate with associated adjectives remains is fundamental to visual storytelling and consumer engagement.

2. 3. Color combinations and associated adjectives

Colors are characterized by three foundational attributes: hue, value, and chroma (Gabbas et al., 2021; Pereira, 2021). Understanding these attributes allows for a more nuanced exploration of color combinations in design contexts. This study analyzes how certain color combinations evoke images through associated adjectives.

Color combinations can be used in design to evoke specific emotions and communicate brand narratives. Combining multiple colors changes consumers' emotional responses from what they would have with individual colors (Chuang & Ou, 2001). For instance, while green is typically associated with eco-friendliness, its perception can be changed by changing the color's value and chroma (Guo et al., 2020). Historically, individual colors have been tied to broad emotional responses and perceptions (Clarke & Costall, 2008; Hanada, 2018). However, juxtaposing two colors can heighten these emotional responses. For example, while red and black signify aggression, red and yellow signify warmth and red and blue can induce feelings of unrest (Elliot & Maier, 2012). Established associations, like the combination of green and yellow's link with cleanliness, have been strategically employed in soap packaging (Bottomley & Doyle, 2006).

The interplay of three colors can be used to produce a wider variety of emotional responses than fewer colors. Three-color combinations can enrich the intricacy of emotional responses and better communicate visual narratives (Gupta, 2015). Combining three colors does not have a mere additive effect, instead producing different emotional responses than the individual colors would alone. Three-color combinations can have diverse cultural associations, making them exceptionally advantageous for cross-cultural branding efforts (Wang et al., 2022). Given these unique attributes, there is a compelling need to study further and understand how combinations of three colors work together. This versatility helps three-color combinations better communicate associated adjectives that are crucial parts of brand stories to diverse audiences. Three-color combinations can increase the efficacy of associative communication (Beaird et al., 2020).

Three-color combinations excel at evoking nuanced emotions and portraying intricate brand stories because of the vast number of possible combinations. Meticulously selected three-color combinations with synergy balance simplicity with the ability to communicate complex meaning, so emerging as a potent tool in visual communication. This study's hypotheses were as follows:

Hypothesis 1. The hue, value, and chroma of laundry detergent packaging colors will have different effects on consumers' perceptions of images evoked through associated adjectives.

Hypothesis 2. The container, label, and cap of laundry detergent packaging will have different effects on consumers' perceptions of images evoked through associated adjectives.

Hypothesis 3. The value and chroma of laundry detergent packaging will have different effects on consumers' perceptions of images evoked through associated adjectives when the hue is kept constant.

3. Methods

3. 1. Product selection

This study investigated laundry detergents because they are low-involvement products widely utilized by people from most demographics and purchase decisions about them are often influenced by scent or brand image. The laundry detergents selected for analysis were the 10 best-selling laundry detergents (Bigdata finance platform, n.d., retrieved 2022; Nielsen Korean Click, n.d., retrieved 2022).

3. 2. Categorization and analysis of detergent packaging design

Laundry detergent packaging designs were categorized and analyzed based on their color, label, graphics, and typography, which is the system used by Mutsikiwa & Marumbwa (2013) and Boz et al. (2020). This study examined packaging color due to its profound impact on consumers' initial package perceptions, so instead of defining colors as primary, secondary, or accent, this study categorized them according to whether they were on the container, label, or cap. This categorization better reflected the characteristics of laundry detergent packaging. Images sourced from brand websites revealed distinct patterns in how packaging parts were colored. Containers and caps typically utilized a single color, while labels displayed a mix of colors primarily for branding and detailing. Although the labels featured many colors, colors from minor details or texts might not significantly impact the overall perception of the product. Therefore, the primary colors, specifically those that constituted more than 70% of the label's colored area, were analyzed. The dominant colors in label design are crucial in shaping the overarching impression and brand image, making this approach essential for capturing core insights. Other visual elements were excluded from this study.

The colors' CMYK and RGB values were determined by Korean Standard Color Analysis. The Wallkill color tool was then used to translate these values to the Munsell color system, which defines colors by their hue, value, and chroma. The hues that were analyzed were those of the Munsell system: white (N10), black (N0), red (R), yellow-red (YR), yellow (Y), green-yellow (GY), green (G), blue-green (BG), blue (B), purple-blue (PB), purple (P), and red-purple (RP). Colors occupying areas less than or equal to 5% of the container, label, and cap's colored area were excluded from the analysis.

3. 3. Current laundry detergent packaging design trends

Examination of current laundry detergent packaging design trends revealed a spectrum of characteristics (Fig. 1 and 2). Laundry detergents have various attributes, such as emphasizing functional solid properties and being natural and eco-friendly. Various color combinations were used to incorporate different hues, values, chromas, and complementary colors. Colors were distributed from 10GY to 10PB, with B and PB hues being prevalent. Colors tended to have lower values and higher chromas, especially when the product emphasized its functionality. Detergents that utilized colors situated centrally on the color wheel, namely those between 5Y and 10G, predominantly communicated eco-friendliness. These colors tended to have higher values and lower chromas. YG and B hues used for functional products like soap communicate functionality (Bottomley & Doyle, 2006). There were also a variety of adjectives used on the packaging. Descriptors like "strong" and "fresh" were more common on products that communicated functionality. In contrast, adjectives associated with nature were more common than those that communicated eco-friendliness. This study was conducted on colors and their associated adjectives to better understand how brands can communicate through their packaging.

Brand	Product Image	Container color analysis	%	Label color analysis	%	Color combination		Shape	Graphics	Adjective
Persil		HVC: 1.75G, 6.02, 9.62 (CMYK: 64, 0, 43, 34) (RGB: 59, 168, 95)	30.7%	HVC: N, 8, 0 (CMYK: 0, 0, 0, 0) (RGB: 255, 255, 255)	32.9%	Container	HVC: 1.75G, 6.02, 9.62 (CMYK: 64, 0, 43, 34) (RGB: 59, 168, 95)		Brand Logo Cloth Textile Simple Graphic (Bean)	Strong Meticulous Clear Fresh Various
		HVC: 3.30GY, 7.97, 7.89 (CMYK: 8, 0, 54, 18) (RGB: 193, 209, 96)	28.2%	HVC: 1.61G, 3.97, 7.96 (CMYK: 88, 0, 47, 56) (RGB: 15, 111, 59)	22.3%	Label	HVC: N, 8, 0 (CMYK: 0, 0, 0, 0) (RGB: 255, 255, 255)			
		HVC: 7.32R, 4.88, 16.83 (CMYK0, 78, 81, 11) (RGB: 227, 51, 42)	10.8%	HVC: 9.99GY, 6, 10.19 (CMYK: 55, 0, 57, 35) (RGB: 71, 161, 70)	13.3%	Cap	HVC: 7.32R, 4.88, 16.83 (CMYK0, 78, 81, 11) (RGB: 227, 51, 42)			
		HVC: 1.61G, 3.97, 7.96 (CMYK: 88, 0, 47, 56) (RGB: 71, 161, 70)	6.2%	HVC: 7.32R, 4.88, 16.83 (CMYK0, 78, 81, 11) (RGB: 227, 51, 42)	11.5%					
Sugar bubble		HVC: 4.08GY, 8.95, 1 (CMYK: 1, 0, 8, 10) (RGB: 206, 209, 194)	52.7%	HVC: 4.04B, 7, 6.2 (CMYK: 50, 9, 0, 20) (RGB: 99, 180, 198)	39.8%	Container	HVC: 4.08GY, 8.95, 1 (CMYK: 1, 0, 8, 10) (RGB: 206, 209, 194)		Brand Logo Human Coconut Lemon Lake	Clean Trustworthy Soft Neat Healthy Delicate
		HVC: 4.04B, 7, 6.2 (CMYK: 50, 9, 0, 20) (RGB: 99, 180, 198)	34.5%	HVC: 9.48G, 8.8, 1.05 (CMYK: 7, 0, 3, 11) (RGB: 210, 227, 221)	9.78%	Label	HVC: 4.04B, 7, 6.2 (CMYK: 50, 9, 0, 20) (RGB: 99, 180, 198)			
		HVC: 2.08GY, 6.99, 8.01 (CMYK: 5, 0, 62, 29) (RGB: 71, 161, 70)	10.7%			Cap	HVC: 2.08GY, 6.99, 8.01 (CMYK: 5, 0, 62, 29) (RGB: 71, 161, 70)			
		HVC: 9.99GY, 6, 10.19 (CMYK: 55, 0, 57, 35) (RGB: 206, 209, 194)	5.28%							

Figure 1 Analysis of visual elements of detergents packaging design

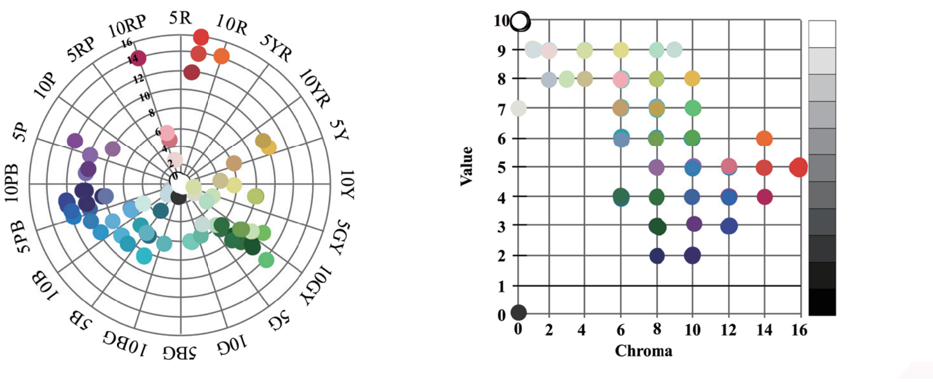

Figure 2 Color distribution of detergents: Hue, Value, Chroma

3. 4. Associated adjectives

The analyzed packaging of current laundry detergent brands revealed 38 distinct adjectives prominent in advertising and promotions. These adjectives, often featured in taglines or as integral parts of brand names, highlight their consistent use and significance in the industry. Given their current synergy in conveying brand messages, we utilized these adjectives to understand the images they evoke when paired with certain three-color combinations. Among these adjectives, only those frequently used and consistently appearing across top brands were shortlisted for our experiment. While elements like typography and design structure influence the consumer experience, our study focuses on color's role in communicating these images.

The adjectives, related to the study's theme, were refined to ensure their semantic accuracy and relevance. Particular attention was paid to ensuring that English translations retained the nuances of their original Korean meanings. Those not aligned with our research objectives, such as "suitable" and "appropriate," were excluded. A professor specializing in Korean language and literature was consulted to finally select the adjectives that were contextually relevant to the Korean market. The final list of adjectives is “strong,” “mild,” “safe,” “fresh,” “fragrant,” “natural,” and “clean.”

3. 5. Stimuli

Survey stimuli were developed by applying three-color combinations to laundry detergent packaging designs with one color each for the container, label, and cap. Rather than using standard color swatches, a tangible representation was used that was similar to actual product designs. Single colors were used to control for other influences, so elements that might affect the colors, like shadows, were removed. To focus solely on color, typography and layout were excluded from the stimuli.

The stimuli were created using the 11 Munsell color system hues (Table 1). A total of 30 stimuli were created with the same shape and size but different colors (Fig. 3).

Table 1 Color Analysis

Container \ Label	N	R	YR	Y	GY	G	BG	B	PB	P	RP
N	●	○ PB ○ G	○ PB	●	○ R ○ PB			● GY	○ G ○ R		○ PB
R	○ PB	●							●	●	
YR	○ N								●		
Y	○ N ○ PB			●		● N			○ B		○ N
GY	●				●			● G			
G	● R			○ N ○ R		●					
BG							●				
B	● R ● RP			○ N			● R	●	●● R		
PB	● R								●		
P		○ Y		○ N						● R	
RP											

● Detergent Products ○ Non-detergent Products

* Row: ner color; Column: label color; Cell: cap color

Figure 3 An example of Stimuli

3. 6. Survey

The survey was conducted online in a controlled setting with participants from various age groups. Participants observed 30 stimuli individually and were asked to rate how vividly the associated adjectives evoked specific images for them using a 7-point Likert scale where 1 means “strongly disagree” and 7 means “strongly agree.” A total of 173 respondents participated in the survey (Table 2). The resulting data was analyzed using IBM SPSS Statistics 26.0 software. Within our analysis framework, we deconstructed color combinations into hue, value, and chroma and statistically determined which combinations best evoked specific adjectives. This methodology was designed to deeply understand the influence of individual color components on the imagery and associations. The reliability analysis showed a Cronbach's alpha value of .780, indicating satisfactory internal consistency.

Table 2 Demographic Characteristic

		Total N(%)
Sex	Male	75(43.35)
	Female	98(56.65)
Age	20s and under*	88(50.75)
	30s	49(28.32)
	40s	27(15.61)
	50s and above	9(5.20)
Job	Secondary and College students*	40(23.12)
	Graduate students	33(19.08)
	Office worker	73(42.20)
	Housewives	12(6.94)
	Etc.	15(8.67)
Design Major	Yes	52(30.06)
	No	121(69.94)
Education	Middle School	2(1.16)
	High School	29(16.76)
	Bachelor's Degree	106(61.27)
	Master's Degree	32(18.50)
	Etc.	4(2.31)
	Total	173(100.00)

* 4 participants who were in their 10s and secondary school students.

4. Results

4. 1. Result by hue

Chi-squared tests were conducted to determine whether the strength of consumer perceptions of associated adjectives varied by hue. The responses were categorized as follows: 1–3 was recoded to 1, 4 was recoded to 2, and 5–7 was recoded to 3, representing weak, neutral, and strong perceptions.

Strong

Analysis of the "strong" in relation to the hues of the container, label, and cap revealed significant associations for all hues (containers: X^2 = 448.014, df = 20, p < .000, λ = .111; labels: X^2 = 879.326, df = 18, p < .000, λ = .207; caps: X^2 = 348.198, df = 16, p < .000, λ = .095) (Tables 3–5). Container hues of YR (86.7%), R (78.0%), and Y (57.2%); label hues of N0 (81.9%), YR (78.6%), R (65.3%), and Y (60.4%); and cap hues of R (60.1%), N0 (55.9%), and RP (55.9%) were most strongly associated with the "strong" image.

The hues of the labels (λ = .207) were most likely to produce a "strong" image, followed in descending order of influence by those of the containers (λ = .111) and caps (λ = .095).

Table 3 Crosstabulations between 'Strong' and container hue

	N10	R	YR	Y	GY	G	BG	B	PB	P	RP
1	763(49.0%)	29(16.8%)	19(11.0%)	297(34.3%)	132(76.3%)	316(60.9%)	109(63.0%)	417(48.2%)	75(43.4%)	89(25.7%)	52(30.1%)
2	208(13.4%)	9(5.2%)	4(2.3%)	73(8.4%)	15(8.7%)	52(10.0%)	18(10.4%)	70(8.1%)	82(47.4%)	219(63.3%)	99(57.2%)
3	586(37.6%)	**135(78.0%)**	**150(86.7%)**	**495(57.2%)**	26(15.0%)	151(29.1%)	46(26.6%)	378(43.7%)	16(9.2%)	38(11.0%)	22(12.7%)
total	1577(100.0%)	173(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	346(100.0%)	173(100.0%)

x^2 = 448.014, df = 20, p<.000, λ = .111

Table 4 Crosstabulations between 'Strong' and label hue

	N10	N0	R	YR	Y	GY	G	B	PB	RP
1	485(56.1%)	62(11.9%)	167(24.1%)	43(12.4%)	205(29.6%)	196(56.6%)	154(89.0%)	178(51.4%)	449(43.3%)	107(61.8%)
2	82(9.5%)	32(6.2%)	73(10.5%)	31(9.0%)	69(10.0%)	66(19.1%)	10(5.8%)	33(9.5%)	113(10.9%)	16(9.2%)
3	298(34.5%)	**425(81.9%)**	**452(65.3%)**	**272(78.6%)**	**418(60.4%)**	84(24.3%)	9(5.2%)	135(39.0%)	449(43.3%)	50(28.9%)
total	865(100.0%)	519(100.0%)	692(100.0%)	346(100.0%)	173(100.0%)	346(100.0%)	1038(100.0%)	173(100.0%)	173(100.0%)	173(100.0%)

x^2 = 879.326, df = 18, p<.000, λ = .207

Table 5 Crosstabulations between 'Strong' and cap hue

	N10	N0	R	Y	GY	G	B	PB	RP
1	582(67.3%)	523(33.6%)	43(24.9%)	130(75.1%)	260(50.1%)	73(42.2%)	412(47.6%)	209(24.2%)	523(33.6%)
2	74(8.6%)	163(10.5%)	26(15.0%)	14(8.1%)	57(11.0%)	28(16.2%)	104(12.0%)	582(67.3%)	163(10.5%)
3	209(24.2%)	**871(55.9%)**	**104(60.1%)**	29(16.8%)	202(38.9%)	72(41.6%)	349(40.3%)	74(8.6%)	**871(55.9%)**
total	692(100.0%)	865(100.0%)	1557(100.0%)	173(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)

x^2 = 348.198, df = 16, p<.000, λ = .095

Mild

Analysis of the "mild" in relation to the hues of the container, label, and cap revealed significant associations for all hues (containers: X^2 = 696.618, df = 20, p < .000, λ = .152; labels: X^2 = 937.291, df = 18, p < .000, λ = .206; caps: X^2 = 643.213, df = 16, p < .000, λ = .125) (Tables 6–8). Container hues GY (72.3%), B (51.4%), and N10 (51.4%); label hues G (75.7%), GY (61.6%), and B (56.6%); and cap hues GY (85.5%) and N10 (54.2%) were most strongly associated with the "mild" image.

The hues of the labels (λ = .206) were most likely to produce a "mild" image, followed in descending order of influence by those of the containers (λ = .152) and caps (λ = .125).

Table 6 Crosstabulations between 'Mild' and container hue

	N10	R	YR	Y	GY	G	BG	B	PB	P	RP
1	534(34.3%)	140(80.9%)	138(79.8%)	584(67.5%)	26(15.0%)	332(64.0%)	74(64.0%)	534(34.3%)	140(80.9%)	138(79.8%)	584(67.5%)
2	222(14.3%)	16(9.2%)	18(10.4%)	59(6.8%)	22(12.7%)	51(9.8%)	28(16.2%)	222(14.3%)	16(9.2%)	18(10.4%)	59(6.8%)
3	**801(51.4%)**	17(9.8%)	17(9.8%)	222(25.7%)	**125(72.3%)**	136(26.2%)	71(41.0%)	**801(51.4%)**	17(9.8%)	17(9.8%)	222(25.7%)
total	1577(100.0%)	173(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	346(100.0%)	173(100.0%)

x^2 = 696.618, df = 20, p<.000, λ = .152

Table 7 Crosstabulations between 'Mild' and label hue

	N10	N0	R	YR	Y	GY	G	B	PB	RP
1	410(47.4%)	434(83.6%)	473(68.4%)	189(54.6%)	499(72.1%)	69(19.9%)	32(18.5%)	100(28.9%)	493(47.5%)	124(71.7%)
2	125(14.5%)	37(7.1%)	73(10.5%)	54(15.6%)	65(9.4%)	64(18.5%)	10(5.8%)	50(14.5%)	152(14.6%)	18(10.4%)
3	330(38.2%)	48(9.2%)	146(21.1%)	103(29.8%)	128(18.5%)	**213(61.6%)**	**131(75.7%)**	**196(56.6%)**	393(37.9%)	31(17.9%)
total	865(100.0%)	519(100.0%)	692(100.0%)	346(100.0%)	173(100.0%)	346(100.0%)	1038(100.0%)	173(100.0%)	173(100.0%)	173(100.0%)

x^2 = 937.291, df = 18, p<.000, λ = .206

Table 8 Crosstabulations between 'Mild' and cap hue

	N10	N0	R	Y	GY	G	B	PB	RP
1	261(37.7%)	660(76.3%)	700(45.0%)	129(74.6%)	12(6.9%)	282(54.3%)	107(61.8%)	444(51.3%)	110(63.6%)
2	56(8.1%)	78(9.0%)	260(16.7%)	21(12.1%)	13(7.5%)	67(12.9%)	21(12.1%)	109(12.6%)	23(13.3%)
3	375(54.2%)	127(14.7%)	597(38.3%)	23(13.3%)	148(85.5%)	170(32.8%)	45(26.0%)	312(36.1%)	40(23.1%)
total	692(100.0%)	865(100.0%)	1557(100.0%)	173(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)

$x^2 = 643.213$, df = 16, p<.000, $\lambda = .125$

Safe

Analysis of the "safe" in relation to the hues of the container, label, and cap revealed significant associations for all hues (containers: $X^2 = 429.374$, df = 20, $p < .000$, $\lambda = .170$; labels: $X^2 = 549.192$, df = 18, $p < .000$, $\lambda = .213$; caps: $X^2 = 399.669$, df = 16, $p < .000$, $\lambda = .061$) (Tables 9–11). Container hues GY (71.1%), N10 (53.3%), and BG (53.2%); label hues GY (64.2%), YR (52.3%), and N10 (50.1%); and cap hues RP (59.5%) and GY (56.3%) were most strongly associated with the "safe" image.

The hues of the labels ($\lambda = .213$) most strongly communicated the "safe" image, followed in descending order of influence by those of the containers ($\lambda = .170$) and caps ($\lambda = .061$).

Table 9 Crosstabulations between 'Safe' and container hue

	N10	R	YR	Y	GY	G	BG	B	PB	P	RP
1	473(30.4%)	109(63.0%)	113(65.3%)	446(51.6%)	32(18.5%)	225(43.4%)	47(27.2%)	446(51.6%)	84(48.6%)	234(67.6%)	97(56.1%)
2	254(16.3%)	24(13.9%)	12(6.9%)	111(12.8%)	18(10.4%)	77(14.8%)	34(19.7%)	152(17.6%)	16(9.2%)	41(11.8%)	27(15.6%)
3	830(53.3%)	40(23.1%)	48(27.7%)	308(35.6%)	123(71.1%)	217(41.8%)	92(53.2%)	267(30.9%)	73(42.2%)	71(20.5%)	49(28.3%)
total	1577(100.0%)	173(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	346(100.0%)	173(100.0%)

$x^2 = 429.374$, df = 20, p<.000, $\lambda = .170$

Table 10 Crosstabulations between 'Safe' and label hue

	N10	N0	R	YR	Y	GY	G	B	PB	RP
1	316(36.5%)	339(65.3%)	362(52.3%)	9(26.3%)	403(58.2%)	73(21.1%)	42(24.3%)	79(22.8%)	304(29.3%)	107(61.8%)
2	116(13.4%)	52(10.0%)	95(13.7%)	74(21.4%)	93(13.4%)	51(14.7%)	114(65.9%)	215(62.1%)	545(52.5%)	27(15.6%)
3	433(50.1%)	128(24.7%)	235(34.0%)	181(52.3%)	196(28.3%)	222(64.2%)	17(9.8%)	52(15.0%)	189(18.2%)	39(22.5%)
total	865(100.0%)	519(100.0%)	692(100.0%)	346(100.0%)	173(100.0%)	346(100.0%)	1038(100.0%)	173(100.0%)	173(100.0%)	173(100.0%)

$x^2 = 549.192$, df = 18, p<.000, $\lambda = .213$

Table 11 Crosstabulations between 'Safe' and cap hue

	N10	N0	R	Y	GY	G	B	PB	RP
1	313(45.2%)	529(61.2%)	790(50.7%)	114(65.9%)	23(13.3%)	292(56.3%)	73(42.2%)	369(42.7%)	51(29.5%)
2	80(11.6%)	114(13.2%)	275(17.7%)	22(12.7%)	20(11.6%)	74(14.3%)	34(19.7%)	128(14.8%)	19(11.0%)
3	299(43.2%)	222(25.7%)	492(31.6%)	37(21.4%)	130(56.3%)	153(29.5%)	66(38.2%)	368(42.5%)	103(59.5%)
total	692(100.0%)	865(100.0%)	1557(100.0%)	173(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)

$x^2 = 399.669$, df = 16, p<.000, $\lambda = .061$

Fragrant

Analysis of the "fragrant" in relation to the hues of the container, label, and cap revealed significant associations for all hues (containers: $X^2 = 538.972$, df = 20, $p < .000$, $\lambda = .096$; labels: $X^2 = 628.571$, df = 18, $p < .000$, $\lambda = .104$; caps: $X^2 = 399.669$, df = 16, $p < .000$, $\lambda = .061$) (Tables 12–14). Container hues PB (55.5%), GY (54.9%), and N10 (47.8%); label hues G (61.8%), GY (52.0%), and YR (48.6%); and cap hues RP (69.4%) and GY (58.4%) were most strongly associated with the "fragrant" image.

The hues of the labels ($\lambda = .104$) most strongly communicated the "fragrant" image, followed in descending order of influence by those of the containers ($\lambda = .096$) and caps ($\lambda = .061$).

Table 12 Crosstabulations between ‘Fragrant’ and container hue

	N10	R	YR	Y	GY	G	BG	B	PB	P	RP
1	576(37.0%)	129(74.6%)	136(78.6%)	592(68.4%)	54(31.2%)	364(70.1%)	78(45.1%)	396(45.8%)	50(28.9%)	237(68.5%)	110(63.6%)
2	236(15.2%)	20(11.6%)	13(7.5%)	78(9.0%)	24(13.9%)	48(9.2%)	30(17.3%)	99(11.4%)	27(15.6%)	24(6.9%)	20(11.6%)
3	745(47.8%)	24(13.9%)	24(13.9%)	195(22.5%)	95(54.9%)	107(20.6%)	65(37.6%)	370(42.8%)	96(55.5%)	85(24.6%)	43(24.9%)
total	1577(100.0%)	173(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	346(100.0%)	173(100.0%)

x^2 = 538.972, df = 20, p<.000, λ = .096

Table 13 Crosstabulations between ‘Fragrant’ and label hue

	N10	N0	R	YR	Y	GY	G	B	PB	RP
1	377(43.6%)	423(81.5%)	431(62.3%)	139(40.2%)	528(76.3%)	106(30.6%)	45(26.0%)	160(46.2%)	487(46.9%)	54(31.2%)
2	116(13.4%)	40(7.7%)	83(12.0%)	39(11.3%)	53(7.7%)	60(17.3%)	21(12.1%)	54(15.6%)	133(12.8%)	20(11.6%)
3	372(43.0%)	56(10.8%)	178(25.7%)	168(48.6%)	111(16.0%)	180(52.0%)	107(61.8%)	132(38.2%)	418(40.3%)	99(57.2%)
total	865(100.0%)	519(100.0%)	692(100.0%)	346(100.0%)	173(100.0%)	346(100.0%)	519(100.0%)	173(100.0%)	173(100.0%)	173(100.0%)

x^2 = 628.571, df = 18, p<.000, λ = .104

Table 14 Crosstabulations between ‘Fragrant’ and cap hue

	N10	N0	R	Y	GY	G	B	PB	RP
1	398(57.5%)	650(75.1%)	759(48.7%)	103(59.5%)	46(26.6%)	225(43.4%)	114(65.9%)	403(14.8%)	36(1.3%)
2	66(9.5%)	80(9.2%)	210(13.5%)	14(8.1%)	26(15.0%)	81(15.6%)	17(9.8%)	108(12.5%)	17(9.8%)
3	228(32.9%)	135(15.6%)	588(37.8%)	56(32.4%)	101(58.4%)	213(41.0%)	42(24.3%)	354(40.9%)	120(69.4%)
total	692(100.0%)	865(100.0%)	1557(100.0%)	173(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)

x^2 = 399.669, df = 16, p<.000, λ = .061

Fresh

Analysis of the “fresh” in relation to the hues of the container, label, and cap revealed significant associations for all hues (containers: X^2 = 829.623, df = 20, p < .000, λ = .222; labels: X^2 = 900.678, df = 18, p < .000, λ = .239; caps: X^2 = 632.390, df = 16, p < .000, λ = .166) (Tables 15–17). Container hues B (59.2%), GY (57.8%), BG (55.5%), and N10 (52.3%); label hues PB (57.2%), B (56.6%), YR (48.8%), and N10 (45.9%); and cap hues GY (70.5%) and RP (63.0%) were most strongly associated with the “fresh” image.

The hues of the labels (λ = .239) most strongly communicated the “fresh” image, followed in descending order of influence by those of the containers (λ = .222) and caps (λ = .166).

Table 15 Crosstabulations between ‘Fresh’ and container hue

	N10	R	YR	Y	GY	G	BG	B	PB	P	RP
1	545(35.0%)	143(82.7%)	143(82.7%)	610(70.5%)	50(28.9%)	328(63.2%)	53(30.6%)	255(29.5%)	85(49.1%)	263(76.0%)	121(69.9%)
2	197(12.7%)	7(4.0%)	8(4.6%)	65(7.5%)	23(13.3%)	56(10.8%)	24(13.9%)	98(11.3%)	25(14.5%)	28(8.1%)	20(11.6%)
3	815(52.3%)	23(13.3%)	22(12.7%)	190(22.0%)	100(57.8%)	135(26.0%)	96(55.5%)	512(59.2%)	63(36.4%)	55(15.9%)	32(18.5%)
total	1577(100.0%)	173(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	346(100.0%)	173(100.0%)

x^2 = 829.623, df = 20, p<.000, λ = .222

Table 16 Crosstabulations between ‘Fresh’ and label hue

	N10	N0	R	YR	Y	GY	G	B	PB	RP
1	363(42.0%)	436(84.0%)	471(68.1%)	128(37.0%)	526(76.0%)	201(58.1%)	58(33.5%)	103(29.8%)	339(32.7%)	88(50.9%)
2	105(12.1%)	25(4.8%)	56(8.1%)	49(14.2%)	67(9.7%)	61(17.6%)	21(12.1%)	47(13.6%)	105(10.1%)	15(8.7%)
3	397(45.9%)	58(11.2%)	165(23.8%)	169(48.8%)	99(14.3%)	84(24.3%)	58(33.5%)	196(56.6%)	594(57.2%)	70(40.5%)
total	865(100.0%)	519(100.0%)	692(100.0%)	346(100.0%)	173(100.0%)	346(100.0%)	1038(100.0%)	173(100.0%)	173(100.0%)	173(100.0%)

x^2 = 900.678, df = 18, p<.000, λ = .239

Table 17 Crosstabulations between 'Fresh' and cap hue

	N10	N0	R	Y	GY	G	B	PB	RP
1	405(58.5%)	675(78.0%)	789(50.7%)	130(75.1%)	26(15.0%)	202(38.9%)	109(63.0%)	426(49.2%)	48(27.7%)
2	58(8.4%)	74(8.6%)	193(12.4%)	13(7.5%)	25(14.5%)	55(10.6%)	14(8.1%)	103(11.9%)	16(9.2%)
3	229(33.1%)	116(13.4%)	575(36.9%)	30(17.3%)	**122(70.5%)**	262(50.5%)	50(28.9%)	336(38.8%)	**109(63.0%)**
total	692(100.0%)	865(100.0%)	1557(100.0%)	173(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)

$x^2 = 632.390$, df = 16, $p < .000$, $\lambda = .166$

Natural

Analysis of the "natural" in relation to the hues of the container, label, and cap revealed significant associations for all hues (containers: $X^2 = 447.354$, df = 20, $p < .000$, $\lambda = .035$; labels: $X^2 = 601.819$, df = 18, $p < .000$, $\lambda = .099$; caps: $X^2 = 404.172$, df = 16, $p < .000$, $\lambda = .026$) (Tables 18–20). Container hues GY (68.2%) and N10 (44.3%); label hues G (63.6%), GY (60.4%), and B (52.6%); and cap hues GY (79.8%), G (48.6%), and RP (42.8%) were most strongly associated with the "natural" image.

The hues of the labels ($\lambda = .099$) most strongly communicated the "natural" image, followed in descending order of influence by those of the containers ($\lambda = .035$) and caps ($\lambda = .026$).

Table 18 Crosstabulations between 'Natural' and container hue

	N10	R	YR	Y	GY	G	BG	B	PB	P	RP
1	701(45.0%)	144(83.2%)	150(86.7%)	583(67.4%)	42(24.3%)	285(54.9%)	92(53.2%)	494(57.1%)	117(67.6%)	271(78.3%)	120(69.4%)
2	166(10.7%)	10(5.8%)	6(3.5%)	75(8.7%)	13(7.5%)	55(10.6%)	17(9.8%)	108(12.5%)	17(9.8%)	25(7.2%)	15(8.7%)
3	**690(44.3%)**	19(11.0%)	17(9.8%)	207(23.9%)	**118(68.2%)**	179(34.5%)	64(37.0%)	263(30.4%)	39(22.5%)	50(14.5%)	38(22.0%)
total	1577(100.0%)	173(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	346(100.0%)	173(100.0%)

$x^2 = 447.354$, df = 20, $p < .000$, $\lambda = .035$

Table 19 Crosstabulations between 'Natural' and label hue

	N10	N0	R	YR	Y	GY	G	B	PB	RP
1	511(59.1%)	445(85.7%)	473(68.4%)	153(44.2%)	471(68.1%)	100(28.9%)	50(28.9%)	134(38.7%)	526(50.7%)	136(78.6%)
2	97(11.2%)	30(5.8%)	67(9.7%)	49(14.2%)	65(9.4%)	37(10.7%)	13(7.5%)	30(8.7%)	110(10.6%)	9(5.2%)
3	257(29.7%)	44(8.5%)	152(22.0%)	144(41.6%)	156(22.5%)	**209(60.4%)**	**110(63.6%)**	**182(52.6%)**	402(38.7%)	28(16.2%)
total	865(100.0%)	519(100.0%)	692(100.0%)	346(100.0%)	173(100.0%)	346(100.0%)	1038(100.0%)	173(100.0%)	173(100.0%)	173(100.0%)

$x^2 = 601.819$, df = 18, $p < .000$, $\lambda = .099$

Table 20 Crosstabulations between 'Natural' and cap hue

	N10	N0	R	Y	GY	G	B	PB	RP
1	427(61.7%)	637(73.6%)	877(56.3%)	130(75.1%)	22(12.7%)	220(42.4%)	111(64.2%)	504(58.3%)	71(41.0%)
2	47(6.8%)	72(8.3%)	173(11.1%)	14(8.1%)	13(7.5%)	47(9.1%)	23(13.3%)	90(10.4%)	28(16.2%)
3	218(31.5%)	156(18.0%)	507(32.6%)	29(16.8%)	**138(79.8%)**	**252(48.6%)**	39(22.5%)	271(31.3%)	**74(42.8%)**
total	692(100.0%)	865(100.0%)	1557(100.0%)	173(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)

$x^2 = 404.172$, df = 16, $p < .000$, $\lambda = .026$

Clean

Analysis of the "clean" in relation to the hues of the container, label, and cap revealed significant associations for all hues (containers: $X^2 = 867.456$, df = 20, $p < .000$, $\lambda = .215$; labels: $X^2 = 772.814$, df = 18, $p < .000$, $\lambda = .234$; caps: $X^2 = 722.667$, df = 16, $p < .000$, $\lambda = .183$) (Tables 21-23). Container hues GY (68.2%), B (57.1%), BG (53.2%), and N10 (45.0%); label hues B (71.1%), N10 (68.0%), YR (59.9%), and PB (56.6%); and cap hues GY (87.9%), G (64.4%), and RP (55.1%) were most strongly associated with the "clean" image.

The hues of the labels ($\lambda = .234$) most strongly communicated the "clean" image, followed in descending order of influence by those of the containers ($\lambda = .215$) and caps ($\lambda = .183$).

Table 21 Crosstabulations between 'Clean' and container hue

	N10	R	YR	Y	GY	G	BG	B	PB	P	RP
1	690(44.3%)	144(83.2%)	150(86.7%)	583(67.4%)	42(24.3%)	285(54.9%)	64(37.0%)	263(30.4%)	117(67.6%)	271(78.3%)	120(69.4%)
2	166(10.7%)	10(5.8%)	6(3.5%)	75(8.7%)	13(7.5%)	55(10.6%)	17(9.8%)	108(12.5%)	17(9.8%)	25(7.2%)	15(8.7%)
3	**701(45.0%)**	19(11.0%)	17(9.8%)	207(23.9%)	**118(68.2%)**	179(34.5%)	**92(53.2%)**	**494(57.1%)**	39(22.5%)	50(14.5%)	38(22.0%)
total	1577(100.0%)	173(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)	346(100.0%)	173(100.0%)

$x^2 = 867.456$, df = 20, $p < .000$, $\lambda = .215$

Table 22 Crosstabulations between 'Clean' and label hue

	N10	N0	R	YR	Y	GY	G	B	PB	RP
1	303(19.5%)	100(57.8%)	114(65.9%)	259(29.9%)	118(68.2%)	256(49.3%)	123(71.1%)	161(18.6%)	54(31.2%)	221(63.9%)
2	196(12.6%)	17(9.8%)	13(7.5%)	88(10.2%)	20(11.6%)	55(10.6%)	16(9.2%)	94(10.9%)	21(12.1%)	30(8.7%)
3	**1058(68.0%)**	56(32.4%)	46(26.6%)	**518(59.9%)**	35(20.2%)	208(40.1%)	34(19.7%)	**610(71.1%)**	**98(56.6%)**	95(27.5%)
total	865(100.0%)	519(100.0%)	692(100.0%)	346(100.0%)	173(100.0%)	346(100.0%)	1038(100.0%)	173(100.0%)	173(100.0%)	173(100.0%)

$x^2 = 772.814$, df = 18, $p < .000$, $\lambda = .234$

Table 23 Crosstabulations between 'Clean' and cap hue

	N10	N0	R	Y	GY	G	B	PB	RP
1	318(46.0%)	562(65.0%)	389(25.0%)	108(62.4%)	11(6.4%)	117(22.5%)	96(55.5%)	477(55.1%)	18(10.4%)
2	69(10.0%)	69(8.0%)	164(10.5%)	19(11.0%)	10(5.8%)	68(13.1%)	27(15.6%)	116(13.4%)	20(11.6%)
3	305(44.1%)	234(27.1%)	1004(64.5%)	46(26.6%)	**152(87.9%)**	**334(64.4%)**	50(28.9%)	272(31.4%)	**135(55.1%)**
total	692(100.0%)	865(100.0%)	1557(100.0%)	173(100.0%)	173(100.0%)	519(100.0%)	173(100.0%)	865(100.0%)	173(100.0%)

$x^2 = 722.667$, df = 16, $p < .000$, $\lambda = .183$

4. 2. Results by value

Multiple regression analysis was conducted to determine whether the strength of consumer perceptions of associated adjectives varied by value.

Strong

Analysis on the influence of the values of the container, label, and cap on the "strong" revealed an overall statistical significance ($F = 371.897$, df = 3, $p < .05$) (Table 24). Container ($t = -21.217$, $p < .05$), label ($t = -27.205$, $p < .05$), and cap value ($t = -4.695$, $p < .05$) were all individually statistically significantly correlated with the "strong" image.

The values of the labels ($\beta = -.359$) were most likely to produce a "strong" image, followed in order of decreasing strength by those of the containers ($\beta = -.276$) and caps ($\beta = -.061$). Specifically, lower the values of the container, the label, and the cap enhances the perception of "strong" image.

Table 24 Regression analysis results between 'Strong' and values

	Beta	t	Sig.	df	F	Sig.	R^2
Container	−.276	−21.217	.000	3	371.897	.000	.177
Label	−.359	−27.205	.000				
Cap	−.061	−4.695	.000				

Mild

Analysis on the influence of the values of the container, label, and cap on the "mild" revealed an overall statistical significance ($F = 444.368$, df = 3, $p < .05$) (Table 25). Container ($t = 23.940$, $p < .05$), label ($t = 27.758$, $p < .05$), and cap values ($t = 7.868$, $p < .05$) were all individually statistically significantly correlated with the "mild" image.

The values of the labels (β = .360) were most likely to produce a "mild" image, followed in order of decreasing strength by those of the containers (β = .306) and caps (β = .009). Specifically, higher the values of the containers, the labels, and the caps enhances the perception of "mild" image.

Table 25 Regression analysis results between 'Mild' and values

	Beta	t	Sig.	df	F	Sig.	R^2
Container	.306	23.940	.000	3	444.368	.000	.204
Label	.360	27.758	.000				
Cap	.009	7.868	.000				

Safe

Analysis on the influence of the values of the container, label, and cap on the "safe" revealed an overall statistical significance (F = 210.761, df = 3, $p < .05$) (Table 26). Container (t = 15.686, $p < .05$), label (t = 18.535, $p < .05$), and cap values (t = 7.187, $p < .05$) were all individually statistically significantly correlated with the "safe" image.

The values of the labels (β = .255) most strongly communicated the "safe" image, followed in order of decreasing strength by those of the containers (β = .212) and caps (β = .097). Specifically, higher the values of the containers, the labels, and the caps enhances the perception of "safe" image.

Table 26 Regression analysis results between 'Safe' and values

	Beta	t	Sig.	df	F	Sig.	R^2
Container	.212	15.686	.000	3	210.761	.000	.109
Label	.255	18.535	.000				
Cap	.097	7.187	.000				

Fragrant

Analysis on the influence of the values of the container, label, and cap on the "fragrant" revealed an overall statistical significance (F = 234.144, df = 3, $p < .05$) (Table 27). Container (t = 15.019, $p < .05$), label (t = 21.969, $p < .05$), and cap values (t = 5.087, $p < .05$) were all individually statistically significantly correlated with the "fragrant" image.

The values of the labels (β = .300) most strongly communicated the "fragrant" image, followed in order of decreasing strength by those of the containers (β = .202) and caps (β = .068). Specifically, higher the values of the containers, the labels, and the caps enhances the perception of "fragrant" image.

Table 27 Regression analysis results between 'Fragrant' and values

	Beta	t	Sig.	df	F	Sig.	R^2
Container	.202	15.019	.000	3	234.144	.000	.119
Label	.300	21.969	.000				
Cap	.068	5.087	.000				

Fresh

Analysis on the influence of the values of the container, label, and cap on the "fresh" revealed an overall statistical (F = 250.890, df = 3, $p < .05$) (Table 28). Container (t = 16.669, $p < .05$), label (t = 20.554, p < .05), and cap values (t = 7.836, p < .05) were all individually statistically significantly correlated with the "fresh" image.

The values of the labels (β = .280) most strongly communicated the "fresh" image, followed in order of decreasing strength by those of the containers (β = .223) and caps (β = .104). Specifically, higher the values of the containers, the labels, and the caps enhances the perception of "fresh" image.

Table 28 Regression analysis results between 'Fresh' and values

	Beta	t	Sig.	df	F	Sig.	R^2
Container	.223	16.669	.000				
Label	.280	20.554	.000	3	250.890	.000	.127
Cap	.104	7.836	.000				

Natural

Analysis on the influence of the values of the container, label, and cap on the "natural" revealed an overall statistical significance (F = 309.504, df = 3, p < .05) (Table 29). Container (t = 19.249, p < .05), label (t = 24.617, p < .05), and cap values (t = 4.840, p < .05) were all individually statistically significantly correlated with the "natural" image.

The values of the labels (β = .330) most strongly communicated the "natural" image, followed in order of decreasing strength by those of the containers (β = .254) and caps (β = .064). Specifically, higher the values of the containers, the labels, and the caps enhances the perception of "natural" image.

Table 29 Regression analysis results between 'Natural' and values

	Beta	t	Sig.	df	F	Sig.	R^2
Container	.254	19.249	.000				
Label	.330	24.617	.000	3	309.504	.000	.152
Cap	.064	4.840	.000				

Clean

Analysis on the influence of the values of the container, label, and cap on the "clean" revealed an overall statistical significance (F = 236.584, df = 3, p < .05) (Table 30). Container (t = 16.694, p < .05), label (t = 20.080, p < .05), and cap values (t = 6.907, p < .05) were all individually statistically significantly correlated with the "clean" image.

The values of the labels (β = .274) most strongly communicated the "clean" image, followed in order of decreasing strength by those of the containers (β = .224) and caps (β = .092). Specifically, higher the values of the containers, the labels, and the caps enhances the perception of "clean" image.

Table 30 Regression analysis results between 'Clean' and values

	Beta	t	Sig.	df	F	Sig.	R^2
Container	.224	16.694	.000				
Label	.274	20.080	.125	3	236.584	.000	.120
Cap	.092	6.907	.421				

4. 3. Results by chroma

Multiple regression analysis was conducted to determine whether the strength of consumer perceptions of associated adjectives varied by chroma.

Strong

Analysis on the influence of the chromas of the container, label, and cap on the "strong" revealed an overall statistical significance ($F = 139.129$, $df = 3$, $p < .05$) (Table 31). Container chroma ($t = 19.028$, $p < .05$) was individually statistically significantly correlated with "strong" image while label ($t = 1.535$, $p > .05$) and cap chroma ($t = .806$, $p > .05$) were not.

The chromas of the containers, labels, and caps were analyzed for their influence on the perception of the "strong" image. It was found that the container's chroma (β=.285) has the most pronounced impact. Specifically, a higher the chromas of the container enhances the perception of "strong" image.

Table 31 Regression analysis results between 'Strong' and chromas

	Beta	t	Sig.	df	F	Sig.	R^2
Container	.285	19.028	.000	3	139.129	.000	.074
Label	.024	1.535	.125				
Cap	.012	.806	.421				

Mild

Analysis on the influence of the chromas of the container, label, and cap on the "mild" revealed an overall statistical significance ($F = 165.208$, $df = 3$, $p < .05$) (Table 32). Container ($t = -18.529$, $p < .05$), label ($t = -2.146$, $p < .05$), and cap color ($t = 6.147$, $p < .05$) were all individually statistically significantly correlated with the "mild" image.

The chromas of the containers (β = -.276) were most likely to produce a "mild" image, followed in order of decreasing strength by those of the labels (β = -.033) and caps (β = .087). Specifically, lower the chromas of the container, the label, and the cap enhances the perception of "mild" image.

Table 32 Regression analysis results between 'Mild' and chromas

	Beta	t	Sig.	df	F	Sig.	R^2
Container	−.276	−18.529	.000	3	165.208	.000	.087
Label	−.033	−2.146	.032				
Cap	.087	6.147	.000				

Safe

Analysis on the influence of the chromas of the container, label, and cap on the "safe" revealed an overall statistical significance ($F = 73.581$, $df = 3$, $p < .05$) (Table 33). Container ($t = -9.026$, $p < .05$) and cap chroma ($t = 7.689$, $p < .05$) were individually statistically significantly correlated with the "safe" image while label chroma was not ($t = .438$, $p > .05$).

The chromas of the containers (β = -.138) most strongly communicated the "safe" image, followed in order of decreasing strength by those of the caps (β = .112). Specifically, lower the chromas of the container combined with higher the chromas of cap enhances the perception of "safe" image.

Table 33 Regression analysis results between 'Safe' and chromas

	Beta	t	Sig.	df	F	Sig.	R^2
Container	−.138	−9.026	.000				
Label	.007	.438	.661	3	73.581	.000	.041
Cap	.112	7.689	.000				

Fragrant

Analysis on the influence of the chromas of the container, label, and cap on the "fragrant" revealed an overall statistical significance (F = 148.046, df = 3, p < .05) (Table 34). Container (t = -13.108, p < .05) and cap chromas (t = 11.145, p < .05) were individually statistically significantly correlated with the "fragrant" image while label chroma was not (t = -.204, p > .05).

The chromas of the containers (β = -.196) most strongly communicated the "fragrant" image, followed in order of decreasing strength by those of the caps (β = -.159). Specifically, lower the chromas of the container combined with higher the chromas of the label and the cap enhances the perception of "fragrant" image.

Table 34 Regression analysis results between 'Fragrant' and chromas

	Beta	t	Sig.	df	F	Sig.	R^2
Container	−.196	−13.108	.000				
Label	−.003	−.204	.839	3	148.046	.000	.079
Cap	−.159	11.145	.000				

Fresh

Analysis on the influence of the chromas of the container, label, and cap on the "fresh" revealed an overall statistical significance (F = 164.620, df = 3, p < .05) (Table 35). Container (t = -9.896, p < .05), label (t = 3.193, p < .05), and cap chromas (t = 13.344, p < .05) were all individually statistically significantly correlated with the "fresh" image.

The chromas of the containers (β = -.147) most strongly communicated the "fresh" image, followed in order of decreasing strength by those of the labels (β = .049) and the caps (β = .190). Specifically, a lower chroma of the container combined with higher chromas of the label and cap enhances the perception of the "fresh" image.

Table 35 Regression analysis results between 'Fresh' and chromas

	Beta	t	Sig.	df	F	Sig.	R^2
Container	−.147	−9.896	.000				
Label	.049	3.193	.001	3	164.620	.000	.087
Cap	.190	13.344	.000				

Natural

Analysis on the influence of the chromas of the container, label, and cap on the "natural" revealed an overall statistical significance (F = 119.949, df = 3, p < .05) (Table 36). Container (t = -17.087, p < .05), label (t = -2.33, p < .05), and cap chromas (t = 2.640, p < .05) were all individually statistically significantly correlated with the "natural" image.

The chromas of the containers (β = -.257) most strongly communicated the "natural" image, followed in order of decreasing strength by those of the labels (β = -.036) and the caps (β =

.038). Specifically, lower the chromas of the container, and the label combined with higher the chromas of the cap enhances the perception of “natural” image.

Table 36 Regression analysis results between ‘Natural’ and chromas

	Beta	t	Sig.	df	F	Sig.	R^2
Container	−.257	−17.087	.000	3	119.949	.000	.065
Label	−.036	−2.33	.019				
Cap	.038	2.640	.008				

Clean

Analysis on the influence of the chromas of the container, label, and cap on the “clean” revealed an overall statistical significance (F = 153.034, df = 3, p < .05) (Table 37). Container (t = -9.529, p < .05), label (t = 2.597, p < .05), and cap chromas (t = 13.244, p < .05) were all individually statistically significantly correlated with the “clean” image.

The chromas of the containers (β = -.142) most strongly communicated the “clean” image, followed in order of decreasing strength by those of the labels (β = .040) and the caps (β = -.189). Specifically, lower the chromas of the container and the cap combined with higher the chromas of the label enhances the perception of “clean” image.

Table 37 Regression analysis results between ‘Clean’ and chromas

	Beta	t	Sig.	df	F	Sig.	R^2
Container	−.142	−9.529	.000	3	153.034	.000	.081
Label	.040	2.597	.009				
Cap	−.189	13.244	.000				

4. 4. Results by color combination

Sections 4.1–4.3 described how color hues, values, and chromas affected the strength of consumers’ perceptions of associated adjectives. To increase this study’s practical relevance and applicability, the results are organized in this paper by associated adjectives (Table 38). For hue and value, associated adjectives are best communicated through the label, followed by the container and then the cap, but for chroma, it is the container, then the label, and then the cap (Table 39).

The analysis by color combination showed that “strong” image was created with values of N0, R, Y, and YR; containers with values and higher chromas of R, YR, and Y; and caps with lower values of R, N0, and RP. “Mild” image was created with labels with higher values and lower chromas of G, GY, and B; containers with higher values and chromas of GY, N10, and B; and caps with higher values and chromas of GY and N10. “Safe” image was created with labels with higher values of GY, YR, and N10; containers of higher values and lower chromas of GY, N10, or BG; and caps with higher values and chromas of RP and GY.

“Fragrant” image was created with labels with higher values of G, RP, GY, and YR; containers with higher values and lower chromas of PB, GY, and N10; and caps with higher values and chromas of RP and GY. “Fresh” image was occurred with labels with higher values and chromas of PB, B, YR, and N10; containers with higher values and lower chromas of B, GY, and BG; and caps with higher values and chromas of GY and RP. “Natural” image was occurred with labels with higher values and lower chromas of GY and N10; containers with higher values and lower chromas of G, GY, and B; and caps with higher values and chromas of GY, G, and RP. "Clean" image was created with labels with higher values and chromas of B, N10, YR, and PB; containers with higher values and lower chromas of GY, BG, B, and N10; and caps with higher values and lower chromas of GY, G, and RP.

Table 38 Guideline on color combination by associated adjectives

Adjective	Components	Hue	Value	Chroma
Strong	Container	YR R Y	↓	↑
	Label	N0 (Black) R Y YR	↓	X
	Cap	R N0 (Black) RP	↓	X
Mild	Container	GY N10(white) B	↑	↓
	Label	G GY B	↑	↓
	Cap	GY N10 (White)	↑	↑
Safe	Container	GY N10(white) BG	↑	↓
	Label	GY YR N10 (White)	↑	X
	Cap	RP GY	↑	↑
Fragrant	Container	PB GY N10 (White)	↑	↓
	Label	G RP GY YR	↑	X
	Cap	RP GY	↑	↓

Fresh	Container	B	↑	↓
		GY		
		BG		
	Label	PB		
		B		
		YR		
		N10 (White)		
	Cap	GY	↑	↑
		RP		
Natural	Container	GY	↑	↓
		N10 (White)		
	Label	G	↑	↓
		GY		
		B		
	Cap	GY	↑	↑
		G		
		RP		
Clean	Container	GY	↑	↓
		BG		
		B		
		N10 (White)		
	Label	B		
		N10 (White)		
		YR		
		PB		
	Cap	GY	↑	↓
		G		
		RP		

Table 39 Effect size (λ or β)

	Adjectives	Container	Label	Cap
Hue	Strong	.111	.207	.095
	Mild	.152	.206	.213
	Safe	.170	.213	.161
	Fragrant	.096	.104	.061
	Fresh	.222	.239	.166
	Natural	.035	.099	.026
	Clean	.215	.234	.183
Value	Strong	−.276	−.395	−.061
	Mild	.306	.360	.009
	Safe	.212	.255	.097
	Fragrant	.202	.300	.068
	Fresh	.223	.280	.104
	Natural	.254	.330	.064
	Clean	.224	.274	.092

Chroma	Strong	.285	.024	.012
	Mild	–.276	–.033	.087
	Safe	–.138	.007	.112
	Fragrant	–.196	–.003	–.159
	Fresh	–.147	.049	.190
	Natural	–.257	–.036	.038
	Clean	–.142	.040	–.189

4. 5. Supplementary results

A comparative analysis was conducted to determine whether the image conveyed by associated adjectives differed based on occupational background (Table 40). Participants with a design background were more attuned to projected brand image with heightened sensitivity to the “mild” (3.78), “safe” (4.29), “natural” (3.55), and “fresh” (3.91) image that differentiate a product from its competitors. Those without a design background had heightened sensitivity to functional image, particularly “fragrant” (3.76) and “clean” (4.48). Except for the “strong” image, all of these differences were statistically significant ($p < .001$).

Table 40 Comparison of Adjectives Perception by design major and non-design major

Variables	Non-Design Major		Design Major		t	Sig.
	M	SD	M	SD		
Strong	4.19	1.94	4.21	2.04	–.302	.763
Mild	3.57	1.77	**3.78**	1.79	−3.982	.000*
Safe	3.87	1.79	**4.29**	1.81	−7.710	.000*
Fragrant	**3.76**	1.90	3.47	1.81	−5.182	.000*
Fresh	3.57	1.87	**3.91**	1.93	−5.787	.000*
Natural	3.31	1.91	**3.55**	1.98	−4.047	.000*
Clean	**4.48**	1.92	4.14	1.93	−5.774	.000*

*p〈.05

5. Discussion

This study examined how three-color combinations in laundry detergent packaging were associated with “strong,” “mild,” “safe,” “fresh,” “fragrant,” “natural,” and “clean” images. The hues, values, and chromas of the containers, labels, and caps were analyzed.

In response to research question 1, the results highlight the impact of three-color combinations in brand messaging, with value being the predominant factor in their perception. These results support hypothesis 1, which posits that a three-color combination’s hue, value, and chroma significantly influence consumers’ perception of laundry detergent. This influence is powerful for packaging that communicates the image conveyed by associated adjectives. In response to research question 2, the relationships between hue, value, and chroma were analyzed. The hue of the labels had a more significant influence on product perception than the containers and caps. This result supports hypothesis 2, which posits that label color attracts consumer attention and reflects the image conveyed by the product’s associated adjectives. Effective use of color combinations enables brands to carve out a unique space in a crowded marketplace. Distinctly, packages projecting "natural" or "safe" themes can enhance a brand's eco-friendly image, offering a competitive edge.

Findings indicate that colors with specific attributes, like lower values and higher chromas, predominantly convey a "strong" image. The image conveyed by color combinations shifts between "fresh" and "clean" depending on cap chroma: a lower chroma signifies "fresh" image. At the same time, a higher one indicates "clean" image. Similar patterns were observed for descriptors like "mild" and "natural" images. Supporting hypothesis 3, an N10 container, G label, and GY cap evoked both "mild" and "natural" impressions. These observations underscore the importance of intentional design. Designers can use this study's results to optimize packaging to resonate more effectively with potential consumers.

These results indicate that brands should consider value and chroma when designing color combinations because the messages they communicate vary (Guo et al., 2020). The image conveyed by associated adjectives was communicated the most strongly with lower values and higher chromas. Higher hues and values communicated the image conveyed by associated adjectives most strongly on the label, followed by the container, and then the cap, while chroma showed no distinct influence by part.

Consumer perceptions shift based on the color triad of the packaging. Optimal hues for labels were identified as YR, N10, G, GY, B, and PB. Each hue corresponded to specific sentiments: YR for "safe" and "fragrant"; GY and G for "natural" and "mild" images; and N10, B, and PB for "fresh" and "clean" images. Consequently, a Y container, N0 label, and R cap signified a "strong" image. In contrast, combinations like a B container, N10 label, and RP cap evoked "fresh" and "clean" images. The cap's chroma level influences the image it evokes. Further combinations, like an N10 container with a G label and GY cap, elicit both "mild" and "natural" feelings. Such results highlight the influential role of color in packaging, underscoring its potential in shaping customer perceptions.

6. Conclusion

In a saturated market, brands are turning to packaging design for distinction. This study delves into color's role in product imagery, offering guidelines for laundry detergent packaging with a specific focus on the three-color combinations in Table 41. Through status analysis and consumer surveys, we identify these critical combinations for optimal image conveyance. The insights are guiding brands and designers to balance visual appeal with accurate product image representation.

Table 41 Guideline for Associated Adjectives in Packaging Based on H, V, C

Associated Adjectives	Elements	Hue	Value	Chroma	Observations
Strong	Container	R	↓	↑	Lower value and higher chroma are most effective for conveying a 'Strong' image.
	Label	R / N0	↓	↓	
	Cap	R / N0	↓	X	
Mild	Container	G / Analogous	↑	↓	Suitable for eco-friendly and mild products. This also resonates with 'fragrant' imagery.
		N10			
	Label	G / Analogous	↑	↓	
	Cap	N10	↑	↑	
		G / Analogous			
Safe	Container	B/G/R/ Analogous	↑	↓	Consider using complementary hues on caps. Shares similar hue ranges with 'Fragrant'.
	Label	YR	↑	X	
	Cap	Complementary	↑	↑	
Fragrant	Container	B / Comp. R	↑	↓	Label and container should have analogous hues of blue, and the cap should have complementary hues of red. This also resonates with 'fragrant' imagery.
		B / Analogous			
	Label	B / Analogous	↑	X	
		YR			
	Cap	B / Comp. R	↑	↓	
Fresh	Container	B	↑	↓	Analogous hues for container and label with cap in complementary hues of YR. This also resonates with 'clean' imagery.
	Label	YR / G	↑	X	
	Cap	Complementary	↑	↓	
Natural	Container	B / Analogous	↑	↓	Suitable for eco-friendly and mild products. This also resonates with 'mind' imagery. Label hue: GY and G.
		N10			
	Label	GY	↑	↓	
		G			
	Cap	B / Comp. R	↑	↓ / ↑	
Clean	Container	B / N10	↑	↓	Higher the cap chroma evokes 'Clean.' Lower the cap chroma evokes 'fresh.'
	Label	B / PB / N10	↑	X	
	Cap	B / Comp. R	↑	↑	

↑ : Higher than lower ↓ : Lower than higher

This study first identifies seven associated adjectives related to laundry detergents: "strong," "mild," "safe," "fresh," "fragrant," "natural," and "clean." Second, the survey results are being analyzed, showing that value has the most significant influence over the associate adjectives communicated by three-color combinations. The colors of package parts also affect the communicated images, which holds true even as hue and chroma vary. Third, these results indicate the importance of considering color combinations holistically. The image conveyed by associated adjectives is communicated more strongly when the container, label, and cap colors are coordinated than by the dominant color alone. Given these results, brands should choose a label color that best communicates the image conveyed by the intended associated adjectives. Next, the container and cap colors should be coordinated based on this study's results to strengthen communication.

This study offers insights into selecting three-color combinations for product packaging that effectively communicate the image conveyed by certain associated adjectives, thereby enhancing product competitiveness. However, our research has several limitations. The first limitation is that it only examines color. The second limitation is that roughly half of the participants are in their 20s and under; many have a design background, and all are South Korean. Therefore, their perceptions may not fully represent those of the global population. Future research should incorporate other visual elements, diversify the participant pool, and investigate additional product categories to yield more comprehensive results.

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