Sustainability and Brand Equity: The Moderating Role of Brand Color and Brand Gender

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Abstract: Green color priming has been introduced as a cue for consumer perceptions of sustainability. Nevertheless, the color green is not necessarily effective in every brand’s sustainability strategy. This study aims to understand the impact of a brand’s color and gender in an investigation of the relationship between sustainability and brand equity, including perceived quality. This study examined Interbrand’s Best Global Brands, conducted an international online survey of more than 400 participants, and demonstrated the relationship between brand color, brand gender, and sustainability using the process macro analysis method. In study 1, it was found that the use of the color green in sustainability color strategy is limited depending on the brand gender of the Best Global Brands through case analysis. In the empirical analysis of study 2, it was discovered that a majority of brands created higher brand equity in the color green than in iconic colors when implementing sustainability strategies. However, brands with a high level of feminine personality with graceful and tender characteristics created a higher level of brand equity when implementing their sustainability strategies with iconic colors than with green. These findings suggest that iconic colors are more effective than the color green in sustainability strategies when the masculine personality level is low, and the feminine personality level is high.

Keywords: sustainability; brand color; brand equity; brand gender; perceived quality; eco-label

1. Introduction

Color is one of the practical tools used in brand strategy [1]. For instance, Coca-Cola’s red color alone can be recognized as Coca-Cola, and Starbucks’ green color can differentiate and identify it from other cafés. Thus, color can be used to evoke brand associations and increase differentiation from other brands, such as Samsung’s blue, LG’s red, and IKEA’s yellow. Many brands use the color that represents their brand to increase brand recognition [2].

Research on color has been conducted in various areas, such as marketing strategy, brand strategy, and consumer behavior. Labrecque and Milne (2013), Labrecque, Patrick and Milne (2013), Kapferer (1995), and Abril, Olazábal and Cava (2009) [3–6] claimed that color is an essential element that represents a brand’s identity, communicates important meanings, and distinguishes it from competitors. Moreover, a brand’s choice of color can convey various feelings, thoughts, and behaviors that resonate with its target audience and reinforce its positioning in the marketplace [7]. Singh (2011) [8] argued that color plays an important role in marketing and identified that red is associated with love, power, and passion, making it a popular choice for beverage and food brands. Blue is associated with truthfulness, tranquility, creativity, and wisdom, making it a popular choice for financial and tech brands. Green is associated with growth, rebirth, stability, good luck, fertility, nature, health, and sustainability, making it a popular choice for environmentally conscious brands. Black is associated with absence, elegance, and
formality. By leveraging different colors’ psychological associations and meanings, brands can create a unique visual identity that helps them stand out in a crowded marketplace and build stronger connections with their consumers [1,7]. Baxter (2018)’s research [9] demonstrated that color is a powerful tool in branding and that iconic colors, widely recognized and well-established, can introduce cues to consumer perceptions of brand personality.

In summary, color plays a crucial role in marketing and branding. Iconic colors applied to brand names, logos, packages, and other visual elements strengthen brand association, awareness, and memorability, and the colors represent each brand’s color identity. For example, Chanel uses black and white to create a sophisticated and elegant brand identity. Hermès utilizes the color orange as an iconic color to symbolize its brand identity and emphasize luxury and excellent quality.

Moreover, the color green represents sustainability. Green color priming uses green to evoke thoughts and associations about sustainability and eco-friendliness [10,11]. Brand marketers often use this color priming to influence consumer perceptions of their visual differentiation as being environmentally responsible [9]. To further explore color associations related to sustainability, a reputable college of design in the Midwest of the United States conducted a survey among 252 design students. The survey findings revealed interesting insights. Among the participants, a significant majority of 233 students identified green as the color most strongly associated with sustainability. Additionally, 142 students mentioned earth colors, while 83 students mentioned brown. The students’ feedback indicated that their choice of the color green was influenced by its strong association with nature, green initiatives, recycling symbols, and its prevalent usage in advertising [12]. Additionally, globally renowned academic journals such as Harvard Business Review, MIT Sloan Review, and the Journal of the Academy of Marketing Science also use the term green to refer to sustainability, in terms such as green consumers and products [13–15].

In addition to academia and government, a majority of brands in the industry use the term and color “green” in their sustainability brand strategies. Samsung Electronics uses the color green on eco-labels, logos, packages, and names to remind people that their brand has eco-friendly elements and uses the term green in their products to imprint an image of sustainability. McDonald’s uses yellow and green instead of yellow and red in their European logo to emphasize their sustainable products and business model [16]. Growing concerns about childhood obesity and health risks associated with fast food choices have emerged in Europe’s leading countries, including Switzerland, Germany, the United Kingdom, France, and Spain. In response, McDonald’s has undertaken strategic initiatives to reshape its brand image in these countries, with a focus on naturalness, environmentalism, healthy living, and balance. The primary alteration in the McDonald’s logo involved eliminating the red color traditionally associated with fast food and replacing it with a green color symbolizing environmental friendliness [17]. This change aimed to align the brand’s visual identity with its efforts to promote healthier and more sustainable choices [18]. Remarkably, in 2023, McDonald’s experienced a significant increase in European sales, demonstrating resilience despite the upward trend in menu prices and concerns regarding an economic downturn [19].

However, despite the symbolic and effective nature of the color green, brands with a high level of feminine personality, with characteristics such as “graceful” and “tender”, tend to use an iconic color, one which symbolizes their brand identity, rather than the color green to represent sustainability. While Hermès is committed to sustainability by developing eco-friendly materials and eco-design [20], it does not use the color green. Louis Vuitton also emphasizes sustainability on its homepage and packaging, but instead of using the color green, it uses an iconic color to convey the message that Louis Vuitton is striving for sustainability. In this way, the color green, which implies ‘reduce’ or ‘recycle’, is widely used as an effective marketing tool to indicate sustainability [12,15], but it can be seen that its use is limited or absent depending on the brand. The Spanish global
fashion company ZARA is highly committed to eco-friendliness, operating a platform for repairing and reselling pre-owned products and striving to produce products with eco-friendly materials. However, they do not use the color green, but rather the color black, which is ZARA’s iconic color, to promote their policies.

Despite the expanding sustainability market and growing demand for sustainable branding strategies, there is a dearth of research on the effectiveness of the color green as a symbol of sustainability and its impact on industries. The majority of existing research has focused on the relationship between brand and color in situations where the concept of sustainability is excluded, such as the effect of variation in hue, saturation, and value, as well as the relationship between brand identity and color. The existing research is, therefore, limited in explaining the relationship between sustainability and color. In this context, research on which colors are appropriate for which brands is a vital step in establishing brand sustainability strategy. Since color has an important influence on consumer decision-making [3,21], it is essential to clearly identify the relationship between them in the sustainability strategy.

This study is expected to provide a foundation for color selection for the development of brand elements such as logos, names, characters, and slogans, in addition to the expansion of the sustainability strategy. This study aims to present implications for the use of color in a sustainability strategy through a different approach from existing color brand marketing studies.

2. Literature Review and Hypotheses

2.1. Brand Color

Color is composed of three dimensions: hue, saturation, and value [22]. Hue is defined as a composition of colors in the visible spectral region of the electromagnetic spectrum and has the same meaning as “color”. Saturation refers to the intensity, richness, strength, and purity of the color, while value describes the lightness and darkness of the color [7].

Brands develop their iconic colors by considering hue, saturation, and value. Brand color influences consumers’ attitudes toward the brand and plays a vital role in consumer decision-making [23]. Many companies use color to create brand identity and differentiate their products. McDonald’s has established a unique brand identity by using a red and yellow palette that evokes ketchup and cheese to create an appealing brand logo. Starbucks uses a deep green color in combination with the color white, and it continues to use the color green to increase brand recognition. In this respect, color is critical in brand strategy as it can evoke consumers’ specific associations, emotions, and perceptions. When used effectively, color can help a brand stand out from competitors, create brand recognition, and reinforce the brand’s values and messaging.

Labrecque and Milne (2012) [2] suggests that color is also related to brand personality, with blue representing competence, red and yellow representing excitement, white representing sincerity, and black representing sophistication. Color plays an essential role in consumer decision-making as it can stimulate and change consumers’ affects and emotions, thereby influencing brand attitudes and purchase intent.

Brand marketers build brand identities by using color associations and symbolism and create color strategies for their target markets based on understanding the meanings, emotions, and cultural symbolism of colors. They apply coherent colors through various marketing channels, such as logos, websites, packaging designs, advertisements, and social media, to strengthen brand images with differentiated strategies [24] (Table 1).

Table 1. Color Symbolism and Association.

<table>
<thead>
<tr>
<th>Color</th>
<th>Color Attributes and Association ¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Love, passion, enthusiasm, suspension, moving, radical, turbulence, unbearable heat, fury, danger, explosion, fight, refusal, energy, vitality</td>
</tr>
</tbody>
</table>
Orange  
Freshness, friendship, stamina, advance, affection, health, hope, permission, heat, warmness, passion, well-behaved, family, pleasure

Yellow  
Inexperienced, warning behavior, pollution, joy, imperfection, glory, transportation safety, depression, contemporary culture

Green  
Growth, rest, sincerity, health, calmness, stillness, cleanliness, mildness, cheerfulness, relaxation, vitality, safety, peace

Blue  
Smart, cleanliness, transparency, progress, bravery, hope, admiration, silence, loneliness, quietness, justice

Purple  
Elegance, mystery, nobility, sin, classical ritual, formality, stillness, sorrow

Black  
Sadness, evil, crime, unlimited, shutdown, pressure, agony, regret, despair, cold-blooded

White  
Simple, purity, freedom, innocence, future, freshness, cleanliness, peace, possibility, nothing, perfection

Notes: 1 Sources: Jin, Yoon and Lee (2019) [23], Aslam (2005) [25].

Labrecque et al. (2013) [4] examined the meaning of color and the significance of contextual factors. According to his research, colors have both embodied meanings, which are universal and widely recognized, and referential meanings, which are context-dependent and can vary across cultures and individuals. Color has many associations, and context plays a significant role in determining the pattern of activation. Learned associations change thoughts and behaviors, for example, a red dress at a party and the color red on a road sign have different meanings, even though they are the same color. Contextual cues influence activation through learned associations and culture, resulting in different marketing outcomes [7] (Figure 1).

Aesthetic Color Dimensions

![Aesthetic Color Dimensions Diagram](image)

**Outcomes**

<table>
<thead>
<tr>
<th>Psychological Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affect, Arousal, Attention, Creativity, Information Processing, Memory, Motivation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marketing Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising Effectiveness Atmospherics Evaluations Brand/Product Inferences Food Inferences Internet Marketing</td>
</tr>
</tbody>
</table>

Figure 1. Embodied versus referential color model by Labrecque et al. (2013) [4]. Reprinted with permission from [4]. Copyright 2013, Labrecque et al.

The color green stands for “eco”, “nature”, “eco-friendly”, and “sustainability”, and is used as an umbrella concept for these terms. The word green has emerged as the issues of nature and people have become more important, and the word green has been converged and used from ecology and environment to various fields such as green marketing, green consumers, green products, green policies, and green advertising [26]. Research in the United States and Europe has shown that green is the color most commonly associated with health, nature, life, youth, and spring, while in Asia, such as China, it is highly
associated with fertility and happiness. In many countries, green is interpreted as the traditional color of safety and permission; for example, a green light at a traffic light is a signal that means go ahead, and a green card is used as a symbol of permanent residence in the United States. However, in the Victorian era, during the reign of Queen Victoria, the color green was perceived to be associated with homosexuality, and William Shakespeare in Othello used the color green to represent the green-eyed monster, which was associated with jealousy and envy [27, 28].

In this sense, consumers’ understanding of the meaning of color varies by culture and era, and learned associations are important and significantly influenced by contextual factors.

2.2. Brand Gender

Brand gender is a type of brand personality, meaning a brand can be categorized as masculine or feminine [29]. Brand personality is considered an essential element in building brand equity. Aaker (1997) [30] defined brand personality as the personality traits or characteristics that a brand possesses, as with a person’s character, and stated that brand personality can be measured by five factors. Grohmann (2009) [29] pointed out the limits of Aaker’s brand personality, notably that it does not account for gender, which is the most crucial factor in distinguishing an individual, and developed a scale to measure brand gender. Brand gender is defined as a brand’s masculine or feminine tendencies and is measured through the masculine brand personality scale (MBP) and feminine brand personality scale (FBP). MBP can be measured by the terms adventurous, aggressive, brave, daring, dominant, and sturdy, whereas FBP can be measured by tender feelings, fragile, graceful, sensitive, sweet, and tender. Based on these criteria, Lieven, Grohmann and Herrmann (2014) [31] categorized brands as either masculine or feminine, with feminine brands including Chanel, Dove, L’Oréal, and Zara, and masculine brands including Pepsi, Red Bull, Levi’s, Nike, and BMW.

Lieven et al. (2014) [31] found that brand equity levels increase when the masculine or feminine orientation is unambiguous, and one orientation is clearly more potent than the other. Accordingly, he argued that brand gender should be clearly expressed to increase brand awareness and brand loyalty (Figure 2).

2.3. Sustainability, Perceived Quality and Brand Equity

2.3.1. Sustainability

In recent years, sustainability has become essential in measuring brand equity due to its increasing influence on consumers’ active consciousness and purchase decisions [26]. A 2022 BCG survey of 11,971 people across eight countries found that consumers are taking the climate change crisis more seriously post-COVID-19 and have increased their preference for purchasing eco-friendly products [32]. Consumers are upcycling or recycling
waste materials and purchasing products with green eco-labels to avoid environmental degradation [33]. Consumers are increasingly sensitive to brand sustainability and have an increased awareness about the impact of the brands they use on the environment and society [15,34].

In light of this, companies engage in various eco-friendly marketing activities as consumers’ interest in eco-friendly brands increases [35]. For example, The Body Shop runs a campaign to save 25 tons of plastic by offering refills and discounts when consumers buy aluminum bottles, and they use the color green to promote this initiative. Samsung uses 20% marine plastic waste in their products, minimizes the use of ink in eco-packages, reduces packaging size, and promotes these efforts with eco-labels. Companies attempt to create favorable consumer perceptions and attitudes through eco-friendly activities and use green and eco-labels to convey their brand’s concern for the environment [34,36].

A thorough examination of recent studies in the field of marketing reveals that research has been conducted to investigate sustainability from various perspectives, including the product, price, promotion, and consumer behavior [37]. Summarizing the key findings, one study indicates that eco-labels have a positive impact on perceived quality within sustainability strategies. Another study highlights the effectiveness of emphasizing sustainability over product excellence for luxury brands. Additionally, research suggests that the pricing of green products does not significantly influence consumers’ purchase intentions. Moreover, it has been observed that a brand’s personality, emphasizing sustainability, has a positive effect on advertisement reliability. Interestingly, millennials appear to be less sensitive to sustainability than other generations when considering sustainable luxury brands (Table 2).

Table 2. Summary review of sustainability research.

<table>
<thead>
<tr>
<th>Authors (Year), Journal</th>
<th>Dimensions</th>
<th>Constructs</th>
<th>Research Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alamsyah (2021) MSL [34]</td>
<td>Product</td>
<td>Eco-label, Perceived quality, Environmental knowledge, Green awareness</td>
<td>An examination of the relationship between green awareness, environmental knowledge, and perceived quality.</td>
</tr>
<tr>
<td>Amatulli (2021) PM [38]</td>
<td>Consumer Behavior</td>
<td>Sustainable luxury consumption, Atypicality</td>
<td>A comparison of consumer perceptions regarding sustainability-focused communication versus product excellence-focused communication in luxury products.</td>
</tr>
<tr>
<td>Sedky (2022) BSD [26]</td>
<td>Price</td>
<td>Eco-labeling, Green advertising, Price, Point of purchase</td>
<td>The impact of green marketing on consumers’ purchase decisions.</td>
</tr>
<tr>
<td>Sander (2021) JBM [39]</td>
<td>Promotion</td>
<td>Brand personality, Ad credibility, Brand attitude</td>
<td>The impact of environmental and social sustainability advertising on brand personality, credibility, and brand attitude.</td>
</tr>
<tr>
<td>Kapferer (2019) JBM [40]</td>
<td>Consumer Behavior</td>
<td>Sensitivity to sustainable luxury, Disengagement to sustainable luxury</td>
<td>The importance of understanding generational and cultural differences in sustainable luxury consumption behavior.</td>
</tr>
</tbody>
</table>


However, it is noteworthy that no existing research has examined the relationship and effectiveness of sustainability, brand color, and brand gender, thereby creating a research gap in this area.
2.3.2. Perceived Quality

Perceived quality refers to consumers’ subjective judgments and thoughts about a product. High perceived quality indicates that consumers perceive the brand as having a distinct overall excellence or superiority compared to other brands [41,42]. Perceived quality is one factor that evaluates brand value, and the higher the perceived quality, the more likely consumers are to select that brand, resulting in greater brand equity [43]. Consumers’ subjective judgments are influenced by a variety of factors, including personal brand experience, needs, and purchasing situations, and are affected by direct attributes such as product design and color, as well as indirect attributes such as brand, price, and culture. Perceived quality has a direct impact on consumers’ purchase decisions, and even if consumers’ awareness of the brand is low, high perceived quality can increase purchase intent and brand equity [44].

2.3.3. Brand Equity

Aaker (2014) [45] defines brand equity as consisting of brand loyalty, awareness, perceived quality, and brand association, which can create and deliver value to consumers. He emphasizes that once brand equity is established, it can be used to provide a competitive advantage to rival brands, such as Coca-Cola’s red color, which fosters consumer brand loyalty. Building brand loyalty can reduce consumer retention costs and provide brand credibility when introducing the brand to new consumers [46].

Keller [47] describes brand equity as the differentiated value that consumers perceive of a brand as a result of the brand’s marketing efforts. Keller cited Netflix as an example of a brand that has built brand equity. Netflix is an on-demand way to watch movies and TV shows on the internet, with more than 200 million members worldwide. In the past, the only way to watch movies was via video or DVD, but Netflix has built a service that enables users to watch movies on their smartphones using an internet connection. Netflix has developed a green production guide that proposes methods to reduce the carbon footprint of video production, including the use of LEDs, recycling materials, and eco-friendly transportation. These initiatives enhance Netflix’s perceived quality, thereby positively influencing brand equity [48]. Hence, it is hypothesized that:

**H1.** A brand’s commitment to sustainability, as assessed by consumers, will have a positive effect on brand equity by mediating perceived quality.

In addition, brands with a high level of feminine personality, such as Zara, Chanel, and Dove, consider sustainability to be essential, but do not use the color green in their logo, brand name, or advertising. On the contrary, brands with a high level of masculine personality, such as Samsung and McDonald’s, are actively using green. The following hypotheses were developed to analyze this phenomenon and provide suggestions for the brand sustainability strategy.

**H2.** The effectiveness of a brand’s sustainability strategy will differ depending on brand color and brand gender.

Thereby, our proposed model is structured as follows (Figure 3).
Figure 3. Suggested research model.

3. Study 1

In Study 1, we examine the Best Global Brands listed by Interbrand [49] in 2022, classifying them into feminine and masculine brand personalities, and explore their sustainability color strategies through case analysis. This study aims to provide ideas and insights for Study 2 by comparing the use of green and iconic colors in the sustainability strategies of the top 100 brands.

3.1. Materials and Methodology

Interbrand, founded in 1974, is the world’s leading brand consulting firm, researching the value of global brands. Each year, the company releases its Best Global Brands, and in 2022, it ranked Apple first, Microsoft second, Amazon third, Google fourth, and Samsung fifth. This study sought to gain insights into sustainability and color by exploring how the world’s leading brands use color in their sustainability strategies.

In Lieven et al. (2014)’s [31] study of brand gender and brand equity, 140 brands were categorized according to their feminine and masculine brand personality level. The results of his study showed that brand gender and brand equity are closely related, with brand equity increasing as the level of either feminine or masculine personality increases. Following the research of Lieven et al. (2014) [31] and the research of Sun and Kim (2021) [50], this study categorized Interbrand’s Best Global Brands according to brand gender, and collected data through brand websites, brand sustainability reports, brand Instagram, Google News Search, and magazines to analyze each brand’s sustainability color strategy. The best global brands establish an iconic color and strategically use it repeatedly to enhance brand awareness. These iconic brand colors can be identified across a wide range of websites. This study investigates two websites that demonstrate a well-organized presentation of these iconic brand colors, utilizing the hex triplet format [51,52].

Based on the collected data, we analyzed how companies use the color green in brand logos, brand packages, brand names, eco-labels, and advertising when implementing sustainability strategies. If the green color is used in all of the logos, packages, names, eco-label, and advertising, it is marked as ●; if it is used in some of them, it is marked as ○; and if it is not used, it is marked as ▲.

3.2. Results

Chanel is a French luxury fashion brand belonging to the high-involvement and emotional dimensions in FCB Grid. Chanel [53] has established particular goals to reduce its carbon footprint in accordance with the mission to reduce global temperatures by 1.5 degrees Celsius by the year 2030. In contrast to these efforts, very little information about Chanel’s sustainability strategy was conveyed to consumers, and the brand did little to communicate its commitment to sustainability through its logo, packaging, name, and advertising. In particular, the brand’s logo, name, and packaging represent sustainability by using Chanel’s iconic black and white colors rather than green (Table 3).
<table>
<thead>
<tr>
<th>Brand Gender</th>
<th>Product Category</th>
<th>Brand</th>
<th>Top 100</th>
<th>MBP-FBP</th>
<th>Iconic Color</th>
<th>Green Color Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feminine</td>
<td>Fashion</td>
<td>LV</td>
<td>14</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Fragrance</td>
<td>Chanel</td>
<td>22</td>
<td>−0.81</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Cosmetics</td>
<td>Hermes</td>
<td>23</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Jewelry</td>
<td>Gucci</td>
<td>30</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Jewelry</td>
<td>Zara</td>
<td>47</td>
<td>−0.33</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Jewelry</td>
<td>Tiffany</td>
<td>88</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Masculine</td>
<td>Food</td>
<td>Coca cola</td>
<td>7</td>
<td>0.86</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td></td>
<td>McDonalds</td>
<td>11</td>
<td>1.00</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pepsi</td>
<td>32</td>
<td>0.34</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Starbucks</td>
<td>51</td>
<td>0.45</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nespresso</td>
<td>67</td>
<td>0.55</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Masculine</td>
<td>IT</td>
<td>Apple</td>
<td>1</td>
<td>0.62</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amazon</td>
<td>3</td>
<td>0.71</td>
<td>□</td>
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<tr>
<td></td>
<td></td>
<td>Samsung</td>
<td>5</td>
<td>0.82</td>
<td>●</td>
<td>●</td>
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<td></td>
<td>Fashion</td>
<td>Sony</td>
<td>39</td>
<td>0.81</td>
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<td>○</td>
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<td></td>
<td></td>
<td>Nike</td>
<td>10</td>
<td>1.08</td>
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<td>●</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adidas</td>
<td>42</td>
<td>1.02</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

Notes: Top 100 = Interbrand Best Global Brands list 2022; MBP-FBP = masculine brand personality-feminine brand personality; Iconic color = source from Brandcolors.net [51]; Green Color Strategy = If the green color is used in all of the logos, packages, names, eco-label, and advertising, it is marked as ●; if it is used in some of them, it is marked as ○; and if it is not used, it is marked as -.

Louis Vuitton is a French luxury brand that was founded in 1854 and is one of the most highly regarded luxury brands, ranking 14th in Interbrand’s Best Global Brands of 2022. Since 2004, Louis Vuitton has endeavored to reduce its carbon footprint by lowering its energy consumption and transportation-related carbon emissions [54]. Louis Vuitton is prominent in sustainability among luxury brands, but instead of green, they use the iconic Louis Vuitton color to represent sustainability.

Apple partially uses green to represent the eco-friendliness of its products on the webpage [55]. However, the recycling symbol on the iPhone and iPad packages is silver, its iconic color. Apple plans to donate $1 to the World Wildlife Fund for every payment made with Apple Pay in Switzerland, Sweden, France, the United Kingdom, and the United States, and the color green was used for this campaign [56].

Nike has set a targeted objective to reduce carbon emissions and waste by 2030 through its comprehensive initiative called the “Move to Zero” campaign. In pursuit of this goal, Nike has introduced an innovative material that effectively reduces carbon emissions by approximately 75 percent compared to conventional apparel. This remarkable achievement is visually represented by Nike’s circular “Sunburst” logo, prominently displayed in black against a green background. This logo serves as a powerful symbol of the company’s unwavering commitment to the Move to Zero initiative and its ongoing sustainability efforts [57].

In summary, the results of Study 1 show that brands with a high level of feminine personality use green to a limited extent or not at all when implementing their sustainability strategies, mainly using iconic colors instead. Brands with a high level of masculine personality are more likely to use green than brands with a high level of feminine personality. In the case of McDonald’s, the company abandoned its iconic red color and replaced it with green to emphasize its eco-friendliness (Figure 4).
Based on the findings from Study 1, it was observed that masculine brands primarily utilize green colors, while feminine brands show a lack of green color usage. However, the limited scope of Study 1, which focused on specific phenomena within the best global brand without conducting empirical analysis, poses challenges in generalizing the findings and comprehending the specific impact of iconic color and brand gender in the context of sustainability. Furthermore, although green color is commonly associated with eco-friendliness and sustainability, one study [11] has indicated that it does not effectively enhance consumers’ purchase intention for green products. In addition, another study [9] has shown a positive effect of iconic color use on consumers’ purchase behavior.

Considering the insights gained from these studies, there is a need to investigate brand colors by categorizing them into green and iconic colors to identify effective color strategies for sustainability initiatives. Therefore, building upon the findings of Study 1 and the comprehensive review of relevant literature, Study 2 aims to conduct additional empirical analysis to examine the effects of green and iconic colors and explore strategies for enhancing brand equity under the influence of sustainability.

To achieve this objective, the following hypothesis has been formulated:

**H3.** The color green advantage is attenuated when the feminine brand personality is stronger in sustainability strategy.

**H4.** Iconic color advantage is intensified when the feminine brand personality is stronger in sustainability strategy.

**H5.** The color green advantage is intensified when the masculine brand personality is stronger in sustainability strategy.

4. Study 2

In Study 1, it was found that the use of color in sustainability strategies is different depending on the brand gender. Based on the findings of Study 1, Study 2 aims to examine which colors are effective in increasing brand equity in the brand sustainability strategy.
4.1. Materials and Methodology

4.1.1. Participants

A total of 432 respondents participated in the survey, and 401 respondents were ultimately analyzed after excluding incomplete responses. A frequency analysis was conducted to determine the sample’s demographic characteristics, as shown in Table 4.

Table 4. Demographic profile of the sample.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Value</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>178</td>
<td>44.4</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>223</td>
<td>55.6</td>
</tr>
<tr>
<td>Age</td>
<td>20–29 years</td>
<td>103</td>
<td>25.7</td>
</tr>
<tr>
<td></td>
<td>30–39 years</td>
<td>187</td>
<td>46.6</td>
</tr>
<tr>
<td></td>
<td>40–49 years</td>
<td>87</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>Over 50 years</td>
<td>24</td>
<td>6.0</td>
</tr>
<tr>
<td>Nationality</td>
<td>United States</td>
<td>133</td>
<td>33.2</td>
</tr>
<tr>
<td></td>
<td>Republic of Korea</td>
<td>227</td>
<td>56.6</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>29</td>
<td>7.3</td>
</tr>
<tr>
<td></td>
<td>Brazil</td>
<td>10</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>Australia</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>401</td>
<td>100</td>
</tr>
</tbody>
</table>

4.1.2. Manipulation Checks

For the empirical analysis, we selected brands that can be clearly distinguished by brand gender and involvement, and have iconic colors, in accordance with the Best Global Brands listed by Interbrand and Lieven et al. (2014)’s [31] study. In addition, we conducted t-test analyses of variance on the feminine brand personality (FBP) and masculine brand personality (MBP) manipulation check measures for 19 participants and selected four brands: Chanel (highly feminine brand, M-F: -0.81), Dove (highly feminine brand, -0.80), BMW (highly masculine brand, M-F: 1.47), Nike (highly masculine brand, M-F: 1.08). Following Liven [31], the M-F value in this study refers to masculine brand personality — feminine brand personality, with a minus indicating feminine and a plus indicating masculine.

To select an eco-label that symbolizes sustainability, we selected from the Energy Star, EU Energy Label, RE100, GR Mark, FSC, WWF, and U+2672 universal recycling symbol by referring to the global environmental labeling report published by the Ministry of Environment of the Republic of Korea and conducted manipulation checks on the awareness of these labels. Accordingly, we selected the highly recognized U+2672 universal recycling symbol, which has been used internationally since 1970.

4.1.3. Procedure and Materials

This study investigates the effect of sustainability strategies on brand equity according to brand gender and brand color. To ensure external validity, the survey was conducted on people aged 20 to 60 with an awareness score of at least four out of seven for the brand and recycling symbol. “Environmental concern” was used as a covariant in order to control for factors that may affect the results. “Environmental concern” refers to an individual’s level of concern for the environment, and we controlled for its influence as greater or lesser environmental concern can alter the overall results.

The data for this study was collected using the survey platform of Amazon Mechanical Turk in the United States and Google Surveys. MTurk is a crowdsourcing survey system that allows participants worldwide, including the United States, Brazil, and India, to respond to paid surveys. A growing number of internationally renowned journals, including the Journal of Advertising and the Journal of Marketing, are using MTurk, validating
its reliability. Statistical analysis was performed using SPSS 25.0, AMOS 23.0, and PROCESS macro for frequency analysis, reliability, discriminant validity, correlation analysis, regression analysis, factor analysis, and moderated mediation analysis.

The four brands used in the survey were Chanel, Dove, BMW, and Nike, which were selected by manipulation checks, and each brand’s logo and recycling symbol were combined in one image. Participants were asked to evaluate their feelings, thoughts, and behaviors toward the brand represented by the recycling symbol (Figure 5).

![Figure 5. Sample stimuli for Study 2.](image)

The constructs used in this study have been developed and used in previous research and were modified for this study. Sustainability is evaluated using four items of Baalbaki’s (2016) scale, which measures the extent to which consumers judge a particular brand to be environmentally friendly. Perceived quality refers to consumers’ perceptions of a brand’s quality and is a concept utilized in research to measure brand equity. While brand equity can be measured indirectly through brand loyalty, brand awareness, etc., this study employed scale items developed by Yoo, Donthu and Lee (2000) [44] that directly measure brand equity. Brand gender was measured using scale items from Lieven and Hildebrand (2016) [58] and César, Fonseca and Martins (2021) [24], which were developed based on Grohmann (2009)’s [29] research. Lieven et al. (2016) [58] conducted an international survey of 3,049 participants and found that the two items “aggressive” and “fragile” from Grohmann (2009) [29]’s twelve items did not seem to reflect the gender dimension of brands well. César et al. (2021) [24]’s study also employed Lieven et al. (2016) [58]’s ten items to measure brand gender. In this study, we used ten items following Lieven et al. (2016) [58] and César et al. (2021) [24]’s study. Environmental concern was utilized as a covariant with three items (Table 5).

### Table 5. Measurement model.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Definition</th>
<th>Measure Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainability Baalbaki and Guzmán (2016) [59]</td>
<td>Consumers’ judgment on the eco-friendliness of a brand</td>
<td>ST1 = Brand X is an environmentally safe brand. ST2 = Brand X is an environmentally responsible brand. ST3 = Brand X is a sustainable brand. ST4 = Brand X is a healthy brand.</td>
</tr>
<tr>
<td>Perceived Quality Yoo et al. (2000) [44]</td>
<td>Consumers’ judgment of brand quality</td>
<td>PQ1 = Brand X is of high quality. PQ2 = The likely quality of Brand X is extremely high. PQ3 = The likelihood that Brand X would be functional is very high. PQ4 = The likelihood that Brand X is reliable is very high. PQ5 = Brand X must be of very good quality.</td>
</tr>
</tbody>
</table>
### 4.2. Results

#### 4.2.1. Discriminant Validity

To verify the reliability and validity of the measurement items, the reliability analysis was conducted using Cronbach’s alpha coefficient to verify internal consistency. For the validity analysis, exploratory and confirmatory factor analyses were conducted, and the standardized factor loadings of all items were above 0.7, AVE was above 0.8, and CR was above 0.9, confirming the convergent validity. Discriminant validity requires that the AVE of the two variables be greater than the square of the correlation coefficient, and since all correlation coefficients are distributed in the range of 0.201 to 0.405, and the values of the AVE are all greater than this, discriminant validity was verified.

As for reliability, Cronbach’s alpha values were all above 0.7, indicating high reliability. Exploratory factor analysis showed that the loading factors were above 0.7, indicating high validity and that each variable was clearly distinguished. The confirmatory factor analysis demonstrated that the AVE value was higher than 0.8, confirming convergent validity, and the CR value was higher than 0.9. The goodness-of-fit indices were CFI= 0.954 and RMSEA= 0.053, indicating that the model fit was acceptable (Table 6).

#### Table 6. Measurement reliabilities and validity.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Items</th>
<th>α</th>
<th>EFA</th>
<th>CFA</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>λ</td>
<td>Eigen Value</td>
<td>Estimate</td>
<td>AVE</td>
<td>CR</td>
</tr>
<tr>
<td><strong>Sustainability</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ST1</td>
<td>0.826</td>
<td>822</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ST2</td>
<td>0.854</td>
<td>835</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ST3</td>
<td>0.808</td>
<td>3.367</td>
<td>761</td>
<td>0.907</td>
<td>0.975</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ST4</td>
<td>0.728</td>
<td>769</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Perceived</strong></td>
<td></td>
<td>0.936</td>
<td>818</td>
<td>3.905</td>
<td>781</td>
<td>0.905</td>
<td>0.979</td>
</tr>
</tbody>
</table>
quality | PQ2 | PQ3 | PQ4 | PQ5  
---|---|---|---|---
0.837 | 0.739 | 0.719 | 0.781 | 0.767  

Overall brand equity | OBE1 | OBE2 | OBE3 | OBE4  
---|---|---|---|---
0.928 | 0.914 | 3.102 | 0.890 | 0.970  

Feminine brand personality | FBP1 | FBP2 | FBP3 | FBP4 | FBP5  
---|---|---|---|---|---
0.857 | 0.951 | 0.854 | 0.773 | 0.825 | 0.743 | 0.739 | 0.849 | 0.642 | 0.830 | 0.864 | 0.969  

Masculine brand personality | MBP1 | MBP2 | MBP3 | MBP4 | MBP5  
---|---|---|---|---|---
0.867 | 0.880 | 0.885 | 0.719 | 0.766 | 0.837 | 0.839 | 0.841 | 0.733 | 0.776  

Environmental concern | EC1 | EC2 | EC3  
---|---|---|---
0.782 | 0.724 | 0.739 | 0.711 | 0.815 | 0.808 | 0.526 | 0.837 | 0.937  

Goodness of fit indices: Normed χ² = 1.486, CFI = 0.954, GFI = 0.847, AGFI = 0.811, RMR = 0.080, RMSEA = 0.053  

Notes: α = Cronbach’s alpha; λ = factor loading; AVE = average variance extracted; CR = composite reliability; EFA = exploratory factor analysis; CFA = confirmatory factor analysis; Normed χ² = χ²/df (CMIN/DF); CFI = comparative fit index; GFI = goodness-of-fit index; AGFI = adjusted goodness of fit index; RMSEA = root mean square error of approximation.

In accordance with the guidelines established by Fornell and Larcker (1981) [61], the square roots of the average variance extracted (AVE) demonstrate superior discriminant validity compared to the correlations between latent variables (Table 7).

**Table 7.** Correlations, the square root of AVE, means, standard deviations.

<table>
<thead>
<tr>
<th></th>
<th>ST</th>
<th>PQ</th>
<th>OBE</th>
<th>FBP</th>
<th>MBP</th>
<th>EC</th>
<th>AW</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST</td>
<td>0.952</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PQ</td>
<td>0.606 **</td>
<td>0.951</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBE</td>
<td>0.613 **</td>
<td>0.666 **</td>
<td>0.943</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FBP</td>
<td>0.373 **</td>
<td>0.350 **</td>
<td>0.420 **</td>
<td>0.929</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MBP</td>
<td>0.318 **</td>
<td>0.474 **</td>
<td>0.470 **</td>
<td>0.160 **</td>
<td>0.934</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC</td>
<td>0.337 **</td>
<td>0.405 **</td>
<td>0.435 **</td>
<td>0.371 **</td>
<td>0.246 **</td>
<td>0.915</td>
<td></td>
</tr>
<tr>
<td>AW</td>
<td>0.244 **</td>
<td>0.291 **</td>
<td>0.272 **</td>
<td>0.269 **</td>
<td>0.294 **</td>
<td>0.368 **</td>
<td>-</td>
</tr>
<tr>
<td>Mean</td>
<td>5.366</td>
<td>5.462</td>
<td>4.959</td>
<td>4.923</td>
<td>5.192</td>
<td>5.411</td>
<td>6.067</td>
</tr>
<tr>
<td>S.D.</td>
<td>1.172</td>
<td>1.162</td>
<td>1.411</td>
<td>1.373</td>
<td>1.407</td>
<td>1.139</td>
<td>1.254</td>
</tr>
</tbody>
</table>

Notes: ST = sustainability; PQ = perceived quality; OBE = overall brand equity; FBP = feminine brand personality; MBP = masculine brand personality; EC = environmental concern; AW = brand awareness; The diagonal values mentioned in bold = the square root of AVE (average variance extracted); ** = correlation is significant at the 0.01 level.
4.2.2. Mediation

Bootstrap estimation with 5000 bootstrapped resamples was conducted with sustainability as the independent variable, overall brand equity as the dependent variable, and perceived quality as the mediator. The confidence interval was set at 95% (Figure 6).

![Figure 6](image)

**Figure 6.** Indirect effect of sustainability on overall brand equity through perceived quality.

Mediation analysis using PROCESS model 4 [62], with sustainability as the independent variable, overall brand equity as the dependent variable, and perceived quality as the mediator, showed that sustainability increased perceived quality (B = 0.51, 95% CI = [0.43, 0.59]), which increased overall brand equity (B = 0.50, 95% CI = [0.39, 0.61]). Thus, the predicted indirect effect was significant (B = 0.26, 95% CI = [0.17, 0.34]), in support of H1.

4.2.3. Moderated Mediation

Moderated mediation analysis was performed using PROCESS model 11, with sustainability as the independent variable, overall brand equity as the dependent variable, perceived quality as the mediator, brand gender as the moderator1, and brand color as the moderator2. Moderated regression analysis was conducted using the method proposed by Aiken and West (1991) [63], which compares the magnitude of the effect of independent variables on the dependent variable at one standard deviation above and below the mean value of the moderator. All variables except the dependent variable, advertising attitude, were mean-centered to facilitate the interpretation of the parameter estimates and to avoid multicollinearity (Figure 7).

![Figure 7](image)

**Figure 7.** Indirect effect of sustainability on brand equity through perceived quality moderated by feminine brand personality and brand color.
Moderated mediation analysis using PROCESS model 11 with feminine brand personality and brand color as a moderator showed that perceived quality is a statistically significant mediator. The index of moderated mediation shows that mediation is stronger for iconic colors (B = 0.22, 95% CI = [0.12, 0.29]) than for the color green (B = 0.21, 95% CI = [0.09, 0.36])

The results show that, as the level of feminine brand personality increases, the brand equity with green decreases drastically, whereas the brand equity with iconic colors increases. This indicates that H3 and H4 are supported.

Moderated mediation analysis using PROCESS model 11 with masculine brand personality and brand color as a moderator showed that perceived quality is a statistically significant mediator. The index of moderated mediation shows that mediation is stronger for green (B = 0.26, 95% CI = [0.14, 0.39]) than for iconic colors (B = 0.17, 95% CI = [0.08, 0.27]) (Figure 8).

![Figure 8. Indirect effect of sustainability on brand equity through perceived quality moderated by masculine brand personality and brand color.](image)

The results demonstrate that brand equity decreases as the level of masculine brand personality increases, regardless of brand color. Although the overall brand equity level was higher for green than for the iconic colors, H5 is not supported. Furthermore, the effects of a brand’s sustainability strategy vary according to brand color and brand gender, thereby supporting H2.

5. Discussion and Conclusions

This study examined the effects of brand color and brand gender on changes in brand equity, given the influence of the brand sustainability strategy on brand equity. In this study, we conducted a case analysis and an empirical study, which resulted in the following conclusions.

First, Study 1 explored the ways in which Interbrand’s Best Global Brands use color in their sustainability strategies through case analysis. The analysis revealed that brands with a high feminine personality level are less likely to use the color green in their sustainability strategies. This case implies that green is not necessarily an effective color for the sustainability strategy.

A study by Samarakweera, Sims and Homsey (2020) [11] on the relationship between the color green and willingness to pay found that willingness to pay was higher for white-
colored labels than for green-colored labels on environmentally friendly packages. It indicates that products using white are perceived as more eco-friendly, clean, and high-quality than those using green. That is, it can be seen that green, which many brands widely use to represent sustainability and eco-friendliness, does not necessarily have a positive effect and may even decrease perceived quality and willingness to pay. While the color green is embedded in the schema of environmental responsibility for consumers and is considered to trigger perceptions of eco-friendliness [64], the effectiveness of the color green may vary depending on the brand or product category. In terms of sustainability strategy, it is therefore important to choose colors that are not only green, but also relevant to the characteristics of the brand or product.

Drawing on the findings of Study 1, Study 2 examined the impact of the brand sustainability strategy on perceived quality and brand equity according to brand color and brand gender. The results demonstrated that green is effective for the majority of brands to communicate their sustainability strategies, whereas iconic colors are more effective than green for brands with a high feminine personality level.

The findings of Study 2 can be explained in terms of Labrecque et al. (2013)’s referential color model theory [4]. In this theory, the color green is classified as a dark color family and is not associated with femininity, and has ruggedness and masculine characteristics [65]. On the other hand, feminine brands have graceful and tender characteristics and have an image that is opposite to the color green. It can be interpreted that the color green and feminine brands are less likely to achieve effective marketing outcomes due to inconsistent learned associations. Within this framework, it is essential to have contextual factors with high coherence in brand strategy [45].

These results suggest that fragrance, cosmetics, and fashion brands, which are classified as product categories with a high feminine personality level, should reduce the use of the color green and use more iconic colors in their sustainability brand strategies. It seems that expressing eco-friendliness with iconic colors instead of green in the brand name, logos, and packages would be more effective in increasing brand equity.

In contrast to Lieven et al. (2014)’s [31] study, which demonstrated that highly masculine (or feminine) brands have higher brand equity than moderately masculine (or feminine) brands, this study found that brand equity decreases when brands have a high level of masculine (or feminine) personality under the influence of sustainability. It is proposed that masculine or feminine personalities should not be stressed for an effective sustainability strategy and that the brand’s adventurous, brave, daring, dominant, sturdy, graceful, sensitive, sweet, and tender traits are not in line with sustainability. In establishing the sustainability strategy of a brand, it is critical to ensure that these characteristics are not communicated to consumers.

Previous studies have separately demonstrated that green images and associations increase brand equity, and brands with a strong feminine or masculine personality have higher brand equity. In this respect, this research is further significant in combining these two different types of studies and suggests implications and strategies for using brand colors.

6. Limitations and Directions for Future Research

This study has the following limitations and suggestions for future research.

First, this study classified brands according to brand gender, but it is necessary to classify brands through the analysis method of the FCB grid, which classifies product groups according to “involvement”, “think”, and “feel” as well as brand gender, and to study the color based on this classification. According to the case analysis of the Best Global Brands, the color green is used closer to the think zone, while the iconic color is used closer to the feel zone. It was also discovered that high-involvement products tend to use less green, which requires additional research.

Second, it is necessary to consider a method to analyze brands by classifying them according to the utilitarian-hedonic axis. In a specific study, researchers [66] explored the variation in consumer consumption patterns between hedonic and utilitarian products,
with an emphasis on the role of color as an influencing factor. The findings reveal a significantly higher purchase intention for consumers engaging in hedonic consumption when exposed to red-colored stimuli, in contrast to green-colored stimuli. In light of these results, future investigations should focus on renowned hedonic brands, such as Lamborghini and Ferrari, as there appears to be a notable absence of green color usage across various platforms, including sustainability reports, websites, and exhibition stores.

Third, this study is limited in that it only examines the Best Global Brands. Further research should be conducted to determine which colors are appropriate for small and medium-sized business brands in their sustainability color strategies.

Fourth, while this study only classified two colors, green and iconic, it is worth further studying the sustainability implications of the three elements of hue, saturation, and value, as well as the classification of colors as black, white, vivid, dark, and dull, as applied in many existing color studies.

Fifth, Labrecque (2020) [7] points out that even the same color has different effects on consumers depending on the color of the background. It is, therefore, worthwhile to measure how brand equity varies with different combinations of background colors.

Sixth, while this study primarily focused on brand gender, further analysis revealed that the effectiveness of color use varies by nationality. When designing an eco-friendly image for a brand, using an iconic color was more effective than the color green for Americans. Koreans were less sensitive to sustainability than Americans, and they were less affected by color than Americans. This indicates that the impact of color may vary depending on culture and nationality, which warrants further research.

**Author Contributions:** Conceptualization, M.S. and J.K.; methodology, M.S. and J.K.; software, M.S. and J.K.; validation, M.S. and J.K.; formal analysis, M.S. and J.K.; writing—original draft preparation, M.S.; writing—review and editing, M.S. and J.K.; supervision, J.K. All authors have read and agreed to the published version of the manuscript.

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**Informed Consent Statement:** Except for personal information that the subject is sensitive to, informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Data sharing not applicable. The data are not publicly available due to privacy issues.

**Conflicts of Interest:** The authors declare no conflict of interest.

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