# Color associations with masculine and feminine brand personality among Chinese consumers

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# ABSTRACT

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This research examines the association between color hue and brightness and consumers' perceptions of masculine and feminine brand personality traits. As most research on color-brand personality associations has focused on the North American context, the current research extends this investigation to Chinese consumers. Building on the literature on color meaning and the gender dimensions of brand personality (i.e., brand masculinity and brand femininity), this research reports results from three empirical studies. Study 1 consisted of interviews exploring the classification of color hues in terms of masculine and feminine brand personality. Studies 2 and 3 examined the relation between color hue (Study 2) and color hue and brightness (Study 3) on consumers' perceptions of masculine and feminine brand personality. Study 2 involved eleven color hues (red, orange, yellow, green, blue, purple, pink, white, black, brown, and gray) that were applied to fictitious brand logos adapted from prior research. Study 3 involved three color hues (red, green, purple) and three brightness levels. Participants rated each colored logo in terms of brand masculinity and brand femininity. Results suggest that red, orange, blue, black, and white are perceived as more masculine (than feminine), and that high levels of brightness tend to increase femininity—a result that was significant for the hue purple. This research concludes with a discussion of the theoretical contributions, limitations, managerial implications and future research.

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# Introduction

Color is a domain that is relatively well researched in the areas of psychology and art. In the domain of branding, however, research on the effects of color on consumers' brand perceptions is only emerging. Recent research, for example, links color hue and saturation to consumers' perceptions of five dimensions of brand personality (Labrecque and Milne, 2012). Brand personality refers to the human characteristics consumers associate with brands and consists of five dimensions: sincerity, excitement, sophistication, ruggedness, and competence (Aaker, 1997). Two additional brand personality dimensions consist of brand masculinity and brand femininity—gendered traits that consumers associate with brands (Grohmann, 2009). The relation between color hue and color brightness and the latter two brand personality dimensions has not been explored.

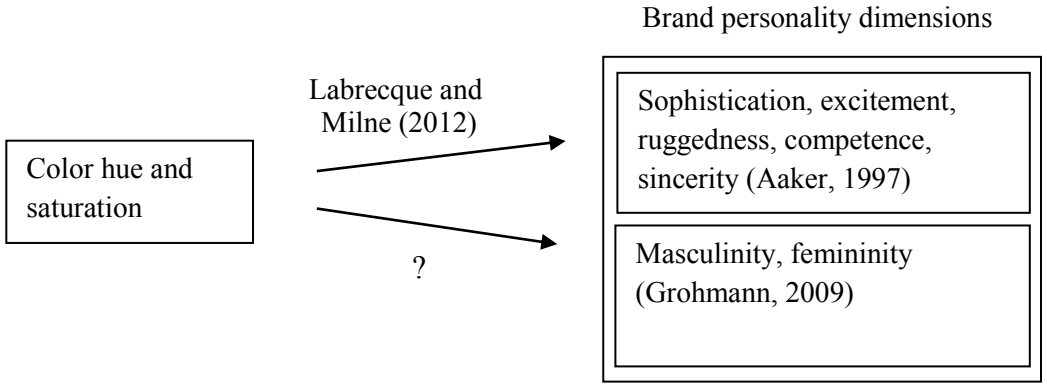



**Figure 1. Color and brand personality dimensions**

The current research aims to fill this gap. More specifically, the objectives of this research are (1) to categorize color hues in terms of their association with masculine brand personality and feminine brand personality; (2) examine the influence of color

brightness on consumer' perceptions of brand masculinity and brand femininity. In doing so, the current research seeks to address the question of what color hue and brightness brands might use in their logos if they wish to evoke a masculine or feminine brand personality. This question is relevant to the branding of many product categories in which brand masculinity or femininity plays an important role in competitive positioning, such as in personal care or apparel product categories.

This research examines the relation between color hue, color brightness, and consumers' perceptions of brand masculinity and femininity among Chinese consumers in particular. The reason underlying this focus on Chinese consumers is that they represent consumers in a rapidly developing market that has not been the focus on much academic research on logo color perception. In the more developed North-American and European markets, many brands possess a mature brand image that includes brand-characteristic colors and logos. An examination of color—brand gender associations could therefore be useful in helping new brands in emerging economies—such as China—to better target and appeal to male and female consumers looking for brands that reflect their gender identity (Grohmann, 2009). By choosing logo colors that are in line with a desired brand gender image, especially small and medium-sized companies might be able to reach consumer segments without massive advertising investments in the brand introduction stage.

A second reason for a focus on Chinese consumers arises from prior research (Akcay and, Sun 2013) examining gender differences in color preferences across product categories in different countries. This research found that that compared to the US and Turkey, Canada, China, India and the Netherlands exhibited stronger gender-color

relations. As a result, there was a call for more research to test color and gender influences in these countries (Akcay and Sun, 2013).

The contribution of this research is to enhance our understanding regarding the association between color and gendered brand personality. In addition, this research sheds light on Chinese consumers' perceptions and understanding of color and gendered brand personality. For the management of brands in the Asian market, especially with regard to shaping consumers' brand personality perceptions through the design of brand logos, this research can provide new insights in that matching logo color to the desired gendered brand personality helps managers to keep brand personality consistent and relevant to consumers. Furthermore, the proper color chosen will save advertisement budget on deliver information, especially deliver brand personality and brand image, to the focal consumer segments.

## Literature Review

### Color in Marketing and Branding

Color is widely used in many ways such as brand visual identity, product design, retail store fitment, advertisement, package and so on. People's assessment of a product is based on color (62%-90%), among other factors. The assessment is usually made in under 90 seconds (Allison, 1999; Argent, 2007; Singh, 2006). Human beings tend to remember color first among other features in visual memory hierarchy (Seckler, 2005). In addition, color advisements are 100% more memorable compared to black and white advertisements (Mofarah, Tahmtan, Dadashi and Banihashemian, 2013). Color

marketing was first mentioned by Gimba (1998). Color was used as a tool which "helps the message stand out and perform" (Gimba, 1998, 6).

Color's usefulness was first considered from a perspective of consumers' psychological desires. People tend to choose a product color based on their sensuous desire because they pay more attention to it (Mofarah, 2013). Their acceptance of product were boosted by color and other color associated features because product color grab their attention (Mofarah, 2013). This is a premise that color affects other consumer related variables, such as purchase intention, brand recall and so on. Later on, color's usefulness was researched in detail in many aspects. The research in color marketing falls into four main categories: product color, packaging color, color in atmospherics and color in advertising (Lee and Rao, 2010). Color was found to have impact on product quality and price perceptions (Argent, 2007; Gimba, 1998; Harrington, 2006), enhance recognition (Allison, 1999; Henderson and Cote, 1998; O'Donnell and Brown, 2011; Slaughter 2011) and recall (Schechter, 1994), influence teenagers' choioce processes (Akcay, 2012), influence purchase intention (Allison, 1999; Madden, Hewett and Roth 2000; O'Donnell and Brown, 2011), influence appetite, mood, and have influence on consumer waiting times (Singh, 2006), influence consumers' brand trust and brand switching (O'Neill, 2008), and create emotional connections with consumers (O'Neill, 2008). More specifically, color impact consumer's perceptions on product quality and price using color raking labels. For example, certain color like gold label in Hong Kong, reveals high quality of soups (Gimba, 1998).

Research has also examined cultural differences in the meaning attached to color. The premise that color helps consumers to understand brand personality is that consumers

perceive color to have consistent meaning that may also relate to personality. If consumers in the same region perceive a color differently, then communication of brand meaning from the brand to consumers is compromised. For example, in ancient Rome, the empire was using purple to reveal power and authority. While in ancient China, the empire use yellow to represent them (Wikipedia, 2014). The articles about color cultural differences include the Asian-Pacific region (Bernd and Pan, 1994), African Americans (Madden, Hewett and Roth, 2000; Silver, 1988) and India (Madden, Hewett and Roth, 2000). More recently, Mofarah, Tahmtan, Dadashi and Banihashemian (2013) looked at how color influences consumers' sensuous desires, memory and perception of other features (Mofaral et al., 2013, 163). They examined the color hues black, white, brown, red, pink, blue, green, yellow, purple, gold, orange, turquoise, gray, and silver (Mofaral et al., 2013) and emphasized that the color blue is useful especially to restaurants because it gives consumers a calm and relaxing dinning (Mofaral et al., 2013). To complement existing studies on color perceptions across cultures and provide insights to marketers wishing to establish or expand their marked to China, the current research examined colors perceptions among Chinese consumers.

**Color Meanings and Color Systems**

Color is defined as "light carried on wavelengths absorbed by the eyes that the brain converts into colors that we can see" (Singh, 2006) and comprises six dimensions: red, orange, yellow, green, blue, and violet (Singh, 2006). Color hue can be categorized into warm and cool colors, whereas white, black and gray are considered as neutral colors (Singh, 2006). The most popular color system is the Munsell Color System (Fraser and

Banks, 2004). The Munsell color distinguishes color along three dimensions: hue, chroma and value (HCV; the current research focuses on the color hue and brightness/value dimensions). The Munsell color system contains five basic color hues: red, yellow, green, blue, and purple (see figure1). Singh (2006) argued that basic colors include orange as well.

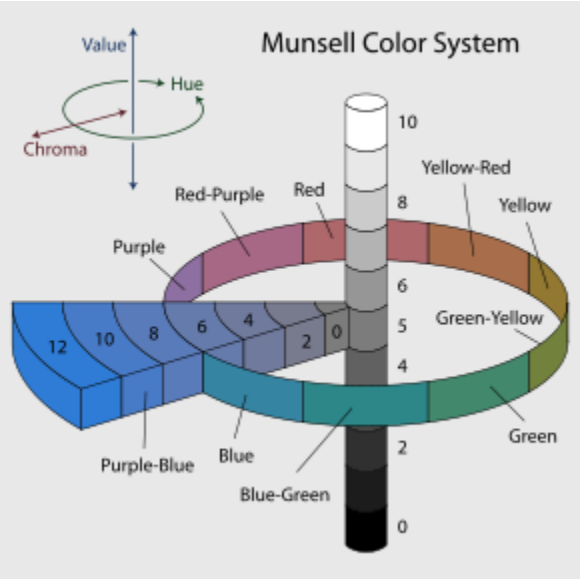



**Figure 2. The Munsell color system**

(From http://en.wikipedia.org/wiki/Munsell_color_system)

Color hue is the basic difference of color cognition: red, green, yellow and so on. It is defined as "the degree to which a stimulus can be described as similar to or different from stimuli that are described as red, green, blue, and yellow." (Mark Fairchild, 12th Color Imaging Conference, unknown page). For example, in peoples' common sense, the sea is basically the hue of blue; the grass is basically the hue of green; the sun is basically the hue of yellow.

Color value is also referred to as brightness. It is defined as “a representation of variation in the perception of a color or color space’s brightness” (Wikipedia, 2014). The higher the value is the more closely the color will approach white. The lower the value is, the darker the color. For example, light red is the color named "watermelon red", while dark red is the color named "wine red".

Color chroma is also referred to as purity. It is defined as “measured radially from the center of each slice, represents the “purity” of a color (related to saturation)” (T. M. Cleland, 1914, Chapter 3). The higher the chroma is, the more vivid the color is. The lower the value is, the color is going to look like it is fading. For example, when the weather is good, the sky looks vivid blue. When it will be raining shortly, the sky is turning faded and gray. In a sense of color hue, they are both blue. However, they change in terms of color chroma.

Along with the development of computer technology, the most popular color system is R, G, B (Red, Green, and Blue) system. The software Photoshop (Adobe) allows people to modify color in hue, value and chroma, then summarizes the three dimensions into one specific color and uses a RGB code to represent that color. In the RGB system, a color can be found using three numbers: the number of red, the number of green, and the number of blue. It is a digital color system that turns color into numbers.

Arising from the development of printing technology, another color categorization method is CMYK. All colors were the combination of four kinds of printing inks: cyan, magenta, yellow, and key (black). The way it works is to control the percentage of each color. It is the most precise method to guarantee that the color we see on the screen will be exactly the color we see after it printed.

The three color systems discussed here (i.e., Munsell color system, RGB color system and CMYK color system) can specify and characterize thousands of colors. However, certain colors are referred to as universal in the sense that people all over the world perceive such colors as frequently used colors. Berlin and Key (1969) defined eleven universal colors: red, orange, yellow, green, blue, purple, pink, white, black, brown and gray. Those universal colors share high chroma as a common characteristic, and are consistently recognized across cultures and time.

**Color Meaning in Psychology and Marketing**

The psychology literature extensively discusses color meanings (Elliot and Maier, 2013). Because we are aiming to look at color effects in marketing and branding, the following discussion will focus on color meanings unveiled in the marketing literature. Table 1 summarizes color meanings in marketing (Labrecque and Milne, 2012; Mofaral et al., 2013; Raizada, 2012).

**Table 1. Color meaning**

| Color | Raizada (2012) | Labrecque and Milne (2012) | Mofaral et al. (2013) |
|---|---|---|---|
| Red | Hot, Blood, Fire, Passion, Excitement, Aggression, Energy and Danger | Arousing, Exciting, Stimulating Color. Activity, Strength. Up-To-Date. | Power, Emotionally Intense, Color of Love, Confidence or Danger, Cheerful, Appetite. |
| Orange | Vibrant, Playful And Full of Energy. Fun and Excitement, Edible and Health, Raise Appetite. | Arousing, Exciting, Less than Red. Lively, Energetic, Extroverted, Sociable. | Attention, Friendlier, Soothing, Fruity, Sociable. |
| Yellow | Happiness, Creativity and Energy, Sun. | Optimism, Extraversion, Friendliness, | Attention, Optimistic, Enhances |

| | | | |
|---|---|---|---|
| | Optimism, Motivation, Boost Morale. | Happiness and Cheerfulness. | Concentration, Metabolism. Excitement. (Color Gold: Wealth and Prosperity, Warmth.) |
| Green | Nature and Vegetation, Health, Freshness and Tranquility, Prestige, Sooth, Concern for Environment. | Nature, Security, Outdoors. | Nature, Calming, Refreshing, Wealth, Dark Green is Masculine. Balance, Harmony, And Stability.( Turquoise: Feminine, Retro Feel, Sophisticated, Soft.) |
| Blue | Trustworthy, Loyal and Dependable, Commitment, Sky, Water, Cooling. | Intelligence, Communication, Trust, Efficiency, Duty, and Logic. Secure. | Popular, Peaceful, Tranquil, Calming, Importance and Confidence, Corporate, Intelligence, Stability, Unity, and Conservatism. Richness or Superiority, Trust and Truthfulness, Sophisticated. |
| Purple | Royalty, Mystery, Sophistication, Creativity and Spirituality. Upper Class, Sooth. Target Female or Teenagers. | Luxury, Authenticity, and Quality, Dignified and Stately, Royalty, Social Roles, Feminine. | Royalty, Luxury, Wealth, and Sophistication. Feminine and Romantic, Artificial, Delicate, |
| Pink | | Optimism, Extraversion, Friendliness, Happiness and Cheerfulness. | Romantic, Create Physical Weakness, Charming, Love. |
| Black | Authority, Power, Elegance and Sophistication. Niche or Expensive, Upper Class. | Sophistication, Glamour, Powerful, Stateliness and Dignity. Expresses Status, Elegance, Richness, Dignity. | Authority and Power. Stylish, Elegance, Sophistication, Mystery. |
| White | Purity, Cleanliness, Peace, Simplicity | Purity, Cleanness, Simplicity, | Sterility, Brides or Funerals. Cleanliness |

| | | | |
|---|---|---|---|
| | And Freshness. Baby or Clinical. Marriage or Festivities. Snow and Cold. | Hygiene, Clarity, Peace, Happiness. | or Purity or Softness. |
| Gray | | | Mourning, Formality, Conservative. (Silver: Riches, Glamorous and Distinguished. Earthy, Natural or Sleek and Elegant, High-Tech or Industrial Look.) |
| Brown | Earth, Wood, Warmth, Comfort, Stability, Reliability, and Approachability, Wholesomeness And Simplicity. | Intelligence, Communication, Trust, Efficiency, Duty, and Logic. Secure. | Wholesomeness and Earthiness, Warmth, Honesty. |

*The above table was prepared based on the results reported by:
Raizada, S. (2012).
Labrecque, L. I., & Milne, G. R. (2012).
Mofarah, M. Y., Tahmtan, Z. S., Dadashi, M. T., & Banihashemian, S. H. (2013).

**Color Preferences**

Research on color preferences has examined developmental as well as cultural aspects. Walsh, Toma, Tuveson and Sondhi (2002) studied the effect of color on children's food choices. Past research have found that food in color red, orange, and clear green are preferred most by consumers (Birren, 1956). In this research, they used color candies and let children choose. They found that children mostly prefer red and green. Walsh et al. (2002) found that their results support past research findings in nonfood domains, where children also preferred red over any other color. Later on, Gollety (2011)

tested children's color preferences in product packaging. He found that children preferred blue, red and purple most when they chose products based on packaging (Gollety, 2011). In summary, empirical research shows that children have a strong preference for red, green and blue.

Seckler's (2005) survey shows that blue is the most popular and favored color by consumers globally, followed by purple, green and red. Appendix 1 illustrates the world's most popular colors. Furthermore, Wolf (2008) examined biological aspects of color preferences and found that blue-eyed men were preferred over brown-eyed men by women. Lee and Rao (2010) tested people's color preferences to websites and the perceptions of trust elicited by different colors. They found that website designed with a main color of blue (compared to green) resulted in more trust and more purchase intentions by consumers (Lee and Rao, 2010).

There are some colors that are popular across cultures and time. However, when applying color findings to a marketing context, it is important to consider that color usually represents a particular company and that—although color choice according to consumer preferences appears desirable—it undermined competitive differentiation. To be attractive and stand out within an industry, companies might take risks in the form of color innovation (e.g., use of a different or contrasting color). Taking such a risk can be rewarding. According to Harrington (2006), once the company has been a "color leader" (Harrington 2006, 154) in the industry, the risk is offset by the financial gains brought by color innovation.

**Color and Gender**

Research frequently discusses color and gender influences independently. For example, research found that gender moderates color influences on consumers' product choice (Funk and Ndusibi, 2006). Khouw (1995) looked at the origin of gender differences regarding color. He found in general "men are more tolerant to achromatic or chromatic colors in interiors" (Khouw, 1995, 1). Guilford (1934) first researched how gender difference affects people's perception of color. According to Khouw (1995), men prefer yellow and blue, whereas women prefer red more than men (in certain context). In addition, women are more easily to point their favorable colors than men, and women prefer soft colors while men prefer bright colors (Khouw, 1995). Past research found that men were more tolerant for neutral colors than women (Khouw, 2002).Women were easily distracted by red and blue (Khouw, 2002). It was confirmed that there are gender differences in color perception. Specifically, gender and ethnicity of teenagers also have impact on the color influences (Akcay, 2012). Akcay found that blue and black were preferred by both genders, while red was preferred more by men than women. On the other hand, white was preferred more by women than men (Akcay, 2012).

In the psychology literature, color and gender relationship was also discussed. Findings suggest that gender affects the way color is perceived or processed. For example, men rate women higher when they are in red clothes (Elliot and Niesta, 2008), whereas women are more confident when they are wearing red clothes (Elliot and Maier, 2013).

In the marketing literature, Cunningham and Macrae (2011) explored color and gender stereotyping. For instance, in most cultures people consider pink as more appropriate as a product color for girls, while blue is considered more fitting for boys. Since the current research considers gender perceptions related to color in a Chinese

context, a brief discussion of the literature on colors and gender associations in Asia follows. Instead of looking at psychological meanings and consumer stereotyping, the literature pertaining to color meanings in Asia mostly tried to explain the color-gender association from a historical perspectives or social class differences. Based on the ProQuest Asian Business & Reference (ProQuest LLC, 2014), the following findings emerged: In 2008, China established a color development center named PolyOne (China Business Newsweekly, 2008). It is aimed at delivering services and to help companies to create a bridge between them and consumers (China Business Newsweekly, 2008). A global color management solution was introduced in China in 2011 (select QC; China Weekly News, 2011). In addition to technology developments, color preferences were considered the most useful factor that companies care about. According to Asia Business Newsweekly (2008), in the automotive world, white pearl replaced silver to become the most popular color. Research on color and gender in Asia is dispersed and limited. Some researchers only looked at a specific phenomenon in a certain culture. For example, several researchers looked at Chinese symbolic colors. In research on Zhang Yi'Mou's film in China, gender/class was explained by exploring the meaning of the Chinese symbolic color red (Yang, 2011). Qu (2013) examined the Chinese costume color black and explained the historical path of this color. Funk and Ndubisi (2006) researched color in marketing in Malaysia. They tested color significance, attitude and color preferences. Gender moderated the relation between color dimensions and product choice (Funk and Ndubisi, 2006). Raizada (2012) investigated the socio-cultural aspects, commercial aspects, scientific aspects, political aspects and psychological aspects of color. He also summarized the marketing meaning of the colors red, brown, yellow, green, blue, black,

orange, purple, and white (Raizada, 2012). To sum up, the gender difference on color may be due to cultural and socio-cultural differences, historical reasons, human-being's tolerance difference on men and women, psychological distraction, age (difference of children and adults), technology development and other possible factors.

**Gendered Brand Personality Dimensions**

Brand personality is defined as "the set of human characteristics associated with a brand"(Aaker 1997, 347). Aaker (1997) separated brand personality into five dimensions: sincerity, excitement, competence, sophistication, and ruggedness. Research shows when people analyze human personality, it is different from processing brand personality: the regions of the human brain which are activated for brand personality and human personality are not the same (Yoon, Gutchess, Feinberg and Polk, 2006).

Regarding color and brand personality, academic literature has begun to explore the relation between color and brand personality (Labrecque and Milne, 2012). Based on a literature review that literature review that integrates research on aesthetic stimuli, associative learning, and referential meaning (Labrecque and Milne 2012, p. 713), Labrecque and Milne (2012) used Aaker's (1997) brand personality dimensions and tested specific color and brand personality associations (e.g., the color hue red and exciting brand personality). They find that color hue, saturation and value—when applied to a brand logo—indeed influence consumers' perceptions of brand personality.

The current research is an extension of this investigation in that it considers two additional dimensions of brand personality: brand masculinity and brand femininity (i.e., the gendered brand personality dimensions). The gender dimensions of brand personality

are defined as "the set of human personality traits associated with masculinity and femininity applicable and relevant to brands" (Grohmann, 2009, p. 106). Gendered brand personality comprises masculine brand personality (MBP)—which consists of masculine traits such as dominant, aggressive— and feminine brand personality (FBP)—which consists of feminine traits such as gentle or sensitive (Grohmann, 2009, p. 105). These two brand gender dimensions are measured by a two-dimensional MBP/FBP scale. Building on the link between color and Aaker's (1997) brand personality dimensions, the current research examines the relation between color (hue and saturation) and the gendered brand personality dimensions in order to shed light on how brand managers might shape brand gender perceptions, but also on how consumers might use colors to express themselves in brand choice.

## Hypotheses

Based on the earlier literature on the meaning of color, Brand Vista (2014) developed a list of personality traits and brands associated with colors. Appendix 2 illustrates the color-trait and color-brand correspondences summarized by Brand Vista. Relating these color associations to the traits subsumed in the masculine and feminine brand personalities (MBP and FBP), this research develops predictions regarding the association between colors and brand masculinity/femininity. More specifically, the trait elicited by the color red (i.e., "bold") is similar to the brand masculinity trait "adventurous". The trait "rebellious" associated with the color red is similar to "radical" in MBP. Thus, we predict that the color red is associated with brand masculinity. The trait triggered by the color brown (i.e., "colonial") is similar to the trait "dominant"

represented in MBP. The marketing meanings of the color black (i.e., “power, authority, upper class”) are similar to the MBP’s “dominant”. Thus, we predict brown and black are associated with brand masculinity. The meanings of color orange (i.e., “excitement and arousing”) are associated to the brand masculinity “adventurous”. The traits of color blue (i.e., cold and royal) are similar to the trait “dominant” represented in MBP. In sum, the colors red, brown, black, orange, and blue are likely associated with masculine brand personality.

The trait of color purple "elegant" relates to FBP's "graceful". Thus, we hypothesize that the color purple is associated with brand femininity. The meaning of the color yellow involves young and warmth, and is associated with the FBP trait “tender.” The meaning of color green (i.e., “natural, growth”) is similar to FBP’s “express tender feelings”. One of the associations of pink is “physical weakness,” and evokes the FBP trait “fragile”. Thus, we predict that the colors purple, yellow, green and pink are likely associated with feminine brand personality.

Finally, the meaning of white (i.e., “purity and clean”) and gray (i.e., “formality and high-tech”) appear to be gender neutral and not directly associated with MBP or FBP. Thus, color white and gray are possibly neutral colors in terms of gendered brand personality.

It is important to note here that the prediction that red is strongly associated with brand masculinity, whereas purple is strongly associated with brand femininity perceptions appears to be at odds with the literature on (human) gender stereotyping, in which blue is perceived as stereotypically male, whereas pink is perceived as stereotypically female. It is also important to acknowledge, however, that the focal hues

do in fact differ (red vs. pink; blue vs. purple), and that the predictions advanced here are grounded in the literature on color associations in marketing/branding contexts rather than in the literature on gender stereotyping.

Taking further into consideration the color meanings proposed by Raizada (2012), Labrecque and Milne (2012), Mofaral and colleagues (2013), and Brand Vista (2014), the following relations between hue and gendered brand personality is proposed:

**H1.** Color hue is associated with consumers' brand gender perceptions, such that (a) the hues black, brown, blue, orange, and red positively relate to consumers' perceptions of masculine brand personality; (b) the hues purple, pink, green, and yellow positively relate to consumers' perceptions of feminine brand personality; (c) the hues white and gray do not relate to gendered brand personality perceptions.

Recently, researchers have started to examine the role of color brightness on color and gender perceptions. Mofaral and colleages (2013) suggest that different levels of color brightness change color meanings and gender perception by consumers. This work reports that light gray tends to be perceived as feminine, while dark gray has more of a masculine feel (Mofaral et al., 2013).

Two examples of the relevance of color brightness in a consumer context are Macaron and Harajyuku style color. A new color set was called "Macaron Color" developed over the last decades, named after Macaron—a famous and colorful dessert. Macaron was named from the Italian word "Maccarone" and it was first introduced to France in 1533 (Anonymous, 2008).The characteristic of Macaron color is that all the Macaron colors share high brightness. For example, green in Macaron color is light green

(i.e., Tiffany green). In 2012, Macaron increased in popularity. Especially in the domain of make-up, several famous make-up brands introduced new collections with a Macaron theme (Anonymous, 2013). Estee Lauder, the Body Shop, and OPI established several new products including eye shadows and nail colors in Macaron colors (Anonymous, 2013).

Another set of high brightness color emerged in Japan: Harajuku style color (Harajukustyle, 2014). The characteristic of Harajuku color is its high level of brightness. It is associated with cuteness and found suitable for young girls to wear (Anonymous, 2013). The dressing style includes light toned dresses, colorful socks, lace accents and so on (Anonymous, 2013).Young Japanese people dye their hair color to light purple, light blue, light pink and silver. They also like to wear accessories and stylish clothes in Harajuku color; this style is called Harajukustyle (Harajukustyle, 2014) and has since expanded to other Asian countries, such as Korea and China.

Because of the popularity of the Macaron and Harajuku colors in the Asian market—particularly among young and female consumers, it is plausible high brightness colors are now strongly associated with femininity. On the other hand, in ancient Europe, dark purple was a sign of royalty and high status, which were most likely to be worn by men. Low levels of color brightness may thus be associated more strongly with masculinity. As a result, it is predicted here that color brightness is associated with brand gender perceptions.

**H2.** Color brightness significantly relates to consumer's brand gender perceptions, such that (a) increased color brightness positively relates to brand femininity, but negatively relates to brand masculinity perceptions;

(b) decreased color brightness positively relates to brand masculinity, but negatively relates to brand femininity perceptions.

## Research Methodology

In this research, color was applied to a fictitious brand logo (adapted from Henderson and Cote, 1998) to test the color hue and brightness influences on gendered brand personality. The use of fictitious logos precluded any effects due to brand familiarity or experience. Although there are many design features, such as package design, shop design, business card design and uniform design, a brand's logo is one of its most significant features; the importance of brand logo and its design characteristics is extensively discussed in work by Henderson and Cote (1998).

The set of color hue that companies use on the packaging and other features is depends mainly on the color hue of the brand logos. A successful brand is putting effort on keeping the brand image consistent over time, so that consumers will memorize and recognize the brand more easily. The information delivered by logo is the core information (Henderson and Cote, 1998).

Especially in advertising, using color to communicate with consumers symbolically could help brands avoid possible misunderstandings caused by words (Seckler, 2005).To make consumers better understand the brand meaning, and the brand logo's size, shape and color is of importance because consistency of the logo design could help consumers better understand brand meanings (Klink, 2003).When the color of

a brand is too similar to competitor's brand color, changing a different color could be used as a rebrand strategy to serve differentiation (Labrecque and Milne, 2012).

We can suppose that certain colors let people think of masculinity or femininity. As discussed in the literature review, however, no research describes this point and gives certain matches of masculine or feminine brand personality and color. Some brands pursue masculinity or femininity because of their target consumer groups. If the color used in these brands lets people think of masculinity or femininity brand personality, these brands could save efforts on their information delivery and be more efficient on their advertising.

Because the experiments were done in China, all the questions were translated into Chinese. Three Chinese international students studying in Canada were chosen (not including the researcher) to review the translated questionnaires to make sure that there is no misunderstanding for the participants.

Although we can find some cues from color meanings and trends, the arrangement of putting colors into either masculine group or feminine group is still subjective. The reason of using two different ways-the interview and the questionnaire- is to reduce the subjectivity of the result to the minimum. Thus, the first study was an interview regarding color perceptions. The second study involved mainly 7-point rating scale where the respondents expressed their opinions in detail. The third study was testing the changing of color brightness in detail.

In all studies, participants completed the Ishihara Color Test (http://www.colour-blindness.com/colour-blindness-tests/ishihara-colour-test-plates/) to test for deficiencies in color vision. This test consists of three images that contain a number that is only

visible to people with no deficiencies in color vision. These images were color printed and shown to participants who had to name the number embedded in the image within five seconds. Participants who did not identify the number correctly were not included in the sample.

## Study 1. Hue and Brand Gender Associations

The first study was an initial test of color-gender associations and involved employees of the Foton Co,.Ltd—an automobile company which supported the research by allowing employees to participate in this research. The sample (n=30, 50% female, 50% male, 24 to 42 years old, median age=30) consisted of Chinese employees who were invited to take part in this study by e-mail and completed an informed consent form prior to the start of the study. The research was administered by a manager of the financial department of Foton Co. Ltd during during employees' lunch break. The participation rate was 44.4% (30/75). An interview usually took 5 to10 minutes. Since the study invitation emanated from the researcher who is not affiliated with the company, participation in the study was voluntary, and the focus of this research was on subjective perceptions of color, the position of the interviewer unlikely to induce feelings of coercion to participate in this research or biases.

In this study, participants were first introduced to eleven universal colors and given printed color cards. Participants were asked to sort the color cards into three groups: masculine, feminine, and neutral. Finally, participants provided non-identifying demographic information (age and gender).

## Results and Discussion

Table 2 and Figure 3 summarize the results of the sorting task.

| | Masculine | Feminine | Neutral |
|---|---|---|---|
| Red | 25 | 1 | 4 |
| Orange | 5 | 5 | 20 |
| Yellow | 14 | 6 | 10 |
| Green | 11 | 7 | 12 |
| Blue | 11 | 5 | 14 |
| Purple | 2 | 17 | 11 |
| Pink | 0 | 30 | 0 |
| Black | 28 | 0 | 2 |
| Brown | 15 | 2 | 13 |
| Gray | 6 | 11 | 13 |
| White | 3 | 17 | 10 |

**Table 2. Study 1 results**

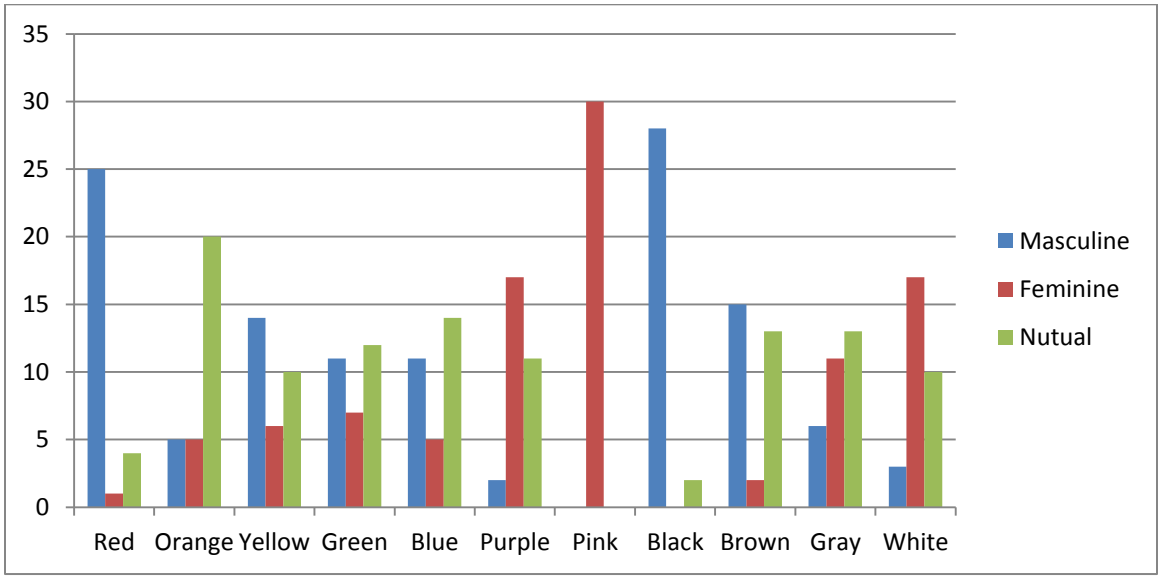



**Figure 3. Study 1 Results**

The results indicate that most participants associated red and black with masculinity, and pink with femininity. The color stereotyping literature suggests that pink is the color most appropriate for girls and blue the color most appropriate for boys. The result of this study show, however, that pink was considered feminine by all participants, that that black was perceived as masculine (to a greater extent than blue). According to the result of this study, blue is considered to be more of a neutral color.

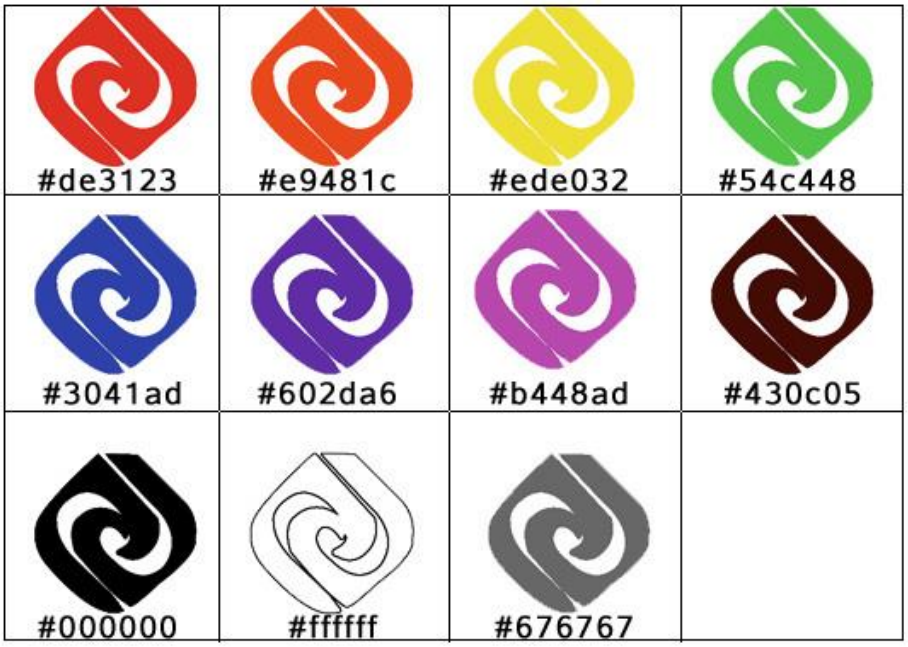
Many participants hesitated when they assigned gray to gender groups. Unlike red or pink, which participants quickly assigned, grey elicited more deliberation. One participant said: "Before this test, I never thought about brown and gray, as if they are not colors. But when I recall, brown and gray did play a big part in the logos and packages in everyday life. I guess I just ignore them and put focus to some other colors, some colors that makes me feel like a color. Um, like red and blue". This suggest that when considering colors on packaging, consumers often focus on masculine/feminine colors over the neutral ones even though the neutral colors were occupying more space on logos and packaging. Study 1 provides initial evidence of association between color hue and gender perceptions among Chinese consumers. Study 2 extends this investigation further.

## Study 2. Hue and Brand Gender

In the second study, the association of different colors and brand masculinity/femininity was tested (H1). Participants—who were again recruited among employees of Foton Co. Ltd.—were assigned to one of eleven hue conditions, developed on the basis of eleven universal colors (Berlin and Key, 1969). Employees of the financial department (75 employees), administration department (35 employees), safety

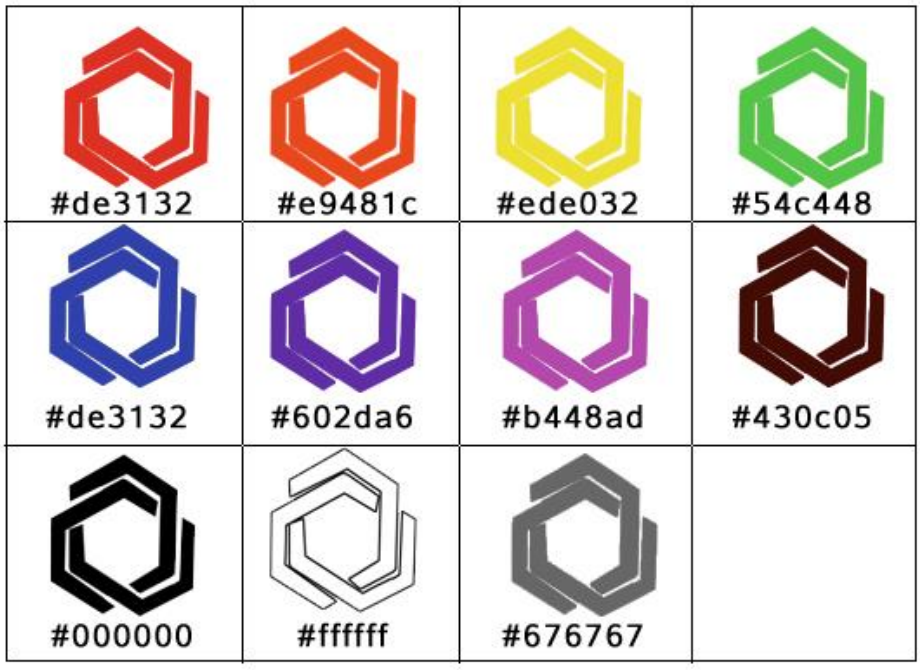
department (12 employees), manufacture department (22 employees), marketing department (62 employees), and general department (42 employees) were contacted by e-mail and invited to take part in this study. The participation rate was 88.7% (220/248). Each hue condition contained 20 people. Two types of logos were used in this study. The logo patterns were adapted from the research of Henderson and Cote (1998) and were used in the research of Labrecque and Milne (2012). The logos were unfamiliar to participants to preclude effects of prior brand exposure or experience. There were 22 conditions (two logos presented in eleven color hues) in this study and the sample size was 220. Tables 3 and 4 illustrate the logos along with their RGB codes. These codes were not shown to participants.

**Table 3. Study 2 logo conditions (A)**




* The color code in Adobe Photoshop was presented below each color.

**Table 4. Study 2 logo conditions (B)**




* The color code in Adobe Photoshop was presented below each color.

First, participants signed an informed consent form and completed the vision test. One of the 22 logos was then randomly assigned to each participant using a computer program. Participants were asked to rate the logo in terms of brand gender, on seven-point scales (anchored 1=not at all descriptive, 7=very descriptive). The brand masculinity dimension of brand gender (MBP) is measured on the items adventurous, aggressive, brave, daring, dominant, and sturdy (Grohmann, 2009). The brand femininity dimension of brand gender (FBP) is measured on the following items: expresses tender feelings, fragile, graceful, sensitive, sweet, and tender (Grohmann, 2009). Those traits were presented in random order. After that, participants completed measures of familiarity with the logo (three-items on seven-point scales, adapted from Kent and Allen, 1994), listed their most liked/disliked color, and provided basic demographic information (age, gender).

**Data Screening**

Data from participants with invariant response patterns (i.e., rated all traits on the same scale point) was removed prior to analysis. This resulted in the deletion of three data points for the red logo, one for the orange logo, two for the green logo, two for the blue logo, one for the white logo, two for the black logo, one for the pink logo, one for the brown logo, and two for the yellow logo. One participant in the purple logo condition who indicated that they were highly familiar with the (fictitious) logo (i.e., average familiarity rating of seven on a seven-point scale) was also deleted. The final sample size was 204 (50% female, 50% male; 21 years old to 52 years old, median age=30).

**MANOVA**

Two summary scales (i.e., MBP with Cronbach's Alpha=.84 and FBP with Cronbach's Alpha=.80) were created and used as dependent variables in a MANOVA, with color hue, logo type, and participant's gender as independent variables.

Study 2 descriptive statistics are shown in Appendix 3, detailed results of the multivariate test are provided in Appendix 4. The multivariate test for an effect of color hue on brand masculinity and femininity did not indicate a significant effect of color hue on brand gender perceptions ($F(20, 318)=1.39$, $p=.12$). Similarly, participants' sex ($F(2, 159)=1.70$, $p=.19$) and logo type ($F(2, 159)=2.18$, $p=.12$) did not significantly affect brand gender perceptions. None of the interactions were significant (color × logotype $p=.60$; color × sex $p=.63$; logotype × sex $p=.77$; color × logotype × sex $p=.38$). This pattern was also observed in the between-participants effects test for brand masculinity and brand femininity (all $p$s > .08): Specifically, the effects of color ($p=.36$), logotype ($p=.19$), sex ($p=.49$), color × logotype ($p=.99$), logotype × sex ($p=.73$), color × logotype × sex ($p=.81$) were not significant. For FBP, no significant effects of color ($p=.09$), logotype ($p=.11$), sex ($p=.09$), color × logotype ($p=.33$), logotype × sex ($p=.52$), color × logotype × sex ($p=.11$) emerged. In pairwise comparisons for an effect of color hue on brand masculinity and femininity, all $p$-values exceeded .05; thus, that there was no significant difference in terms of color hue on brand gender perceptions. Based on the MANOVA, H1 was not supported.

**Paired Samples t-test**

To examine whether color hues differed in the extent to which they evoked a masculine versus feminine brand personality, paired samples t-tests were conducted. The

criterion to determine whether a color hue evokes masculine (vs. feminine) brand personality to a greater extent was $Mean_{MBP}$ - $Mean_{FBP}$ (M-F) >0 and $p<.05$; for a color hue to evoke greater brand femininity (compared to masculine), the decision criterion was M-F<0, $p<.05$. Results suggest that red, orange, blue, black, and white elicit greater brand masculinity compared to brand femininity perceptions and could thus be considered as logo colors enhancing brand masculinity perceptions.

| Color | Mean M | Mean F | Correlations | Correlation Sig | M-F | t | p-value |
|---|---|---|---|---|---|---|---|
| Red | 26.24 | 18.41 | 18.41 | .179 | 7.824 | 3.213 | **.005** |
| Orange | 23.84 | 18.63 | .013 | .957 | 5.211 | 2.142 | **.046** |
| Yellow | 22.10 | 19.65 | .390 | 2.450 | 2.450 | 1.223 | .236 |
| Green | 24.00 | 23.94 | .073 | .775 | .056 | .027 | .979 |
| Blue | 26.17 | 20.22 | .388 | .112 | 5.944 | 2.835 | **.011** |
| Purple | 23.84 | 19.21 | -.053 | .830 | 4.632 | 1.551 | .138 |
| Pink | 20.47 | 19.42 | -.052 | .832 | 1.053 | .471 | .643 |
| Black | 28.39 | 17.50 | -.118 | .642 | 10.889 | 4.283 | **.001** |
| White | 24.05 | 17.84 | .191 | .433 | 6.211 | 3.250 | **.004** |
| Gray | 25.15 | 20.65 | -.422 | .064 | 4.500 | 1.695 | .106 |
| Brown | 24.89 | 23.47 | .390 | .099 | 1.421 | .725 | .478 |

Note: bold type represents $p<.05$, 95% confidence.

**Table 5. Paired samples t-test of study 2**

**Discussion**

Although a MANOVA did not find significant influences of color hue on brand gender perceptions, paired samples t-tests suggest that some color hues lead to greater brand masculinity rather than brand femininity perceptions. This perspective would suggest weak support for H1. More specifically, paired samples t-tests suggest that black, red, orange, blue, black and white were colors evoking masculine (rather than feminine) brand personality to a greater extent. Surprisingly, no color hue evoked brand femininity (compared to brand masculinity) to a greater extent. The two most feminine color hues identified in study 1 (i.e., pink and purple) did not evoke higher levels of brand femininity in this study. These equivocal results may need to be interpreted in the context of relatively small cell sizes that arose in this study (i.e., lack of statistical power) .

## Study 3. Color Brightness and Brand Gender

The purpose of Study 3 was to test H3—an effect of color brightness on brand gender perceptions. Participants in study 3 (n=130) were drawn among employees of the same company as studies 1 and 2. More specifically, the financial department (75 employees), administration department (35 employees), safety department (12 employees), and manufacture department (22 employees) were invited by e-mail to take part in this study. The participation rate was 90.27% (130/144). Stimuli consisted of brand logos in three hues (red, green, and purple) that were manipulated in terms of color brightness in Photoshop. The color brightness adjustments were to + 100~150 or -100~150 in Photoshop. The corresponding logos and color codes are shown in Table 6. The logo manipulations were shown on top of the questionnaire, and a color label was

attached to this presentation (watermelon red, red, wine red; peak green, green, dark green; dasheen purple, purple, dark purple), which reflected the color's specific name in Chinese. Incomplete questionnaires (n=5) were eliminated from the data set, resulting in a final sample of 125(49.6% female, 50.4% male, 24 years old to 50 years old, median age=30).

**Table 6. Color brightness manipulations.**

| | Low Brightness | Medium | High Brightness |
|---|---|---|---|
| Red |  #691312 |  #de3123 |  #ff7b76 |
| Green |  #26551f |  #54c448 |  #aef688 |
| Purple |  #35165a |  #602da6 |  #de6ffa |

* Color code in RGB.

First, participants signed an informed consent form and completed the vision test. Then, participants were randomly assigned to a color (red, green or purple) and brightness condition. Participants rated the brand represented by the logo in terms of MFB and FBP, and completed the familiarity scale as well as demographic questions. These measures were identical to those used in study 2.

**MANOVA**

The MBP (Cronbach's Alpha=.84) and FBP (Cronbach's Alpha=.80) summary scores served as dependent variables in a MANOVA, with color hue, brightness and participants' gender serving as independent variables. Appendix 6 shows the descriptive statistics of study 3. Appendix 7 illustrates the MANOVA results. In multivariate tests color hue ($F(4, 204)=1.39$, $p=.24$) , color brightness ($F(4, 204)=2.18$, $p=.07$), and participants' sex ($F(2, 102)=.164$, $p=.85$) did not significantly influence brand gender perceptions. None of the interaction effects reached significance (color hue × brightness $p=.23$; color hue × participants' sex $p=.39$; brightness × participants' sex $p=.56$; color hue × brightness × particpiants' sex $p=.39$). The between-subjects effects tests (Appendix 8) show a similar pattern of results: color hue had no significant effect on brand masculinity ($p=.88$) and femininity perceptions ($p=.07$). Brightness had no significant effect on brand masculinity ($p=.11$) and femininity perceptions ($p=.10$). Participants' sex did not influence brand masculinity ($p=.58$) and femininity perceptions ($p=.88$). None of the interaction effects were significant (all $p$s$>.22$). In multiple comparisons among brightness levels, medium brightness was perceived as more masculine compared to high levels of brightness ($p=.04$). The predicted increase in brand femininity perceptions at high levels of brightness, and increase in brand masculinity perceptions at low levels of brightness did not emerge, however.

Table 7 summarizes the results of paired samples t-tests contrasting brand masculinity and brand femininity perceptions for each of the nine logos. Significant differences only emerged for the purple medium-brightness logo, which evoked more

masculine than feminine brand personality perceptions, whereas the purple high-brightness logo evoked more feminine than masculine brand personality perceptions.

**Table 7. Paired Samples t-Test of Study 3.**

| Color | Mean M | Mean F | Correlations | Correlation Sig | M-F | t | p-value |
|---|---|---|---|---|---|---|---|
| Red-lowbright | 25 | 20.23 | -.283 | .348 | 4.769 | 1.458 | .171 |
| Red | 22.85 | 20.77 | -.126 | .681 | 2.077 | .642 | .533 |
| Red-highbright | 21.00 | 17.71 | -.126 | .668 | 3.286 | .964 | .353 |
| Green-lowbright | 22.36 | 18.00 | -.241 | .406 | 4.357 | 1.336 | .204 |
| Green | 26.23 | 25.92 | .394 | .183 | .308 | .148 | .885 |
| Green-highbright | 22.15 | 25.23 | .111 | .718 | -3.077 | -1.045 | .317 |
| Purple-lowbright | 21.86 | 21.79 | -.022 | .940 | .071 | .025 | .981 |
| Purple | 26.85 | 20.92 | .171 | .576 | 5.923 | 2.374 | **.035** |
| Purple-highbright | 19.15 | 26.85 | -.193 | .527 | -7.692 | -2.687 | **.019** |

Note: bold type represents $p<.05$, 95% confidence.

## Discussion

The results of study 3 do not provide support for H2. Overall, color brightness change did not affect consumers' perceptions of brand gender. Only for the color hue purple, an increase to high brightness led to perceptions of higher brand femininity (compared to masculinity), whereas medium-brightness purple appeared more masculine than feminine. These results may have been driven by relatively small cell sizes, as well as the manipulation of the brightness levels adopted in this study.

# Conclusions

This research tested the association between color hue (studies 1 and 2) and color brightness (study 3) with brand masculinity and brand femininity perceptions among Chinese consumers. Although study 1 suggests that consumers tend to sort colors into masculine, feminine, and neutral categories, masculine and feminine brand gender perceptions did not arise on the basis of logos colored in focal color hues and brightness levels. Despite these equivocal results, study 1 provides several insights for marketers. The first is that black is a masculine rather than neutral color hue, and that red is a masculine color hue, whereas purple emerged as the most feminine color. The second is that pink is not a pure feminine color in terms of brand personality. Study 2 finds that the color hues red, orange, white, black, and blue lead to more masculine (vs. feminine) brand personality perceptions. Study 3 then finds limited support for an impact of brightness on brand gender perceptions—although it is limited to a contrast of brand masculinity versus femininity perceptions and the color hue purple.

There might be two reasons that the result of study 2 was very different from study 1. The first reason is that participants were rating brand personality traits instead of sorting color samples into gender categories. Traits are more complex and specific than gender. It is possible that when participants think of pink, they may immediately put it into a feminine category, whereas they may have more difficulty rating pink in terms of traits such as "graceful." Most colors were sorted into neutral group shows a sign that gender brand personality may not be strongly evoked by color. This may indicate that companies may have more flexibility in their use of colors, as color perceptions do not differ across male and female consumers and in many cases (six out of eleven color hues) do not reflect clearly masculine or feminine brand personality. The second reason may lie in the use of average scale scores for the masculine and feminine brand personality dimensions, which involves an equal weighting of each trait. For example, for the six masculine traits: adventurous, aggressive, brave, daring, dominant and sturdy, the ratings of each trait were equally weighted in the summary scale of masculine brand personality. It is possible, however, that participants perceived some of the traits as more representative of brand masculinity, and as a results, an accurate reflection of brand gender perceptions would require a weighted model. The use of equal weighting of scale items may thus have influenced the results. Overall, the small cell sizes arising in this research also need to be acknowledged as a limitation that may have led to equivocal findings regarding the impact of color hue and brightness on brand gender perceptions. These limitations were due to the fact that recruitment opportunities were limited due to the remote location of the study site (i.e., in China to reach Chinese consumers).

## Theoretical Contributions

This research sought to offer new insights into the use of color in marketing and branding, by exploring the association of color and brand gender. In the past, researchers have looked at gender by discussing gender with other aspects, such as social classes and discrimination. However, it is worth to explore gender differences in a more practical way. Gender brand personality worth to be researched in many fields and it is more and more important these days. This research starts a try in the deep sea of the gender brand personality knowledge. The procedure of the interview and questionnaire could save researcher some time and give them some suggestions on how other researcher can explore color and gender brand personality. Furthermore, other aspects besides color, such as smell, sounds, could also reference the way of testing the linkage between them just like the way we did in this research. The research on changing color brightness add a research point of view that when researching a question, it is good to look at the changing of independent variable and the changing of result. Also, research need to consider popular things and trends. In this study, I considered the newly emerged color trend Macaron color and HARAJYUKU style and tried to see whether this trend will affect the association of color and gender brand personality. Not only for new theories, researcher could consider the development of technology and newly emerged things might change old theories, which is worth to look at and update old theories.

Another contribution is that the results gave us a sign that the importance of each gender brand personality traits maybe is different. Thus, instead of put equal importance to each trait, researcher can think of a new way to deal with the diverse importance of brand personality traits to develop gender brand personality scales.

## Managerial Implications

Results of studies 1 and 2 provide practical guidelines for brands who wish to reach male consumers in China. They suggest that a masculine brand personality that would lend itself to self-expression by male consumers could be created by the use of logos that are colored red or black—and to some extent also orange, white, or blue. A brand targeting family or mixed gender consumer segments in China has a wide range of colors available (e.g., brown, grey, yellow) and could also use pink without alienating male consumers. In addition, when targeting male consumers, marketers should to some extent consider color brightness, as high levels of brightness (particularly for purple) tend to increase brand femininity perceptions and the brand may be perceived as less appropriate for men as a result.

Managers can benefit from the findings of this research in three contexts:

(1) For the new brands, color and gender brand personality can help managers to identify a main color to be used in the logo and to deliver information to the main consumer groups. It is important to a new brand to leave a good and right impression to their focused consumer group. Figure1 gives a procedure for managers to follow and make them easy to apply the result of this research.

(2) For existing brands, color-induced brand gender perceptions can help managers to save advertisement spending by using color to communicate with target consumer groups (i.e., male consumers and female consumers). For example, a brand of shampoo targeting men and women can use different logo or packaging colors, such as black and purple, to separate the product and make consumers feel that the brand fits important aspects of their self-concept.

Based on the result of this research, managers can be more confident in choosing appropriate colors.

(3) For large brands that introduce a new brand in new markets, color and gender brand personality can help managers to determine a color before establishing this new brand. One thing to consider is to compare the gender meanings of color of the parent brand and the brand extension. Chosen colors could keep the brand personality consistent overall and create new impressions of the new brand at the same time.

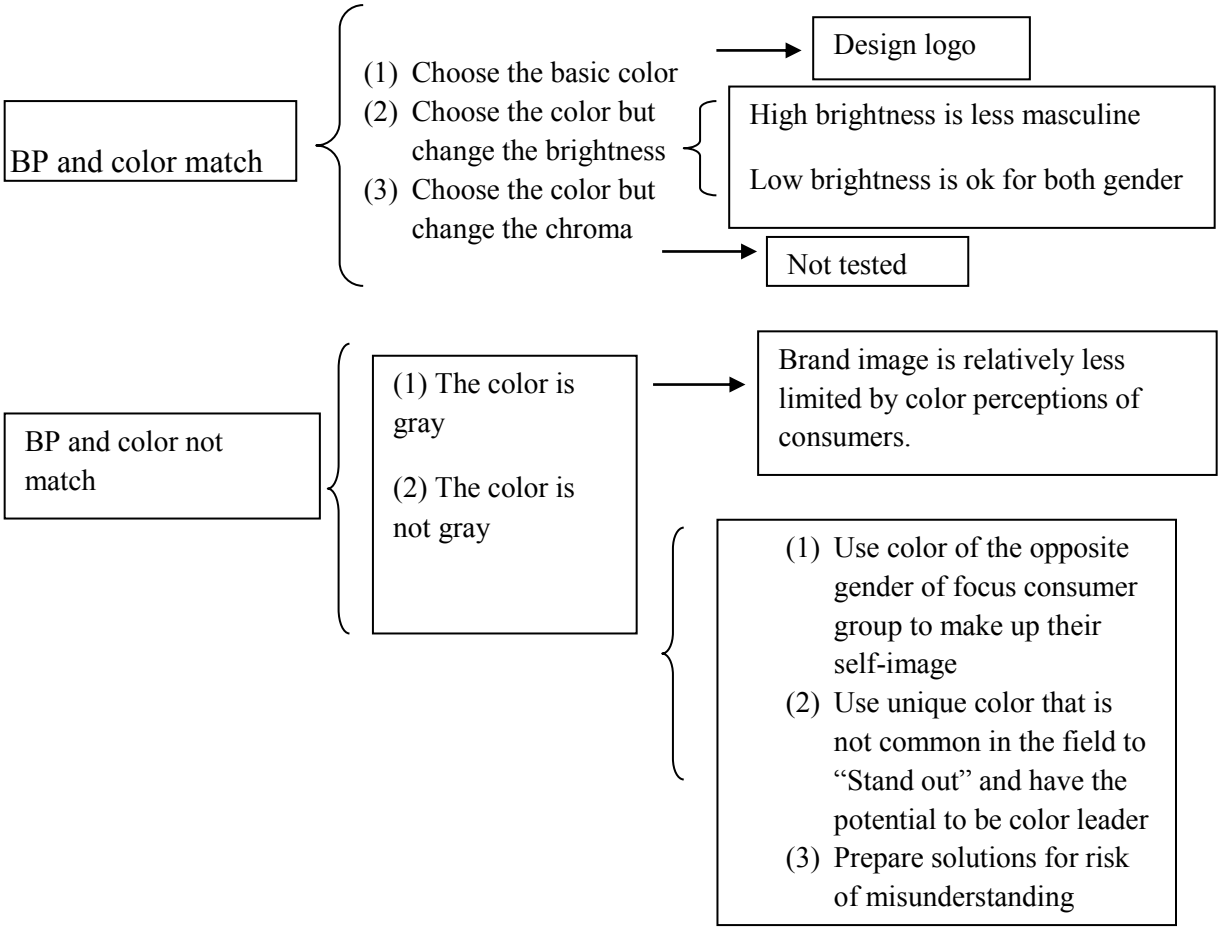



**Figure 4. The Color and Gender Matching Check Procedure**

## Limitations and Future Research

In the context of blurring gender roles, consumers are looking for more and different color choices (Labrecque, 2010). It is therefore important to acknowledge that some women may tend to choose color that reflects masculine brand personality, while some men may tend to choose color that reflects feminine brand personality. Nonetheless, this research sought to link color hue and brightness to brand gender perceptions in an attempt to help marketers reach major consumer groups. In order to expand the appeal of a brand to new consumer segment, marketers could also consider adopting a color that is associated with a different gender than the primary consumer group. Such a strategy might also be useful for brands that focus at young generations and consumer groups that define themselves in terms of different gender concepts (e.g., homosexual consumers).

With regard to the sample, this research involved consumers who were between 21 and 52 years old. Future research could test color and gender association in other age groups, such as teenagers, to explore if age-related gender role concepts relate to color perceptions. The color choice in Study 3 in particular, was driven by popular trends that may be more relevant and apparent to younger consumers. It is possible that one of the reasons that study 3 did not show strong support of H2 is because the sample was not as sensitive to popular trends compared to teenagers and students. Thus, it is possible that if study 3 was conducted with a student sample, H2 would have received stronger support.

Several limitations and future research opportunities relate to color hue and brightness. This study involved eleven hues and three levels of brightness. Future research could also extend the investigation to other colors and also consider color chroma.

Past researches that looked at color's marketing meanings are three kinds as mentioned in the literature review: Raizada's (2012), Raizada's (2012), and Mofaral et al (2013). Only Mofaral et al (2013) specifically looked at different color combinations could affect color's marketing meanings. That is a very good point to be researched in the color marketing literature. Future research can do color combinations and see how different color combinations, whether the colors in the same color hue or the colors that is opposite to the prior color, will affect consumer's perception, appetite, memory and purchase intension. For example, researchers can look at blue combines with turquoise, and blue combines with yellow, then see how these two combinations of color will affect consumers. Also, in the interview some participants mentioned some color like gray is "not obvious color", so if it is accompanied with "obvious color", he will notice more on the "obvious color". Researchers could also look at this point.

Another limitation is that consumers' associations related to color are context dependent. Culture is one such context, along with geography (e.g., subpopulations within a cultural context) and time. Since this study was conducted in China, future research is recommended to explore color-brand gender association in other cultures, countries, or over time. Even in the same country like China, the culture of north China and south China might differ significantly. Because of emerging color trends, researchers are encouraged to examine changes in the relation between color, gender, and brand personality.

The notion that product category serves as a context in consumers' associations triggered by brand logo color might also be a limitation of the current research – which used logos in isolation. Akcay (2012) mentioned that gender differences of color

perception depend on product category to some extent. It is possible that the product category a brand competes in will affect consumers' brand perceptions based on brand color logo. Past research on the effects of color has included product categories such as food (Allison, 1999), cosmetics and clothes (Seckler, 2005), automobile and medicine (Gimba, 1998), beverages (Harrington, 2006), pharmaceuticals (Klink, 2003), toys (Cunningham and Macrae, 2011), and film (Yang, 2011). Future research could focus on product category effects and replicate the research by applying the brand logos differing in hue and brightness to different product categories. In other words, researchers can examine whether product category is a moderator of the relationship between color and brand personality perceptions.

Another limitation that should be acknowledged relates to the role of consumers' brand preferences in their perceptions of brand gender based on color. For example, if a female consumer likes the hue red and associates wearing this color with enhanced femininity, she may perceive a red brand logo as more feminine. Future research could look into the role of such preferences in influencing consumers' responses to logo color in the evaluation of brand gender. This research could also be extended to Aaker's brand personality dimensions (sophistication, competence, excitement, ruggedness, and sincerity; Aaker, 1997).

There are two methodological concerns related to the current research: First, this study employed an established measure of brand masculinity and brand femininity and relied on averaged scale items to judge consumer perceptions of logo color. It is possible, however, that consumers do not weigh all traits represented by the scale items equally. Future research could test the association of color and specific gender brand personality

traits using a different approach. For example, researcher could test which color best represents the trait “graceful” or “dominant.”

A second methodological concern relates to the use of multiple pairwise comparisons (i.e., pairwise statistical tests) in studies 2 and 3. It is important to acknowledge that the few significant findings that emerged in this research could have been due to multiple hypothesis tests. The researcher acknowledges that the use of statistical adjustments is recommended in such situations.

Despite the limitations, this study contributes to current knowledge by being one of the first to examine color hue and brightness associations with brand gender. Hopefully, this research will spark further investigations on this topic.

**Appendix 1: The World's Most Popular Colors**

Rank/ Color/ Global Share of Popularity/Feeling and Imagery Suggested

1. Blue: 40%; Calm, peace, technology, nature

2. Purple: 14%; Mystery, mists, royalty

3. Green: 12%; Renewal, balance, nature

4. Red: 11%; Power, strength, love

5. Black: 8%; Cool, luxury, chaos

6. Orange: 6%; Optimism, hope, warmth, autumn

7. Yellow: 5%; Happiness, joy, light

8. White: 4%; Innocence, peace, chastity

Source: "Global Market Bias: Part 1- Color," October 2004; Toniq (Seckler, 2005)

**Appendix 2: Brand Vista's Color and Brand Personality Traits**

## Appendix 3. Descriptive statistics of study 2

**Descriptive Statistics**

| | color | logotype | sex | Mean | Std. Deviation | N |
|---|---|---|---|---|---|---|
| masculinity | brown | round | Female | 3.7500 | .95743 | 4 |
| | | | Male | 4.3056 | 1.74298 | 6 |
| | | | Total | 4.0833 | 1.44070 | 10 |
| | | angular | Female | 4.0714 | 1.55116 | 7 |
| | | | Male | 4.7500 | 1.53206 | 2 |
| | | | Total | 4.2222 | 1.47902 | 9 |
| | | Total | Female | 3.9545 | 1.32097 | 11 |
| | | | Male | 4.4167 | 1.59613 | 8 |
| | | | Total | 4.1491 | 1.41954 | 19 |
| | black | round | Female | 4.7917 | .92671 | 4 |
| | | | Male | 4.4333 | .95452 | 5 |
| | | | Total | 4.5926 | .90182 | 9 |
| | | angular | Female | 4.9583 | 1.53584 | 4 |
| | | | Male | 4.8000 | .62805 | 5 |
| | | | Total | 4.8704 | 1.04342 | 9 |
| | | Total | Female | 4.8750 | 1.17767 | 8 |
| | | | Male | 4.6167 | .78587 | 10 |
| | | | Total | 4.7315 | .95681 | 18 |
| | gray | round | Female | 3.9333 | 1.58815 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Male | 4.7000 | 1.24387 | 5 |
| | | | Total | 4.3167 | 1.40425 | 10 |
| | | angular | Female | 3.9444 | 1.68600 | 3 |
| | | | Male | 4.1190 | 1.16155 | 7 |
| | | | Total | 4.0667 | 1.24027 | 10 |
| | | Total | Female | 3.9375 | 1.50116 | 8 |
| | | | Male | 4.3611 | 1.17815 | 12 |
| | | | Total | 4.1917 | 1.29583 | 20 |
| | orange | round | Female | 3.0417 | 1.78665 | 4 |
| | | | Male | 4.3667 | 1.06328 | 5 |
| | | | Total | 3.7778 | 1.50000 | 9 |
| | | angular | Female | 4.6111 | .83887 | 3 |
| | | | Male | 3.9524 | 1.60933 | 7 |
| | | | Total | 4.1500 | 1.40864 | 10 |
| | | Total | Female | 3.7143 | 1.59198 | 7 |
| | | | Male | 4.1250 | 1.36723 | 12 |
| | | | Total | 3.9737 | 1.42429 | 19 |
| | green | round | Female | 4.0833 | 1.93146 | 6 |
| | | | Male | 3.6111 | .38490 | 3 |
| | | | Total | 3.9259 | 1.55704 | 9 |
| | | angular | Female | 4.3750 | .25000 | 4 |
| | | | Male | 3.8333 | .45644 | 5 |
| | | | Total | 4.0741 | .45728 | 9 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Total | Female | 4.2000 | 1.45466 | 10 |
| | | | Male | 3.7500 | .41786 | 8 |
| | | | Total | 4.0000 | 1.11584 | 18 |
| | blue | round | Female | 4.4167 | 1.21825 | 8 |
| | | | Male | 4.3333 | . | 1 |
| | | | Total | 4.4074 | 1.13990 | 9 |
| | | angular | Female | 4.2292 | 1.43907 | 8 |
| | | | Male | 5.0000 | . | 1 |
| | | | Total | 4.3148 | 1.37043 | 9 |
| | | Total | Female | 4.3229 | 1.29167 | 16 |
| | | | Male | 4.6667 | .47140 | 2 |
| | | | Total | 4.3611 | 1.22374 | 18 |
| | purple | round | Female | 3.6667 | 1.45297 | 3 |
| | | | Male | 3.9444 | 1.81251 | 6 |
| | | | Total | 3.8519 | 1.61255 | 9 |
| | | angular | Female | 3.8611 | 1.74934 | 6 |
| | | | Male | 4.4167 | 1.44978 | 4 |
| | | | Total | 4.0833 | 1.57576 | 10 |
| | | Total | Female | 3.7963 | 1.56520 | 9 |
| | | | Male | 4.1333 | 1.60785 | 10 |
| | | | Total | 3.9737 | 1.55284 | 19 |
| | white | round | Female | 2.5000 | .60093 | 3 |
| | | | Male | 4.3056 | .79873 | 6 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Total | 3.7037 | 1.14193 | 9 |
| | | angular | Female | 4.3095 | 1.31032 | 7 |
| | | | Male | 4.2222 | .91793 | 3 |
| | | | Total | 4.2833 | 1.15483 | 10 |
| | | Total | Female | 3.7667 | 1.41028 | 10 |
| | | | Male | 4.2778 | .78174 | 9 |
| | | | Total | 4.0088 | 1.15533 | 19 |
| | yellow | round | Female | 3.9722 | .94526 | 6 |
| | | | Male | 3.6250 | .82074 | 4 |
| | | | Total | 3.8333 | .86781 | 10 |
| | | angular | Female | 3.5000 | 1.25831 | 3 |
| | | | Male | 4.4333 | 1.05804 | 5 |
| | | | Total | 4.0833 | 1.15126 | 8 |
| | | Total | Female | 3.8148 | 1.00500 | 9 |
| | | | Male | 4.0741 | .99691 | 9 |
| | | | Total | 3.9444 | .98020 | 18 |
| | pink | round | Female | 3.7222 | 2.11038 | 3 |
| | | | Male | 3.1905 | 1.02482 | 7 |
| | | | Total | 3.3500 | 1.32509 | 10 |
| | | angular | Female | 3.8333 | 1.52753 | 3 |
| | | | Male | 3.3056 | 1.01880 | 6 |
| | | | Total | 3.4815 | 1.14092 | 9 |
| | | Total | Female | 3.7778 | 1.64879 | 6 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Male | 3.2436 | .98040 | 13 |
| | | | Total | 3.4123 | 1.20872 | 19 |
| | red | round | Female | 4.7222 | 1.82828 | 3 |
| | | | Male | 4.0833 | .89287 | 6 |
| | | | Total | 4.2963 | 1.19831 | 9 |
| | | angular | Female | 4.6000 | 1.05804 | 5 |
| | | | Male | 4.2222 | 1.00462 | 3 |
| | | | Total | 4.4583 | .98299 | 8 |
| | | Total | Female | 4.6458 | 1.26440 | 8 |
| | | | Male | 4.1296 | .86914 | 9 |
| | | | Total | 4.3725 | 1.07129 | 17 |
| | Total | round | Female | 3.9490 | 1.41184 | 49 |
| | | | Male | 4.0617 | 1.16972 | 54 |
| | | | Total | 4.0081 | 1.28537 | 103 |
| | | angular | Female | 4.2201 | 1.29997 | 53 |
| | | | Male | 4.1493 | 1.10514 | 48 |
| | | | Total | 4.1865 | 1.20584 | 101 |
| | | Total | Female | 4.0899 | 1.35495 | 102 |
| | | | Male | 4.1029 | 1.13501 | 102 |
| | | | Total | 4.0964 | 1.24677 | 204 |
| femininity | brown | round | Female | 4.5833 | .67358 | 4 |
| | | | Male | 3.9167 | 1.12916 | 6 |
| | | | Total | 4.1833 | .98898 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | angular | Female | 3.8333 | 1.31586 | 7 |
| | | | Male | 2.8333 | .47140 | 2 |
| | | | Total | 3.6111 | 1.23322 | 9 |
| | | Total | Female | 4.1061 | 1.14812 | 11 |
| | | | Male | 3.6458 | 1.09268 | 8 |
| | | | Total | 3.9123 | 1.11854 | 19 |
| | black | round | Female | 2.8750 | 1.48058 | 4 |
| | | | Male | 3.3333 | 1.04748 | 5 |
| | | | Total | 3.1296 | 1.19541 | 9 |
| | | angular | Female | 1.8750 | .83194 | 4 |
| | | | Male | 3.3667 | 1.91630 | 5 |
| | | | Total | 2.7037 | 1.64734 | 9 |
| | | Total | Female | 2.3750 | 1.23362 | 8 |
| | | | Male | 3.3500 | 1.45604 | 10 |
| | | | Total | 2.9167 | 1.41335 | 18 |
| | gray | round | Female | 3.1667 | .79057 | 5 |
| | | | Male | 4.0000 | 1.13652 | 5 |
| | | | Total | 3.5833 | 1.02213 | 10 |
| | | angular | Female | 3.6111 | 1.49381 | 3 |
| | | | Male | 3.1667 | 1.00462 | 7 |
| | | | Total | 3.3000 | 1.10219 | 10 |
| | | Total | Female | 3.3333 | 1.02353 | 8 |
| | | | Male | 3.5139 | 1.09742 | 12 |

| | | | | | |
|---|---|---|---|---|---|
| | | Total | 3.4417 | 1.04472 | 20 |
| orange | round | Female | 2.9583 | 1.45535 | 4 |
| | | Male | 3.3000 | .46248 | 5 |
| | | Total | 3.1481 | .96625 | 9 |
| | angular | Female | 3.6667 | 1.30171 | 3 |
| | | Male | 2.8095 | 1.15241 | 7 |
| | | Total | 3.0667 | 1.19722 | 10 |
| | Total | Female | 3.2619 | 1.32936 | 7 |
| | | Male | 3.0139 | .93056 | 12 |
| | | Total | 3.1053 | 1.06460 | 19 |
| green | round | Female | 3.8333 | 1.30809 | 6 |
| | | Male | 3.2778 | 1.00462 | 3 |
| | | Total | 3.6481 | 1.18276 | 9 |
| | angular | Female | 4.5833 | .83333 | 4 |
| | | Male | 4.1333 | .73974 | 5 |
| | | Total | 4.3333 | .76830 | 9 |
| | Total | Female | 4.1333 | 1.15417 | 10 |
| | | Male | 3.8125 | .89282 | 8 |
| | | Total | 3.9907 | 1.02974 | 18 |
| blue | round | Female | 3.2708 | 1.46639 | 8 |
| | | Male | 5.6667 | . | 1 |
| | | Total | 3.5370 | 1.58723 | 9 |
| | angular | Female | 3.2083 | 1.43580 | 8 |

| | | | | | |
|---|---|---|---|---|---|
| | | Male | 3.1667 | . | 1 |
| | | Total | 3.2037 | 1.34314 | 9 |
| | Total | Female | 3.2396 | 1.40234 | 16 |
| | | Male | 4.4167 | 1.76777 | 2 |
| | | Total | 3.3704 | 1.43663 | 18 |
| purple | round | Female | 3.3889 | .91793 | 3 |
| | | Male | 2.4722 | 1.07195 | 6 |
| | | Total | 2.7778 | 1.06719 | 9 |
| | angular | Female | 2.7778 | 1.34440 | 6 |
| | | Male | 4.7917 | 1.42319 | 4 |
| | | Total | 3.5833 | 1.66157 | 10 |
| | Total | Female | 2.9815 | 1.19735 | 9 |
| | | Male | 3.4000 | 1.65775 | 10 |
| | | Total | 3.2018 | 1.43434 | 19 |
| white | round | Female | 2.7778 | 1.53960 | 3 |
| | | Male | 3.5000 | .78881 | 6 |
| | | Total | 3.2593 | 1.05446 | 9 |
| | angular | Female | 2.8810 | .91142 | 7 |
| | | Male | 2.3333 | 1.20185 | 3 |
| | | Total | 2.7167 | .97198 | 10 |
| | Total | Female | 2.8500 | 1.04068 | 10 |
| | | Male | 3.1111 | 1.04416 | 9 |
| | | Total | 2.9737 | 1.02177 | 19 |

| | | | | | |
|---|---|---|---|---|---|
| yellow | round | Female | 3.9722 | 1.19915 | 6 |
| | | Male | 4.1250 | .43833 | 4 |
| | | Total | 4.0333 | .93227 | 10 |
| | angular | Female | 2.0556 | .91793 | 3 |
| | | Male | 3.4000 | 1.57498 | 5 |
| | | Total | 2.8958 | 1.46368 | 8 |
| | Total | Female | 3.3333 | 1.42400 | 9 |
| | | Male | 3.7222 | 1.20761 | 9 |
| | | Total | 3.5278 | 1.29636 | 18 |
| pink | round | Female | 3.2222 | 1.25093 | 3 |
| | | Male | 3.6667 | .99536 | 7 |
| | | Total | 3.5333 | 1.02680 | 10 |
| | angular | Female | 2.7222 | 1.18243 | 3 |
| | | Male | 3.0000 | .94281 | 6 |
| | | Total | 2.9074 | .96145 | 9 |
| | Total | Female | 2.9722 | 1.12258 | 6 |
| | | Male | 3.3590 | .99267 | 13 |
| | | Total | 3.2368 | 1.02034 | 19 |
| red | round | Female | 2.0556 | .41944 | 3 |
| | | Male | 3.5278 | 1.06675 | 6 |
| | | Total | 3.0370 | 1.13889 | 9 |
| | angular | Female | 2.9667 | .90062 | 5 |
| | | Male | 3.3333 | .76376 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| | | Total | 3.1042 | .81619 | 8 |
| | Total | Female | 2.6250 | .85797 | 8 |
| | | Male | 3.4630 | .93087 | 9 |
| | | Total | 3.0686 | .97014 | 17 |
| Total | round | Female | 3.3639 | 1.25077 | 49 |
| | | Male | 3.5432 | 1.02187 | 54 |
| | | Total | 3.4579 | 1.13441 | 103 |
| | angular | Female | 3.1352 | 1.26848 | 53 |
| | | Male | 3.3194 | 1.25187 | 48 |
| | | Total | 3.2228 | 1.25770 | 101 |
| | Total | Female | 3.2451 | 1.25901 | 102 |
| | | Male | 3.4379 | 1.13571 | 102 |
| | | Total | 3.3415 | 1.19989 | 204 |

## Appendix 4. Multivariate tests of study 2

**Multivariate Tests[a]**

| Effect | | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| Intercept | Pillai's Trace | .949 | 1481.857[b] | 2.000 | 159.000 | .000 | .949 |
| | Wilks' Lambda | .051 | 1481.857[b] | 2.000 | 159.000 | .000 | .949 |
| | Hotelling's Trace | 18.640 | 1481.857[b] | 2.000 | 159.000 | .000 | .949 |
| | Roy's Largest Root | 18.640 | 1481.857[b] | 2.000 | 159.000 | .000 | .949 |
| color | Pillai's Trace | .160 | 1.391 | 20.000 | 320.000 | .124 | .080 |
| | Wilks' Lambda | .846 | 1.386[b] | 20.000 | 318.000 | .127 | .080 |
| | Hotelling's Trace | .175 | 1.380 | 20.000 | 316.000 | .129 | .080 |
| | Roy's Largest Root | .109 | 1.737[c] | 10.000 | 160.000 | .077 | .098 |
| logotype | Pillai's Trace | .027 | 2.180[b] | 2.000 | 159.000 | .116 | .027 |
| | Wilks' Lambda | .973 | 2.180[b] | 2.000 | 159.000 | .116 | .027 |
| | Hotelling's Trace | .027 | 2.180[b] | 2.000 | 159.000 | .116 | .027 |
| | Roy's Largest Root | .027 | 2.180[b] | 2.000 | 159.000 | .116 | .027 |
| sex | Pillai's Trace | .021 | 1.701[b] | 2.000 | 159.000 | .186 | .021 |
| | Wilks' Lambda | .979 | 1.701[b] | 2.000 | 159.000 | .186 | .021 |
| | Hotelling's Trace | .021 | 1.701[b] | 2.000 | 159.000 | .186 | .021 |
| | Roy's Largest Root | .021 | 1.701[b] | 2.000 | 159.000 | .186 | .021 |
| color * logotype | Pillai's Trace | .105 | .891 | 20.000 | 320.000 | .599 | .053 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Wilks' Lambda | .896 | .900[b] | 20.000 | 318.000 | .588 | .054 |
| | Hotelling's Trace | .115 | .908 | 20.000 | 316.000 | .577 | .054 |
| | Roy's Largest Root | .101 | 1.619[c] | 10.000 | 160.000 | .106 | .092 |
| color * sex | Pillai's Trace | .103 | .866 | 20.000 | 320.000 | .631 | .051 |
| | Wilks' Lambda | .900 | .865[b] | 20.000 | 318.000 | .633 | .052 |
| | Hotelling's Trace | .109 | .863 | 20.000 | 316.000 | .635 | .052 |
| | Roy's Largest Root | .077 | 1.227[c] | 10.000 | 160.000 | .278 | .071 |
| logotype * sex | Pillai's Trace | .003 | .259[b] | 2.000 | 159.000 | .772 | .003 |
| | Wilks' Lambda | .997 | .259[b] | 2.000 | 159.000 | .772 | .003 |
| | Hotelling's Trace | .003 | .259[b] | 2.000 | 159.000 | .772 | .003 |
| | Roy's Largest Root | .003 | .259[b] | 2.000 | 159.000 | .772 | .003 |
| color * logotype * sex | Pillai's Trace | .124 | 1.060 | 20.000 | 320.000 | .391 | .062 |
| | Wilks' Lambda | .878 | 1.067[b] | 20.000 | 318.000 | .384 | .063 |
| | Hotelling's Trace | .136 | 1.073 | 20.000 | 316.000 | .377 | .064 |
| | Roy's Largest Root | .110 | 1.763[c] | 10.000 | 160.000 | .071 | .099 |

## Appendix 5. Tests of between-subjects effects of study 2

**Tests of Between-Subjects Effects**

| Source | Dependent Variable | Type III Sum of Squares | df | Mean Square | F |
|---|---|---|---|---|---|
| Corrected Model | masculinity | 45.471[a] | 43 | 1.057 | .626 |
| | femininity | 80.695[b] | 43 | 1.877 | 1.419 |
| Intercept | masculinity | 2768.313 | 1 | 2768.313 | 1640.013 |
| | femininity | 1839.168 | 1 | 1839.168 | 1390.880 |
| color | masculinity | 18.628 | 10 | 1.863 | 1.104 |
| | femininity | 22.298 | 10 | 2.230 | 1.686 |
| logotype | masculinity | 2.896 | 1 | 2.896 | 1.716 |
| | femininity | 3.440 | 1 | 3.440 | 2.601 |
| sex | masculinity | .793 | 1 | .793 | .470 |
| | femininity | 3.955 | 1 | 3.955 | 2.991 |
| color * logotype | masculinity | 3.732 | 10 | .373 | .221 |
| | femininity | 21.386 | 10 | 2.139 | 1.617 |
| color * sex | masculinity | 10.073 | 10 | 1.007 | .597 |
| | femininity | 15.117 | 10 | 1.512 | 1.143 |
| logotype * sex | masculinity | .200 | 1 | .200 | .119 |
| | femininity | .541 | 1 | .541 | .409 |
| color * logotype * sex | masculinity | 10.139 | 10 | 1.014 | .601 |
| | femininity | 20.997 | 10 | 2.100 | 1.588 |
| Error | masculinity | 270.077 | 160 | 1.688 | |

| | | | | | |
|---|---|---|---|---|---|
| | femininity | 211.569 | 160 | 1.322 | |
| Total | masculinity | 3738.778 | 204 | | |
| | femininity | 2570.056 | 204 | | |
| Corrected Total | masculinity | 315.548 | 203 | | |
| | femininity | 292.264 | 203 | | |

**Tests of Between-Subjects Effects**

| Source | Dependent Variable | Sig. | Partial Eta Squared |
|---|---|---|---|
| Corrected Model | masculinity | .963 | .144 |
| | femininity | .063 | .276 |
| Intercept | masculinity | .000 | .911 |
| | femininity | .000 | .897 |
| color | masculinity | .363 | .065 |
| | femininity | .088 | .095 |
| logotype | masculinity | .192 | .011 |
| | femininity | .109 | .016 |
| sex | masculinity | .494 | .003 |
| | femininity | .086 | .018 |
| color * logotype | masculinity | .994 | .014 |
| | femininity | .106 | .092 |
| color * sex | masculinity | .815 | .036 |
| | femininity | .333 | .067 |
| logotype * sex | masculinity | .731 | .001 |

| | | | |
|---|---|---|---|
| | femininity | .523 | .003 |
| color * logotype * sex | masculinity | .812 | .036 |
| | femininity | .114 | .090 |
| Error | masculinity | | |
| | femininity | | |
| Total | masculinity | | |
| | femininity | | |
| Corrected Total | masculinity | | |
| | femininity | | |

a. R Squared = .144 (Adjusted R Squared = -.086)

b. R Squared = .276 (Adjusted R Squared = .082)

## Appendix 6. Descriptive statistics of study 3

**Descriptive Statistics**

| | colorhue | brightness | Gender | Mean | Std. Deviation | N |
|---|---|---|---|---|---|---|
| masculinity | red | low | male | 4.1667 | 1.27112 | 13 |
| | | | Total | 4.1667 | 1.27112 | 13 |
| | | medium | female | 4.3056 | 1.61044 | 6 |
| | | | male | 3.3810 | 1.43280 | 7 |
| | | | Total | 3.8077 | 1.52881 | 13 |
| | | high | female | 3.5167 | 1.55446 | 10 |
| | | | male | 3.4583 | 1.39692 | 4 |
| | | | Total | 3.5000 | 1.45737 | 14 |
| | | Total | female | 3.8125 | 1.57159 | 16 |
| | | | male | 3.8194 | 1.33507 | 24 |
| | | | Total | 3.8167 | 1.41462 | 40 |
| | green | low | female | 3.5926 | 1.34915 | 9 |
| | | | male | 3.9667 | 1.23266 | 5 |
| | | | Total | 3.7262 | 1.27368 | 14 |
| | | medium | female | 3.5333 | 1.18087 | 5 |
| | | | male | 4.8958 | 1.05009 | 8 |
| | | | Total | 4.3718 | 1.25859 | 13 |
| | | high | female | 3.5833 | 1.60468 | 6 |
| | | | male | 3.7857 | 1.10014 | 7 |

| | | | | | |
|---|---|---|---|---|---|
| | | Total | 3.6923 | 1.29965 | 13 |
| | Total | female | 3.5750 | 1.31842 | 20 |
| | | male | 4.2750 | 1.17637 | 20 |
| | | Total | 3.9250 | 1.28322 | 40 |
| purple | low | female | 3.1852 | .72382 | 9 |
| | | male | 4.4667 | 1.71351 | 5 |
| | | Total | 3.6429 | 1.27745 | 14 |
| | medium | female | 4.6167 | .90284 | 10 |
| | | male | 4.0000 | 1.42400 | 3 |
| | | Total | 4.4744 | 1.01116 | 13 |
| | high | female | 3.5000 | .50000 | 5 |
| | | male | 3.0000 | 1.39158 | 8 |
| | | Total | 3.1923 | 1.13007 | 13 |
| | Total | female | 3.8472 | .99990 | 24 |
| | | male | 3.6458 | 1.55858 | 16 |
| | | Total | 3.7667 | 1.23851 | 40 |
| Total | low | female | 3.3889 | 1.07101 | 18 |
| | | male | 4.1884 | 1.31167 | 23 |
| | | Total | 3.8374 | 1.26298 | 41 |
| | medium | female | 4.2698 | 1.22074 | 21 |
| | | male | 4.1574 | 1.38794 | 18 |
| | | Total | 4.2179 | 1.28427 | 39 |
| | high | female | 3.5317 | 1.33502 | 21 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | male | 3.3860 | 1.26936 | 19 |
| | | | Total | 3.4625 | 1.28961 | 40 |
| | | Total | female | 3.7472 | 1.26204 | 60 |
| | | | male | 3.9250 | 1.35102 | 60 |
| | | | Total | 3.8361 | 1.30484 | 120 |
| femininity | red | low | male | 3.3718 | 1.18273 | 13 |
| | | | Total | 3.3718 | 1.18273 | 13 |
| | | medium | female | 3.6944 | 1.26235 | 6 |
| | | | male | 3.2619 | .82134 | 7 |
| | | | Total | 3.4615 | 1.02549 | 13 |
| | | high | female | 3.0000 | 1.51535 | 10 |
| | | | male | 2.8333 | 1.13039 | 4 |
| | | | Total | 2.9524 | 1.37503 | 14 |
| | | Total | female | 3.2604 | 1.42461 | 16 |
| | | | male | 3.2500 | 1.05409 | 24 |
| | | | Total | 3.2542 | 1.19828 | 40 |
| | green | low | female | 3.0370 | 1.16302 | 9 |
| | | | male | 2.9333 | 1.68572 | 5 |
| | | | Total | 3.0000 | 1.30744 | 14 |
| | | medium | female | 4.3333 | .51370 | 5 |
| | | | male | 4.3125 | 1.21315 | 8 |
| | | | Total | 4.3205 | .97292 | 13 |
| | | high | female | 4.0556 | 1.72133 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| | | male | 4.3333 | 1.07583 | 7 |
| | | Total | 4.2051 | 1.35427 | 13 |
| | Total | female | 3.6667 | 1.32564 | 20 |
| | | male | 3.9750 | 1.37360 | 20 |
| | | Total | 3.8208 | 1.34153 | 40 |
| purple | low | female | 3.7963 | 1.33015 | 9 |
| | | male | 3.3333 | 1.11181 | 5 |
| | | Total | 3.6310 | 1.23375 | 14 |
| | medium | female | 3.1833 | 1.21830 | 10 |
| | | male | 4.5000 | 1.16667 | 3 |
| | | Total | 3.4872 | 1.29361 | 13 |
| | high | female | 4.1333 | .70119 | 5 |
| | | male | 4.6875 | 1.27066 | 8 |
| | | Total | 4.4744 | 1.08833 | 13 |
| | Total | female | 3.6111 | 1.19749 | 24 |
| | | male | 4.2292 | 1.28794 | 16 |
| | | Total | 3.8583 | 1.25607 | 40 |
| Total | low | female | 3.4167 | 1.27347 | 18 |
| | | male | 3.2681 | 1.23985 | 23 |
| | | Total | 3.3333 | 1.24108 | 41 |
| | medium | female | 3.6032 | 1.15887 | 21 |
| | | male | 3.9352 | 1.14638 | 18 |
| | | Total | 3.7564 | 1.15016 | 39 |

| | | | | | |
|---|---|---|---|---|---|
| | high | female | 3.5714 | 1.47815 | 21 |
| | | male | 4.1667 | 1.32404 | 19 |
| | | Total | 3.8542 | 1.42134 | 40 |
| | Total | female | 3.5361 | 1.29212 | 60 |
| | | male | 3.7528 | 1.28203 | 60 |
| | | Total | 3.6444 | 1.28627 | 120 |

## Appendix 7. Multivariate tests of study 3

**Multivariate Tests[a]**

| Effect | | Value | F | Hypothesis df | Error df | Sig. |
|---|---|---|---|---|---|---|
| Intercept | Pillai's Trace | .952 | 1003.531[b] | 2.000 | 102.000 | .000 |
| | Wilks' Lambda | .048 | 1003.531[b] | 2.000 | 102.000 | .000 |
| | Hotelling's Trace | 19.677 | 1003.531[b] | 2.000 | 102.000 | .000 |
| | Roy's Largest Root | 19.677 | 1003.531[b] | 2.000 | 102.000 | .000 |
| colorhue | Pillai's Trace | .052 | 1.381 | 4.000 | 206.000 | .242 |
| | Wilks' Lambda | .948 | 1.385[b] | 4.000 | 204.000 | .241 |
| | Hotelling's Trace | .055 | 1.388 | 4.000 | 202.000 | .239 |
| | Roy's Largest Root | .054 | 2.759[c] | 2.000 | 103.000 | .068 |
| brightness | Pillai's Trace | .082 | 2.197 | 4.000 | 206.000 | .071 |
| | Wilks' Lambda | .920 | 2.176[b] | 4.000 | 204.000 | .073 |
| | Hotelling's Trace | .085 | 2.155 | 4.000 | 202.000 | .075 |
| | Roy's Largest Root | .045 | 2.303[c] | 2.000 | 103.000 | .105 |
| Gender | Pillai's Trace | .003 | .164[b] | 2.000 | 102.000 | .849 |
| | Wilks' Lambda | .997 | .164[b] | 2.000 | 102.000 | .849 |
| | Hotelling's Trace | .003 | .164[b] | 2.000 | 102.000 | .849 |
| | Roy's Largest Root | .003 | .164[b] | 2.000 | 102.000 | .849 |
| colorhue * brightness | Pillai's Trace | .099 | 1.334 | 8.000 | 206.000 | .228 |
| | Wilks' Lambda | .903 | 1.340[b] | 8.000 | 204.000 | .225 |
| | Hotelling's Trace | .107 | 1.346 | 8.000 | 202.000 | .223 |
| | Roy's Largest Root | .093 | 2.391[c] | 4.000 | 103.000 | .056 |

| | | | | | | |
|---|---|---|---|---|---|---|
| colorhue * Gender | Pillai's Trace | .040 | 1.048 | 4.000 | 206.000 | .384 |
| | Wilks' Lambda | .960 | 1.039[b] | 4.000 | 204.000 | .388 |
| | Hotelling's Trace | .041 | 1.030 | 4.000 | 202.000 | .393 |
| | Roy's Largest Root | .027 | 1.388[c] | 2.000 | 103.000 | .254 |
| brightness * Gender | Pillai's Trace | .029 | .745 | 4.000 | 206.000 | .563 |
| | Wilks' Lambda | .971 | .743[b] | 4.000 | 204.000 | .564 |
| | Hotelling's Trace | .029 | .741 | 4.000 | 202.000 | .565 |
| | Roy's Largest Root | .029 | 1.500[c] | 2.000 | 103.000 | .228 |
| colorhue * brightness * Gender | Pillai's Trace | .060 | 1.064 | 6.000 | 206.000 | .386 |
| | Wilks' Lambda | .940 | 1.063[b] | 6.000 | 204.000 | .386 |
| | Hotelling's Trace | .063 | 1.062 | 6.000 | 202.000 | .387 |
| | Roy's Largest Root | .056 | 1.914[c] | 3.000 | 103.000 | .132 |

## Appendix 8. Tests of between-subjects effects of study 3

**Tests of Between-Subjects Effects**

| Source | Dependent Variable | Type III Sum of Squares | df | Mean Square |
|---|---|---|---|---|
| Corrected Model | masculinity | 34.379[a] | 16 | 2.149 |
| | femininity | 39.831[b] | 16 | 2.489 |
| Intercept | masculinity | 1603.921 | 1 | 1603.921 |
| | femininity | 1495.525 | 1 | 1495.525 |
| colorhue | masculinity | .438 | 2 | .219 |
| | femininity | 8.136 | 2 | 4.068 |
| brightness | masculinity | 7.479 | 2 | 3.740 |
| | femininity | 6.431 | 2 | 3.215 |
| Gender | masculinity | .496 | 1 | .496 |
| | femininity | .034 | 1 | .034 |
| colorhue * brightness | masculinity | 2.370 | 4 | .592 |
| | femininity | 14.468 | 4 | 3.617 |
| colorhue * Gender | masculinity | 3.144 | 2 | 1.572 |
| | femininity | 3.405 | 2 | 1.703 |
| brightness * Gender | masculinity | 2.147 | 2 | 1.073 |
| | femininity | 2.744 | 2 | 1.372 |
| colorhue * brightness * Gender | masculinity | 8.346 | 3 | 2.782 |
| | femininity | 2.284 | 3 | .761 |
| Error | masculinity | 168.231 | 103 | 1.633 |

| | | | | |
|---|---|---|---|---|
| | femininity | 157.054 | 103 | 1.525 |
| Total | masculinity | 1968.500 | 120 | |
| | femininity | 1790.722 | 120 | |
| Corrected Total | masculinity | 202.610 | 119 | |
| | femininity | 196.885 | 119 | |

**Tests of Between-Subjects Effects**

| Source | Dependent Variable | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|
| Corrected Model | masculinity | 1.316 | .202 | .170 |
| | femininity | 1.633 | .073 | .202 |
| Intercept | masculinity | 982.004 | .000 | .905 |
| | femininity | 980.802 | .000 | .905 |
| colorhue | masculinity | .134 | .875 | .003 |
| | femininity | 2.668 | .074 | .049 |
| brightness | masculinity | 2.290 | .106 | .043 |
| | femininity | 2.109 | .127 | .039 |
| Gender | masculinity | .304 | .583 | .003 |
| | femininity | .022 | .882 | .000 |
| colorhue * brightness | masculinity | .363 | .835 | .014 |
| | femininity | 2.372 | .057 | .084 |
| colorhue * Gender | masculinity | .963 | .385 | .018 |
| | femininity | 1.117 | .331 | .021 |
| brightness * Gender | masculinity | .657 | .520 | .013 |
| | femininity | .900 | .410 | .017 |

| | | | | |
|---|---|---|---|---|
| colorhue * brightness * Gender | masculinity | 1.703 | .171 | .047 |
| | femininity | .499 | .684 | .014 |
| Error | masculinity | | | |
| | femininity | | | |
| Total | masculinity | | | |
| | femininity | | | |
| Corrected Total | masculinity | | | |
| | femininity | | | |

a. R Squared = .170 (Adjusted R Squared = .041)

b. R Squared = .202 (Adjusted R Squared = .078)

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