Effectively communicating masculine and feminine brand personality traits using brand logo designs

Kathleen Browne

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By:　　　　　Kathleen Browne

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Signed by the final examining committee:

_____ Chair
Dr. Linda Dyer
_____ Examiner
Dr. Darlene Walsh
_____ Examiner
Dr. Mrugank Thakor
_____ Supervisor
Dr. Bianca Grohmann

Approved by _____
　　　　　　　Chair of Department or Graduate Program Director

　　　　　　　_____
　　　　　　　Dean of Faculty

Date _____

iii. Abstract

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This research aims to further explore and clarify the roles of visual design elements in brand logos and their ability to influence brand gender perceptions. In an improvement on past research, this study clearly delineates the independent effects of type font, colour hue, and colour brightness in brand logos on creating brand femininity and masculinity perceptions. Using a between-subjects design with an online panel of American consumers, the study finds that display fonts, blue hues, and dark brightnesses in brand logos significantly enhance brand masculinity perceptions while script fonts, pink hues, and light brightnesses in brand logos significantly enhance brand femininity perceptions. This research is the first in the brand gender literature to uncover strong main effects for all three of these design elements. Individual-level uncertainty avoidance, Masculine and Feminine Gender Trait Index, and participant-identified sex are also tested as moderators and the main and interaction effects of these participant traits on brand gender perceptions are discussed. The results of this research provide theoretical contributions to brand personality, evolutionary psychology, and sensory marketing literatures. Limitations, future research ideas, and managerial implications conclude the discussion of this research.

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Literature Review

Aaker's (1997) seminal paper on brand personality dimensions launched a new field of academic and managerial investigation into how consumers conceptualize brands, interact and form relationships with brands, and how researchers can empirically measure these phenomena. Managers and researchers had known for a long time that consumers attribute human-like characteristics to brands and that consumers may even form relationships with brands that have some similarities to interpersonal relationships. But with the empirical validation of a scale to measure brand personality constructs, managers and researchers could now "quantify" some of these human-like traits of brands; importantly, they could now investigate how the presence or absence of these traits could be manipulated and how such manipulations would affect downstream consumer behaviours such as brand loyalty and purchase intentions (Aaker, 1997).

Along this line of research, Eisend and Stokburger-Sauer (2013) recently conducted a meta-analysis to examine the antecedents and consequences of brand personality traits as defined by Aaker (1997). They found that the major contributors to brand personality were marketing communications with hedonic benefit claims, branding activities that support the creation of a unique brand entity, a brand's country of origin, and the personalities of the consumers themselves. Furthermore, the brand personality dimensions of sincerity and competence seemed to have the strongest influence on brand success as operationalized by consumers' brand attitude, commitment, and purchase intention. Consequently, there is meta-analysis level evidence to suggest that brand personality does have powerful implications for managerial and marketing practice and is thus a construct that warrants further study (Eisend & Stokburger-Sauer, 2013).

In regards to the influential antecedents to brand personality, Eisend and Stokburger-Sauer (2013) found that communicating hedonic benefits is more powerful in shaping brand personality than communicating utilitarian benefits. Managers have control over the communication of the benefits to the consumers and related branding activities, but they may not have control over the brand's country of origin and they definitely do not have control over consumers' personality traits. So in terms of suggesting future brand personality research ideas that can also be managerially implemented, it may be in the researcher's and the manager's best interest to further study the influence of communication and branding activities on brand personality construction because these antecedents are ones that managers can manipulate and control in practice.

While Eisend and Stokburger-Sauer (2013) did not go into the details of how they operationalized the "branding activities" variable in their meta-analysis, they did broadly define it as "activities that support the creation of a unique and inimitable brand" (Eisend & Stokburger-Sauer, 2013, pg. 207). One such branding activity that falls into this category is brand logo design, which is the brand management strategy of focal interest in this research. Over the last 10 years, research on the elements of brand logo design and its relationship with consumer behaviour has grown. In 2004, Bottomley and Doyle manipulated different combinations of colours and fonts in brand logos and found that consumers believed certain combinations to be more appropriate for certain product categories than others. Furthermore, these consumer beliefs seemed to manifest in actual choice behaviour. When given a choice of two identical chocolate bars that only differed in the brand logo, participants were more likely to choose the chocolate bar with the "product-category-appropriate" font, which in this case was Signet (Doyle & Bottomley, 2004). While Bottomley and Doyle did not measure or investigate brand personality

directly, their research findings suggest that brand logo design elements such as font choice, colour choice, and name choice do affect consumers' perceptions of brand-product appropriateness and have implications for consumer choice in a competitive context. Consequently, these design elements are an important branding activity to research so that brand managers can better understand how their brand logo design choices influence downstream consumer behaviour effects.

Extending brand logo design research into brand personality, Grohmann, Giese, and Parkman (2013) found that type font characteristics can be used to communicate brand personality dimensions. For example, the authors find that the "naturalness" of the font type, which refers to how organic the font appears, increased perceptions of the sincerity and excitement dimensions of brand personality. Additionally, the researchers found that the colour of the type font influenced consumers' perceptions of brand personality independently of type font: for example, green type font positively influenced perceptions of brand ruggedness but negatively influenced perceptions of brand sophistication (Grohmann et al., 2013). Similarly and equally important to the present research, Labrecque and Milne (2012) studied how colour hues and saturations in brand logo and package designs can effectively communicate brand personality traits. For example, these researchers found that pink and white communicate sincerity, brown communicates ruggedness, and high saturation colours communicate excitement. Clearly, there is empirical evidence to suggest that logo design elements can communicate the five brand personality traits defined by Aaker (1997).

In the research reviewed thus far, we can see accumulating evidence for the importance of brand logo design elements on consumer brand perceptions and possibly even purchase behaviours (Doyle & Bottomley, 2004). More specifically, a brand manager's choice of colour

and font in a brand logo can influence consumer perceptions of logo-product appropriateness (Bottomley & Doyle, 2006) and brand personality dimensions outlined by Aaker (1997) (Grohmann et al., 2013). Following Aaker's (1997) brand personality dimensions conceptualization, researchers have been interested in trying to better understand how else consumers might anthropomorphize brands. Brand anthropomorphization, even in small dosages, seems to be necessary in order for consumer-brand relationships to develop and anthropomorphized brands are more likely to become relationship partners, a desirable outcome for managers (Alvarez & Fournier, 2016). Therefore, managerially relevant research questions should address which and in what ways brand attributes can enhance or reduce the likelihood of brand anthropomorphization.

Recently, the construct of brand gender has been unveiled as another way in which consumers may attribute human-like characteristics to brands. This human attribute could be sensibly detected in a non-human context, such as branding, because gender is such a salient characteristic: Dion, Berscheid, and Walster (1972) found that gender is one of the first characteristics processed when one meets a new person. So in consideration of the possible existence of brand gender, Grohmann (2009) created an empirically validated scale for this construct which includes items addressing daringness and dominance, for example, to measure brand masculinity and tenderness and fragility, for example, to measure brand femininity. Brand masculinity and femininity are brand personality dimensions distinct from those outlined by Aaker (1997) and these personality dimensions seem to have managerial relevance because they can lead to more positive brand evaluations and purchase intentions of a brand extension (Grohmann, 2009). For instance, a feminine parent brand extending into a feminine product category such as mineral water was evaluated more favourably than a feminine parent brand

extending into a male product category such as exercise equipment (Grohmann, 2009). Furthermore, an investigation by Lieven, Grohmann, Herrmann, Landwehr, and van Tilburg (2014) uncovered that brand gender contributes to the strength of consumer-based brand equity above and beyond the equity contribution of other brand personality dimensions. In other words, brands with high masculinity and/or femininity perceptions may enjoy greater brand equity. A more recent study by Lieven and Hildebrand (2016) extended these results and found that androgynous brands, or brands that score high on both masculine and feminine items, enjoy the greatest consumer-based brand equity ratings across countries and product categories. The researchers explained this finding by paralleling it with psychology research that has found that humans with strong masculine and strong feminine traits are perceived to be most likeable and successful in many countries of the world (Lieven & Hildebrand, 2016). Nonetheless, this consumer-based brand equity body of research suggests that brand gender personality dimensions are important factors for managers to consider in branding activities and brand management strategy.

Since there is empirical evidence that suggests that consumers' perceptions of Aaker's brand personality dimensions can be influenced by brand logo design elements (Grohmann et al., 2013), it is likely that these visual design elements can also influence perceptions of brand gender personality dimensions. In the human context, physical appearance is the primary channel through which a person's gender is assessed (Deaux & Lewis, 1984). Indeed, Lieven, Grohmann, Herrmann, Landwehr, and van Tilburg (2015) found evidence that the font choice, logo shape, and brand name in a logo can all influence brand gender perceptions. Lieven and colleagues (2015) explained most of these findings using evolutionary psychology theory. To illustrate, the authors found that angular logo shapes are perceived as more masculine and rounded logos are

perceived as more feminine. Slender, rounded, and script fonts are perceived as more feminine; angular, bold, and display fonts are perceived as more masculine. The authors also borrow propositions from sound symbolism and find that brand names with back vowels (e.g. *o, u,* which create deeper and heavier sounds) are perceived as more masculine and brand names with front vowels (e.g. *i, e,* which create lighter and thinner sounds) are perceived as more feminine. All of these findings align with evolutionary psychology theory because these visual and auditory cues imitate physical and sexual dimorphism characteristics of sexually desirable human males and females (Lieven et al., 2015).

Evolutionary principles may be deeply entrenched in human cognitive processing especially when it comes to assessing attractiveness of a potential mate, which occurs first and foremost through the visual channel (Buss, 1994). Sexual strategies theories postulate that an ideal male mate is protective, able-bodied, and constantly present to take care of offspring while an ideal female mate is sexually healthy, fertile, and available. These traits manifest themselves in a strong and powerful male, and a curvy yet fragile female (Buss, 1994). These visual cues of gendered sexual desirability may be recognized in non-human brand logos, leading to the perception of a brand being masculine or feminine. Script fonts are delicate and curved, imitating the visual appearance of the ideal curvy and fragile female mate. Display fonts are heavy and angular, imitating the visual appearance of the ideal muscular and protective male mate. These fonts could be helping consumers to assess and perceive brand gender through their visual imitation of deeply entrenched mate desirability cues that have been shaped by evolution (Lieven et al., 2015).

Grohmann (2014) presents compelling evidence in support of the effect of type fonts on brand gender personality dimensions. In a series of studies, she found that script fonts such as

Gigi, Rage Italic, and Kristen ITC effectively communicate brand femininity traits while display fonts such as Rockwell Extra Bold, Impact, and Agency FB effectively communicate brand masculinity traits. The use of a gender-congruent font with a masculine or feminine brand name further enhanced brand gender perceptions. Interestingly, brand name and type font independently influenced brand gender perceptions. This means that type fonts still produced enhanced brand gender perceptions such that script fonts increased brand femininity and display fonts increased brand masculinity even when an incongruent gendered brand name was used. Similarly, when Lieven and colleagues (2015) independently manipulated type fonts in brand logo designs, they found that script fonts enhanced brand femininity perceptions and display fonts enhanced brand masculinity perceptions. The converging findings of Lieven and colleagues (2015) and Grohmann (2014) suggest that font type is a strong and effective communicator of brand gender personality traits.

Additionally, Lieven and colleagues (2015) investigated colour and its effects on brand gender perceptions. The researchers used blue as the colour hue indicating masculinity and light red/pink representing femininity, but they did not find the expected relationships with the respective brand gender perceptions. Unlike the rest of their studies, the predictions and results regarding colour hues are not based in evolutionary psychology theory. One possible explanation for the unclear findings is that the researchers only chose colour hues that are stereotypically associated with gender based on Western society's social construction of gender, such as blue for boys and pink for girls (Cunningham & Macrae, 2011). It is plausible that colour brightness is also an important dimension that could affect gender perceptions through evolutionarily-learned associations; specifically, lightness is associated with females and darkness with males based on sexually dimorphic skin pigmentation (Jablonski & Chaplin, 2000). Jablonski (2004) asserts that

lighter skin pigmentation of females maximizes "cutaneous vitamin D3 production in order to meet the absolutely higher calcium requirements of pregnancy and lactation" (p. 609) and that "darker pigmentation may have been the object of natural selection in males because of the importance of maintaining optimal levels of folate in order to safeguard sperm production, a process depending on folate for DNA synthesis" (p.609). Although Lieven and colleagues (2015) did acknowledge that evolutionary psychology predicts that colour brightness should influence gender perceptions, the researchers did not explicitly consider this visual cue or hold brightness constant when designing their stimuli to investigate the relation between brand logo design colours and brand gender perceptions. In their design, colour hue and colour brightness are confounded because both different hues and different brightness levels were used to design the "masculine" colour type font (e.g. dark blue) and the "feminine" colour type font (e.g. light red/pink), instead of each of these colour dimensions being manipulated independently. This additional and likely important colour parameter of brightness may help explain why Lieven and colleagues (2015) did not find the expected relationship between type font colour in a brand logo and brand gender perceptions.

Consequently, a deeper and cleaner investigation of type font colour in brand logo design and the relationship with brand gender perceptions is warranted, especially because colour brightness has been shown to be an important visual cue in determining gender in other contexts, including in other consumer contexts. Semin and Palma (2014) used a variety of methodologies to demonstrate that colour brightness (e.g. how light or dark a colour appears) is a visual cue that consumers use to assign gender to both human and non-human entities. First, the researchers demonstrated in a simple reaction time study that participants are faster at classifying male and female human names when the male name is presented in a black typeface and when the female

name is presented in a white typeface. These results also held independent of colour hue: participants were faster at classifying a male name when it was printed in dark green than when it was printed in light green, and the opposite results were demonstrated for female names. Further, Semin and Palma (2014) found that participants used colour brightness to assign consumption choices to gendered actors. Participants inferred that the darker beverage or food item (e.g. coffee) was ordered by a male consumer and the lighter item (e.g. cappuccino) was ordered by the female consumer in a mock consumption scenario. These results held for non-food consumer products: for example, the white iPhone was assigned to the female consumer and the black iPhone to the male consumer in a mock consumption scenario. Other researchers have uncovered similar findings when consumers are asked to rate a product's gender. In a study that investigated design aesthetics and product gender, Tilburg and colleagues (2015) found that the darkness or lightness of the colour of a product was one of the strongest predictors for that product's perceived gender. Combined, these results from Semin and Palma (2014) and Tilburg and colleagues (2015) provide strong evidence that consumers may use colour brightness in various consumption contexts as a cue for the gender of non-human products and their human owners. If consumers can use the colour brightness of the product to infer its gender, might consumers use the colour brightness of a brand logo to infer brand gender?

Prior research (Semin & Palma, 2014; Tilburg et al., 2015) did not explore colour brightness and gender in the context of branding. Combined with the inadequate treatment of colour dimensions when exploring brand gender in Lieven and colleagues (2015) by confounding colour hue and brightness dimensions, the present research will examine the independent effects of colour hue and colour brightness in brand logo type font and the influences of these visual cues on brand gender perceptions. This research will also examine the

effects of type font on brand gender perceptions to further corroborate the findings of Lieven and colleagues (2015) and Grohmann (2014).

Hypotheses

This research seeks to replicate the findings reported by Lieven and colleagues (2015) regarding the impact of type font used in brand logos on brand gender perceptions. It also aims to test the influence of type font hue and brightness on brand gender perceptions. This research will test the following hypotheses:

H1: Type font in the brand logo will influence brand gender perceptions such that script fonts will increase perceptions of brand femininity and display fonts will increase perceptions of brand masculinity.

H2: Colour hue (when brightness is held constant) in the brand logo will influence brand gender perceptions such that socialized colour-gender associations will strengthen brand gender. In Western culture, a pink hue will increase perceptions of brand femininity while a blue hue will increase perceptions of brand masculinity.

H3: Colour brightness (when hue is held constant) in the brand logo will influence brand gender perceptions such that light colours will increase perceptions of brand femininity and dark colours will increase perceptions of brand masculinity.

H4: A brand logo with internally gender-congruent design elements will be perceived as having stronger brand gender (e.g. a logo with script font and light pink font colour will be perceived as strongly feminine) than a brand logo with internally gender-incongruent design elements.

Moderators

Other studies in the brand gender literature have found that biological sex and/or identified gender of the participants has moderated the strength of brand or product gender perceptions and preferences. For example, Tilburg and colleagues (2015) found that female participants rated product gender closer to the midpoint of a gender scale adapted from Grohmann (2009) than the male participants did. Lieven and colleagues (2015) found that female participants displayed a higher preference for feminine brand logos and male participants displayed a stronger preference for masculine brand logos. Similarly, Lieven and Hildebrand (2016) found that female consumers displayed higher brand equity ratings for feminine brands and male consumers for masculine brands. While the proposed study will assess only brand gender perceptions and not preferences or consumer-based brand equity, it is worthwhile to note that other researchers in this area find that the sex of participants can be a significant moderator. The present study will therefore explore sex as a moderator, although no hypothesis will be postulated because there is no compelling theoretical justification as to why brand gender perceptions may be moderated by the participants' gender or biological sex.

Other possible moderators that could be explored are related to cultural dimensions (Hofstede, 2001). There is some empirical evidence that individuals from cultures high in uncertainty avoidance are more likely to anthropomorphize brands because this psychological conceptualization is one way to place more structure onto novel and previously unknown brand encounters (Hudson, Huang, Roth, & Madden, 2016). Brand gender could be considered to be a form of brand anthropomorphization because gender is a human characteristic that is being transferred and attributed to a non-human entity. Might participants or those from cultures high in uncertainty avoidance have stronger perceptions of brand masculinity and femininity traits in a

fictitious and novel brand, due to the desire to infuse structure into unknown situations? Using a human characteristic like gender to inform and give structure to perceptions of a non-human entity could be a way in which the uncertainty created by a novel brand is reduced. The uncertainty avoidance cultural dimension question has not yet been addressed in the brand gender research area but could be an interesting one to investigate.

Methodology Overview

In order to address the hypotheses and explore the moderators, a similar experimental setup to that of Lieven and colleagues (2015) was implemented. To test the effects of logo design elements on brand gender, a 2 (type font) × 2 (colour hue) × 2 (colour brightness) between-subjects design was used. This is an improvement on the experimental design of Lieven and colleagues (2015), in which a within-subjects design was used. In other words, participants saw all possible logo designs and therefore the brand gender perceptions reported were inherently comparative. The stimuli in the present study consisted of eight brand logo designs that combine a display (masculine) or script (feminine) type font, a masculine or feminine colour hue, and a dark or light colour brightness manipulation. All design elements were individually pretested in a non-brand context to validate their associations with masculinity or femininity.

The pre-testing identified which brand name, type fonts, colour hues, and colour brightness levels should be combined into the eight main study brand logos. In the main study, participants were randomly assigned to evaluate one of the possible brand logo design combinations on brand masculinity and femininity using the Brand Gender scale (Grohmann, 2009).

Moderators were measured after the brand logo section of the study. Uncertainty avoidance was measured using a seven-item scale adopted from Hofstede for use at the

individual level (Jung & Kellaris, 2004). While there are many scales available to measure gender identity, the Gender Trait Index (GTI; Barak & Stern, 1986) has been used in many consumer behaviour and marketing research studies as a gender segmentation variable and is relatively brief (Schertzer, Laufer, Silvera, & McBride, 2008). Demographics were measured last and included a single item on sex identification, which was also tested as a moderator in addition to GTI scores.

Overall, this study was similar to Study 3 of Lieven and colleagues (2015), however there was the added manipulated component of colour brightness and the possible moderators. Importantly, independently manipulating the hue and brightness of the font colour in the brand logo was an improvement upon Lieven and colleagues' (2015) design.

Method

Pre-tests

Pre-tests of the visual stimuli and scales were required to establish the final design elements for the brand logos in the main study. Visual stimuli were designed in Powerpoint and the pre-test questionnaire was created using Qualtrics survey software. In this stage, participants did not see sample logos; rather, they evaluated a single visual element at a time, for example the femininity and masculinity of the Kristen font (presented in black). The goal of this pretesting was to validate the selection of two type fonts for the main study, ensuring that the script font chosen for the main study is perceived to be more feminine and less masculine than the display font (and vice versa), that the light colour swatch is perceived to be more feminine and less masculine than the dark colour swatch (and vice versa), and to investigate if the colour hues are more strongly associated with masculinity or femininity.

Fictitious brand names were pre-tested for gender neutrality, (un) familiarity, and attitude. The fictitious brand name used in the study had to be pretested to ensure gender "neutrality" so that the brand name is unlikely to contribute to the masculinity or femininity perceptions of the brand. Lieven and colleagues (2015) used "Young" and "Connect" as fictitious brand names in their studies, however it was not explicitly stated that these brand names had been pre-tested for brand gender "neutrality".

Moderators were also measured following the visual stimuli section of the pre-tests. Uncertainty avoidance was measured using a seven-item scale adopted from Hofstede for use at the individual level (Jung & Kellaris, 2004), gender identity was measured with the Gender Trait Index (GTI; Barak & Stern, 1986), and demographics were measured and included a single item regarding identified sex.

Pre-test 1 Stimuli and Questionnaire

After providing informed consent, participants evaluated one randomly assigned colour swatch on the Brand Gender scale (Grohmann, 2009) with a seven-point Likert format, anchored by "Not at all descriptive" and "Extremely descriptive". The twelve items of the scale were displayed in random order. There were seven colours included in the pre-test. Red and blue hues were chosen because they were articulated in the hypotheses of Lieven and colleagues (2015) such that blue was chosen as a masculine colour and pink or "light red" as a feminine colour. Green was also pre-tested because it was found to be a gender-neutral colour and was used to test gender-brightness associations in Semin and Palma (2014).

Further, testing red, blue, and green meant that all pre-tested colours are primary colours and are the three dimensions on the RGB scale; thus the brightness levels can be consistently manipulated across colour hues. The brightness values were chosen through the following

process. The colour swatches were created in Powerpoint. First, the colours were designed using the RGB scale with the most extreme values at R, G, or B to create the pure red, green, and blue samples, respectively. From there, the RGB values were transformed to HSL values in Powerpoint so that the Hue and Saturation levels could be held constant and Lightness could be manipulated. Initially, the most extreme lightness values were assigned to the hues (0 and 255); this process created colour swatches with very little resemblance to their original hue (i.e. the darkest red appeared brown). Therefore, more moderate lightness values were created and chosen so that the dark and light values were multiples of each other (i.e. dark red is three times darker than light red). The dark blue colour swatch had HSL values of 170, 255, 60; light blue was 170, 255, 180; dark red was 0, 255, 60; light red was 0, 255, 180; dark green was 85, 255, 60; light green was 85, 255, 180. An additional red colour swatch was added to appear as more of a pure red (0, 255, 120) to accompany the dark red that appeared maroon and the light red that appeared peach. In total, there were seven colour swatches chosen for pre-testing on the Brand Gender scale (Grohmann, 2009).

Brand names were also included in the pre-test. Based on prior pre-testing results involving fictitious brand names and brand gender in Grohmann (2014), "Biovit" and "Dynafit" were chosen because these names were perceived to have low levels of brand masculinity and femininity. Similar to the pre-testing procedure of Grohmann (2014), these brand names were assessed on the Brand Gender scale (Grohmann, 2009) as well as on single item brand familiarity and brand attitude measures. Pre-testing participants were randomly assigned to assess one of the two fictitious brand names.

Finally, participants assessed one of six randomly assigned fonts on the Brand Gender scale (Grohmann, 2009). The three display fonts chosen were Agency FB, Impact, and Rockwell

Extra Bold, and the three script fonts chosen were Monotype Corsiva, Kristen ITC, and Rage Italic. All six of these fonts were previously found to be perceived as masculine or feminine, respectively, in a brand gender context (Grohmann, 2014; Lieven et al., 2015).

The visual stimuli section was then followed by the Uncertainty Avoidance scale (Jung & Kellaris, 2004), the Gender Trait Index (Barak & Stern, 1986), and demographic items that measured identified sex, age, ethnic background, education level, and income.

Pre-test 1 Sample

The pre-testing study was launched on the Amazon mTurk platform. First, a "soft launch" with 40 participants was published on Sunday, October 16, 2016 around 11am EST. After manually inspecting the data output for errors or other issues with the Qualtrics survey logic, the pre-test was published again for 210 participants on Monday, October 17, 2016 around 3pm EST. mTurk participants were paid $1.00 (USD) for a completed survey. Qualtrics collected 241 usable responses for the pre-test.

A common response problem with online survey panels is that participants randomly click through questions to complete the survey as quickly as possible and obtain the completion reward. To address this issue, the survey completion time (in seconds) was analyzed for the sample. The mean completion time for the pre-test was 280.017 seconds and the standard deviation was 165.059 seconds; responses were excluded from the data analysis if the completion time was less than one standard deviation below the mean. However, these participants were still paid for the completed survey. The total sample size after this exclusion process was 228.

Pre-test 1 Results

Colour Swatches

The first category of visual stimuli that was tested was colour swatches. Recall that there were seven different colours tested, falling into three hue categories (red, green, blue) and three brightness categories (light, dark, and "plain" for red only). The results were analyzed using brand femininity and brand masculinity as dependent variables in separate two-way ANOVAs with colour and participant identified sex as the two independent variables, identical to the data analysis procedures in Grohmann (2014). The colour independent variable was categorized and analyzed in a few different ways: as seven colour swatches, as three hues, and as three brightnesses. These categorizations resulted in three two-way ANOVAs for brand femininity and three two-way ANOVAs for brand masculinity.

Colour Hue

Brand Femininity

Colour hue produced mixed results. Overall, there was no effect of colour hue on brand femininity perceptions ($F(2, 222) = 2.20, p = .11$), no effect of participant sex ($F(1, 222) = 0.23$, $p = .63$), and a possible interaction effect between colour hue and participant sex ($F(2, 222) = 3.01, p =. 05$). However, when the green hue was removed from the analysis because it was intended to be a gender-neutral or control hue and a one-tailed t-test (i.e., planned comparison) was run to compare blue and red hues, blue hues were perceived as more feminine ($M = 3.42$, $SD = 1.46$) than red hues($M = 3.03, SD = 1.44$), $t(138.81) = 1.65, p = .05$. This t-test was analyzed with equal variances not assumed due to the difference in sample size between the blue hues (n = 66) and the red hues (n = 94). Blue being perceived as more feminine than red is the opposite of what was expected.

Brand Masculinity

Unlike brand femininity, there was a clear effect of colour hue on brand masculinity perceptions ($F(5, 222) = 11.78$, $p < .001$) such that the red hue was perceived as more masculine ($M = 4.88$, $SD = .15$) than the green hue ($M = 3.88$, $SD = .18$) and the blue hue ($M = 3.78$, $SD = .18$), $p < .001$. Bonferoni comparisons revealed that there is no difference between the masculinity perceptions of green and blue, $p = 1.00$. When the green hue was removed from the analysis because it was intended to be a gender-neutral or control hue and a one-tailed t-test (i.e., planned comparison) was run to compare blue and red hues, red hues were perceived as more masculine ($M = 4.85$, $SD = 1.47$) than blue hues($M = 3.78$, $SD = 1.41$), $t(143.75) = 4.68$, $p < .001$. Like with the brand femininity results, this result was also theoretically unexpected as blue is the colour hue associated with boys and masculinity in Western society. There was a significant effect of participant sex ($F(1, 222) = 4.01$, $p = .046$) such that female participants perceived stronger brand masculinity ($M = 4.37$, $SD = .15$) than did male participants ($M = 3.99$, $SD = .12$). There was no interaction effect between participant sex and colour hue, $F(2, 222) = 1.46$, $p = .23$.

Colour Brightness

Brand Femininity

Colour brightness had a significant effect such that light colours ($M = 3.753$, $SD = .148$) were perceived as more feminine than dark colours ($M = 2.937$), $F(2, 222) = 11.26$, $p < .001$. There was no effect of participant sex ($F(1, 222) = 0.61$, $p = .44$) or interaction between colour brightness and participant sex ($F(2, 222) = 0.09$, $p = .91$).

Brand Masculinity

Colour brightness had a significant effect ($F(2, 222) = 24.18$, $p < .001$) such that dark colours ($M = 4.50$, $SD = .13$) were perceived as more masculine than light colours ($M = 3.56$, $SD = .15$). There was also a main effect of participant sex ($F(1, 222) = 4.68$, $p = .03$) such that female participants perceived stronger brand masculinity ($M = 4.74$, $SD = .17$) than male participants did ($M = 4.28$, $SD = .13$). There was no interaction effect between participant sex and colour brightness, $F(2, 222) = 0.11$, $p = .90$.

Brand Names

The next category of design stimuli to be measured and analyzed was the brand name data. The dependent variables of interest here are brand femininity, brand masculinity, brand familiarity, and brand attitude. The latter two variables were measured on reverse coded seven-point scales (anchored 7 = extremely unfamiliar and 1 = extremely familiar). Two-way ANOVAs were run for the brand gender variables with brand name and participant sex as the independent variables.

Brand Femininity

For brand femininity, there was no difference ($F(1, 224) = 0.16$, $p = .69$) between Biovit ($M = 2.64$, $SD = .12$) and Dynafit ($M = 2.57$, $SD = .13$) and both names were perceived as not strongly feminine. There was a main effect of participant sex ($F(1, 224) = 9.95$, $p = .002$) such that male participants perceived stronger brand femininity ($M = 2.88$, $SD = .11$) than did the female participants ($M = 2.32$, $SD = .14$). There was no significant interaction between brand name and participant sex ($F(1, 224) = 0.008$, $p = .93$).

Brand Masculinity

For brand masculinity, Dynafit was perceived as more masculine ($M = 4.72$, $SD = .12$) than Biovit ($M = 4.16$, $SD = .12$), $F(1, 224) = 10.62$, $p = .001$. There was no main effect of

participant sex ($F(1, 224) = 1.36$, $p = .25$) or interaction effect of participant sex and brand name ($F(1, 224) = 0.53$, $p = .47$) on brand masculinity perceptions.

Brand Familiarity, Attitude, and Conclusion

For brand familiarity, Biovit was perceived as less familiar ($M = 6.38$, $SD = .13$) than Dynafit ($M = 5.19$, $SD = .14$), $F(1, 226) = 5.63$, $p = .018$, although both were unfamiliar as they were significantly different than the scale midpoint (4) in a one-sample t-test, $ps < .001$. Finally, for brand attitude, Biovit was perceived as more favourable ($M = 3.97$, $SD = .10$) than Dynafit ($M = 3.45$, $SD = .10$), $F(1, 224) = 12.42$, $p = .001$. In one-sample t-tests from the scale midpoint (4), Biovit was not statistically different, $t(116) = -.33$, $p = .74$, whereas Dyanfit was significantly below the scale midpoint for brand attitude, $t(110) = -5.34$, $p < .001$. Thus, Biovit was chosen as the brand name to be used in the main study because it had low femininity perceptions, lower masculinity perceptions, less familiarity, and more favourable attitudes than Dynafit.

Font Type

The final visual stimuli to be measured and analyzed was font type. Three display fonts and three script fonts were pre-tested and the two-way ANOVAs had font group (script vs. display) and participant sex as the independent variables.

Brand Femininity

For brand femininity, script fonts were perceived as more feminine ($M = 4.13$, $SD = .13$) than display fonts ($M = 2.16$, $SD = .13$), $F(1, 224) = 119.01$, $p < .001$. There was no main effect of participant sex, $F(1, 224) = 1.94$, $p = .17$, or interaction of font group and participant sex on brand femininity perceptions, $F(1, 224) = 0.004$, $p = .95$.

Brand Masculinity

For brand masculinity, display fonts were perceived as more masculine (M = 4.44, SD = .13) than script fonts (M = 3.13, SD = .13), $F(1, 224)$ = 49.52, $p < .001$. There was no main effect of participant sex, $F(1, 224)$ = 0.49, p = .48, or interaction of font group and participant sex on brand masculinity perceptions, $F(1, 224)$ = 0.53, p = .46.

Font Type Conclusion

Multiple comparisons did not reveal any difference amongst script fonts or amongst display fonts on brand femininity and brand masculinity perceptions, respectively. In other words, no single font emerged as the most feminine or the most masculine. For the main study, Rockwell was chosen as the masculine font and Rage Italic chosen as the feminine font because these two fonts performed most strongly, although not significantly so, in their font type categories. Rockwell had a mean brand masculinity perception of 4.53 (SD = 0.24), the largest of the display fonts. Rockwell was perceived to be significantly more masculine than feminine (M = 2.05, SD = 0.23), $t(35)$ = 10.58, $p < .001$. Rage Italic had a mean brand femininity perception of 4.51 (SD = 0.25), the largest of the script fonts. Rage Italic was perceived to be significantly more feminine than masculine (M = 3.43, SD = 0.22), $t(37)$ = 4.31, $p < .001$.

Pre-test 2 Stimuli and Questionnaire

Due to the unexpected results of colour hue in the first pre-test—which were in the reverse direction of theory and past testing, a second pre-test was conducted using blue and pink as the colour hues rather than blue and red. This decision was based on the colour hues chosen for testing by Lieven and colleagues (2015) who used navy blue and bright pink as the masculine and feminine colour hues, respectively, in their brand logo study. These colours were chosen in Lieven and colleagues (2015) based on the strong sex-typed colour associations of American

preschool children which were also found to be consistent with adult stereotypes (Piciarello, Greenberg, & Pillemer, 1990).

Recall that colour brightness was not taken into account by Lieven and colleagues (2015). Consequently, the second pre-test consisted of two hues and three brightness levels for a total of six different colour swatches: dark blue, neutral blue, light blue, dark pink, neutral pink, and light pink. The colours were designed in Powerpoint and based off the RGB values provided by Lieven and colleagues (2015). The RGB values were converted into HSL values to more effectively manipulate the brightness levels. The final pre-test colours' HSL values were as follows: dark blue was 170, 255, 64 (the same as the navy blue used in Lieven et al., 2015); neutral blue was 170, 255, 128; light blue was 150, 255, 128 (in order to eliminate all red in the colour swatch); dark pink was 234, 255, 96; neutral pink was 234, 255, 128 (the same as the bright pink used in Lieven and colleagues (2015); light pink was 234, 255, 190.

The second pre-test questionnaire had a similar design to the first pre-test. Participants were randomly assigned to view a single colour swatch and respond to the Brand Gender scale (Grohmann, 2009) with a randomized statement order on a seven-point Likert format, anchored by "Not at all descriptive" and "Extremely descriptive". Following the colour swatch question, participants responded to demographic items including participants' identified sex. Because of the conclusive results for brand names and fonts produced in the first pre-test, these stimuli were not re-administered in the second pre-test.

Pre-test 2 Sample

The Qualtrics questionnaire was published on mTurk around 9am EST on Friday, November 4, 2016. Because this questionnaire was much shorter than the first pre-test, survey durations (in seconds) were smaller and no participants fell below one standard deviation from

the mean on this measure. As a result, no participants were removed based on overly-quick survey completions and the following results are based on n = 240.

Pre-test 2 Results

Colour Hue

To analyze colour hue, two two-way ANOVAs were run, one with brand femininity and the other with brand masculinity as the dependent variable and both with hue (blue, pink) and participant identified sex (male, female) as the independent variables.

Brand Femininity

For brand femininity, there was a significant main effect of hue such that pink ($M = 4.52$, $SD = .14$) was perceived as significantly more feminine than blue ($M = 3.37$, $SD = .13$), $F(1, 236) = 36.52$, $p < .001$. There was also a significant main effect of participant sex such that male participants ($M = 4.13$, $SD = .12$) perceived stronger brand femininity than female participants ($M = 3.76$, $SD = .15$), $F(1, 236) = 3.90$, $p = .049$. There was no significant interaction effect between hue and identified sex, $F(1, 236) = 4.88$, $p = .13$.

Brand Masculinity

For brand masculinity, there was a marginally significant main effect of hue such that blue ($M = 4.00$, $SD = .12$) was perceived as more masculine than pink ($M = 3.67$, $SD = .12$), $F(1, 236) = 3.48$, $p = .063$. Unlike the first pre-test, these results are in the expected theoretical direction and the marginal significance was deemed adequate for a pre-test result. There was also a significant main effect of participant sex such that female participants ($M = 4.18$, $SD = .14$) perceived stronger brand masculinity than male participants ($M = 3.49$, $SD = .11$), $F(1, 236) = 15.50$, $p < .001$. There was no significant interaction effect between hue and identified sex, $F(1, 236) = 0.19$, $p = .66$.

Colour Brightness

As in the first pre-test, colour brightness was also analyzed and produced the same pattern of results for brand gender. Two two-way ANOVAs were run, one with brand femininity and the other with brand masculinity as the dependent variable and both with brightness (dark, neutral, light) and participant identified sex (male, female) as the independent variables.

Brand Femininity

For brand femininity, there was a significant main effect of brightness level, $F(2, 234) = 6.91$, $p = .001$. Bonferroni post-hoc tests revealed that the effect was due to the differences in the dark and light conditions such that light colours ($M = 4.14$, $SD = .18$) were perceived as more feminine than dark colours ($M = 3.54$, $SD = .17$), $p = .001$. There was no main effect of identified sex, $F(1, 234) = 2.66$, $p = .104$, or an interaction effect between colour brightness and identified sex, $F(2, 234) = 0.85$, $p = .43$.

Brand Masculinity

For brand masculinity, there was a significant main effect of brightness level, $F(2, 234) = 10.74$, $p < .001$. Bonferroni post-hoc tests revealed that the effect was due to the differences in the dark and light conditions and in the light and neutral conditions such that dark colours ($M = 4.19$, $SD = .14$) were perceived as more masculine than light colours ($M = 3.29$, $SD = .15$), $p < .001$; neutral colours ($M = 4.04$, $SD = .16$) were perceived as more masculine than light colours, $p = .006$. Together, these results indicate that light colours were perceived as the least masculine of all the brightness levels and dark colours were perceived as the most masculine. There was also a main effect of identified sex such that female participants ($M = 4.18$, $SD = .14$) perceived stronger brand masculinity than male participants ($M = 3.50$, $SD = .11$), $F(1, 234) = 15.94$, $p <$

.001. There was no interaction effect between colour brightness and identified sex, $F(2, 234) =$ 0.80, $p = .45$.

Pre-Tests Conclusions

In summary, the colours chosen for the brand logo designs in the main study are dark blue, light blue, dark pink, and light pink. The neutral brightness colours were not used in the main experiment because multiple comparison tests did not uncover reliable significant differences between the neutral brightness level and the dark and/or light brightness level of the same colour hue with respect to the effects on brand masculinity and femininity perceptions.

Recall from the first pre-test that Biovit was chosen as the brand name, Rockwell Extra Bold was chosen as the masculine font, and Rage Italic was chosen as the feminine font. After Pre-Test 2, all relevant visual stimuli elements had been pre-tested and were then systematically combined to create fictitious brand logos.

Main Study

The main study design was a 2 (type font) × 2 (colour hue) × 2 (colour brightness) between-subjects design. There are eight possible combinations of design elements for a total of eight brand logos created (Appendix 1). Participants were randomly assigned to evaluate one of the possible brand logo design combinations on brand masculinity and femininity using the Brand Gender scale (Grohmann, 2009). Moderators were measured using the Uncertainty Avoidance Scale (Jung & Kellaris, 2004), the Gender Trait Index (Barak & Stern, 1986), and demographic items including identified sex. Please see Appendix 1 for the full questionnaire.

Main Study Sample

The main study Qualtrics survey was launched on the Amazon mTurk platform around 11am EST on Friday, December 2, 2016. mTurk participants were paid $1.00 (USD) for a

completed survey. Qualtrics collected 492 usable responses. Recall that a common response problem with online survey panels is that participants will randomly click through questions to complete the survey as quickly as possible and obtain the completion reward. To address this issue, the survey completion time (in seconds) was analyzed for the sample. The mean completion time for the main study was 218.97 seconds and the standard deviation was 153.35 seconds; responses were excluded from the data analysis if the completion time was shorter than one standard deviation below the mean, or less than 65.62 seconds. Two participants were also excluded because their completion times were above 2300 seconds. However, all participants were still paid for the completed survey. The total sample size after this exclusion process was 485.

Results

Results – Design Elements

First, to address Hypotheses 1 to 3, a three-way MANOVA was conducted with hue, brightness, and font as the independent variables and brand femininity and brand masculinity as the dependent variables. The results of the three-way MANOVA revealed significant differences among the three logo design features on the dependent variables. Colour hue had a significant main effect on the dependent measures, Wilk's Λ = .92, $F(2,476)$ = 19.62, $p < .001$, colour brightness had a significant main effect on the dependent measures, Wilk's Λ = .96, $F(2,476)$ = 9.62, $p < .001$, and font had a significant main effect on the dependent measures, Wilk's Λ = .77, $F(2,476)$ = 70.17, $p < .001$. There were also significant interactions in the MANOVA. The interaction of hue and brightness had a significant effect on the dependent measures, Wilk's Λ = .98, $F(2,476)$ = 3.85, $p = .022$, the interaction of font and brightness had a significant effect on the dependent measures, Wilk's Λ = .98, $F(2,476)$ = 4.26, $p = .015$, and the three-way interaction

of hue, brightness, and font had a significant effect on the dependent measures, Wilk's $\Lambda = .98$, $F(2,476) = 3.61$, $p = .028$.

Analyses of variances (ANOVA) on the two dependent variables were conducted as follow-up tests to the significant results of the MANOVA. Colour hue had a significant main effect on both brand masculinity, $F(1, 477) = 12.38$, $p < .001$, and brand femininity $F(1, 477) = 27.75$, $p < .001$. Specifically, the blue hue increased perceptions of brand masculinity ($M = 3.88$, $SD = 0.82$) compared to the pink hue ($M = 3.48$, $SD = 0.81$) and the pink hue increased perceptions of brand femininity ($M = 4.20$, $SD = 0.80$) compared to the blue hue ($M = 3.61$, $SD = 0.80$). Colour brightness had a significant main effect on both brand masculinity, $F(1, 477) = 11.98$, $p = .001$, and brand femininity $F(1, 477) = 7.72$, $p = .006$. Specifically, the dark brightness level increased perceptions of brand masculinity ($M = 3.88$, $SD = 0.82$) compared to the light brightness level ($M = 3.48$, $SD = 0.81$), and the light brightness level increased perceptions of brand femininity ($M = 4.06$, $SD = 0.79$) compared to the dark brightness level ($M = 3.75$, $SD = 0.81$). Finally, font had a significant main effect on both brand masculinity, $F(1, 477) = 27.63$, $p < .001$, and brand femininity $F(1, 477) = 115.45$, $p < .001$. Specifically, the display fonts increased perceptions of brand masculinity ($M = 3.99$, $SD = 0.81$) compared to the script fonts ($M = 3.38$, $SD = 0.82$), and the script fonts increased perceptions of brand femininity ($M = 4.51$, $SD = 0.80$) compared to the display fonts ($M = 3.30$, $SD = 0.80$). In summary, Hypotheses 1, 2, and 3 were supported.

Despite the significant interaction terms in the MANOVA, no logo design feature interactions had a significant effect on brand masculinity and only the interaction of brightness and font had a significant effect on brand femininity, $F(1, 477) = 5.195$, $p = .023$. The effect of brightness levels on brand femininity varies as a function of font type. Femininity perceptions

with regard to a script type font did not differ across brightness levels ($M_{darkbrightness}$ = 4.49, SD = 0.12, $M_{lightbrightness}$ = 4.54, SD = 0.11), $F(1, 477)$ = .124, p = .73, while display type font was perceived as significantly more feminine at a light brightness level ($M_{darkbrightness}$ = 3.01, SD = 0.12, $M_{lightbrightness}$ = 3.58, SD = 0.11), $F(1, 477)$ = 12.87, $p < .001$.

Figure 1. Colour Hue Main Effects
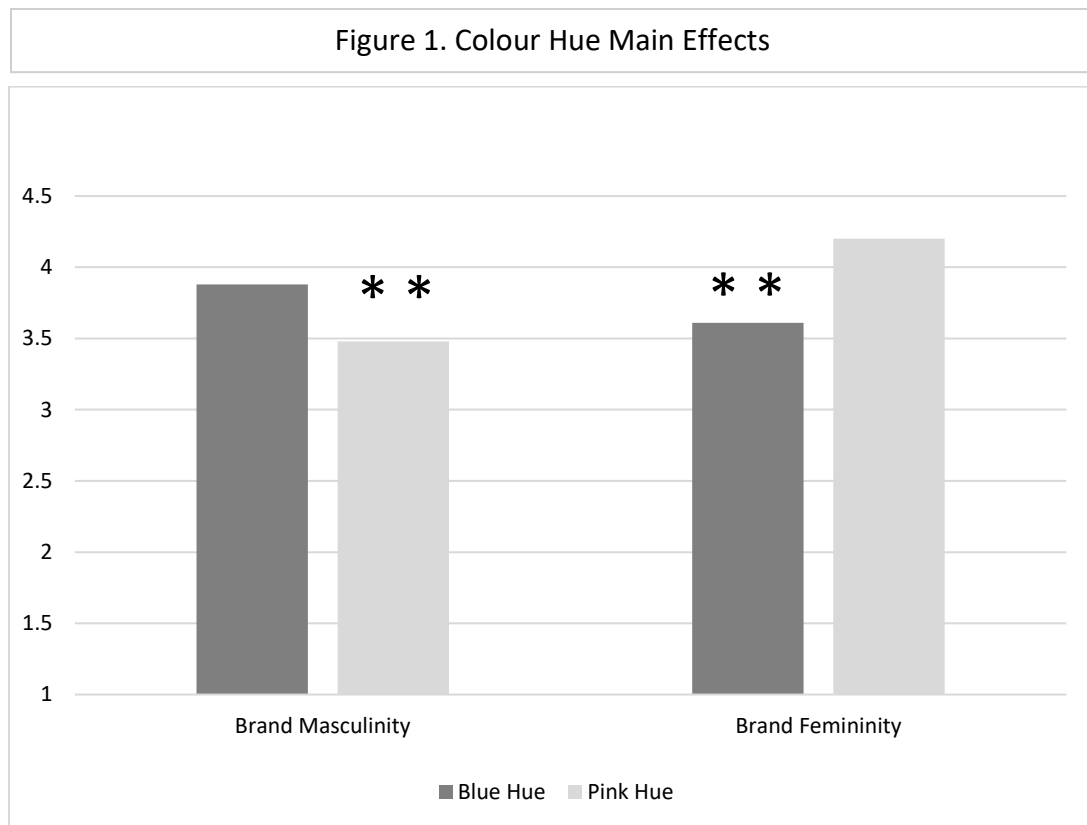
Notes: ** p-value < .001

Figure 2. Colour Brightness Main Effects
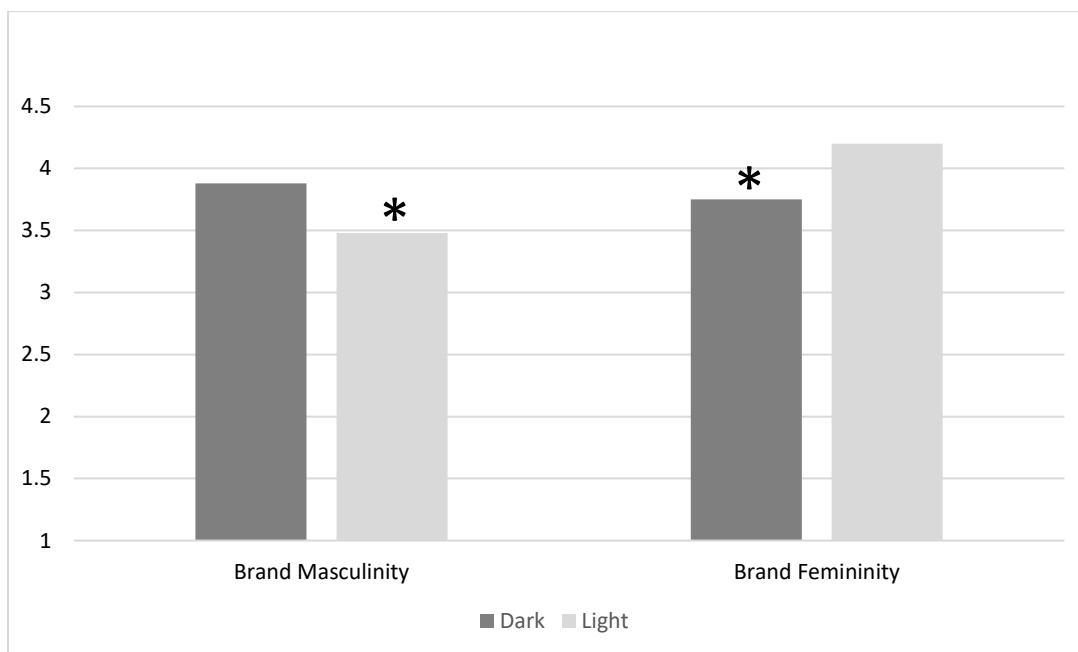
Notes: * p-value < .05

Figure 3. Font Main Effects

Notes: ** p-value < .001

Figure 4. Brightness x Font Interaction Effect - Brand Femininity
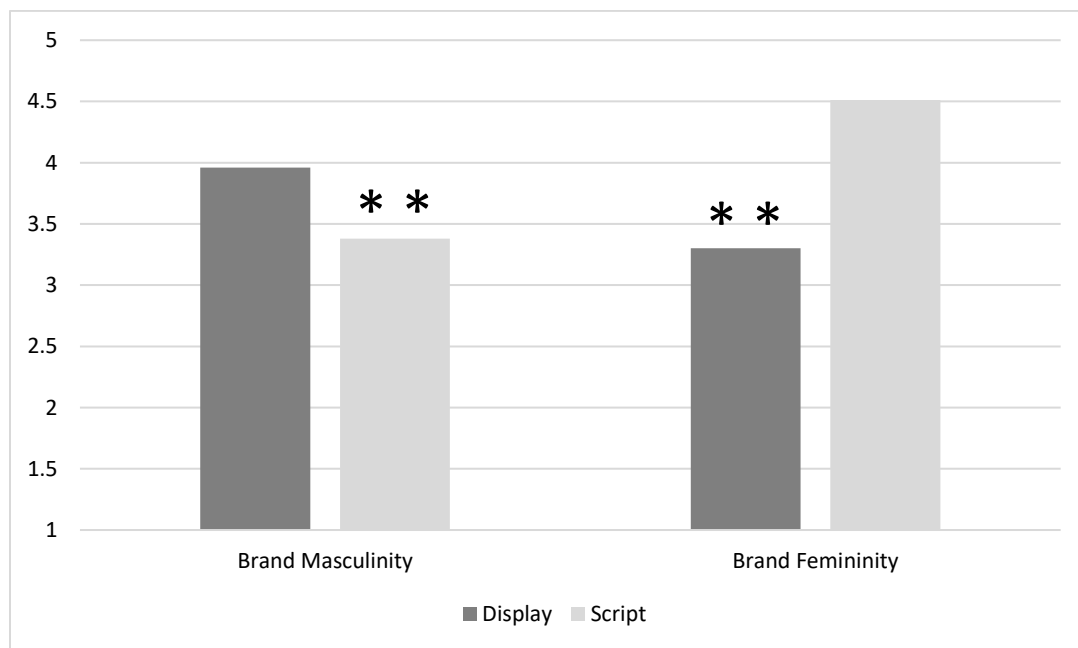
*Notes: * p-value < .05*
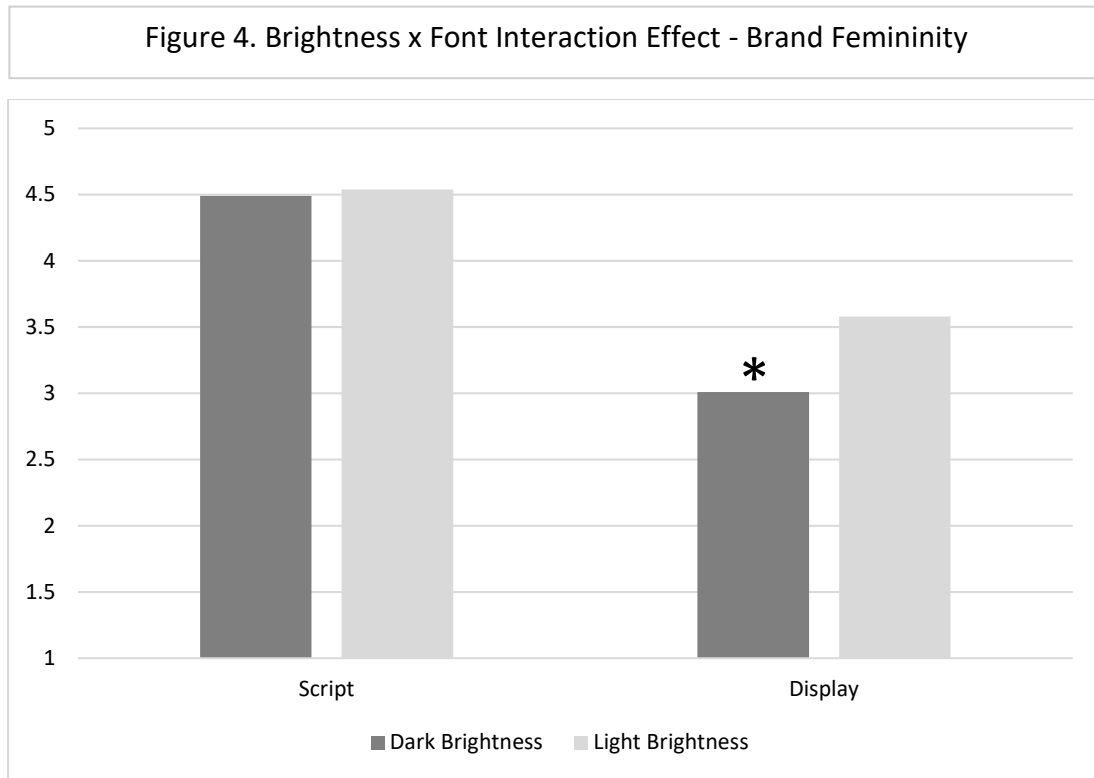
Results – Internal Congruency and Brand Gender

To address Hypothesis 4 regarding internal congruency of gendered elements in the brand logo and brand gender perceptions strength, logos were classified into different congruency groups for brand femininity and brand masculinity. To evaluate brand femininity strength as dependent on the internal congruency of feminine design elements, logos were categorized as follows: Light Pink Script logo was the congruent logo; Dark Pink Script, Light Pink Display, and Light Blue Script were somewhat congruent logos because two of the three elements were "feminine"; Dark Pink Display, Dark Blue Script, and Light Blue Display were classified as incongruent logos because only one of the three design elements was "feminine". The Dark Blue Display logo was not included in the analysis for brand femininity because none of the elements

was "feminine"; hence, the logo could not be classified as congruently or incongruently feminine.

A one-way ANOVA was conducted with brand femininity as the dependent variable and congruency group as the independent variable. In support of Hypothesis 4, brand femininity was strengthened by the congruency of the feminine design elements, $F(2, 426) = 35.61, p < .001$. Dunnett's T3 post-hoc comparisons were conducted because this test is the most conservative for large sample sizes when equal variances are not assumed, which is appropriate for this analysis because of the unequal sample sizes between congruency groups. These pairwise comparisons revealed that the significant main effect is driven by the differences between the completely congruent ($M_{congruent} = 4.77, SD = .16$) and incongruent groups ($M_{incongruent} = 3.46, SD = .095$), $p < .001$ and by the differences between the incongruent group and the somewhat congruent group ($M_{somewhatcongruent} = 4.40, SD = .096$), $p < .001$. The differences between the congruent group and somewhat congruent group were not significant, $p = .075$.

Figure 5. Internal Congruency Main Effects
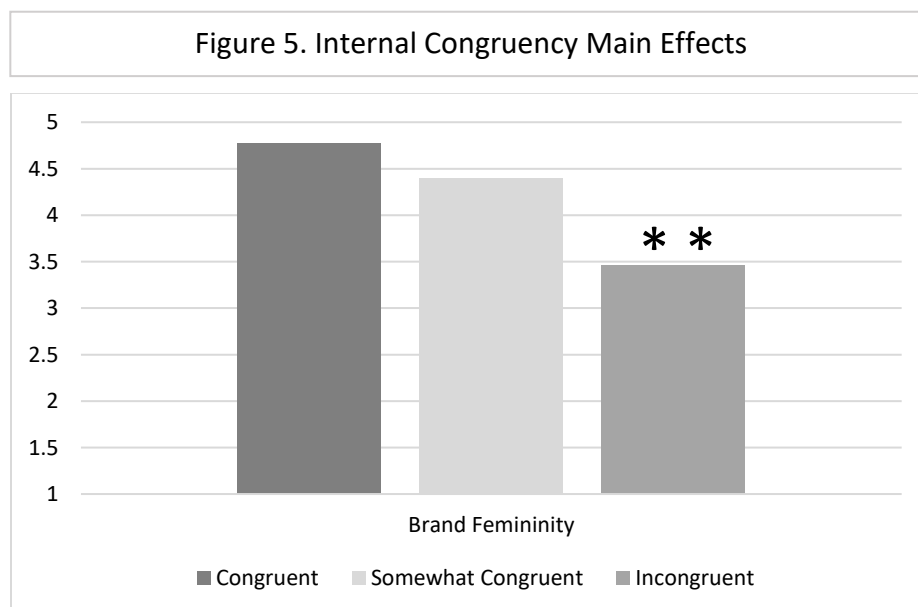
Notes: ** p-value < .001

To test for brand masculinity strength as dependent on the internal congruency of masculine design elements, logos were categorized as follows: Dark Blue Display logo was the congruent logo; Dark Pink Display, Dark Blue Script, and Light Blue Display were somewhat congruent logos because two of the three elements were "masculine"; Dark Pink Script, Light Pink Display, and Light Blue Script were classified as incongruent logos because only one of the three design elements was "masculine". The Light Pink Script logo was not included in the analysis for brand masculinity because none of the elements was "masculine"; hence, the logo could not be classified as congruently or incongruently masculine.

A one-way ANOVA was conducted with brand masculinity as the dependent variable and congruency group as the independent variable. In support of Hypothesis 4, brand masculinity was strengthened by the congruency of the masculine design elements, $F(2, 420) = 18.68$, $p < .001$. Dunnett's T3 post-hoc comparisons were conducted because this test is the most conservative for large sample sizes when equal variances are not assumed, which is the case for this analysis because of the unequal sample sizes between congruency groups. Similar to the brand femininity results, these pairwise comparisons revealed that the main effect is driven by the differences between the completely congruent ($M_{congruent} = 4.29$, $SD = .17$) and incongruent groups ($M_{incongruent} = 3.34$, $SD = .095$), $p < .001$ and by the differences between the incongruent group and the somewhat congruent group ($M_{somewhatcongruent} = 4.02$, $SD = .093$), $p < .001$. The differences between the congruent group and somewhat congruent group were not significant, $p = .49$.

Figure 6. Internal Congruency Main Effects
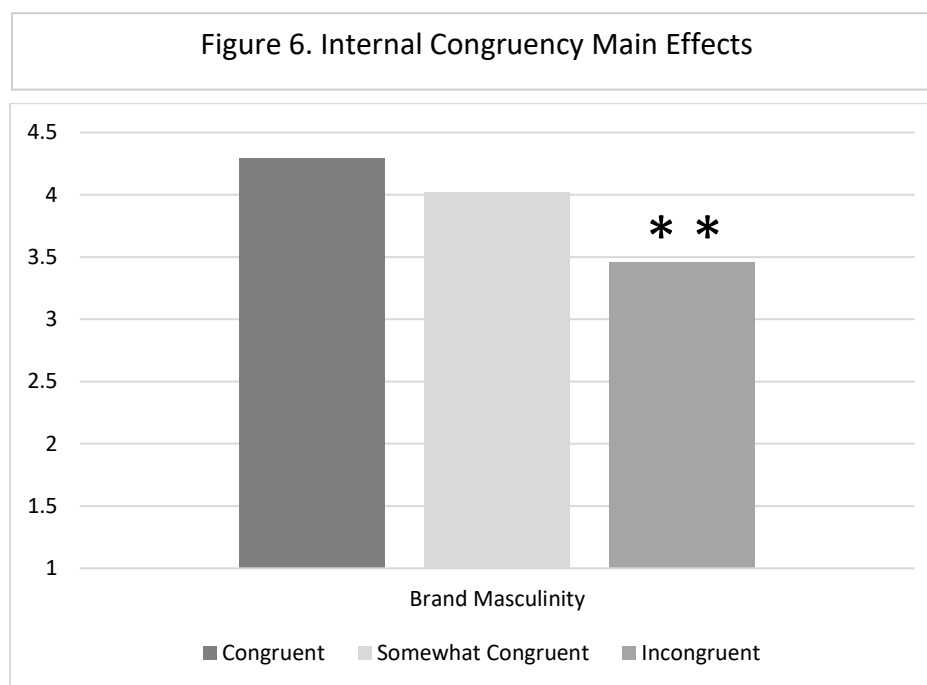
Notes: ** p-value < .001

Results – Moderators

Uncertainty Avoidance, Gender Trait Index (Feminine and Masculine), and identified sex moderators were explored in this research. However, no formal hypotheses were postulated because of mixed or lacking theoretical evidence for their effects on brand gender perceptions. The results of each moderator on brand femininity and brand masculinity are discussed below.

Uncertainty Avoidance – Brand Femininity

A four-way ANOVA was conducted with colour hue, brightness, font, and uncertainty avoidance score as the independent variables and brand femininity as the dependent variable. Uncertainty avoidance score was calculated by averaging response scores to the items (Jung & Kellaris, 2004). One item, "I believe that rules should not be broken for mere pragmatic reasons", was removed to increase scale reliability, Cronbach's α = .89 after removal. This item likely contained language that was overly complex and was thus difficult to understand for some

participants. Participants were assigned to a "high" or "low" uncertainty avoidance groups based on a median split (M_{high} = 4.62, SD = 0.57, M_{low} = 2.60, SD = 0.87, $t(483)$ = 30.69, $p < .001$). The same significant main effects for hue, brightness, and font were uncovered as discussed previously. Uncertainty avoidance did not have a significant main effect on brand femininity perceptions, $F(1, 469) = 0.06$, $p = .81$. There was a significant two-way interaction effect of brightness and font and three-way interaction effect of hue, brightness, and font. For the two-way interaction, $F(1, 469) = 4.29$, $p = .039$, brightness level has a stronger influence on brand femininity perceptions with display font ($M_{darkbrightness}$ = 3.02, SD = 0.12, $M_{lightbrightness}$ = 3.56, SD = 0.11), $F(1, 469) = 11.30$, $p = .001$, than with script font ($M_{darkbrightness}$ = 4.49, SD = 0.12, $M_{lightbrightness}$ = 4.56, SD = 0.11), $F(1, 469) = 0.22$, $p = .64$. The same interaction effect was found in the follow-up to the MANOVA.

For the three-way interaction, it appears that for the pink hue–display font levels combination, the brightness level has a strong effect on brand femininity perceptions such that the light pink-display font combination was perceived to be much more feminine (M = 4.18, SD = .16) than the dark pink-display font logo (M = 3.17, SD = .17), $F(1, 469) = 18.66$, $p < .001$. For all other hue-font level combinations, brightness level has a modest effect on brand femininity perceptions, for example at the blue-script font combination level ($M_{darkbrightness}$ = 4.25, SD = 0.16, $M_{lightbrightness}$ = 4.25, SD = 0.16), $F(1, 469) = .18$, $p = .67$.

Figure 7: Hue-Brightness-Font Three-Way Interaction Results – Brand Femininity
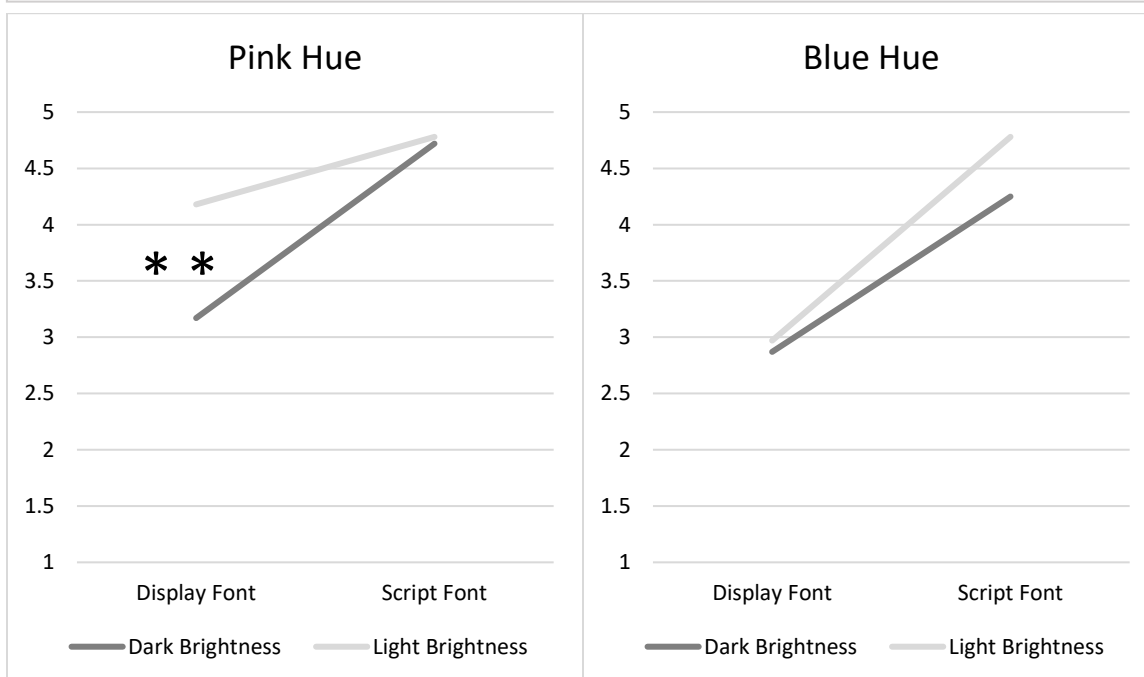

Notes: ** p-value < .001

Uncertainty Avoidance – Brand Masculinity

A four-way ANOVA was conducted with colour hue, brightness, font, and uncertainty avoidance as the independent variables and brand masculinity as the dependent variable. The same significant main effects for hue, brightness, and font were found as previously uncovered in the MANOVA. In addition, there was a significant main effect of uncertainty avoidance group, $F(1, 469) = 4.99$, $p = .026$, such that participants high in uncertainty avoidance perceived stronger brand masculinity ($M = 3.78$, $SD = .08$) than participants low in uncertainty avoidance ($M = 3.52$, $SD = .09$).

Figure 8. Uncertainty Avoidance Main Effects
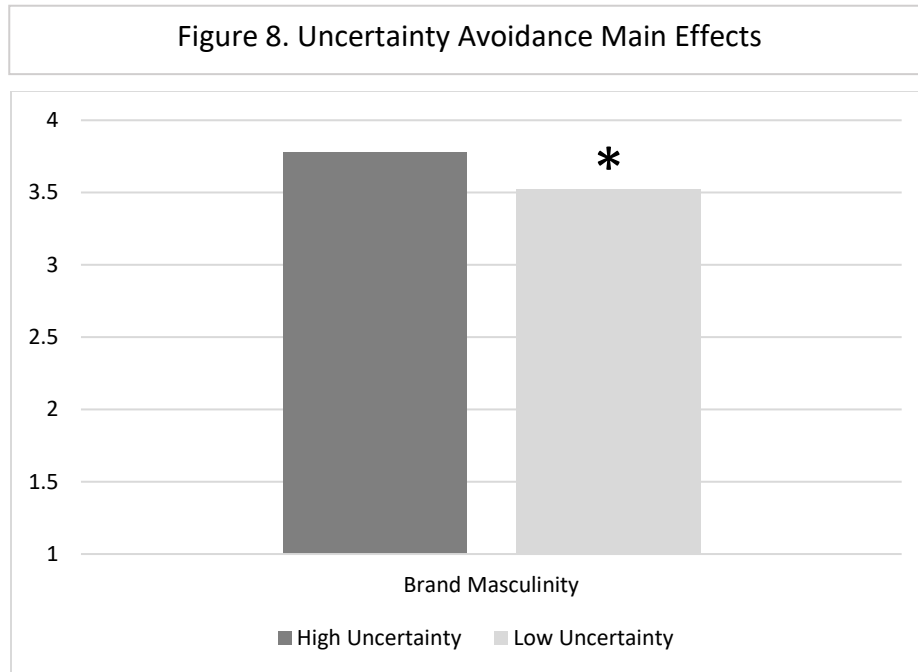
Notes: * p-value < .05

There was also a significant two-way interaction between font and uncertainty group, $F(1, 469) = 6.95$, $p = .009$, such that high uncertainty avoidance participants perceived stronger brand masculinity in display fonts than did low uncertainty avoidance participants ($M_{high} = 4.22$, $SD = 0.11$, $M_{low} = 3.65$, $SD = 0.13$), $F(1, 469) = 11.66$, $p = .001$, while for script fonts the two groups of participants perceived brand masculinity more similarly ($M_{high} = 3.34$, $SD = 0.12$, $M_{low} = 3.39$, $SD = 0.12$), $F(1, 469) = 0.08$, $p = .77$. Put another way, participants high in uncertainty avoidance perceived display fonts to be much more masculine than script fonts ($M_{display} = 4.22$, $SD = 0.11$, $M_{script} = 3.34$, $SD = 0.12$), $F(1, 469) = 31.24$, $p < .001$, while participants low in uncertainty avoidance perceived display and script fonts to have more similar brand masculinity ($M_{display} = 3.65$, $SD = 0.13$, $M_{script} = 3.39$, $SD = 0.12$), $F(1, 469) = 2.33$, $p = .13$.

Figure 9. Font x Uncertainty Group Interaction Effect - Brand Masculinity

Notes: ** p-value < .001

GTI Feminine – Brand Femininity

A four-way ANOVA was conducted with colour hue, brightness, font, and Gender Trait Index- Feminine score as the independent variables and brand femininity as the dependent variable. The GTI-Feminine score was calculated by simply summing the responses to each feminine item on the GTI (Barak & Stern, 1986). Participants were assigned to "high" or "low" GTI-Feminine groups based on a median split (M_{high} = 60.96, SD = 5.11, M_{low} =41.90, SD = 9.90), $t(483)$ = 27.08, $p < .001$. The same significant main effects for hue, brightness, and font as previously uncovered in the MANOVA were found here. GTI-Feminine scores did not have a significant main effect on brand femininity perceptions, $F(1, 469) = 1.00$, $p = .32$. There was also

a significant two-way interaction effect of brightness and font, $F(1, 469) = 5.22$, $p = .023$, and a three-way interaction effect of hue, brightness, and font, $F(1, 469) = 4.53$, $p = .034$; these interaction effects were in the same pattern as in the results of the uncertainty avoidance-brand femininity ANOVA discussed above.
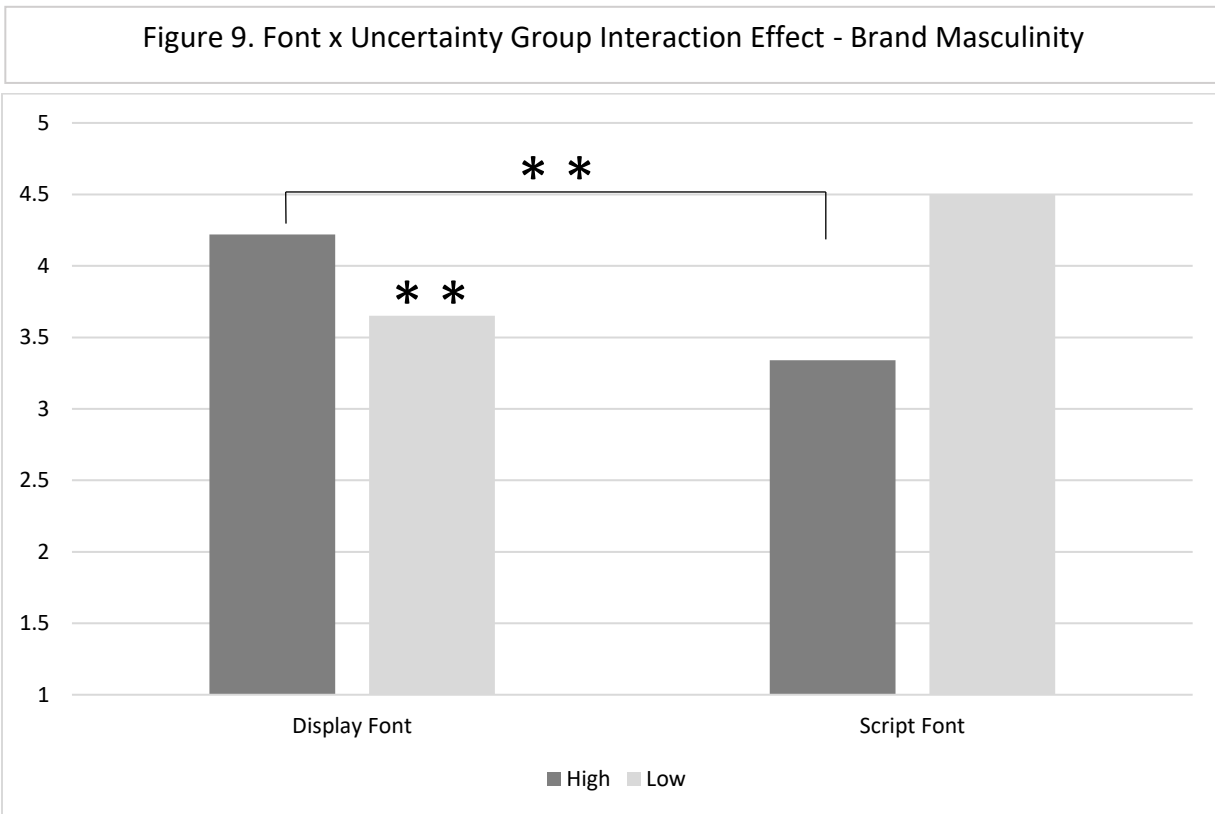
GTI Feminine – Brand Masculinity

A four-way ANOVA was conducted with colour hue, brightness, font, and GTI-Feminine score as the independent variables and brand masculinity as the dependent variable. There were the same significant main effects for hue, brightness, and font as previously uncovered. GTI-Feminine scores did not have a significant main effect on brand masculinity perceptions, $F(1, 469) = 0.66$, $p = .42$. There was a significant two-way interaction effect of font and GTI-Feminine group and three-way interaction effects of hue, brightness, and font and of hue, font, and GTI-Feminine group. For the two-way interaction, $F(1, 469) = 4.39$, $p = .037$, it appears that high GTI-Feminine participants perceived stronger brand masculinity in display fonts than did low GTI-Feminine participants ($M_{high} = 4.14$, $SD = 0.11$, $M_{low} = 3.80$, $SD = 0.13$), $F(1, 469) = 4.21$, $p = .041$ while for script fonts the two groups of participants perceived brand masculinity more similarly ($M_{high} = 3.34$, $SD = 0.12$, $M_{low} = 3.45$, $SD = 0.11$), $F(1, 469) = 0.83$, $p = .36$.

Figure 10. Font x GTI-Feminine Group Interaction Effect - Brand Masculinity
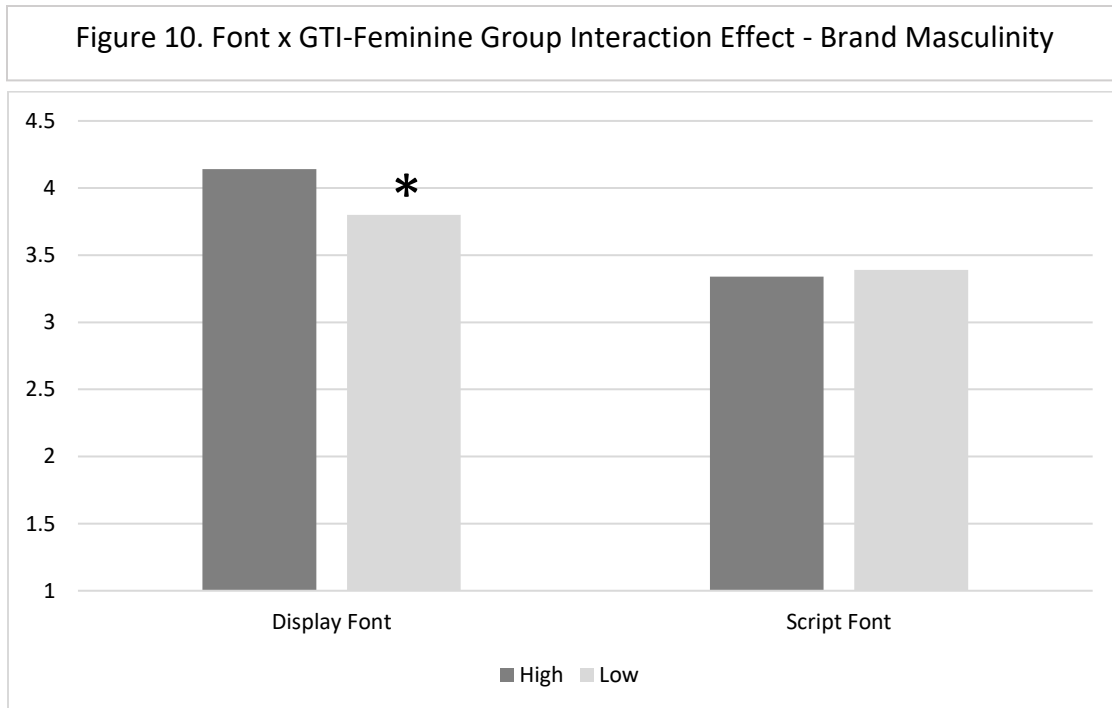
*Notes: * p-value < .05*

For the three-way interaction of hue, brightness, and font, it appears that for the pink hue–display font levels combination, the brightness level has a strong effect on brand masculinity perceptions such that the dark pink-display font combination was perceived to be much more masculine ($M = 4.47$, $SD = .44$) than the light pink-display font logo ($M = 3.27$, $SD = .16$), $F(1, 469) = 19.23$, $p < .001$. For all other hue-font level combinations, brightness level has only a modest effect on brand masculinity perceptions, for example at the blue-script font combination level ($M_{darkbrightness} = 3.66$, $SD = 0.17$, $M_{lightbrightness} = 3.47$, $SD = 0.16$), $F(1, 469) = 0.67$, $p = .41$. Similarly, this also means that for the light-pink combination level, font choice did not make a difference in brand masculinity perceptions ($M_{display} = 3.22$, $SD = 0.16$, $M_{script} = 3.12$, $SD = 0.16$), $F(1, 469) = 0.22$, $p = .64$. For all other brightness-hue combinations, display fonts

were perceived as more masculine than scripts fonts, for example at the dark-blue combination

level (M_{display} = 4.27, SD = 0.17, M_{script} = 3.66, SD = 0.16), $F(1, 469)$ = 6.82, p = .009.

Figure 11. Hue-Brightness-Font Three-Way Interaction Results – Brand Masculinity
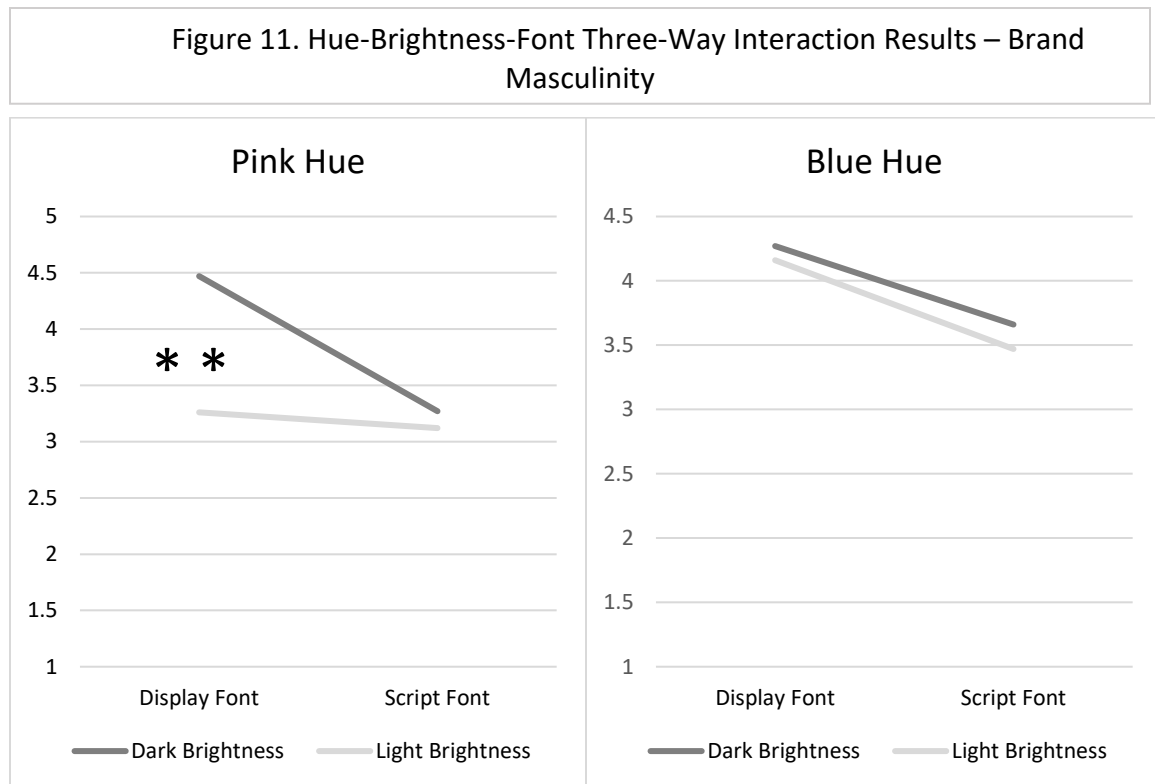
Notes: ** p-value < .001

For the three-way interactions of hue, font, and GTI-Feminine score, it appears that for

the pink hue, high GTI-Feminine participants found display fonts to be much more masculine (M

= 3.99, SD = 0.15) than script fonts (M = 2.93, SD = 0.17), $F(1, 469)$ = 22.02, p < .001, and low

GTI-Feminine participants perceived there to be little difference in brand masculinity for display

(M = 3.46, SD = 0.17) and script fonts (M = 3.45, SD = 0.16), $F(1, 469)$ = .003, p = .96. For the

blue hue level, both groups of participants perceived display fonts to be more masculine than

script fonts, for example at the blue-high GTI-Feminine combination level (M_{display} = 4.29, SD =

0.15, M_{script} = 3.68, SD = 0.17), $F(1, 469)$ = 7.45, p = .007. This creates another interesting effect

such that low GTI-Feminine participants actually perceived the pink-script font logos to be significantly more masculine than did high GTI-Feminine participants (M_{High} = 2.93, SD = 0.17, M_{Low} = 3.45, SD = 0.16), $F(1, 469)$ = 5.08, p = .025.

Figure 12. Hue-GTIF-Font Three-Way Interaction Results – Brand Masculinity

Notes: ** p-value < .001, *p-value < .05
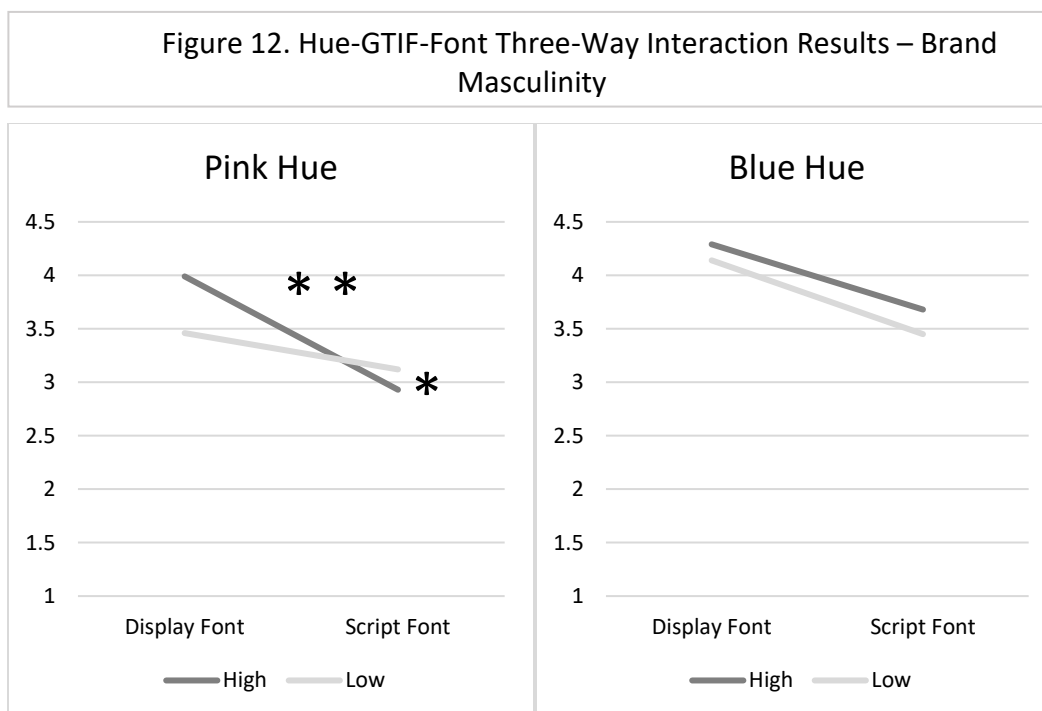
GTI Masculine – Brand Femininity

A four-way ANOVA was conducted with colour hue, brightness, font, and Gender Trait Index- Masculine score as the independent variables and brand femininity as the dependent variable. GTI-Masculine scores were calculated by summing the responses to each masculine item on the GTI (Barak & Stern, 1986). Participants were assigned to "high" or "low" GTI-Masculine groups based on a median split (M_{high} = 51.72, SD = 6.17, M_{low} =32.78, SD = 6.80), $t(483)$ = 32.05, p < .001. There were the same significant main effects for hue, brightness, and font as previously uncovered in the MANOVA. GTI-Masculine did not have a significant main

effect on brand femininity perceptions, $F(1, 469) = 1.85$, $p = .17$. There was also a significant two-way interaction effect of brightness and font, $F(1, 469) = 5.54$, $p = .019$, and three-way interaction effect of hue, brightness, and font, $F(1, 469) = 4.54$, $p = .034$; these interaction effects were in the same pattern as the results of the uncertainty avoidance-brand femininity ANOVA discussed above.

GTI Masculine – Brand Masculinity

A four-way ANOVA was conducted with colour hue, brightness, font, and GTI-Masculine score as the independent variables and brand masculinity as the dependent variable. There were the same significant main effects for hue, brightness, and font as previously uncovered in the MANOVA. GTI-Masculine scores also had a significant main effect on brand masculinity perceptions, $F(1, 469) = 5.59$, $p = .018$, such that participants scoring high on GTI-Masculine perceived stronger brand masculinity in the brand logos ($M = 3.83$, $SD = 0.08$) than did participants scoring low on GTI-Masculine ($M = 3.55$, $SD = 0.08$).

Figure 13. GTI-Masculine Main Effects
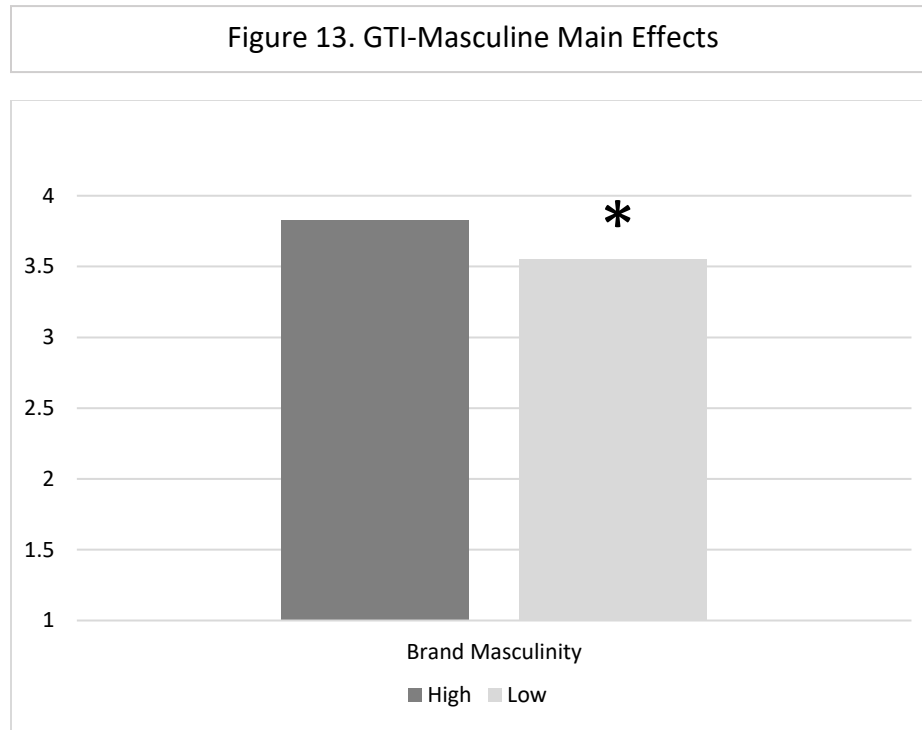
Notes: * p-value < .05

There was also a significant two-way interaction effect of font and brightness, $F(1, 469) = 4.41$, $p = .036$, such that the effect of brightness varies as a function of the font type. For the display font, dark colours are perceived to be more masculine than light colours ($M_{darkbrightness} = 4.29$, $SD = 0.12$, $M_{lightbrightness} = 3.67$, $SD = 0.11$), $F(1, 469) = 14.31$, $p < .001$, while brightness level does not change brand masculinity perceptions when combined with a script font ($M_{darkbrightness} = 3.47$, $SD = 0.12$, $M_{lightbrightness} = 3.34$, $SD = 0.12$), $F(1, 469) = 0.59$, $p = .45$.

Figure 14. Font x Brightness Interaction Effect - Brand Masculinity

Notes: ** p-value < .001

Identified Sex – Brand Femininity

A four-way ANOVA was conducted with colour hue, brightness, font, and identified sex (male, female) as the independent variables and brand femininity as the dependent variable. There were the same significant main effects for hue, brightness, and font as previously uncovered in the MANOVA. There was also a significant main effect of identified sex, $F(1, 468) = 6.64$, $p = .01$, such that male participants perceived stronger brand femininity ($M = 4.03$, $SD = .08$) than did female participants ($M = 3.73$, $SD = .09$).

Figure 15. Identified Sex Main Effects
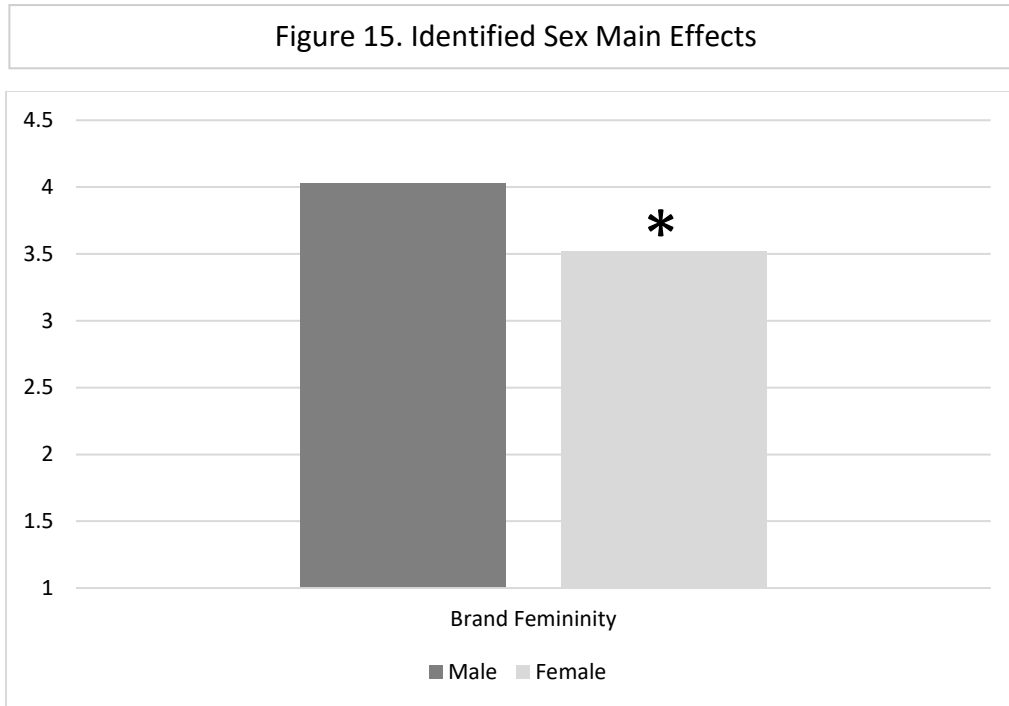
Notes: * p-value < .05

There were also significant two-way interactions of brightness and font, $F(1, 468) = 4.48$, $p = .035$, and of font and identified sex, $F(1, 468) = 7.38$, $p = .007$, and three-way interaction of hue, brightness, and font, $F(1, 468) = 4.28$, $p = .039$. For the two-way interaction of brightness and font and the three-way interaction, the pattern of results was the same as discussed above in the uncertainty avoidance moderator section. For the interaction of font and identified sex, male participants perceived display fonts as having stronger brand femininity than did female participants ($M_{female} = 2.96$, $SD = 0.12$, $M_{male} = 3.56$, $SD = 0.11$), $F(1, 468) = 14.43$, $p < .001$, whereas the two groups of participants perceived script fonts more similarly ($M_{female} = 4.50$, $SD = 0.12$, $M_{male} = 4.49$, $SD = 0.11$), $F(1, 468) = 0.10$, $p = .92$.

Figure 16. Font x Identified Sex Interaction Effect - Brand Femininity
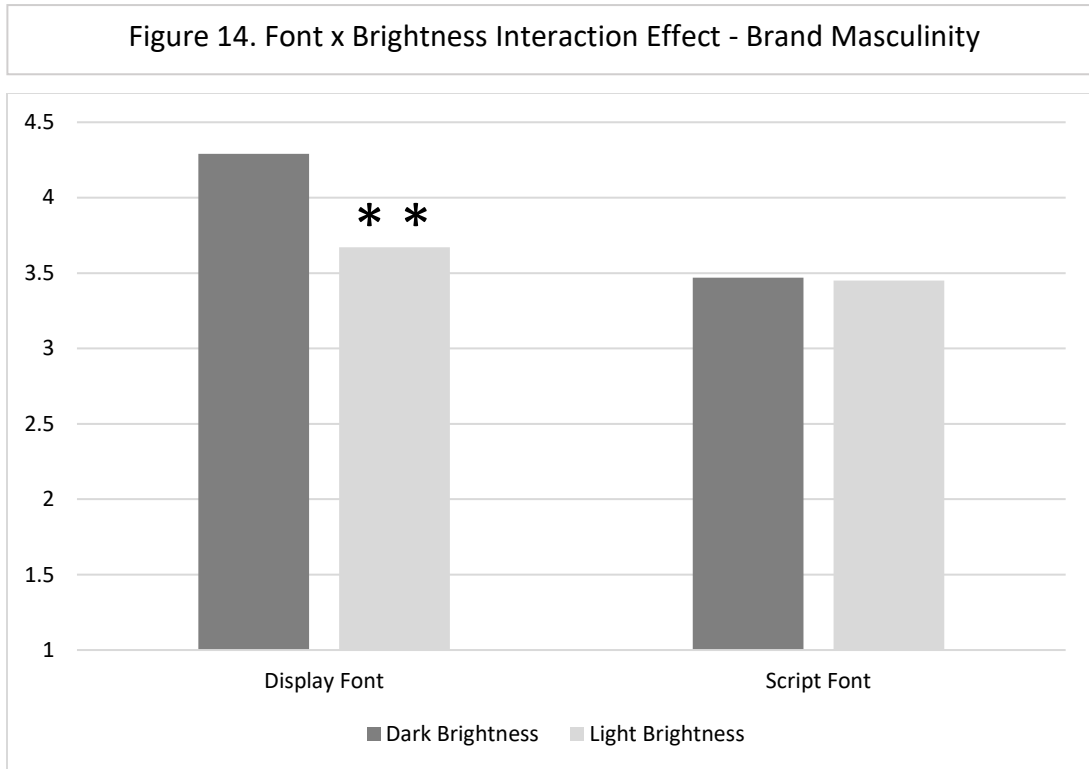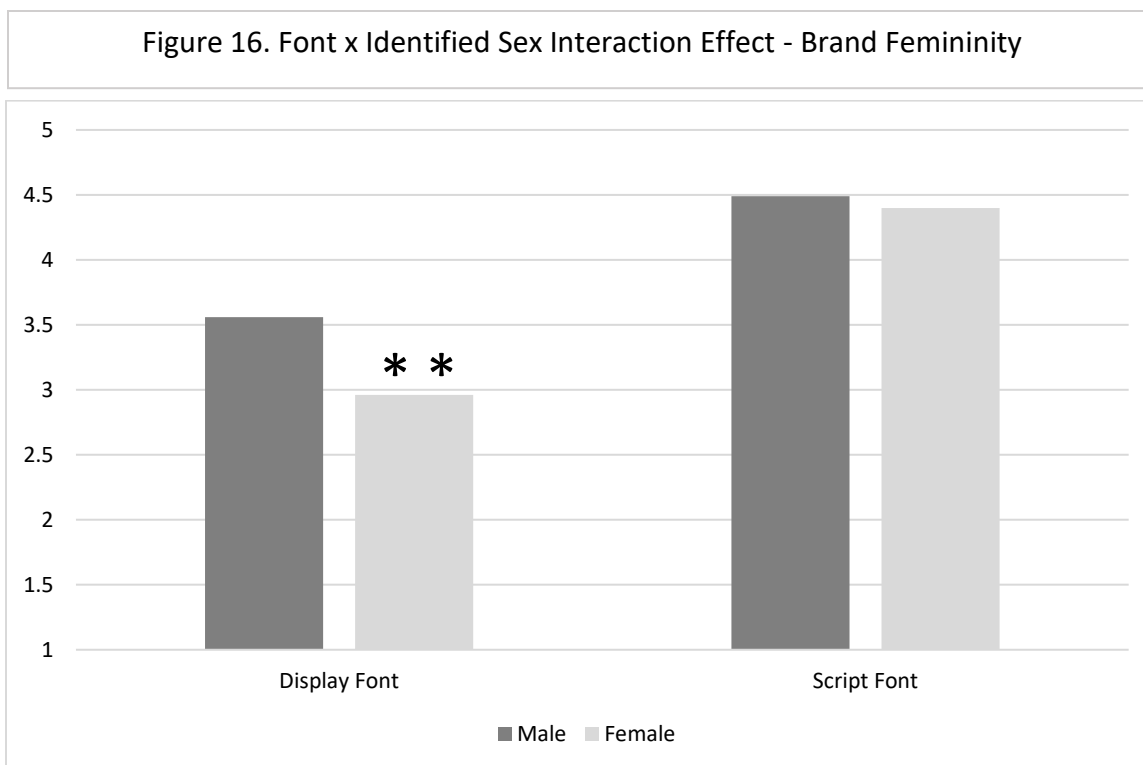

*Notes: ** p-value < .001*

Identified Sex – Brand Masculinity

A four-way ANOVA was conducted with colour hue, brightness, font, and identified sex as the independent variables and brand masculinity as the dependent variable. There were the same significant main effects for hue, brightness, and font as previously uncovered in the MANOVA. There was also a significant two-way interaction between font and identified sex, $F(1, 468) = 5.86$, $p = .016$, such that female participants perceived stronger brand masculinity in display fonts than did male participants ($M_{female} = 4.17$, $SD = 0.12$, $M_{male} = 3.83$, $SD = 0.11$), $F(1, 468) = 4.56$, $p = .033$, while for script fonts the two groups of participants perceived brand masculinity more similarly ($M_{female} = 3.27$, $SD = 0.13$, $M_{male} = 3.48$, $SD = 0.11$), $F(1, 468) = 1.69$, $p = .20$.

Figure 17. Font x Identified Sex Interaction Effect - Brand Masculinity
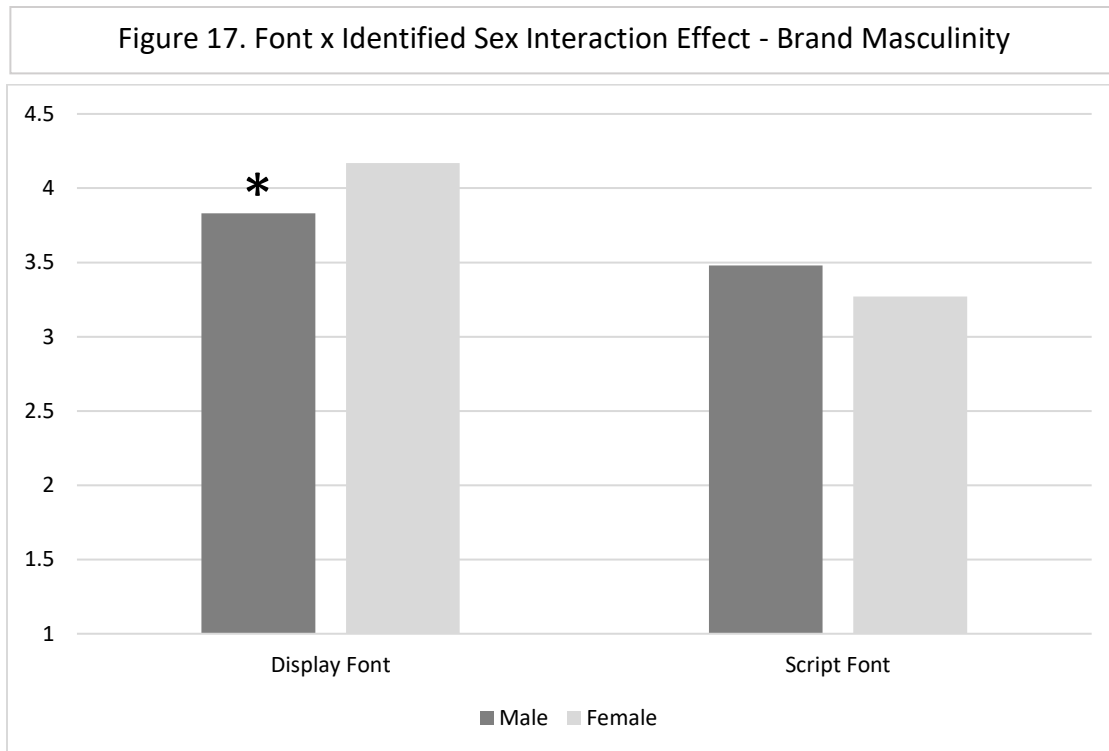
Notes: * p-value < .05

Two three-way interaction effects were also significant: hue, brightness, and font, $F(1, 468) =$ 4.09, $p = .044$, and brightness, font, and identified sex, $F(1, 468) = 4.49$, $p = .035$. The hue, brightness, and font three-way interaction was in the same pattern as discussed in the GTI-Feminine moderator results. For the brightness, font, and identified sex three-way interaction, male participants perceived there to be little difference in brand masculinity between display and script fonts at the light brightness level ($M_{display} = 3.48$, $SD = 0.15$, $M_{script} = 3.59$, $SD = 0.16$), $F(1, 468) = .22$, $p = .64$, while female participants perceived display fonts to have stronger brand masculinity than script fonts at the light brightness level ($M_{display} = 3.92$, $SD = 0.17$, $M_{script} = 2.96$, $SD = 0.18$), $F(1, 468) = 15.43$, $p < .001$. This also means that male participants perceived light-script logos to have stronger brand masculinity than did the female participants ($M_{female} = 2.96$, $SD = 0.18$, $M_{male} = 3.59$, $SD = 0.16$), $F(1, 468) = 6.99$, $p = .008$.

Figure 18. Identified Sex-Brightness-Font Three-Way Interaction Results – Brand Masculinity
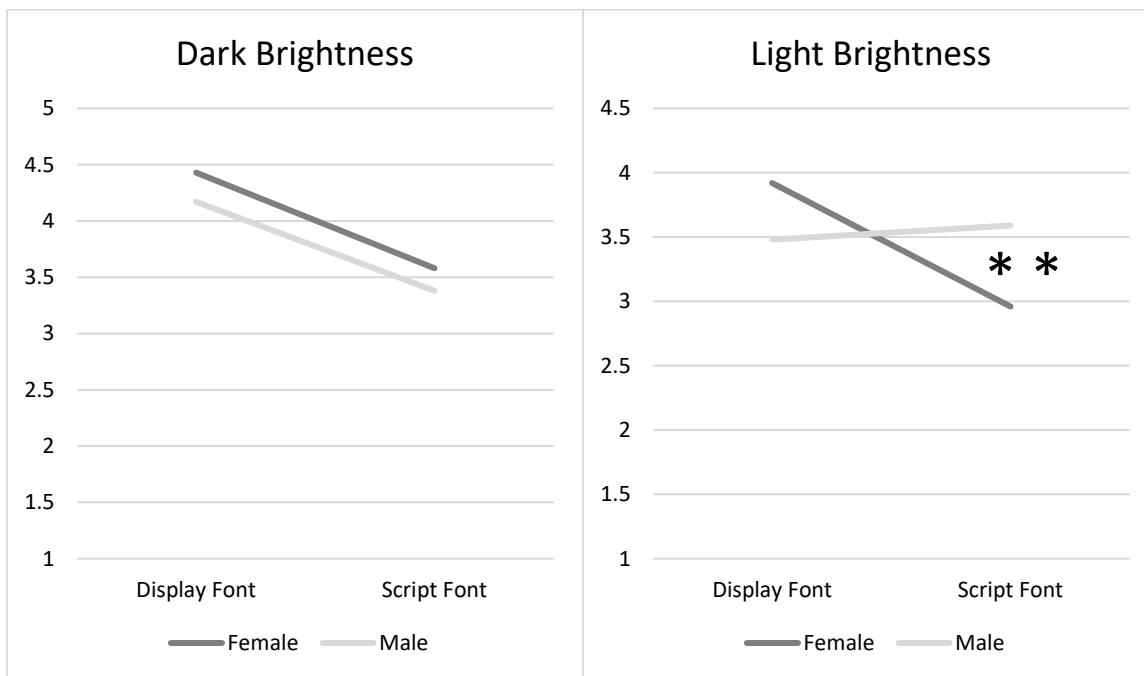
*Notes: ** p-value < .001*

Results – Discussion

To summarize the findings of this research, Hypotheses 1 to 3 were supported. Script fonts increased brand femininity perceptions while display fonts increased brand masculinity perceptions (H1), pink hues increased brand femininity perceptions while blue hues increased brand masculinity perceptions (H2), and light brightness levels increased brand femininity perceptions while dark brightness levels increased brand masculinity perceptions (H3). Hypothesis 4 was also supported: for both brand femininity and brand masculinity, internal congruency of gendered design elements in the brand logos increased the strength of brand gender perceptions, namely that logos with all three or two of three gendered design elements

were considered to have stronger brand gender than logos containing only one element with the respective gender.

The analyses of the moderators produced some very complex yet interesting main and interaction effects, particularly for brand masculinity perceptions. As for brand femininity perceptions, male participants perceived stronger brand femininity overall than did female participants which suggests that male consumers may be more sensitive to feminine cues in brands; interestingly, male participants perceived display fonts to have stronger brand femininity than did female participants. Furthermore, for all participants, light brightness increased brand femininity perceptions compared to dark brightness except for when the logo included script fonts, in which case brightness level manipulations did not change brand femininity perceptions. These results suggest that script fonts are highly effective at creating brand femininity perceptions for all consumers.

For the brand masculinity moderator analyses, many interaction effects occurred and two of the four moderators produced significant main effects. Specifically, participants high in uncertainty avoidance and in GTI-Masculine perceived stronger brand masculinity overall than did the participants low on those traits. Further, it appears that high uncertainty avoidance participants were influenced by font choice in the logo such that they perceived display fonts to have much stronger brand masculinity than script fonts, whereas low uncertainty avoidance participants perceived the two types of font to be more similar in brand masculinity. Furthermore, the main effect of GTI-Masculine score suggests that consumers who are higher in masculine traits are more sensitive to perceiving brand masculinity in brand logos, possibly because consumers can make connections on the personality similarities between themselves and the brands they interact with (Fennis & Pryn, 2007). But in addition, both female participants and

participants who scored high on GTI-Feminine perceived stronger brand masculinity in display fonts than did male participants and low scorers on GTI-Feminine, respectively. These moderator results suggest that display fonts are effective in communicating brand masculinity to consumers who may not be highly masculine themselves. Overall, display fonts appear especially effective in communicating brand masculinity to consumers who are high on uncertainty avoidance, on GTI-Feminine, and/or female.

Finally, all the three-way interactions uncovered for both dependent variables that involved colour seem to suggest that logos with a pink hue do not have effects on brand gender perceptions that are as straightforward as logos with a blue hue. For the blue hue, brightness and font choice manipulations displayed the expected effects on brand gender perceptions. For the pink hue, however, light brightness strongly increased brand femininity perceptions when a display font was used and dark brightness strongly increased brand masculinity perceptions when a display font was used. When a script font was used in a pink logo, brightness manipulations had a null effect on both brand femininity and brand masculinity perceptions. These results could suggest that the combination of the pink hue and the display font in a brand logo created a "mixed" impression and thus the participants used the brightness cue to guide their brand gender perceptions. It appears that this "mixed" impression did not occur for the blue hue and script font combination, possibly because blue brand logos are very common in marketing (Seckler, 2005) and consumers are accustomed to interacting with blue brand logos. It is possible that the blue colour hue was not able to communicate brand masculinity as strongly as the pink hue was able to communicate brand femininity, especially in the non-comparative context that was created by the between-subjects design. Instead, it is possible that font and brightness were the main visual cues that influenced brand gender perceptions for the blue brand logos. However, the design of

this study does not allow us to draw definitive conclusions about the cognitive processes occurring in consumers when assessing the brand gender communicated by a brand logo so these explanations are merely speculative.

In summary, the various interaction effects uncovered in this study suggest that for both brand femininity and brand masculinity, font and brightness cues can have unusually strong and effective impacts on brand gender perceptions in certain logo contexts. Both of these cues are hypothesized to be effective gender communicators because of evolution-based associations (see also Lieven et al. 2015). While a main effect of colour hue was uncovered which means that this socially-learned association is effective in communicating brand gender, this design element did not appear as an unusually strong brand gender communicator within any of the significant interaction effects or for any of the demographic moderator groups, unlike the font and brightness cues.

Theoretical Contributions

The findings of this research contribute to many areas in the marketing and psychology literatures, including brand personality, evolutionary psychology, sensory marketing and embodied cognition.

Firstly, this study was intended to be a methodological improvement on Lieven and colleagues (2015) by making a clear distinction between the colour elements of brightness and hue and by using a between-subjects design. These methodological improvements resulted in discovering the main effects that were originally hypothesized but not found in Lieven and colleagues (2015), while also providing replication evidence for the effect of font type on brand gender perceptions (Grohmann 2014; Lieven et al., 2015). Further, separating the colour elements of hue and brightness is important because it allowed a comparison of the effects of hue

and brightness in influencing gender perceptions, which actually tackles much bigger underlying questions. Which colour dimensions can reliably drive gender perceptions? From a theoretical standpoint, is society, evolution, or both the strongest force in creating visual cue-gender associations? In this research, the colour hues used to communicate masculinity and femininity (e.g. blue and pink) are entirely socialized associations (Cunningham & Macrae, 2011). In other words, an American consumer might strongly associate the colour blue with males but an Indonesian consumer might not because the blue-male association is culturally bound. However, the colour brightness-gender link is supposedly based on evolutionary knowledge because of a DNA-based sexual dichotomy in skin colour (Jablonski & Chaplin, 2000). Therefore, by separating colour hue and brightness, this research helps to address a bigger theoretical question about sources of "knowledge" in shaping gender perceptions. The answer based on the present results appears to be both culture AND evolution because both hue and brightness were highly effective in shaping brand gender perceptions. However, it is worth noting that brightness seemed to be at play in many of the significant interaction effects uncovered in this research. Regardless, the main effects of colour brightness (and font type) in this study are in line with and contribute to evolutionary psychology theory regarding visual cue-sexual dimorphism associations, even in a non-human context.

Both colour brightness and type fonts are hypothesized to effectively communicate brand gender because of their evolutionary associations with various human physiological traits that indicate gender (e.g. sexual dimorphisms; Lieven et al., 2015). These and other strong psychological analogies drawn between the external environment, physical human traits, and psychological processes are becoming an increasingly popular research topic in the broader theory of embodiment and/or grounded cognition. This school of thought asserts that human

psychological processes are grounded in the outside world and that humans use their bodily experiences as a source of information that affects internal cognitive processes (Krishna & Schwarz, 2014). A popular and clear illustration of embodied cognition at work is the study in which participants were instructed to hold a pen in their mouth in such a way that smiling muscles were facilitated or inhibited. The same cartoon stimulus was judged as funnier in the smiling-facilitation condition than in the smiling-inhibition condition, suggesting that human cognition and psychological experience is at least partially dictated by physical bodily states (Strack, Martin, & Strepper, 1988). This embodiment school of thought stands in stark contrast to the information processing interpretation of cognition in psychology which holds that the brain operates in isolation and is completely separate from the rest of the body (Krishna & Schwarz, 2014).

While embodiment and grounded cognition have gained popularity in psychology in recent years, these theories are starting to gain traction in marketing as well, specifically in the field of sensory marketing. This area of research is grounded (excuse the pun) in the idea that sensory and bodily experiences can affect consumers' perceptions, attitudes, and decision making in consumption contexts (Krishna & Schwarz, 2014). In fact, there is evidence across all sensory modalities that subtle sensory cues influence consumer behaviour and decisions. In the haptic modality, Florack, Kleber, Busch, and Stohr (2014) find that physical cleansing rituals reduce feelings of ownership that consumers associate with their own possessions. Warm (e.g. cinnamon) and cool (e.g. mint) ambient scents in the retail environment can lead consumers to feel less or more powerful, respectively, due to the embodied associations between warmth, the number of people in the space, and feelings of power and control, which then translates into various patterns of compensatory consumption behaviours (Madzharov, Block, & Morrin,

2015). The visual sensory modality has been extensively studied in sensory marketing, including the research by Semin and Palma (2014), which is clearly a major influence on the present research. Similarly, the present research also contributes to the visual sensory marketing literature because it demonstrates how subtle changes in the visual appearance of a brand logo can lead to changes in brand gender perceptions. Further, colour brightness and font type are thought to influence brand gender perceptions because they are grounded in physical sexual dimorphisms. Specifically, curvy script fonts and light colours can communicate brand femininity while stocky display fonts and dark colours can communicate brand masculinity; all of these design elements are grounded in *human* sexual dimorphisms. In this way, this research also contributes to the embodiment and grounded cognition literature because it demonstrates how gender can be grounded in visual cues in the branding context.

Similarly, this research contributes to the brand personality literature. As just mentioned, the findings illustrate how brand gender is grounded in visual cues in a similar way to how gender is visually perceived in human physical characteristics. These parallels could help further illustrate how brands are perceived in broadly similar ways to other human beings, specifically in the personality dimension of gender. There is already an abundance of literature that illustrates how brands are psychologically construed in similar ways as to how other humans are construed: consumers can assign various personality traits to brands (Aaker, 1997), develop human-like relationships with brands (Fournier, 1998), and brands can contribute to and change culture just as humans can (Holt, 2002). And while we do know that consumers can assign gender to brands (Grohmann, 2009), this research continues to build a case for the construct of brand gender by illustrating clear parallels between how consumers assign gender to other humans and products (Semin & Palma, 2014; Tilburg et al., 2015) and how consumers assign gender to brands.

Specifically, colour brightness appears to be an effective and reliable cue in communicating masculinity and femininity in both human-to-human and human-to-brand interactions.

Additionally, the inclusion of gender and sex moderators and their subsequent main and/or interaction effects also contribute to a theoretical understanding of gender within both a human and a branding context. Much of the research done on brand gender has found null or seemingly spurious effects regarding the moderating role of participant sex or gender on brand gender perceptions (Grohmann, 2009; Grohmann, 2014; Lieven et al., 2015). While the presence of spurious moderating effects cannot be ruled out in the present study, these exploratory results might be informative. One interesting result is that the interaction and moderator main effects were not usually present in opposite form between brand femininity and brand masculinity, which contributes further evidence to the idea that these two brand personality constructs are indeed separate rather than opposite ends of the same spectrum (Grohmann, 2009). In a similar vein, GTI-Masculine scores and GTI-Feminine scores did not produce opposite moderating effects, providing more evidence that masculine and feminine gendered traits are two separate personality dimensions rather than opposites (Barak & Stern, 1986; Grohmann, 2009). Similarly, it was interesting to note that the moderators of participant sex and Gender Trait Index (Barak & Stern, 1986) did not often produce converging effects, suggesting that feminine and masculine traits do not cleanly map onto female/male sex identification. Put another way, participants high in GTI-Masculine traits did not necessarily perceive brand gender in the same pattern as male-identifying participants. These results make sense in that both male and female participants could score high on GTI-feminine, GTI-masculine, or both. Nonetheless, this pattern of results or lack thereof provides further evidence for modern theories of gender that suggest that gendered traits and biological sex are not necessarily related or incompatible (Barak & Stern, 1986).

Finally, the inclusion of the uncertainty avoidance moderator was intended to bring cultural dimension theory (Hofstede, 2001) and a recent idea regarding brand anthropomorphization (Hudson et al., 2016) into the brand gender research stream. A main effect of uncertainty avoidance was found for strengthening brand masculinity perceptions, which is in line with the findings of Hudson et al. (2016) that participants from high uncertainty avoidance cultures are more likely to anthropomorphize brands. The present research makes a novel contribution by measuring uncertainty avoidance at the *individual* rather than cultural level (Jung & Kellaris, 2004) and assessing its relationship with brand gender, one possible way in which brands can be anthropomorphized. The research stream on brand anthropomorphization is very recent (Hudson et al., 2016) yet the idea and the construct relationship with uncertainty avoidance is a very interesting one. The finding that high uncertainty avoidance led to stronger brand masculinity perceptions in the present study contributes evidence in support of further exploring the relationship between uncertainty avoidance and brand anthropomorphization.

In conclusion, this research here first and foremost clarifies the role of colour hue and brightness in brand logos and their influence on brand gender perceptions while providing further replication evidence for the effect of font type on brand gender perceptions. This research also contributes to theory in multiple areas of marketing and psychology: importantly, the delineation of colour hue and brightness provides insights on the influence of cultural and evolutionary knowledge structures on gender associations, thus contributing to evolutionary psychology literature. This research also contributes to theory in the fields of embodied cognition, sensory marketing, and brand personality.

Limitations and Future Research

Of course, no study is without its limitations. A limitation that should be acknowledged is that the main study did not employ preference measures such as brand liking or brand attitude. While previous research has suggested that brand gender increases consumer-based brand equity (Lieven et al., 2014; Lieven & Hildebrand, 2016), the present research did not use any measures of brand preference which could have produced even more interesting and managerially-relevant results. For example, while the results suggest that consumers high in GTI-Feminine perceive stronger brand masculinity in display fonts than consumers low on this trait, we do not know if this visual cue improves their attitude towards the brand or if the increased brand masculinity enhances their liking for the brand. Such results could be more managerially useful and could contribute even more to brand gender literature.

Similarly, there is empirical evidence to suggest that colour brightness levels can influence arousal and excitement in humans such that light brightness reduces arousal and induces a calming effect (Profusek & Rainey, 1987) and that dark brightness can have an arousing and exciting effect in advertising (Gorn et al., 1997). In fact, Labrecque and Milne (2012) found evidence that manipulating colour brightness in brand logos changes consumer perceptions on the "excitement" brand personality trait and that manipulating this design element in product packaging to match the intended brand personality profile led to higher purchase intentions. Another direction for future research in the brand logo and brand gender stream could be to not only add measures of consumer liking, attitude, and/or arousal towards the brand but also to add measures of purchase intention. If colour brightness is able to communicate brand gender personality traits and it contributes to consumer arousal levels which may relate to

purchase behaviour (Belizzi & Hite, 1992), then research on brand logos that includes colour brightness as a design element would benefit from a purchase behaviour measure.

Finally, sampling is a limitation that can be improved in future research. This study used an American sample but in an increasingly globalized world, it would be interesting to sample from other cultures, specifically non-Western ones. Studying more cultures would be especially interesting because font and brightness are hypothesized to communicate gender based on evolutionary knowledge, which is expected to exist in most human cultures. Further, a similar study could be conducted with different colour hues that are more in line with the cultural gender-colour associations of the culture being studied. Or, blue and pink hues could remain intact in future studies because these Western cultural traditions are known and practiced in other parts of the world due to increased globalization of markets and the consequent mixing of cultures (Cleveland & Laroche, 2007). Finally, the Hofstedian cultural dimension of uncertainty avoidance was included in this study and even though it was measured as an individual trait here (Jung & Kellaris, 2004), future research could examine the relationship between high and low uncertainty avoidance cultures and strength of brand gender perceptions. Such research investigations could produce findings of particular value to brand managers looking to move gendered brands into different cultures or to alter the strength of their brand's gender to better align with a cultural environment.

Since the results of the present study are different than that of Lieven and colleagues (2015) (e.g. there is a strong effect of colour hue and brightness on brand gender perceptions), it would be interesting to conduct a study similar to their Study 4 in which existing brands logos are manipulated to increase or decrease perceptions of brand masculinity or femininity. Such subtle manipulations and their effects on brand gender perceptions may be important for brand

managers who need to reposition or extend an existing brand (Lieven et al., 2015) into a different gendered product category or audience than the one that the brand currently occupies. To illustrate this idea more clearly, Lieven and colleagues (2015) found that manipulating the Mercedes logo in a print advertisement so that it had a light red colour and a script font (instead of a dark blue bold font) successfully increased the femininity and decreased the masculinity perceptions of the brand. It would therefore be interesting to replicate this study using even more subtle manipulations (e.g. adjusting only the colour brightness) of existing gendered brand logos, such as the Dove logo. The consumer perception outcomes of manipulating existing brand logos could be informative for brand managers interested in "flipping" the gender of their brand, adding gender to a currently neutral brand, or neutralizing a currently strongly gendered brand.

Another possible experiment to more directly study managerial implications of brand gender logo design elements could be an actual choice paradigm like that implemented by Doyle and Bottomley (2004). As a reward at the end of a study, participants could choose a single gender-neutral product (e.g. deodorant, chocolate). All the products in the selection would be the same except for the brand logo, which would vary on different gendered visual elements. Do more of the female participants choose the deodorant with the "feminine" brand logo than the deodorant with the mixed or masculine brand logo? The results of such a choice paradigm experiment would have clear managerial implications regarding gendered brand logo design and consumer choice in a somewhat "competitive" context and could also offer indirect evidence for the importance of brand gender on brand equity. This study could also provide an externally valid demonstration of the importance of logo design in communicating brand gender and the importance of brand gender as an equitable differentiator in decision making for consumers who must choose from nearly identical products in a competitive context.

Managerial Implications

The findings of this research could have practical implications for managers looking to strengthen the gender of an existing gendered brand, to create a new brand or extension, or to reposition an existing neutral or gendered brand.

Brand managers are frequently making decisions regarding brand logo design for new brands, brand extensions, and brand repositioning. The results of this research can help brand managers to choose design elements in brand logos to make their brand seem more or less masculine or feminine. The use of display fonts, dark colour brightnesses, and blue colour hues enhance brand masculinity perceptions. The use of script fonts, light colour brightnesses, and pink colour hues in a brand logo enhance brand femininity perceptions. There is existing research that demonstrates that strong brand gender contributes to stronger consumer-based brand equity (Lieven et al., 2014; Lieven et al., 2015; Lieven & Hildebrand, 2016) and the results of the present research provide evidence that logo design elements can be used to create a stronger gendered brand. Taken together, these results suggest that managers can make evidence-based logo design choices using fonts, colour brightnesses, and colour hues in order to strengthen consumer-based brand equity and to increase overall positive consumer responses to their brand (Lieven et al., 2015).

However, these positive consumer response effects may be more applicable for the development and initial positioning of new brands. Lieven and colleagues (2015) found that while modifying design elements in existing brand logos did successfully change brand gender perceptions for that existing brand, these modifications could lead to decreased brand equity. Similarly, Walsh, Winterich, and Mittal (2010) found that design modifications to existing brands that broke with consumer expectations resulted in negative responses to the brand.

Consequently, while the current research study did not investigate design modifications to existing brand logos, past research suggests that these design changes should be taken with caution. The logos studied here were fictitious and therefore novel, so the present results would likely be most applicable to the development of new brands.

Furthermore, the interaction effects uncovered in this research suggest that some design element manipulations are more effective in enhancing the brand gender perceptions of certain consumer groups. Specifically for display fonts, male participants perceived display fonts to have stronger brand femininity than did female participants; consumers high in uncertainty avoidance perceived that display fonts were strongly masculine more than consumers low on this trait; female consumers and those high on GTI-Feminine scores perceived display fonts to be more masculine than male consumers and those low on GTI-Feminine scores. These interaction results could be interesting to take into account when considering the target audience for a new brand or brand extension: font choice could be a very powerful way to increase brand gender perceptions in the target segment. As discussed earlier, the present study did not employ measures of brand preference or liking. However, previous research has found that across cultures, male consumers place stronger value on masculine brands and female consumers place stronger value on feminine brands (Lieven et al., 2015). Combined with the interaction results found in this research, it appears that using display fonts might not be an effective design choice if a manager's target segment is only male or only female consumers. Since display fonts are perceived to be more feminine by male consumers and more masculine by female consumers, then using display fonts could actually detract from the brand-gender congruence effect found by Lieven and colleagues (2015). However, in the case that a brand's target audience is not segmented along a specific sex demographic, then creating a highly gendered brand, possibly

with the use of display fonts, should enhance positive responses from all consumers (Lieven et al., 2014; Lieven et al., 2015; Lieven & Hildebrand, 2016).

Another interesting segmentation effect uncovered by Lieven and Hildebrand (2016) was that consumers from individualistic cultures are more likely to value brands with strong masculinity and consumers from collectivistic cultures are more likely to value brands with strong femininity. When combined with the results of this research, brand managers in charge of a brand with a target market in an individualistic culture, such as the United States, might benefit from creating a strong masculine brand logo by using display fonts, dark colour brightnesses, and/or blue colour hues. Similarly, brand managers in charge of a brand with a target market in a collectivistic culture, such as Japan, might benefit from creating a strong feminine brand logo by using script fonts, light colour brightnesses, and/or pink colour hues. The results of the present research found that using congruent design elements along masculine or feminine lines did have an additive strengthening effect on the respective brand gender perceptions, so modifying multiple congruent design elements at once could be highly effective to increase brand gender perceptions.

Finally, if a manager is in charge of a global gendered brand instead of a brand in just one culture or type of culture, it may be better to manipulate the colour brightness and font of the logo to communicate gender because these cues are embedded in evolutionary associations and could be understood by people around the world. Colour hue and its gender associations are dictated by culture and is therefore not a universally-understood visual cue (Cunningham & Macrae, 2011), which could mean that only considering colour hue when designing a logo for a global gendered brand might result in brand gender not being communicated as strongly as managerially desired. The question of globally-recognized and appreciated brand symbols is

becoming of increasing importance because of the rise of global consumer culture, which refers to the phenomenon that today's consumers are increasingly consuming goods from all around the world rather than just local goods. This market phenomenon provides both an opportunity and a challenge for brand managers to communicate effectively with consumers of many different cultures at once (Alden, Steenkamp, & Batra, 1999). The present research collected consumer responses from an American sample and therefore cannot provide evidence for the effectiveness of design elements in communicating brand gender to other cultural groups. However, taken together with evolutionary theory, the results suggest that colour brightness and font could be effective in communicating brand gender for a global brand that interacts with consumers from many different cultures.

Regardless of the brand manager's target segment, the results of this research provide clear evidence for the role of brand logo design elements in influencing brand gender perceptions. Specifically, this research is the first to clearly demonstrate the theoretically-predicted effects of colour hues and brightnesses in brand logos on brand gender perceptions. Hopefully, the encouraging results and the methods implemented in this research can be used to spark further research ideas and studies in the fields of brand personality and sensory marketing.

Appendix A – Main Study Questionnaire

Q28   INFORMATION AND CONSENT FORM   You are being invited to participate in the research study mentioned above. This form provides information about what participating would mean. Please read it carefully before deciding if you want to participate or not. If there is anything you do not understand, or if you want more information, please ask the researcher.   A. PURPOSE   The purpose of the research is to gain a better understanding of how consumers perceive certain types of visual designs and how these designs can be used to communicate brand personality traits.   B. PROCEDURES   If you participate, you will be asked to respond to a brief survey about your perceptions regarding visual design elements and to questions about some of your own individual personality traits and demographic information. In total, participating in this study will take about 10 minutes.   C. RISKS AND BENEFITS   There are no known risks involved with participating in this research This research is not intended to benefit you personally, however you will be monetarily compensated by the panel provider if you complete this questionnaire.   D. CONFIDENTIALITY   We will gather the following information as part of this research: your perceptions of visual designs and the demographic information you provide.   We will not allow anyone to access the information, except people directly involved in conducting the research. We will only use the information for the purposes of the research described in this form.   The information gathered will be anonymous. This means that the researcher will not know your identity. We intend to publish the results of the research. However, it will not be possible to identify you in the published results. We will destroy the information five years after the end of the study.   F. CONDITIONS OF PARTICIPATION   You do not have to participate in this research. It is purely your decision. If you do participate, you can stop at any time by simply closing your browser. Because the data is anonymous, we will not be able to withdraw your data once you have completed the questionnaire. There are no negative consequences for not participating or stopping in the middle, but you will not receive compensation from the panel provider if the questionnaire is not completed.   G. PARTICIPANT'S DECLARATION   I have read and understood this form. I have had the chance to ask questions and any questions have been answered. I agree to participate in this research under the conditions described.

○ I agree to participate (1)
○ I do not agree to participate (please close your browser) (2)

Q26 Please take a moment to look at the brand logo below.

Q21 How well do the following words or phrases describe the brand?

	Not at all descriptive (1)	Moderately not descriptive (2)	Somewhat not descriptive (3)	Neither descriptive nor non-descriptive (4)	Somewhat descriptive (5)	Moderately descriptive (6)	Extremely descriptive (7)
Adventurous (1)	○	○	○	○	○	○	○
Aggressive (2)	○	○	○	○	○	○	○
Brave (3)	○	○	○	○	○	○	○
Daring (4)	○	○	○	○	○	○	○
Dominant (5)	○	○	○	○	○	○	○
Sturdy (6)	○	○	○	○	○	○	○
Expresses tender feelings (7)	○	○	○	○	○	○	○
Fragile (8)	○	○	○	○	○	○	○
Graceful (9)	○	○	○	○	○	○	○
Sensitive (10)	○	○	○	○	○	○	○
Sweet (11)	○	○	○	○	○	○	○
Tender (12)	○	○	○	○	○	○	○

Q93 How strongly do you agree with the following statements about you?

	Strongly agree (1)	Agree (2)	Somewhat agree (3)	Neither agree nor disagree (4)	Somewhat disagree (5)	Disagree (6)	Strongly disagree (7)
I prefer structured situations to unstructured situations. (1)	○	○	○	○	○	○	○
I prefer specific instructions to broad guidelines. (2)	○	○	○	○	○	○	○
I tend to get anxious easily when I don't know an outcome. (3)	○	○	○	○	○	○	○
I feel stressful when I cannot predict consequences. (4)	○	○	○	○	○	○	○
I would not take risks when an outcome cannot be predicted. (5)	○	○	○	○	○	○	○
I believe that rules should not be broken for mere pragmatic reasons. (6)	○	○	○	○	○	○	○
I don't like ambiguous situations. (7)	○	○	○	○	○	○	○

Q94 How well do each of the following words or phrases describe you?

Affectionate (1)	○	○	○	○	○	○	○
Assertive (2)	○	○	○	○	○	○	○
Strong personality (3)	○	○	○	○	○	○	○
Loyal (4)	○	○	○	○	○	○	○
Forceful (5)	○	○	○	○	○	○	○
Sympathetic (6)	○	○	○	○	○	○	○
Has leadership skills (7)	○	○	○	○	○	○	○
Sensitive to others' needs (8)	○	○	○	○	○	○	○
Understanding (9)	○	○	○	○	○	○	○
Compassionate (10)	○	○	○	○	○	○	○
Eager to soothe hurt feelings (11)	○	○	○	○	○	○	○
Dominant (12)	○	○	○	○	○	○	○
Warm (13)	○	○	○	○	○	○	○
Willing to take a stand (14)	○	○	○	○	○	○	○
Tender (15)	○	○	○	○	○	○	○
Aggressive (16)	○	○	○	○	○	○	○
Acts as a leader (17)	○	○	○	○	○	○	○
	○	○	○	○	○	○	○
Competitive (18)	○	○	○	○	○	○	○
Ambitious (19)	○	○	○	○	○	○	○
Gentle (20)	○	○	○	○	○	○	○

Q23 Age

Q24 Identified Sex:

○ Male (1)
○ Female (2)
○ Other (3)

Q25 Ethnic Background

○ White (1)
○ Black or African American (2)
○ American Indian or Alaska Native (3)
○ Asian (4)
○ Native Hawaiian or Pacific Islander (5)
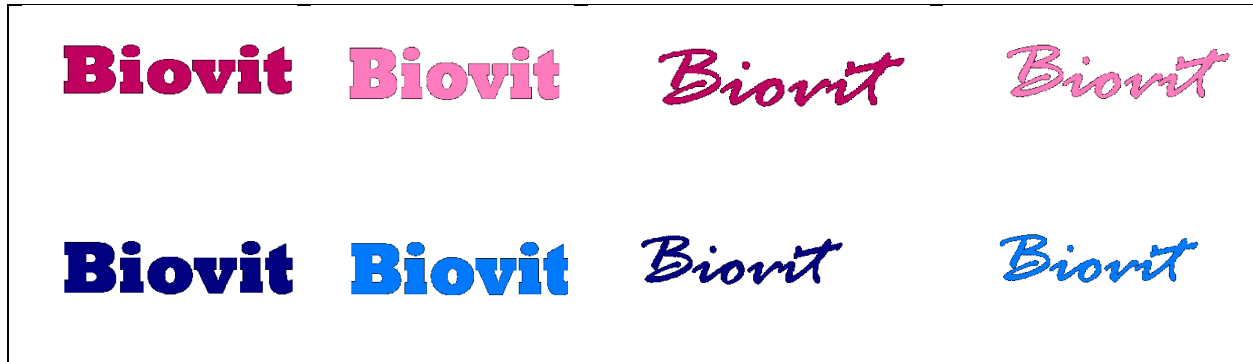○ Other (6)

Q26 Highest Education level achieved:

○ Less than high school (1)
○ High school graduate (2)
○ Some college (3)
○ 2 year degree (4)
○ 4 year degree (5)
○ Professional degree (6)
○ Doctorate (7)

Q27 Income:

○ under $24,999 (1)
○ $25,000- $49,999 (2)
○ $50,000- $74,999 (3)
○ $75,000- $99,999 (4)
○ $100,000 or more (5)
○ other (6)

Q1 Your survey code: ${e://Field/survey_code}

Appendix B – Stimuli

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