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A Process for Evaluating the Gender and Professionalism of Web Design Elements

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This work lays the foundation for creating gender neutral web design guidelines by determining the following: the gendering of web design element examples (including whether some examples are distinctly masculine or feminine), the perceived professionalism of design elements, and whether there is an interaction between gender and professionalism. Designing for a particular gender is common in both product and web design, but in many situations is exclusionary. In the study, participants rated a series of graphical element examples in six categories: Font, Color, Image, Shape, Texture and Mixed Elements. Participants rated each element on their femininity, masculinity and professionalism. Some element examples were found to be strongly feminine or masculine, while others were neutral. In three of the six elements (Color, Shape, Mixed Elements), there was a positive correlation between professionalism and masculinity. Similarly, in the same three elements, there was a negative correlation between professionalism and femininity. This information will aid designers in making principled decisions on how they wish the gender of their website to be perceived.

INTRODUCTION

Gendered design is the process of deliberately choosing design elements to evoke a response from a particular gender (van Tilburg, Lieven, & Hermann, 2015). The association of a design element (e.g., color, shape, font) with a gender is largely learned through socialization and may vary with cultural identity (van Tilburg et al, 2015). In many contexts such as product and web design, gendered design is considered biased and exclusionary (Friedmann & Nissenbaum, 1996). Gender neutral design aims to be suitable for all users regardless of gender.

Gendered Product Design

A walk through the aisles of a drugstore makes the prevalence of gendered design immediately apparent. This tactic is used because consumers' product preferences often fall along gender lines (van Tilburg et al., 2015; Xue & Yen, 2007; Fugate & Phillips, 2010). Products "acquire" gender through aesthetics and design choices; which results in guidelines for creating "strongly gendered products" (van Tilburg et al., 2015). However, while consumers responded favorably to strongly gendered products, it was strongly androgynous (employing strong masculine and strong feminine traits) products that consumers responded to most favorably (van Tilburg et al., 2015). While the use of gendered design may be preferred by marketers where a product is used in an outward expression of gender (van Tilburg et al., 2015; Xue & Yen, 2007), it is also inherently exclusionary (Moss & Gunn, 2007). For example, in 2012 when a popular pen company created a series of pens "for Her", there was severe backlash from both men and women. The strong gendering of such a universal product was perceived as inappropriate. The exclusionary nature of gendered design is the driving force behind developing gender neutral design guidelines.

Gendered Interface and Web Design

The exclusionary nature of gendered design is especially apparent in the fields of interface and web design. Significant study has been given to the bias toward masculinity in these fields (Huff & Cooper, 1987; Moss, Gunn, & Heller, 2006; Horvath, Moss, Gunn & Vass, 2007; Moss & Gunn, 2007). For example, when groups of designers were asked to create computer programs for 7th grade boys, 7th grade girls, and a general class of 7th graders, the resulting "general" program was strikingly similar in design to the one for boys and shared few design elements with the program for girls (Huff & Cooper, 1987). These biases are explained by the notion that the "average" user will be male unless otherwise specified (Friedman & Nissenbaum, 1996). This bias should be familiar to those experienced in user centered design as a common design pitfall is assuming the user is very similar to the designer. The notion that designers unintentionally design for themselves is further explained in a study of 60 personal websites at Oxford University. The study illustrated that men and women design differently in areas of language, color, typography, and form. Websites designed by men were more appealing to men, and websites designed by women were more appealing to women (Moss et al., 2006). Website appeal may be maximized if the design "mirrors" the target population (Tuch, Bargas-Avila, & Opwis, 2010).

The tendency to design with one's own gender in mind combined with imbalance favoring men in the field (only 19-22% of IT professionals are women) compounds the problem of bias in web design (Horvath & Moss, 2007). In an analysis of 3,682 website templates across nine design packages, it was found that, using the default elements associated with each template, 84% were masculine in form (line and shape), 99.6% were masculine in color, and 99.8% were masculine in typography (Horvath et al., 2007). This vertical and horizontal male domination (software designed by and for an audience of men) creates a "masculine computer culture" which produces a "masculine discourse" within the field of web design (Robertson & Newell, 2004).

Given the bias that gendered design creates, there has begun to be more consideration for the use of gender neutral design strategies (Friedman & Nissenbaum, 1996; Moss & Gunn, 2007; Fugate & Phillips, 2010). In fact, it has been suggested that “freedom from bias should be counted among the select set of criteria—including reliability, accuracy, and efficiency—according to which the quality of systems in use in society should be judged.” (Friedman & Nissenbaum, 1996, pp.345-346). However, guidelines for gender neutral design have yet to be set forth. Where 19-22% of website designers are women, but 51% of web browsers are women (Horvath et al., 2007), this is a gap in design knowledge.

Gender and Professionalism

In the workplace, the intersection of gender and perceived professionalism is complicated. Women who consistently exhibit masculine behaviors such as confidence, aggressiveness, and self-assuredness tend to be negatively evaluated in the workplace (Heilman, Block, Martell, & Simon, 1998) and passed over for promotions (Rudman & Glick, 2001). In contrast, “ultra-feminine” women who did not exhibit any masculine behaviors in the workplace were perceived as less qualified, less confident, and also less likely to be promoted (O’Neill & O’Reilly, 2011). However, women who can self-monitor and “turn on” or “turn off” masculine behaviors in certain workplace situations were the most successful in securing promotions (O’Neill et al., 2011). The trend of feminine traits leading to fewer promotions also extends to men: men who exhibited traits of femininity were less likely to secure a promotion than their more masculine peers (O’Neill et al., 2011). In general, overt displays of femininity or gender incongruent behaviors negatively impact overall perceptions of personal professionalism.

While the effects of gendered actions on professionalism have been studied, less is known about the effect of gendered design on professionalism. In web design, designers often aim for their sites to be perceived as professional. However, it is unknown what effect the gendering of the site (intentional or unintentional) will have on user’s perceptions of its professionalism. The intersection of gender and professionalism in design is explored in this study.

Measuring Gender

The scales for measuring femininity and masculinity in this study were originally designed to measure psychological androgyny (Bem, 1974). They were adapted for the evaluation of products (Van Tilburg, et al., 2015). Likert scales (from 1-7) rate Masculine Perceived Gender (MPG) and Feminine Perceived Gender (FPG). FPG and MPG interact to create “zones” of gender. Simultaneously high FPG and MPG scores imply “high androgyny”. Simultaneously low FPG and MPG scores imply “undifferentiated”. High MPG coupled with low FPG suggests masculinity, while high FPG coupled with low MPG suggests femininity (van Tilburg, et al., 2015).

METHOD

Research Objectives

This work lays the foundation for creating gender neutral web design guidelines by understanding how the basic

elements of design are gendered and perceptions of their professionalism. The questions explored are: Are web design elements gendered? Are some elements distinctly masculine and feminine? How professional are individual design elements perceived? Finally, is there an interaction between gender and professionalism? These questions are essential for designers to create websites free of gender bias while still maintaining an appropriate level of professionalism.

Participants

1,116 participants (681 female and 435 male) were recruited from a large Midwestern university and social media. Participants averaged 29.1 years old (range: 18 – 76). English was the most comfortable speaking language for 94.1 % of participants. Participants were not offered compensation.

Variables

Multiple unique examples in each of six Design Elements were considered: Colors (21 unique examples), Fonts (18), Textures (12), Shapes (14), Images (38), and Mixed Elements (21). The examples were selected to be appropriate for use in designing a “general use” website – meaning of appeal to a wide audience regardless of gender. Images and Textures were obtained from open stock photography databases. Mixed Element examples were composed of two or more elements (such as color and shape) combined. Each example was presented simply on a white background.

Each design element example was rated on three metrics:

- *Feminine Perceived Gender (FPG)* where 1 is “Not Feminine at All” and 7 is “Very Feminine”
- *Masculine Perceived Gender (MPG)* where 1 is “Not Masculine at All” and 7 is “Very Masculine”
- *Professionalism*: where 1 is “Unprofessional” and 7 is “Professional”.

Procedure

Participants accessed the study by clicking a link to an online Qualtrics survey sent to them via email. After providing consent, they were asked to fill out a demographic survey and report their age (an age under 18 closed the survey). Instructions for completing the study as well as definitions of femininity, masculinity, and professionalism were displayed. To familiarize the participants with the scales in the study, three example elements were presented as training. After training, participants advanced through the study where they rated FPG, MPG, and Professionalism for each example. Each participant randomly received half of the element examples. Every element was rated by approximately the same number of participants using Qualtrics’ randomization function.

RESULTS

Design Elements

Font. The mean FPG, MPG, and Professionalism ratings for Font are presented in Figure 1 (ordered on FPG: low to high). Edwardian had the highest mean FPG at 5.48 (SD = 1.46) while Stencil had the lowest at 2.31 (SD = 1.11). Stencil had the highest mean MPG at 5.07 (SD = 1.26), while Edwardian had the lowest mean FPG at 2.30 (SD = 1.21).

Times New Roman had the highest mean professionalism at 6.16 (SD = .75) and Glossdrop the lowest at 1.66 (SD = 1.48)

Figure 1. FPG, MPG, and Professionalism for the Font category of element examples

Shape. The mean FPG, MPG, and Professionalism ratings for Shape are presented in Figure 2 (ordered on FPG: low to high). Heart had the highest mean FPG at 5.54 (SD = 1.11) while Square had the lowest at 3.06 (SD = 1.48). Rectangle had the highest mean MPG at 3.94 (SD = 1.51) while Scroll had the lowest mean MPG at 2.48 (SD = 1.44). Square had the highest mean professionalism at 5.07 (SD = 1.52) and Heart had the lowest at 2.72 (SD = 1.57).

Figure 2. FPG, MPG, and Professionalism for the Shape category of element examples

Image. The mean FPG, MPG, and Professionalism ratings for Image are presented in Figure 3 (ordered on FPG: low to high). Woman with Baby had the highest mean FPG at 5.88 (SD = 1.02) while Office had the lowest at 2.92 (SD = 1.15). Man with Baby had the highest mean MPG at 5.01 (SD = 1.41) while Young Girl had the lowest mean MPG at 2.32 (SD = 1.43). Highrise Building had the highest mean professionalism at 5.92 (SD = 1.00) and Man had the lowest at 3.17 (SD = 1.45).

Figure 3. FPG, MPG, and Professionalism for the Image category of element examples

Texture. The mean FPG, MPG, and Professionalism ratings for Texture are presented in Figure 4 (ordered on FPG: low to high). Floral Cloth had the highest FPG at 5.71 (SD = 1.25) while Cardboard had the lowest at 2.92 (SD = 1.12). Rough Wood had the highest MPG at 5.08 (SD = 1.52) while Floral Cloth had the lowest MPG at 2.05 (SD = 1.06). Dark Denim had the highest professionalism at 4.44 (SD = 1.60) and Tree Limbs had the lowest at 3.15 (SD = 1.52).

Figure 4. FPG, MPG, and Professionalism for the Texture category of element examples

Color. The mean FPG, MPG, and Professionalism ratings for Color are presented in Figure 5 (ordered on FPG: low to high). Pastel Pink had the highest mean FPG at 5.72 (SD = 1.04) while Brown had the lowest at 2.97 (SD = 1.59). Grey had the highest mean MPG at 4.90 (SD = 1.22) while Magenta had the lowest mean MPG at 2.26 (SD = 1.52). Black had the highest mean professionalism at 5.92 (SD = 1.03) and Magenta had the lowest at 2.95 (SD = 1.37).

Figure 5. FPG, MPG, and Professionalism for the Color category of element examples.

Mixed Elements. The mean FPG, MPG, and Professionalism ratings for Mixed Elements are presented in Figure 6 (ordered on FPG: low to high). Pink Thick Circle had the highest mean FPG at 5.47 (SD = 1.40) while Black Thick Square had the lowest at 2.92 (SD = 1.48). Black Thick Square had the highest mean MPG at 4.60 (SD = 1.50) while Pink Thick Circle had the lowest mean MPG at 2.19 (SD = 1.54). Black Thin Bookman had the highest mean professionalism at 5.73 (SD = 1.09) and Pink Thick Bookman had the lowest at 2.35 (SD = 1.58).

Figure 6. FPG, MPG, and Professionalism for the Mixed Elements category of element examples

Correlations

Feminine and Masculine Perceived Gender. Each element exhibited a negative correlation between MPG and FPG. Mixed Elements exhibited the strongest negative correlation ($r = .97$, $N = 21$, $p < .0001$). Font ($r = .86$, $N = 18$, $p < .0001$), Shape ($r = .84$, $N = 14$, $p < .0001$), and Color ($r = .83$, $N = 21$, $p < .0001$) showed a very strong negative correlation between MPG and FPG. Texture ($r = .76$, $N = 12$, $p < .0002$) showed a strong negative correlation between MPG and FPG. Image exhibited a moderate negative correlation between MPG and FPG ($r = .56$, $N = 38$, $p < .0001$).

Masculine Perceived Gender and Professionalism. Color exhibited a very strong positive correlation between Professionalism and MPG ($r = .80$, $N = 21$, $p < .0001$). Mixed Elements showed a strong positive correlation between Professionalism and MPG ($r = .76$, $N = 21$, $p < .0001$). Shape showed a moderate positive correlation between

Professionalism and MPG ($r = .40$, $N = 14$, $p = .015$). Font ($r = .03$, $N = 18$, $p = .51$), Texture ($r = .03$, $N = 12$, $p = .57$), and Image ($r = .10$, $N = 38$, $p = .06$) exhibited very weak correlation between Professionalism and MPG.

Feminine Perceived Gender and Professionalism. Mixed elements showed a very strong negative correlation between Professionalism and FPG ($r = .82$, $N = 21$, $p < .0001$). Shape displayed a strong negative correlation between Professionalism and FPG ($r = .60$, $N = 14$, $p = .0012$). Color showed a moderate negative correlation between Professionalism and FPG ($r = .45$, $N = 21$, $p = .0008$). Font ($r = .03$, $N = 18$, $p = .47$), Texture ($r = .06$, $N = 12$, $P = .46$), and Image ($r = .15$, $N = 38$, $p = .017$) showed very weak correlation between Professionalism and FPG.

DISCUSSION

The results for FPG and MPG show that there are design elements which are distinctly masculine and feminine. Design elements which are very much gender neutral also exist with FPG and MPG ratings in the middle of the scale. This result is of particular interest to designers in order to be able to consciously design gender neutral (or gendered) websites. The gendering of element examples tended to follow societal norms for what is considered masculine and feminine. Dark colors, angular shapes, rugged or business-like images, thick serif fonts, and wood or stone based textures were considered the most masculine. In contrast, light colors, curvy shapes, soft images, script fonts, and cloth based textures were considered the most feminine.

In all of the six element categories, there was at least a moderate negative correlation between MPG and FPG. The highest negative correlation was observed in the Mixed Elements category. This could be due to the way the element examples were presented. In all categories except Mixed Elements, the examples were presented with no context or other elements. The mixing of two or more elements provides more context in which to view the example, and may have had an additive effect.

In three of the six categories (Color, Mixed Elements, Shape), there was a moderate to very strong positive correlation between Professionalism and MPG. That is, an element in those categories with a higher masculinity rating also had a higher professionalism rating. Similarly, the same three elements showed moderate to very strong negative correlation between Professionalism and FPG – a higher femininity rating resulted in a lower professionalism rating. In these categories, the correlations between gender and professionalism are in line with the behavioral finding that femininity is considered less professional while masculinity is more professional. Interestingly, the element which exhibited the least correlation between gender and Professionalism was Font – the fonts considered most professional were those which were rated most neutral in terms of FPG and MPG. This could have been an effect of the demographics of the participants: 87% of participants had received at least some college instruction where professional development advice (such as fonts to use on professional documents) is common.

CONCLUSION

While gendered design may be appropriate in some situations, it is inherently exclusionary and may ostracize some users. Due to the demographics of the web design community, gender bias in websites is often unintentional. Understanding how web design elements are gendered is an important aspect in creating gender neutral web design guidelines to counteract these biases.

The study contained a limited number of examples of design elements (124). The work could be enhanced by evaluating a larger number of examples to create a resource for designers. As 92% of study participants reported being United States natives, the generalizability of the results to other cultures with differing gender-design associations is unknown. In terms of demographics, the participant group was skewed toward women under age 30. Additionally, participants were not offered compensation which could have increased the likelihood of participation based upon interest in the subject matter. Finally, the study included limited tests of design elements in context. In future work, the elements should be presented and evaluated in the context of web design as in a series of websites. Furthermore, the results of this study could be the first step towards the design of a prediction function to predict the perceived gender of a design based upon the gender of the elements used.

REFERENCES

- Bem, S.L. (1974). The measurement of psychological androgyny. *Journal of Consulting and Clinical Psychology*, 42(2), 155-162.
- Friedman, B. & Nissenbaum, H. (2007). Bias in computer systems. *ACM Transactions on Information Systems (TOIS)*, 14(3), 330-347.
- Fugate, D. L., and Phillips J. Product gender perceptions and antecedents of product gender congruence. (2010). *Journal of Consumer Marketing*, 27(3), 2010, 251-61.
- Heilman, M. E., Block, C. J., Martell, R. E., & Simon, M. C. (1998). Has anything changed? Current characterizations of men, women, and managers. *Journal of Applied Psychology*, 74, 935– 942.
- Horvath, G., Moss G., Gunn R., & Vass E. (2007). Gender and web design software. *Journal of Systemics, Cybernetics and Informatics* 5.6(22).
- Huff, C., & Cooper J. (1987). Sex Bias in Educational Software: The effect of designers' stereotypes on the software they design. *Journal of Applied Social Psychology*, 17(6), 519-32.
- Moss, G., & Gunn R. (2007). Gender differences in website design: Implications for education. *Journal of Systemics, Cybernetics and Informatics* 5(6), 38.
- Moss, G., Gunn, R., & Heller, J. (2006). Some men like it black, some women like it pink: consumer implications of differences in male and female website design. *Journal of Consumer Behaviour* 5(4), 28-41.
- O'neill, O. A., & O'reilly Iii, C.A. (2011). Reducing the backlash effect: self-monitoring and women's promotions. *Journal of Occupational and Organizational Psychology*, 84(4), 825-832.
- Robertson, M., Newell, S., Swan, J., Mathiassen, L. & Bjerknes, G. (2001). The issue of gender within computing: reflections from the UK and Scandinavia. *Information Systems Journal*, 11, 111–126.
- Rudman, L. A., & Glick, P. (2001). Prescriptive gender stereotypes and backlash toward agentic women. *Journal of Social Issues*, 57, 743–762
- Tuch, A. N.,Bargas-Avila, J.A., & Opwis, K. (2010). Symmetry and aesthetics in website design: it's a man's business. *Computers in Human Behavior*, 26(6), 1831-1837.
- Van Tilburg, M., Lieven, T., Hermann, A., & Townsend, C. (2015). Beyond "pink it and shrink it" perceived product gender, aesthetics, and product evaluation. *Psychology & Marketing*, 32(4), 422.
- Xue, L., & Ching Y. Towards female preferences in design - A pilot study. (2007). *International Journal of Design*, 1(3).