GENDER DIFFERENCES AND COLOR: CONTENT AND EMOTION OF WRITTEN DESCRIPTIONS

HEATHER ARTHUR, GAIL JOHNSON AND ADENA YOUNG
Texas A&M - Commerce, TX, USA

In this study gender language differences in the written description of color were analyzed. The total number of words used, number of tertiary level terms used, and normative emotionality were assessed. Women were found to use more words to describe color than men. An interaction effect among gender and age was found for the number of tertiary level words used. A main effect of gender for total mean emotionality was found that was not ameliorated by age or education level.

Keywords: gender, color, written descriptions, language differences, emotionality.

There are no colors in the physical world, only light waves of various wavelengths that are received and distinguished within the eye and brain. Although humans are able to discriminate between numerous wavelengths, our color lexicon is considerably more limited. Indeed, the perception of color is largely a psychological experience, and differences have been found between males and females in their ability to accurately identify color terms (Yang, 2000) and in the size of color lexicon used (Lyons, 1995; Thomas, Curtis, & Bolton, 1978). It has also been noted that color perception may have an emotional component (Leichsenring, 2004; Nourse & Welch, 1971; Xin, Cheng, Taylor, Sato, & Hansuebsai, 2004) and many studies have documented gender

differences in emotional language. For example, Bauer, Stennes, and Haight (2003) found that women tend to express themselves with more emotional terms, and men are more apt to use cognitive and perceptual terms. Likewise, Mulac, Bradac, and Gibbons (2001) conclude that male language is more direct, succinct and instrumental, whereas female language is more elaborate and affective.

Simon and Nath (2004) found that men report calm feelings more frequently than do women, who more frequently report feelings of anxiety, sadness and anger. Indeed, it has even been suggested that gender communication styles are indicative of different worldviews (Franzwa & Lockhart, 1998). Not surprisingly then, such difference in gendered communication have been reported in the identification and description of color (Nowaczyk, 1982).

Anyan and Quillian (1971) report that girls learn the names of primary colors earlier than boys and Simpson and Tarrant (1991) found that women use more elaborate color names, and men use more simple color terms combined together (e.g. blue green). Additionally, Rich (1977) found that women use a more extensive color vocabulary and also more "fancy" color words (e.g., sky blue, hunter green).

A substantial amount of research shows that women not only have larger vocabularies when talking about colors but that they appear to have also superior abilities to match and discriminate colors. For example, Perez-Carpinell, Baldovi, de Fez, and Castro (1998) found that women were more accurate for chroma and hue than men. Also, in a speeded naming task, females named the colors more quickly than did the males, suggesting that women may possess a faster retrieval of color labels (Elias, Saucier, Nylen, & Cheesman, 2003). It is perhaps possible that different patterns of socialization for males and females encourage a greater awareness of color among women (Bimler, Kirkland, & Jameson, 2004).

Interestingly, such results have been reported across many cultures. Yang (2000) studied male and female Chinese speakers who were undergraduate English majors and found women possessed more color vocabulary (both in English and in Chinese), were more elaborate in the Chinese translations of the color words, and showed superiority in the accuracy of color-lexicon matching. In a study in Spain, accessing color words was found to be easier for the females (Delgado & Prieto, 2003). When Nepalese residents were asked to name all of the colors that they could, females consistently listed more color terms than did males (Thomas et al., 1978).

In sum, numerous studies have been conducted about objective color naming, color matching and the memory for color tasks between the sexes. However, there is a surprising lack of research on gender differences for subjective color descriptions. This study was designed to explore gender differences in the written description of various colors through an analysis of wordiness, emotion and color term usage.

METHOD

PARTICIPANTS AND MATERIALS

The sample consisted of 68 male and 82 female students over the age of 18 drawn from a large university in Texas. Participants were screened for color blindness, but no persons were excluded on that basis.

All materials were printed on a Hewlett Packard Photosmart PSC 1315V printer with maximum color resolution of 2400 dpi (dots per inch) x 1200 dpi and maximum black and white resolution of 600 dpi x 600 dpi. All materials were printed on 8.5 inch x 11 inch white carbonless paper. Four color hue stimuli with a size of .63 inches x .5 inches were presented. The four colors were equally spaced and numbered down the left side of the page at 2 inch intervals. Based on the work of Kaya and Epps (2004), two principle hues were used (yellow and purple), and two intermediate hues were used (blue-green and brownish-orange).

PROCEDURE

Participants were screened for color blindness and then completed a short demographics measure. Next, study materials were provided and participants were asked to describe the colors in their own words. Very importantly, it should be noted that the actual color names, or proper lexicon, of the colors was irrelevant because this study was not testing the accuracy of the color terms used, only the content and number of words used to describe the color.

Lastly, participants were asked to match the colors presented to the same randomized color on the opposite side of the page. Each randomized color on the right (opposite) side of the page was numbered. This portion of the procedure was used to show that the participants could differentiate the four *presented* colors.

ANALYSIS

The total number of words written was counted and documented for each participant, and the number of words used that exceeded a perimeter of the primary, secondary, and tertiary colors on the red, blue, and yellow color wheel were also recorded. The primary color level consisted of red, yellow, and blue. The secondary color level consisted of orange, green, and purple, and the six tertiary colors are red-orange, reddish-purple, yellow-green, yellow-orange, blue-green, and bluish-purple. Anything outside of these 12 colors was accounted for as a higher level of description and counted for analysis (e.g., tangerine, aqua, or sea foam).

The Affective Norms for English Words (ANEW) wordlist, created by Bradley and Lang (1999), was also used to assess the emotional content of the

participants' color hue descriptions. This word set includes over one thousand words that have been rated and normed for pleasure, arousal, and dominance in an attempt to create a standard emotional rating for English words. Each rating scale runs from 1 to 9 with a rating of 1 indicating a low value on a dimension and 9 indicating a high value on that dimension (i.e., high pleasure, high arousal, and high dominance). Collapsing across tenses, the mean score for each dimension of each word on the ANEW list that the participants used in their descriptions was recorded and used in data analysis.

RESULTS

All of the participants ($N = 150$) correctly matched the presented colors in the matching section of the instrument. In the analysis of the number of words for the male and female color descriptions, a main effect for gender was found; $F(1, 128) = 16.83$, $p < .01$, $\eta_p^2 = .12$. The number of words used by males ($M = 6.88$, $SD = 5.77$) was fewer than that of females ($M = 11.5$, $SD = 8.92$). In the analysis for the number of tertiary words used in the color descriptions, a significant main effect of gender was also found; $F(1, 128) = 5.09$, $p = .03$, $\eta_p^2 = .04$. Females used significantly more tertiary terms ($M = .99$, $SD = .64$) than males ($M = .82$, $SD = .88$) in the written description of color. However, a gender by age interaction effect was also found for tertiary terms; $F(3, 128) = 3.2$, $p = .03$. Younger males used the same number of such terms as females, but older males did not. No other demographic variables were significant.

In the analysis of the total ANEW affective value mean for the words used in the description of color, a main effect of gender was found; $F(1, 128) = 9.0$, $p = .003$, $\eta_p^2 = .07$, and no significant interaction effects emerged. Males ($M = 5.21$, $SD = .31$) chose words with a significantly lower total emotionality than females ($M = 5.43$, $SD = .36$) based on the ANEW word list. In the analysis of the ANEW mean in the affective dominance domain for the words used in the color descriptions, a main effect of gender was found; $F(1, 128) = 8.39$, $p = .004$, $\eta_p^2 = .06$. Females used words with a significantly higher emotionality domain of dominance rating ($M = 5.48$, $SD = .25$) than males did ($M = 5.37$, $SD = .23$). In the analysis of the ANEW mean in the affective positive domain, a main effect of gender was found; $F(1, 128) = 6.19$, $p = .01$, $\eta_p^2 = .05$. Females used words with a significantly higher positive emotionality domain ($M = 6.13$, $SD = .60$) than males ($M = 5.78$, $SD = .82$). For the ANEW mean in the affective arousal domain, no significant effects were found for independent variables of gender, age, or education ($p > .05$, respectively). The largest mean difference between females and males for the mean emotionality ratings was for the positive domain, followed by the total emotionality mean.

Obviously, the ANEW (Bradley & Lang, 1999) word list with the affective normative ratings does not include every possible word in the English language. Therefore, some of the words used by the participants in their color descriptions were not included in the data analysis, due to an unavailable affective rating. The number of words not listed on the ANEW word list that were used by the participants, ranged from 0 to 12 (14%). Based on a univariate analysis of variance, there was a significant difference in the number of words that were not listed among males ($M = 2.88$, $SD = .87$) and females ($M = 3.40$, $SD = 1.55$); $F(1, 148) = 47.73$, $p = .001$. Females used more unlisted words than males. However, females used more words in general in their descriptions.

DISCUSSION

This study was designed to analyze differences between males and females in the written description of various colors. There was a main effect for gender on the number of words used in the color descriptions, and females did tend to use more total words in their descriptions than did males. Although a main effect of gender was found on the number of tertiary words used in the color descriptions, there was also an interaction between gender and age. Females did use more tertiary terms than males in their color descriptions, but age/educational level played a role. Additionally, females used words with a higher mean emotionality rating more frequently than did males. This finding aligns with previous research that reports women use more emotional terms during communication (e.g., Bauer et al., 2003; Mulac et al., 2001).

Not only did females show increased emotion when describing color, they also had a higher mean ANEW normative rating for dominance on the words used in their color descriptions than the males. Although there may have been many results showing male "dominance" during communication (e.g., Edwards, 1998; Koch, Mueller, Kruse, & Zumbach, 2005; Meyers, Brashers, Winston, & Grob, 1997), in the description of color the terminology that females used had significantly more dominant emotionality ratings for the words.

A significant main effect of gender was also found for the mean positive ratings of the words chosen for the participants' color descriptions. Females had a higher mean ANEW normative rating for using positive (pleasurable) words than men. Noller (1993) reported that women reveal more personal feelings and express a broader range of emotion in relationships. Perhaps this disclosure of expressivity carries over not only into relationships, but also into other domains, such as the description of color.

Several questions emerge from this research. Does the difference in emotional language impact choices of genders in color decisions? Should manufacturers and marketers be more aware and more sensitive to the differences in description

of colors and emotional content? Future research could look at the applied impact of the knowledge of difference in color descriptions. One limitation of this study was the restricted age range given that college students were used as participants. Overall this study provides important new information for persons interested in gender differences in the use of language concerning color.

REFERENCES

Anyan, W. R., & Quillian, W. W. (1971). The naming of primary colors by children. *Child Development*, **42** (5), 1629-1632.

Bauer, P. J., Stennes, L., & Haight, J. C. (2003). Representation of the inner self in autobiography: Women's use of internal states language in personal narratives. *Memory*, **11** (1), 27-43.

Bimler, D. L., Kirkland, J., & Jameson, K. A. (2004). Quantifying variations in personal color spaces: Are these sex differences in color vision? *Color Research & Application*, **29** (2), 128-134.

Bradley, M. M., & Lang, P. J. (1999). *Affective Norms for English Words (ANEW): Stimuli, instruction manual and affective ratings.* (Technical report C-1). Gainesville, FL. The Center for Research in Psychophysiology, University of Florida.

Delgado, A. R., & Prieto, G. (2003). Sex-related differences in lexical access to color. *Psicothema*, **15** (3), 484-488.

Edwards, R. (1998). The effects of gender, gender role and values. *Journal of Language & Social Psychology*, **17** (1), 52-59.

Elias, L. J., Saucier, D. M., Nylen, K., & Cheesman, J. (2003). Female advantage in speeded colour naming: A special naming factor or superior motor sequencing? *Perceptual & Motor Skills*, **96** (3), 955-961.

Franzwa, G., & Lockhart, C. (1998). The social origins and maintenance of gender: Communication styles, personality types and grid-group theory. *Sociological Perspectives*, **41** (1), 185-209.

Kaya, N., & Epps, H. H. (2004). Relationship between color and emotion: A study of college students. *College Student Journal*, **38** (3), 396-406.

Koch, S. C., Mueller, B., Kruse, L., & Zumbach, J. (2005). Constructing gender in chat groups. *Sex Roles*, **53** (1/2), 29-41.

Leichsenring, F. (2004). The influence of color on emotions in the Holtzman Inkblot technique. *European Journal of Psychological Assessment*, **20** (2), 116-123.

Lyons, J. (1995). Colour in language. In T. Lamb & J. Bourriau (Eds.), *Colour: Art & science* (pp. 194-224). New York: Cambridge University Press.

Meyers, R. A., Brashers, D. E., Winston, L., & Grob, L. (1997). Sex differences and group argument: A theoretical framework and empirical investigation. *Communication Studies*, **48**, 19-41.

Mulac, A., Bradac, J., & Gibbons, P. (2001). Empirical support for the gender-as-culture hypothesis: An intercultural analysis of male/female language differences. *Human Communication Research*, **27** (1), 121-153.

Noller, P. (1993). Gender and emotional communication in marriage: Different cultures or differential social power? *Journal of Language and Social Psychology*, **12**, 132-152.

Nourse, J. C., & Welch, R. B. (1971). Emotional attributes of color: A comparison of violet and green. *Perceptual & Motor Skills*, **32** (2), 403-406.

Nowaczyk, R. H. (1982). Sex-related differences in the color lexicon. *Language & Speech*, **25** (3), 257-265.

Perez-Carpinell, J., Baldovi, R., de Fez, M. D., & Castro, J. (1998). Color memory matching: Time effect and other factors. *Color Research & Application*, **23** (4), 234-247.

Rich, E. (1977). Sex-related differences in color vocabulary. *Language & Speech*, **20** (4), 404-409.

Simon, R. W., & Nath, L. E. (2004). Gender and emotion in the United States: Do men and women differ in self-reports of feelings and expressive behavior? *American Journal of Sociology*, **109** (5), 1137-1176.

Simpson, J., & Tarrant, A. W. S. (1991). Sex and age-related differences in colour vocabulary. *Language and Speech*, **34** (1), 57-62.

Thomas, L. L., Curtis, A. T., & Bolton, R. (1978). Sex differences in elicited color lexicon size. *Perceptual & Motor Skills*, **47** (1), 77-78.

Xin, J. H., Cheng, K. M., Taylor, G., Sato, T., & Hansuebsai, A. (2004). Cross-regional comparison of colour emotions Part I: Quantitative analysis. *Color Research & Application*, **29** (6), 451-457.

Yang, Y. (2000). Sex and skill differences in translation of English color words by Chinese students. *Perceptual & Motor Skills*, **91** (3), 1181-1192.