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Facial masculinity is a cue to women's dominance

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ABSTRACT

Although there is compelling evidence for associations between facial masculinity and indices of dominance in men, comparatively few studies have tested for corresponding associations in women. Here we found that (1) ratings of women's facial masculinity were correlated with their scores on a dominance questionnaire, and (2) prototypes with the average facial characteristics of women with high scores on the dominance questionnaire were judged to be more masculine than prototypes with the average facial characteristics of women with low scores, even when color and texture cues were kept constant to control for effects of makeup use. These findings suggest an association between facial masculinity and dominance in women, complementing prior work reporting that masculine women are *perceived* to be more dominant than their relatively feminine peers.

1. Introduction

Many researchers have highlighted the importance of dominance perceptions for social behavior in humans (reviewed in Puts, 2010). For example, a recent model of social judgments of faces showed that perceptions of others' dominance are a key predictor of a range of assessments about their personality, appearance, emotional state, and preferences (Oosterhof & Todorov, 2008). Indeed, adults and young children judge others' dominance from facial cues in similar ways, suggesting that dominance plays a fundamental role in social perception from a young age (Keating & Bai, 1986).

Prior work has demonstrated accurate perception of men's dominance from facial cues (reviewed in Watkins, Jones, & DeBruine, 2010). For example, dominance ratings of men's faces are positively correlated with indices of upper body strength (Fink, Neave, & Seydel, 2007; see also Gallup, O'Brien, White, & Wilson, 2010 and Sell et al., 2009) and social status (Mueller & Mazur, 1996). These findings appear to reflect the association between perceived dominance and masculine characteristics (reviewed in Puts, 2010; Watkins et al., 2010); Fink et al. (2007) and Mueller and Mazur (1996) reported that the more dominant men in their studies possessed more masculine facial characteristics. Consistent with these findings, Pound, Penton-Voak, and Surridge (2009) reported that both facial masculinity and dominance are positively correlated with men's testosterone responses to competition, suggesting that both characteristics may reflect the effects of testosterone surges during puberty.

Although there is compelling evidence linking masculine facial characteristics to indices of men's dominance, few studies have investigated the relationship between facial masculinity and indices of women's dominance. Moreover, results from these studies are inconsistent. In one case, sexually dimorphic facial proportions predicted aggression among men, but not among women (Carre & McCormick, 2008). Additionally, Gallup, O'Brien, White, and Wilson (2010) found that aggressiveness and dominance ratings of young women's faces were not correlated with their upper body strength, although these correlations were significant in men. In another case, observers could accurately judge both men's and women's fighting ability from facial appearance alone, although judgments of women were less accurate than judgments of men (Sell et al., 2009).

Here we investigated the relationship between women's scores on the dominance subscale of the International Personality Items Pool (IPIP, http://ipip.ori.org/ipip/; Goldberg, 1999), a questionnaire that has previously been used to assess individual differences in dominance (e.g., Havlicek, Roberts, & Flegr, 2005; Watkins et al., 2010), and ratings of women's facial masculinity. Following research on men's appearance and dominance (e.g., Fink et al., 2007), we predicted that the faces of women with high scores on the dominance subscale would be rated as less feminine (i.e., more masculine) than those of women with low scores.

2. Study 1

We investigated the relationship between scores on the dominance subscale of the IPIP and rated facial femininity in two

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samples of young adult women (Samples A and B). Because femininity and attractiveness ratings of women's faces are highly correlated (see Rhodes, 2006 for a meta-analytic review), we controlled for the possible effects of women's facial attractiveness in our analyses.

2.1. Methods

2.1.1. Face stimuli and dominance questionnaire

For Sample A, full-face photographs of 93 women (mean age = 19.82 years, SD = 2.17 years) were taken under standardized photographic conditions. For Sample B, 43 different women (mean age = 19.40 years, SD = 1.30 years) were photographed under identical conditions. None of the women were photographed wearing glasses and women were instructed to look at the camera with a neutral expression and direct gaze when the photograph was taken. Images were masked so that hairstyle and clothing were not visible. All women were undergraduate students at the University of Aberdeen, participating for course credit. An additional 19 women were photographed under the same lighting conditions and around the same time as the images in Sample B were collected. These 19 images were not included in Study 1 because the women did not consent for their photographs to be shown as individual images in our research.

Each participant also completed the dominance subscale of the International Personality Items Pool (IPIP, http://ipip.ori.org/ipip/), which assesses the extent to which respondents dominate their peers during social interactions (Goldberg, 1999). This questionnaire has been used to assess individual differences in dominance in previous studies (e.g., Havlicek et al., 2005; Watkins et al., 2010) and consists of 11 statements (e.g., "I impose my will on others"). Participants indicate how accurately each statement describes them by choosing from the options 'very accurate', 'moderately accurate', 'neither accurate nor inaccurate', 'moderately inaccurate', and 'very inaccurate'.

In Sample A, scores on the dominance subscale ranged from 12 to 44 (M = 27.92, SD = 7.22). In Sample B, scores ranged from 17 to 47 (M = 28.91, SD = 6.84). Reliability was good in both samples (Cronbach's alphas: Sample A = .79; Sample B = .75). High scores indicate high dominance.

2.1.2. Face ratings

The face images were rated for femininity using a 1 (very masculine) to 7 (very feminine) scale (Sample A raters: 8 men, 8 women, mean age = 23.6 years, SD = 4.2 years; Sample B raters: 3 men, 12 women, mean age = 21.8 years, SD = 4.6 years). The face images were also rated for attractiveness using a 1 (very unattractive) to 7 (very attractive) scale (Sample A raters: 5 men, 8 women, mean age = 22.3 years, SD = 3.9 years; Sample B raters: 7 men, 9 women, mean age = 22.9 years, SD = 5.9 years). The order in which faces were presented was fully randomized and ratings were self-paced (i.e., each image remained onscreen until the participant had rated it and there was no time limit set on how quickly the participant had to respond). Images were presented at 400 × 300 pixels. None of the individuals depicted in the photographs were known to the raters and none of the raters had been photographed for the study.

Inter-rater agreement for both ratings was high in both samples (Cronbach's alphas: Sample A attractiveness = .97; Sample A femininity = .97; Sample B attractiveness = .95; Sample B femininity = .95). We therefore calculated the average femininity rating for each face and, separately, the average attractiveness rating for each face. Men's and women's ratings were highly correlated for both judgments in both samples (Sample A attractiveness: r = .75, N = 93, p < .001; Sample A femininity: r = .79, N = 93, p < .001; Sample B attractiveness: r = .71, N = 43, p < .001; Sample B femininity: r = .74, N = 43, p < .001). Consequently, we did not consider sex of rater in subsequent analyses.

2.2. Results

2.2.1. Sample A

A regression analysis, in which scores on the dominance subscale were entered as the dependent variable and attractiveness ratings and femininity ratings were entered as predictors (F(2,90) = 2.71, p = .072), revealed a significant negative relationship between women's scores on the dominance subscale and their femininity ratings (t = −2.16, standardized beta = −.32, p = .033). The relationship between women's scores on the dominance subscale and their attractiveness ratings was not significant, however (t = 0.93, standardized beta = .14, p = .36). Including age as an additional predictor did not alter this pattern of results (F(3,89) = 1.80, p = .15; femininity: t = −2.12, standardized beta = −.31, p = .037; attractiveness: t = 0.90, standardized beta = .13, p = .37).

2.2.2. Sample B

Data for Sample B were analyzed in the same way (F(2,40) = 3.61, p = .036). Again, there was a significant negative relationship between women's scores on the dominance subscale and their femininity ratings (t = −2.37, standardized beta = −.51, p = .023). By contrast with Sample A, however, there was a significant positive relationship between women's scores on the dominance subscale and their attractiveness ratings (t = 2.60, standardized beta = .56, p = .013). Including age as an additional predictor did not alter this pattern of results (F(3,39) = 2.40, p = .08; femininity: t = −2.38, standardized beta = −.52, p = .023; attractiveness: t = 2.58, standardized beta = .56, p = .014).

3. Study 2

In Study 1, regression analyses showed that women's scores on the dominance subscale of the IPIP were negatively and significantly correlated with femininity ratings in both samples of faces. In Study 2, we investigated whether the tendency for the faces of more dominant women to be perceived as more masculine also occurred when we used computer graphic methods to create 'high dominance' and 'low dominance' prototype faces (i.e., prototypes with the average color, texture, and shape information for women with the highest and lowest scores on the dominance subscale, respectively) for each sample. This method has previously been used to investigate relationships between facial appearance and hormone levels (e.g., Moore et al., 2011), symmetry (e.g., Jones et al., 2004), and personality (e.g., Little & Perrett, 2007). If the 'high dominance' prototypes are perceived as more masculine than the 'low dominance prototypes', this will suggest that the facial correlates of dominance are systematic, rather than idiosyncratic for each woman. Although the correlations reported in Study 1 suggest that perceptions of facial masculinity are systematically related to women's dominance scores, the specific features and/or configurations of features that underpin this relationship could be either consistent or highly variable across individual faces. The methods used in Study 2 address this issue by isolating the specific facial features that are consistent across the high and low dominance samples, respectively (Tiddeman, Burt, & Perrett, 2001).

3.1. Methods

The 'high dominance' prototype for Sample A was manufactured using the photographs of the 33 women with the highest scores on the dominance subscale in Sample A (i.e., the most