



## The influence of facial masculinity and voice pitch on jealousy and perceptions of intrasexual rivalry

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### ABSTRACT

The assessment of same-sex individuals as intrasexual competitors may depend in part on the perceived mate value of potential rivals. Men's and women's preferences for vocal and facial masculinity suggest that feminine women and masculine men may be perceived as more threatening intrasexual competitors. We tested the influence of men's and women's vocal and facial masculinity on preferences for who should accompany romantic partners on a weekend trip and on jealousy in response to imagined flirting. We found that men and women preferred their partners to be accompanied by people who had less masculine/feminine voices, and were more jealous in response to people who had relatively more masculine/feminine voices. Women, but not men, rated faces with exaggerated sex-typical characteristics as undesirable travel companions for their romantic partners and reported more jealousy in response to imagined flirting from such faces. We also found that participants who rated masculine male and feminine female stimuli as more attractive also perceived such stimuli as greater intrasexual threats, demonstrating individual differences in competition-related social perceptions. Our findings indicate that perceptions related to intrasexual competition are related to cues to underlying mate quality, which may aid in effective mate guarding.

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### 1. Introduction

Jealousy may be an adaptive response to perceived pair-bond threats, though not all potential competitors will elicit equivalent jealous responses (Buss, Shackelford, Choe, Buunk, & Dijkstra, 2000). Individuals possessing traits indicating relatively high mate value may be perceived as greater threats to relationships than those without such traits (Dijkstra & Buunk, 1998, 2001).

Female characteristics such as a higher-pitched voice, feminine facial structure, and a feminine waist-to-hip ratio are traits preferred by men (for review see Feinberg, 2008; Little, Jones, & DeBruine, 2011). Women also report more intense jealousy when rating attractive female faces (Massar & Buunk, 2010) and bodies (Dijkstra & Buunk, 2001; Massar & Buunk, 2009). Vocal (Abitbol, Abitbol, & Abitbol, 1999), facial (Law Smith et al., 2006), and body (Jasienska, Ziomkiewicz, Ellison, Lipson, & Thune, 2004) femininity communicate relatively higher estrogen levels, which are positively related to reproductive potential (Venners et al., 2006). Therefore, estrogen-dependent traits may cue underlying mate quality (for review see Feinberg, 2008; Little et al., 2011), and may elicit jealousy among other women.

Among men, lower-pitched, masculine voices (Dabbs & Mallinger, 1999; Hollien, 1960), masculine facial structure (Verdonck, Gaethofs, Carels, & De Zegher, 1999) and body configuration are testosterone-dependent traits (Kasperk et al., 1997). Testosterone levels are positively associated with indices of health (Feely, Saad, Guay, & Traish, 2009), dominant behavior, and social status (Mazur & Booth, 1998). Also, facial masculinity is positively correlated with measures of perceived and actual health (Rhodes, Chan, Zebrowitz, & Simmons, 2003; Thornhill & Gangestad, 2006). Furthermore, masculine men's faces and voices are perceived as relatively more dominant (Feinberg et al., 2006; Jones, Feinberg, DeBruine, Little, & Vukovic, 2010; Perrett et al., 1998). Indeed, men and women are more likely to follow the gaze of masculine faces, demonstrating that images of faces can influence dominance-related behaviors (Jones et al., 2010). Therefore, testosterone-dependent traits may communicate health and/or dominance.

Women generally prefer relatively masculine men's voices and bodies (Collins, 2000; Feinberg, Jones, Little, Burt, & Perrett, 2005; Hodges-Simeon, Gaulin, & Puts, 2010; Jones, Feinberg, et al., 2010). Both vocal and facial masculinity preferences increase with conception risk (Feinberg et al., 2006; Penton-Voak et al., 1999; Puts, 2005) and for short-term relationships (Little, Jones, Penton-Voak, Burt, & Perrett, 2002; Puts, 2005). Women who are open to casual sex, as indicated by the sociosexual orientation inventory (Simpson & Gangestad, 1991), prefer relatively masculine men's faces

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(Waynforth, Delwadia, & Camm, 2005) and bodies (Provost, Kormos, Kosakoski, & Quinsey, 2006). As masculinity preferences are greater among women in seek of short-term and potentially extra-pair relationships, men possessing relatively more masculine traits may be perceived by other men as particularly threatening to pair-bond fidelity (Dijkstra & Buunk, 2001; Kruger, 2006; Massar & Buunk, 2009).

Men's jealous responses to imagined scenarios are elicited by traits such as body masculinity (Dijkstra & Buunk, 2001; Massar & Buunk, 2009). Similarly, Kruger (2006) found that men chose feminized male faces more often than masculinized men's faces when asked to choose the man they would prefer accompany their girlfriend on a short trip to another city, suggesting that men perceive males with masculine faces as a greater threat to pair-bond fidelity than males with feminine faces. It is unknown if these perceptions of potential rivalry are tied to attractiveness, or alternatively, some knowledge of underlying mating strategies. Furthermore, it is unknown whether these attributions generalize to other testosterone-dependent traits, and whether prior findings extend to women's perceptions.

Here, we tested the influence of vocal and facial masculinity on perceptions of how jealous people would be if the person were flirting with their partner, or who they would prefer accompany their partner on a weekend trip, as well as the degree to which these perceptions are related to perceptions of attractiveness. If jealousy responses and/or preferences for partner accompaniment are influenced by cues to underlying mate quality, then jealousy responses and preferences for partner accompaniment may correlate with the degree to which they find masculinity/femininity attractive.

## 2. Methods

### 2.1. Participants

This study was approved by the McMaster Research Ethics Board. Heterosexual men ( $N = 40$ ; mean age = 19.22 years,  $SD = 1.82$ ) and women ( $N = 39$ ; mean age = 18.72 years,  $SD = 0.97$ ) were recruited from McMaster University and compensated with course credit. Participant age, relationship status, and sexual orientation (Kinsey, Pomeroy, & Martin, 1948) were self-reported.

### 2.2. Stimuli

Participants (6 women, 6 men) aged 18–24 were photographed in color, with a neutral facial expression, under standardized lighting conditions. Computer graphics software (Tiddeman, Burt, & Perrett, 2001) was used to create a masculinized and feminized version of each face in the same manner as Perrett et al. (1998). Faces were masked to remove visual cues of hairstyle, facial jewellery, and clothing. This method of facial stimuli creation has been widely and successfully used in studies of face preferences (for review, see Feinberg, 2008), and has been validated in a number of studies (DeBruine, Jones, Smith, & Little, 2010; DeBruine et al., 2006).

Voice stimuli were collected from participants aged 18–24 (6 women, 6 men), speaking the English monophthong vowels; 'ah' as in father, 'ee' as in see, 'eh' as in bet, 'oh' as in note, 'oo' as in boot. Single channel recordings were made in a quiet room with an Audio-Techica AT4041 microphone at a 44.1 kHz sampling rate, with 16-bit amplitude quantization in Sound Forge software (Sony Creative Software).

We created two versions of each recording, a feminized version with raised pitch, and a masculinized version with lowered pitch. Pitch was modified using the pitch-synchronous overlap add (PSO-

LA<sup>®</sup> France Telecom) method in Praat software (Boersma & Weenink, 2009). Pitch was raised and lowered by adding or subtracting 0.5 equivalent rectangular bandwidths (ERBs) of the baseline frequency. This level of manipulation has been successful in previous research on voice pitch (Apicella & Feinberg, 2009; Feinberg, DeBruine, Jones, & Perrett, 2008; Jones, Feinberg, et al., 2010).

### 2.3. Procedure

Same-sex face and voice pairs were presented in separate, randomized blocks within three different rating contexts (jealousy, weekend trip, attractiveness). Within blocks, stimuli pairs were randomized for order and side of screen presentation.

Stimuli pairs were masculine and feminine versions of the same voice or face, presented in a two-alternative forced choice paradigm. Faces were presented simultaneously on either side of the screen. Voices were played consecutively, prompted by the participant selecting the 'play' button for the individual file. Participant responses automatically loaded the next trial.

Participants rated same-sex voices and faces within three contexts. First, following Kruger (2006), we asked participants to indicate which, from a pair of voices/faces, they would prefer to accompany their romantic partner on a weekend trip. Second, we asked participants to indicate which, from a pair of voices/faces, would make them more jealous if flirting with their romantic partner, which provided a measure of the degree to which potential rivals induced jealousy. Third, participants were asked to indicate which, from a pair of voices/faces, was more attractive. All participants were instructed to imagine they had a partner if they were not currently in a relationship.

## 3. Results

We calculated the proportion of trials in which women selected feminized female stimuli and men selected masculinized male stimuli, per rating context. We reverse coded the weekend accompaniment variable (1-proportion of trials participant selected sex-typical voice/face) to reflect the proportion of trials in which participants chose sex-typical stimuli as *undesirable* travel companions for their romantic partner. All analyses were done using two-tailed probability estimates.

One-sample Wilcoxon signed-rank tests against chance (0.5) were used to determine if pitch manipulations influenced participant's selection of voices and faces, for each sex separately (see Fig. 1). In the weekend context, women selected feminized female voices ( $Z = 4.34$ ,  $P < .001$ ) and faces ( $Z = 3.42$ ,  $P = .001$ ) as undesirable travel companions for their romantic partner on significantly greater proportion of trials than would be predicted by chance. In the jealousy and attractiveness contexts, women selected feminized female voices (jealousy:  $Z = 4.91$ ,  $P < .001$ , attractiveness:  $Z = 4.52$ ,  $P < .001$ ) and faces (jealousy:  $Z = 5.44$ ,  $P < .001$ , attractiveness  $Z = 5.09$ ,  $P < .001$ ) significantly more often than chance.

In the weekend context, men selected feminized men's voices ( $Z = 4.09$ ,  $P < .001$ ) as preferred travel companions for their romantic partner on a significantly greater proportion of trials than would be predicted by chance. Men reported jealousy in response to masculinized men's voices that was significantly greater than chance ( $Z = 5.13$ ,  $P < .001$ ). There was no significant effect of face manipulations on the proportion of trials in which men selected masculinized male faces for either the weekend ( $Z = -0.17$ ,  $P = .862$ ) or jealousy ( $Z = -1.13$ ,  $P = .257$ ) contexts. Men selected feminized male faces as more attractive ( $Z = -3.80$ ,  $P < .001$ ) significantly more often than chance. There was no significant effect of pitch manipulations on the proportion of trials in which men chose masculine male voices as more attractive ( $Z = 1.26$ ,  $P = .207$ ).

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