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Correlated preferences for men's facial and vocal masculinity

David R. Feinberg[a,*], Lisa M. DeBruine[b], Benedict C. Jones[b], Anthony C. Little[c]

[a]*Department of Psychology, Neuroscience, and Behaviour, McMaster University, Canada*
[b]*School of Psychology, University of Aberdeen, UK*
[c]*School of Psychology, Stirling University, UK*

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Abstract

Previous studies have reported variation in women's preferences for masculinity in men's faces and voices. Women show consistent general preferences for vocal masculinity, but highly variable general preferences for facial masculinity. Within individuals, men with attractive voices tend to have attractive faces, suggesting common information may be conveyed by these cues. Here we tested whether men and women with particularly strong preferences for male vocal masculinity also have stronger preferences for male facial masculinity. We found that masculinity preferences were positively correlated across modalities. We also investigated potential influences on these relationships between face and voice preferences. Women using oral contraceptives showed weaker facial and vocal masculinity preferences and weaker associations between masculinity preferences across modalities than women not using oral contraceptives. Collectively, these results suggest that men's faces and voices may reveal common information about the masculinity of the sender, and that these multiple quality cues could be used in conjunction by the perceiver in order to determine the overall quality of individuals.

Keywords: Face; Voice; Femininity; Hormonal contraceptive; Birth control; Pill

1. Introduction

Among humans, face, voice, and body attractiveness are influenced by their degree of masculinity or femininity (DeBruine et al., 2006; Fan, Dai, Liu, & Wu, 2005; Fan, Liu, Wu, & Dai, 2004; Feinberg, DeBruine, Jones, & Perrett, in press; Feinberg et al., 2006b; Feinberg, Jones, Little, Burt, & Perrett, 2005b; Perrett et al., 1998; Rhodes, Hickford, & Jeffery, 2000). In turn, it has been demonstrated that sex hormones (primarily testosterone, progesterone, and estrogen) are related to the degree of masculinity and femininity displayed by men's and women's faces (Law-Smith et al., 2006; Penton-Voak & Chen, 2004; Roney, Hanson, Durante, & Maestripieri, 2006), voices (Abitbol, Abitbol, & Abitbol, 1999; Alonso & Rosenfield, 2002; Brukert, Lienard, Lacroix, Kreutzer, & Laboucher, 2006; Dabbs & Mallinger 1999; Feinberg, Jones DeBruine, et al., 2006), and bodies (Jasienska, Ziomkiewicz, Ellison, Lipson, & Thune, 2004). It is likely that males displaying testosterone-dependent traits to a greater degree can afford to produce such traits despite the immunosuppressive effects (Folstad & Karter, 1992; Thornhill & Gangestad, 1999), antisocial behavior (Archer, Birring, & Wu, 1998; Book, Starzyk, & Quinsey, 2001; Gonzalez-Bono et al., 1999; O'Connor, Archer, & Wu, 2004; Rowe, Maughan, Worthman, Costello, & Angold, 2004; Studer, Aylwin, & Reddon, 2005; Tremblay et al., 1998), and tendency to take risks (Archer, 1999; Booth et al., 1999) that are thought to be associated with high testosterone levels. Thus, facial and vocal masculinity may be considered cues of costly testosterone levels. Furthermore, men in a natural-fertility population with low voice pitch have higher reproductive success than men with relatively high voice pitch do (Apicella et al. In Press).

There is substantial evidence that people who are attractive in one domain (e.g., face, voice, or body) are also attractive in other domains (Collins & Missing, 2003; Feinberg, Jones, DeBruine et al., 2005; Hughes, Dispenza, & Gallup, 2004; Saxton, Caryl, & Roberts, 2006; Thornhill & Grammer, 1999). Indeed both men's (Saxton et al., 2006) and women's (Collins & Missing, 2003; Feinberg,

* Corresponding author.
E-mail address: feinberg@mcmaster.ca (D.R. Feinberg).

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Jones, DeBruine, et al., 2005) facial attractiveness are positively correlated with the attractiveness of their voices. Both men and women with attractive voices and faces also tend to have attractive body configurations, such as low fluctuating asymmetry (Hughes, Harrison, & Gallup, 2002) in women and a masculine upper-body shape in men (Hughes et al., 2004).

The findings described above suggest that humans display multiple cues to the same underlying quality. However, a few key questions regarding the evolution of multiple quality cues in humans remain unresolved. While many studies show that women have consistent preferences for masculine men's voices across studies (Collins, 2000; Feinberg, Jones, Law-Smith, et al., 2006; Feinberg et al., 2004; Saxton et al., 2006), different studies have yielded preferences in women for masculine (DeBruine et al., 2006; Johnston, Hagel, Franklin, Fink, & Grammer, 2001), average (Cornwell et al., 2004; Swaddle & Reierson, 2002), and feminine (Perrett et al., 1998; Rhodes, Hickford, & Jeffery, 2000) men's faces. It has been suggested that differences in the computer graphic methods that have been used in different studies of preferences for masculinity in men's faces may explain these variable findings for women's face preferences (Penton-Voak & Chen, 2004; Rhodes, 2006; Swaddle & Reierson, 2002). However, studies using the same method to manipulate masculinity in male faces have found different general preferences: DeBruine et al. (2006) reported a general preference for masculinity among women, Cornwell et al. (2004) found that average faces were generally preferred by women to feminized or masculinized versions, and Perrett et al. (1998) reported that women demonstrated strong aversions to masculinity in men's faces. More important, DeBruine et al. (2006) compared the strength of women's preferences for masculine faces using different types of computer graphic methods, finding that women who preferred facial masculinity did so for each type of manipulation.

Given that both male vocal and facial masculinity are influenced by testosterone, and masculinity and femininity affect voice and face attractiveness, why are women's preferences for masculinity in the voice consistently above chance, but women's preferences for masculinity in the face vary considerably more from study to study? Studies have revealed a great deal of individual variation in female preferences for both facial and vocal masculinity. Sources of variation in women's preferences for male vocal masculinity that have been identified to date include relationship context (Puts, 2005), menstrual cycle phase (Feinberg, Jones, Law-Smith, et al., 2006; Puts, 2005), and height (Feinberg, Jone, Little, et al., 2005). Women prefer masculinity more when in the most fertile menstrual cycle phase (Feinberg, Jones, Law-Smith, et al., 2006; Puts, 2005) and when rating voices as potential short-term partners (Puts, 2005). Taller and heavier women also prefer men with voice characteristics rated as more masculine sounding (Feinberg, Jone, Little, et al., 2005). Similar sources of systematic variation in *face preferences* have also been found (see Table 1 for an extensive list of studies).

This overlap in sources of individual differences (i.e., menstrual cycle and relationship context) between face and voice is consistent with the hypothesis that preferences for masculinity in men's faces and voices may be concordant, despite variation across studies in women's generalized preferences for male facial masculinity. Indeed, previous studies showing positive associations between the strength of women's preferences for masculinity in men's faces and both putative male pheromones (Cornwell et al., 2004) and the reported masculinity of partnered women's romantic partners (DeBruine et al., 2006) suggest correlated preferences for masculinity in different domains. Nevertheless, while Feinberg, Jones, Law-Smith, et al. (2006) found that women with the *lowest* average estrogen levels demonstrated the largest cyclic shifts in vocal masculinity preferences, Welling et al. (in press) found that women with the *highest* average estrogen levels demonstrated the largest cyclic shifts in facial masculinity preferences (see also Johnston et al., 2001, for further evidence that particularly feminine women

Table 1
Potential sources of variation in women's preferences for male facial masculinity

Potential source of variation in facial masculinity preference	Direction of relationship with facial masculinity preferences	Study
Being in a committed relationship	−	Little et al. (2002)
Rating faces in a relationship context		
Short-term	+	Little et al. (2002)
Long-term	−	
Oral contraceptive use	Can mask masculinity preferences	Little et al. (2002)
Self-rated attractiveness	+	Little et al. (2001)
Women's attractiveness as rated by men	+	Penton-Voak et al. (2003)
Waist–hip ratio	−	Penton-Voak et al. (2003)
Menstrual-cycle phase	− at nonfertile phases	Frost (1994), Johnston et al. (2001), Penton-Voak and Perrett (2000), Penton-Voak et al. (1999)
State progesterone level	− as progesterone increases	Jones, Little, et al. (2005)
State testosterone level	+ as testosterone increases	Welling et al. (2007)
Second-to-fourth digit ratio	+	Scarbrough and Johnston (2005)
Age	+	Little et al. (2001)
Paternal investment	−	Penton-Voak et al. (2004)

show larger cyclic shifts in preferences for faces of masculine men).

Since any costs of producing multiple ornaments will outweigh the benefits of redundant ornaments, why would men produce more than one cue to testosterone levels? While both facial and vocal masculinity are influenced by testosterone, neither facial nor vocal masculinity is perfectly correlated with testosterone levels. In other words, each cue also has a degree of error (Candolin, 2003; Møller & Pomiankowski, 1993). Indeed, people can modify their voice pitch (within physiological constraints) and their apparent facial masculinity (e.g., altering brow height; Campbell, Benson, Wallace, Doesbergh, & Coleman, 1999). Thus, it is possible that there remains selection pressure from receivers for senders to produce multiple cues to the same underlying quality in order to (a) more easily detect dishonesty, (b) reduce error in cue perception, or both. Both proximate explanations result in an ultimate effort to evoke a more robust assessment of the sender's overall quality. If multiple quality cues are used by receivers to detect dishonest cues, it may then be an evolutionarily stable strategy (Maynard-Smith, 1976) for senders to produce consistent multiple quality cues. Alternatively, senders' multiple quality cues could merely demonstrate to receivers that they are of such quality that they can spend their resources on more than one ornament if such ornaments themselves are costly.

There is evidence of inconsistencies between generalized vocal and facial masculinity preferences and also inconsistencies in the nature of individual differences in the strength of masculinity preferences. Furthermore, although it has been demonstrated numerous times that people are sending multiple quality cues across visual and vocal domains, it is unknown if these cues are used in a consistent manner. To address these issues, we examined the extent to which the strength of men's and women's preferences for male facial masculinity is associated with the strength of their preferences for male vocal masculinity. As studies have shown that hormonal contraception is associated with a disruption of potentially adaptive facial masculinity preferences (Little, Jones, Penton-Voak, Burt, & Perret, 2002) and a disruption of correlations between preferences for male-typical putative pheromones and facial masculinity preferences (Cornwell et al., 2004), we investigated whether women using hormonal contraceptives have similar face and voice masculinity preferences to those not using hormonal contraceptives. As others have found that relationship status (partnered vs. single) affects facial masculinity preferences (Little et al., 2002), we also investigated the role of relationship status on the association between facial and vocal masculinity preferences.

2. Methods

Protocols were approved by the ethics committee at the School of Psychology, University of Aberdeen (UK).

2.1. Participants

As Internet research on face attractiveness is commonplace and produces results similar to those of laboratory studies (Feinberg, Jones DeBruine, et al., 2005; Feinberg et al., in press; Jones et al., in press; Wilson & Daly, 2004), the experiment was run online. Recent research has also demonstrated that Internet-based studies on voice attractiveness (using voice pitch manipulations of the same strength as used in the current study) reveal preferences that are consistent with laboratory studies, and that the use of varied computer speakers in these studies does not affect the ability to perceive voice attractiveness, femininity, and age in a manner consistent with use of sets of identical, professional-quality headphones (Feinberg et al., in press). Data from repeat user IDs were excluded from analysis (following Kraut et al., 2004). Participants were 1759 people (age range 17–40 years; mean age=24.3 years, S.D.=6.042 years; 1213 women) recruited from lists of online psychology experiments and through the media.

2.2. Stimuli

Here we used face stimuli from DeBruine et al. (2006) to test preferences for facial masculinity. These were six male faces that had been masculinized and feminized by changing two-dimensional (2-D) shape by ±50% of the vector shape differences between an average male face and an average female face. This technique is also identical to facial masculinity manipulations used in many other studies of preferences for masculinity in male faces (see DeBruine et al., 2006, for a review). DeBruine et al. (2006) have previously demonstrated that the versions of these face images with increased masculinity of 2-D shape are perceived as more masculine and dominant than the versions in which masculinity of 2-D shape was reduced (see also Welling et al., in press).

To create masculine and feminine voices, six men's voices (spanning the normal range of male voice pitch) were manipulated in pitch (i.e., perception of fundamental frequency and corresponding harmonics) ±20 Hz, using methods identical to those of Feinberg, Jones, Little, et al. (2005). Briefly, Praat's (Boersma & Weenink, 2007) pitch-synchronous overlap add algorithm was applied to the signal to manipulate the fundamental frequency and corresponding harmonics independently of other acoustic features (i.e., formant frequencies) associated with perceived masculinity (Feinberg, Jones, Little, et al., 2005). These methods have not only been used in several studies of attractiveness and dominance judgments of human voices (Feinberg, Jones, Law-Smith, et al., 2006; Feinberg et al., 2005b; Puts, Gaulin, & Verdolini, 2006), but also by several researchers studying the relationship between perceptions of these acoustic manipulations and social behavior in red deer (Reby et al., 2005) and rhesus macaques (Fitch & Fritz, 2006; Ghazanfar et al., 2007). See Fig. 1 for illustrations of face and voice stimuli.

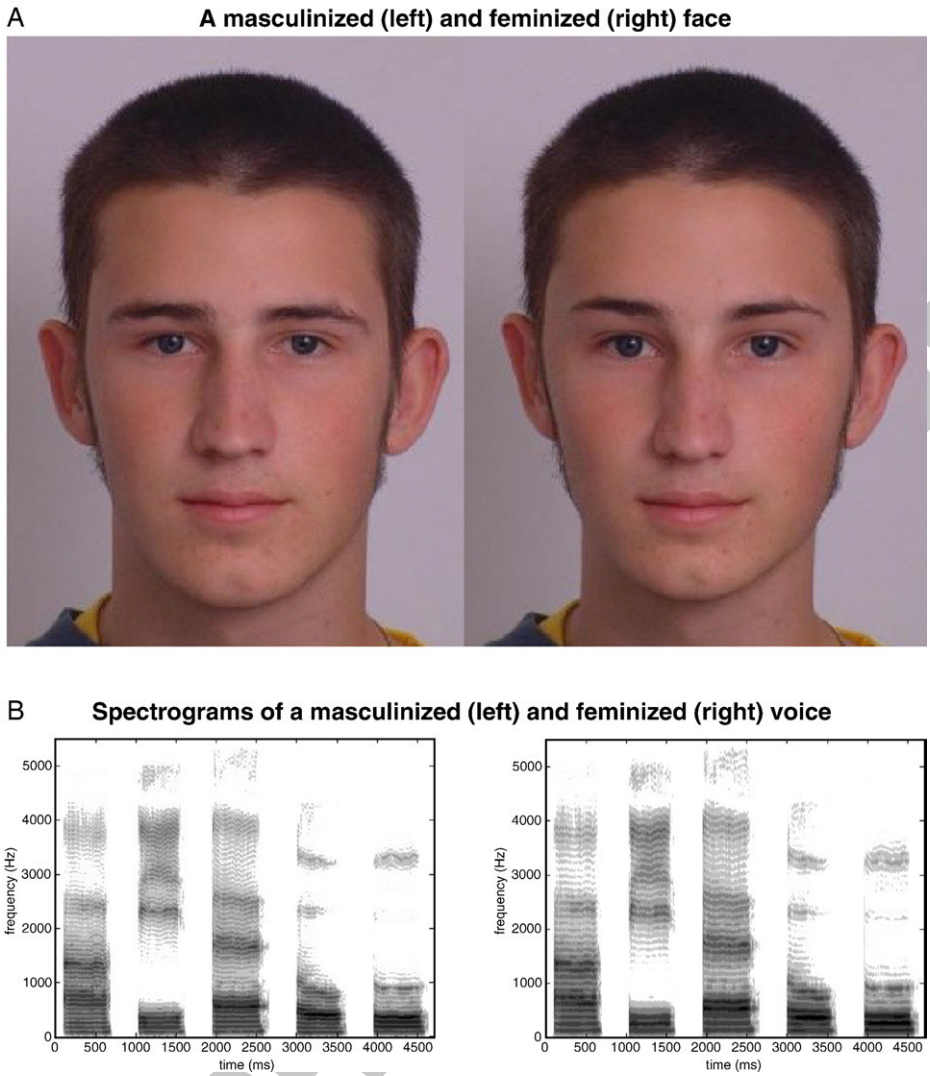

Fig. 1. Masculinized and feminized faces (A) and spectrograms of masculinized and feminized voices (B). Harmonic spacing (distance between the thin horizontal lines) is equal to the fundamental frequency (pitch) of the voice. Thus the voice on the left side of (B) has a lower pitch than the voice on the right side of (B). Note that the formant frequencies (dark bands on the spectrogram) and time (*x*-axis) do not change when pitch has been manipulated.

2.3. Procedure

Voices and faces were presented in separate blocks in random order. Masculine and feminine stimuli were presented in a forced-choice paradigm: Voices were presented side by side and participants chose how much they preferred either voice or face by selecting one of the ratings above the stimulus preferred. Faces were presented in an identical fashion. For voices, both voices were not played simultaneously, but rather, participants pushed play buttons on-screen to hear each voice individually. This method of forced-choice voice presentation has been used in other Internet-based studies of voice attractiveness (Feinberg et al., in press). All orders of stimuli presentation and the side that stimuli were presented on were fully randomized.

Subsets of female raters self-reported whether or not they are currently using hormonal contraceptives or have used hormonal contraceptives within the last 3 months prior to testing (Feinberg, Jones, Law-Smith, et al., 2006; Jones, Perrett, et al., 2005; Welling et al., in press). Participants also reported whether or not they were currently in a romantic relationship (Little et al., 2002). One hundred twelve women reported using hormonal contraceptives.

3. Results

For analyses, we calculated the number of trials on which each participant chose the more masculine voice (vocal masculinity preference) and the more masculine face (facial masculinity preference). Poisson-based generalized linear models with log-link functions were used to analyze these data. Using the number of masculine faces or voices chosen (as opposed to rating scale data) controls for the possibility that correlations between facial and vocal masculinity preferences may occur as a result of some

participants being more willing to use the scale end points than other participants.

3.1. Generalized preferences

We utilized a generalized linear model to test for general associations among vocal and facial masculinity preferences [dv=facial masculinity preference; factors: sex of rater (male, female); covariates: vocal masculinity preference, age of rater]. The test model was significantly different than the intercept-only model (both χ^2_5>141.864, p<.0001). Analysis of deviance evaluated goodness of fit (both D_{1754}=1765.204, D/df=1.006). Vocal masculinity preferences significantly predicted facial masculinity preferences [β=.005, S.E.=0.024, 0.0001<confidence interval (CI)<0.01; χ^2_1=5.194, p=.023]. No other effects or interactions were significant (all χ^2_1<1.114, p>.291).

A separate generalized linear model [dv=vocal masculinity preference; factor: sex of rater (male, female); covariates: facial masculinity preference and age of rater] was significantly different than the intercept-only model (χ^2_5=184.621, p<.0001). Analysis of deviance evaluated goodness of fit (both D_{1754}=3361.775, D/df=1.917). Facial masculinity preferences significantly predicted vocal masculinity preferences (β=.312, S.E.=0.084, 0.139<CI<0.485, χ^2_5=12.444, p<.001). Additionally, women had stronger vocal masculinity preferences in men's voices than men did (β=.825, S.E.=0.1733, 0.485<CI<1.165, χ^2_5=22.669, p<.001). Facial masculinity preferences predicted vocal masculinity preferences more strongly among men than women (β=−.123, S.E.=0.0416, −0.204<CI<−0.041, χ^2_5=8.669, p=.003). No other effects or interactions were significant (all χ^2_1<3.291, all p>.07, which is the nonsignificant main effect of age on vocal masculinity preferences).

One-sample t tests revealed that, for both men and women, vocal and facial masculinity preferences were significantly above 50% (i.e., chance). Table 2 displays these statistics. For both male and female raters, vocal masculinity preferences were positively and significantly correlated with facial masculinity preferences (women: r_{1213}=.246, p<.0001; men: r_{547}=.366, p<.0001). Fisher's r-to-z test revealed a significantly higher correlation between vocal and facial masculinity preferences among men than women (Z=2.57, p=.010).

Table 2
Generalized face and voice masculinity preferences

Sex of rater	Modality of masculinity preference	T value	Mean % of masculine voices chosen	S.D.	df	p value
Male	Voice	14.52	65.9	25.9	546	<.0001
	Face	12.13	65.1	29.6	546	<.0001
Female	Voice	28.56	69.3	23.6	1212	<.0001
	Face	9.67	58.0	28.6	1212	<.0001

Table 3
Hormonal contraceptives and masculinity preferences

Using hormonal contraceptives	% Masculine stimuli chosen	
	Face	Voice
No	58.33	70.39
Yes	54.88	68.21

3.2. Potential influencing factors

We created two generalized linear models for women's ratings (dv's=facial or vocal masculinity preference; hormonal contraceptive use, relationship status; covariates: vocal/facial masculinity preference, age of rater). Both models were significantly different than the intercept-only model (both χ^2_8>17.01, p<.03). Analysis of deviance examined goodness of fit (both D_{312}<308, D/df<0.99).

We observed an interaction between hormonal contraceptive use and the predictive strength of facial masculinity preferences on vocal masculinity preferences (β=.005, S.E.=0.024, 0.0001<CI<0.01. χ^2_1=4.277, p=.039) and vice versa (β=.141, S.E.=0.0529, 0.38<CI<0.245. χ^2=7.148, p=.008). In both cases, predictions were stronger among women not using hormonal contraceptives. We also observed a significant main effect of hormonal contraceptive use on facial masculinity preferences (β=−.556, S.E.=0.227, −1.002<CI<−0.110. χ^2_1=5.976, p=.014). Women using hormonal contraceptives had weaker masculinity preferences than women not using hormonal contraceptives. No other effects or interactions were significant (all χ^2_1=1.117, all p>.278).

To further investigate the role of hormonal contraceptives on masculinity preferences, we analyzed the relationship between women's facial and vocal masculinity preferences separately for those women using hormonal contraceptives and those not using hormonal contraceptives. Only those women not using hormonal contraceptives exhibited correlated preferences for facial and vocal masculinity (not using hormonal contraceptives: r_{307}=.337, p<.0001; using hormonal contraceptives: r_{112}=.112, p=.22). Fisher's r to z test revealed that the positive correlation between facial and vocal masculinity preferences was significantly stronger among women not using hormonal contraceptives than among women using hormonal contraceptives (z=2.134, p=.033). Further analysis revealed that there was no difference in the strength of the relationship between vocal and facial masculinity preferences among women not using hormonal contraceptives and men (z=−0.462, p=.644). Table 3 highlights mean masculinity preferences of women using and not using hormonal contraceptives.

3.3. Additional analyses

We repeated our analyses, substituting rating scale data for the forced-choice data analyzed thus far. Rating scale responses were coded using 0 (*feminine face* or *voice rated*

much more attractive) to 7 (*masculine face* or *voice rated much more attractive*), and the average rated masculinity preference calculated separately for the voice and face preference tests for each participant. Normal-based identity models of 8-point scale data revealed no qualitative differences between the findings for 8-point scale data and forced-choice data.

We also repeated our analyses of forced-choice (percent masculine voices or faces chosen) and 8-point scale data using analysis of covariance (ANCOVA). Findings from these ANCOVA analyses showed no qualitative differences from those of our custom generalized linear models.

4. Discussion

We found that preferences for men's facial and vocal masculinity were positively correlated among both male and female judges. These results are consistent with findings that men with attractive faces also tend to have attractive voices (Saxton et al., 2006). The collective results of these two studies lend support to the theory that women's preferences for vocal and facial masculinity are consistent, most likely because men's faces (Penton-Voak & Chen, 2004) and voices (Brukert et al., 2006; Dabbs & Mallinger, 1999) advertise common information about the senders' testosterone levels. Thus, we suggest that not only do men's faces and voices transmit common information about the underlying quality of the sender (Saxton et al., 2006), but also that perceivers use this cross-modal information in a way that may better inform their mate-choice decisions.

When analyzing general preferences, it appears that women showed a weaker relationship between facial and vocal masculinity preferences than men did. This pattern of results, however, occurred because only women not using hormonal contraceptives exhibited correlated preferences for vocal and facial masculinity. Thus, hormonal contraceptive use appears to mask the relationship between preferences for vocal and facial masculinity. Indeed, there was no significant difference in correlation strength between facial and vocal masculinity preferences among women not using hormonal contraceptives and men. Although it is likely that women's attractiveness ratings of masculinity in voices are mate-choice relevant, as they appear only to correlate with facial masculinity preferences after puberty (Saxton et al., 2006), and menstrual cycle shifts in women's preferences for masculinity in voices are specific to men's but not women's voices (Feinberg et al., 2006), some researchers have suggested that men's attractiveness ratings of other men are an index of dominance (Penton-Voak et al., 2003). Future research should investigate the motivations that underpin same-sex attractiveness ratings of faces and voices.

Our findings highlight the importance of investigating preferences for male masculinity while taking into account possible sources of individual differences in preferences such as menstrual cycle phase (Feinberg, Jones, Law-Smith, et al., 2006; Penton-Voak et al., 1999; Puts, 2005), age (Little et al., 2001; Saxton et al., 2006), and relationship context (Little et al., 2002; Puts, 2005). In the current study, age predicted the strength of women's preferences for vocal masculinity but not the strength of their preferences for facial masculinity (although a near-significant result was observed). Age, however, is still a potential influencing factor for cross-modal masculinity preferences, as age has been found to correlate positively with women's facial masculinity preferences in other studies in a manner consistent with the results of this study (Little et al., 2001). Additionally, menstrual cycle, self-rated attractiveness, and relationship context may contribute to the collective findings reported here.

We found that women not using oral contraceptives had stronger facial and vocal masculinity preferences than women using oral contraceptives. Since progesterone is a major component of most hormonal contraceptives, this finding complements those showing that raised progesterone during the menstrual cycle is associated with increased preferences for feminine faces (Jones et al., 2005; Welling et al., in press) and voices (Puts, 2005). While Feinberg, Jones, Law-Smith, et al. (2006) demonstrated that these associations may be stronger among women with high trait estrogen levels, Welling et al. (in press) recently found that these associations may only emerge in women with relatively high levels of estrogen during the late follicular phase of the cycle (i.e., women with high "trait" estrogen). Johnston et al. (2001) also found evidence for more feminine women (as scored by a questionnaire) exhibit larger menstrual cycle shifts in facial masculinity preferences than masculine women do. Future research should be conducted to further explore these individual differences in the magnitude of cyclic shifts in women's masculinity preference.

We also found that use of hormonal contraceptives was associated with a lack of correlated cross-modal masculinity preferences. This finding is consistent with that of Cornwell et al. (2004) who found that correlated preferences for opposite-sex putative pheromones and facial masculinity were also found among women not using hormonal contraceptives but were not found among women using hormonal contraceptives. We exercise caution in interpreting this as hormonal contraceptive use causally disrupting preferences, as we cannot be sure that there were no other factors associated with masculinity preferences that differed between the two groups. For example, Little et al. (2002) reported that their oral-contraceptive-using group attested to having had more previous sexual partners than those not using oral contraceptives.

By focusing our analytic lens on the *perceivers* rather than the *senders*, we have found that preferences for facial and vocal masculinity vary consistently between individuals in a manner suggesting that preferences in the different modalities are yoked. Furthermore, our finding is consistent with data showing concordant preferences between visual and olfactory preferences: individuals' preferences for

masculine male faces are positively related to their preferences for male-typical putative pheromones (Cornwell et al., 2004). Thus, it is likely that the human body produces multiple ornaments that are cues to the same underlying quality and that these are used in conjunction by perceivers to assess the overall quality, dominance, or both of the individual in question.

Our findings provide evidence that humans have evolved to use multiple cues of the same mate quality, as has been found in many species (Candolin, 2003; Møller & Pomiankowski, 1993). Other work on humans has determined that men also send multiple correlated cues of mate quality, such as symmetry and masculinity (Gangestad & Thornhill, 2003) and symmetry and visible skin condition (Jones et al., 2004), potentially producing a better overall assessment of generalized mate quality (Johnstone, 1995, 1996). Thus it is likely that humans have evolved different ways of sending and receiving multiple mate-quality cues. Indeed, many seemingly disparate cues display common information about a single trait (Candolin, 2003) or the qualities of multiple traits (Johnstone, 1995, 1996). Both theories need not be mutually exclusive, and can be used in conjunction to provide a clearer picture of the individual's potential fitness.

We encourage future research to examine the extent to which multiple cues of the same qualities are integrated in forming mate preferences, and how individual differences in preferences may mediate or moderate these relationships. Indeed, more work needs to be done to determine if people sending disparate cues of mate quality are treated differently than those sending concordant mate-quality cues.

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