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Original Article

Human preference for masculinity differs according to context in faces, bodies, voices, and smell

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Sexual dimorphism is important in mate choice in many species and can be appraised via multiple traits in any one individual. Thus, one question that arises is whether sexual dimorphism in different traits influences preferences consistently. Here, we examined human preferences for masculinity/femininity in different types of stimuli. For face and body stimuli, images were manipulated to be more or less masculine using computer graphic techniques. Voice stimuli were made more or less masculine by manipulating pitch. For smell, we used variation among male aftershaves as a proxy for manipulating masculinity of real male smell and used relatively masculine/feminine odors. For women, we found that preferences for more masculine stimuli were greater for short-term than for long-term relationships across all stimuli types. Further analyses revealed consistency in preferences for masculinity across stimuli types, at least for short-term judgments, whereby women with preferences for masculinity in one domain also had preferences for masculinity in the other domains. For men, we found that preferences for more feminine stimuli were greater for short-term than for long-term judgments across face and voice stimuli, whereas the reverse was true for body stimuli. Further analyses revealed consistency in preferences for masculinity across stimuli types for long-term judgments, whereby men with preferences for femininity in one domain also had preferences for femininity in the other domains. These data suggest that masculinity/femininity as a trait may be assessed via different modalities and that masculinity/femininity in the different modalities might be representing a single underlying quality in individuals. *Key words:* attractiveness, cross-modal, mate-choice, relationship context, sexual dimorphism. *[Behav Ecol]*

INTRODUCTION

Sexual dimorphism influences attractiveness judgments in a variety of domains. The masculinity of male faces (Perrett et al. 1998; Penton-Voak et al. 1999; Little et al. 2001), voices (Feinberg, Jones, Little, et al. 2005; Puts 2005; Feinberg et al. 2008), bodies (Pawlowski and Jasienska 2005; Little, Jones, and Burriss 2007), and putative male pheromones (Cornwell et al. 2004; Saxton et al. 2008) have been shown to influence attractiveness. In turn, sex hormones are related to the degree of masculinity displayed by men's faces (Penton-Voak and Chen 2004; although the relationship is complex and not all studies demonstrate a link, see e.g., Pound et al. 2009), voices (Dabbs and Mallinger 1999), and bodies (Knussmann and Sperwien 1988). As in men, masculinity/femininity influences preferences for female faces (Perrett et al. 1998), body shape (Singh 1993), and voices (Feinberg, Jones, Little, et al. 2005; Feinberg et al. 2006), with men preferring feminine women. Feminine traits are also linked to reproductively relevant hormones. For example, in women, facial and vocal femininity in adulthood are positively correlated with estrogen levels (Abitbol et al. 1999; Law-Smith et al. 2006) and estrogen-dependent characteristics of the female body that are positively correlated with health and reproductive fitness are found attractive (e.g., body shape, Singh 1993). These studies suggest commonality of the signal value of masculinity from a variety of domains.

Another line of evidence that masculinity/femininity in different domains are associated with a common underlying quality comes from studies that examine covariation in masculinity preferences. Given individual differences in masculinity preferences (Little et al. 2001; Little and Perrett 2002; Jones et al. 2005; Little, Cohen, et al. 2007), if individuals use different cues of masculinity in the same way, we would expect those individuals with stronger preferences for masculinity in one domain to also have stronger preferences in other domains. Indeed, studies have shown 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 masculine-sounding voices (Feinberg et al. 2008). A correlation between preferences for femininity in women's faces and preferences for putative female pheromones in men has also been demonstrated (Cornwell et al. 2004).

More evidence for masculinity advertising similar qualities across domains comes from consistency in the causes of variation in preferences. Many studies have demonstrated that women's preferences for masculine male traits change across the menstrual cycle. Increased preferences for facial masculinity (Frost 1994; Penton-Voak et al. 1999; Johnston et al. 2001; Little, Jones, DeBruine 2008), body masculinity (Little, Jones, and Burriss 2007; Pawlowski and Jasienska 2005), vocal masculinity (Puts 2005; Feinberg et al. 2006), the smell of dominant men (Havlicek et al. 2005), and putative male pheromones (Grammer 1993) coincide with the fertile phase of the menstrual cycle. These changes in preferences for masculine men are potentially adaptive by allowing women to

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pursue a dual strategy by selecting investing partners but increasing their chances of gaining indirect genetic benefits for their offspring from higher quality males at peak fertility (e.g., Gangestad and Thornhill 2008; Jones et al. 2008). Thus, variation in preferences during the menstrual cycle may enable women to maximize the benefits of their mate preferences, potentially shifting priorities between heritable benefits to offspring and investment (e.g., Gangestad and Thornhill 2008; Jones et al. 2008). Cyclic variation then appears to shift preferences for masculinity in the same way for several different domains.

Another factor that influences preferences for masculinity is relationship type. Studies have shown that women tend to prefer more masculine faces (Little et al. 2002), bodies (Pawlowski and Jasienska 2005), and voices (Puts 2005) when judging for a short-term than for a long-term relationship. In a variety of studies, cycle effects are often more likely seen when women judge for short-term relationships (for review, see Gangestad and Thornhill 2008; Jones et al. 2008). Women who are generally interested in pursuing short-term relationships also appear more attracted to masculine male faces than women who are more generally interested in pursuing long-term relationships (Waynforth et al. 2005). Short-term relationships minimize the need to value investment from partners and hence remove the constraint of choosing a cooperative partner. Given the documented potentially strategic preferences that women display for male sexual dimorphism, men may also demonstrate differences in preferences according to relationship term. Indeed, one study has demonstrated that men under imagined conditions of environmental harshness prefer greater masculinty in women's faces for long- than for short-term relationships (Little, Cohen, et al. 2007). Likewise, using facial and body characteristics of Playboy Playmates of the Year from 1960–2000 as a proxy for male preference, Pettijohn and Jungeberg (2004) found that under difficult economic conditions, older, heavier, and taller Playboy Playmates of the Year were selected. That Playboy Playmates of the Year with smaller eyes and larger waist-to-hip ratios were selected under difficult conditions (Pettijohn and Jungeberg 2004) is consistent with preferences for masculine female face traits for long-term relationships under stressful conditions (Little, Cohen, et al. 2007).

The current study examined women's preferences for sexual dimorphism in 4 domains and men's preference in 3 domains. Previous studies have demonstrated correlated preferences for face masculinity and both voice masculinity and preferences for putative male pheromones. We extend these results by examining masculinity preferences in 2 visual traits, faces and bodies, and in both voices and male aftershaves. Additionally, we assessed preferences across mating context, examining both short-term and long-term preferences. We predicted that if masculinity advertises the same factor across domains, we would observe similarities in preferences across modality and similar effects of relationship term on choice of masculine stimuli. Finally, most research has focused on female preference, though recent studies have demonstrated variation in male preferences for femininity (Jones et al. 2007; Little, Cohen, et al. 2007; Welling et al. 2008). Here, we thus also address variation and covariation in male preferences for feminine traits.

MATERILAS AND METHODS

Participants

Twenty-five women (aged between 18 and 35, mean age = 22.4, standard deviation [SD] = 4.1) and 24 men (aged between 17 and 49, mean age = 25.9, SD = 7.1) took part in the study. Participants were selected for reporting to be heterosexual. Participants were drawn from the University of Stirling's participant pool and received credit for taking part.

Stimuli

Faces

To measure preferences for sexually dimorphic features, we used 10 pairs of composite male face images and an equivalent set made from 10 female faces. Each pair comprised one masculinized and one feminized version of the same face. Original images were 50 young adult Caucasian male and 50 Caucasian female photographs taken under standard lighting conditions and with a neutral expression. The composite images were made by creating an average image made up of 5 randomly assigned individual facial photographs (this technique has been used to create composite images in previous studies, see e.g., Benson and Perrett 1993; Tiddeman et al. 2001). Composite images were made perfectly symmetric. Faces were transformed on a sexual dimorphism dimension using the linear difference between a composite of all 50 adult males and a composite of all 50 young adult females (following Perrett et al. 1998). Transforms represented ±50% the difference between these 2 composites. Example images can be seen in Figure 1.

Bodies

Ten pairs of body images were constructed from 10 individual photographs of male bodies with an equivalent set made from 10 photographs of female bodies. For every image, 52 feature points were delineated on each body image from which the average male and female shapes were calculated. Composite images were created by warping and then superimposing all the male or female bodies into each of the average body shapes. The images were made perfectly symmetrical and were equalized in height based on the highest and lowest points. Using the linear difference between feature points in the average male and female shape, each male (or female) body was transformed both +50% masculinized and +50% feminized to create a pair differing in masculine shape only. Transforms were equivalent to those described for faces, and these images have been used in previous studies of body shape preferences (Little, Jones, and Burriss 2007). Example images can be seen in Figure 1.

Voices

To create masculine and feminine voices, 10 men's and 10 women's voices (spanning the normal range of male/female voice pitch) were manipulated in pitch (i.e., perception of fundamental frequency and corresponding harmonics) by ±20 Hz, using identical methods to those presented in Feinberg, Jones, Little, et al. (2005). Briefly, Praat's (Boersma and Weenink 2009) 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).

Smells

To measure preferences for masculinity in odor, 15 different male aftershaves were collected by the experimenters. These were rated by 3 individuals (2 males and 1 female, mean age = 21), who were asked to rate how masculine/feminine they thought they were on a scale from 1 to 7 (7 masculine, 1 feminine). There was high agreement among raters

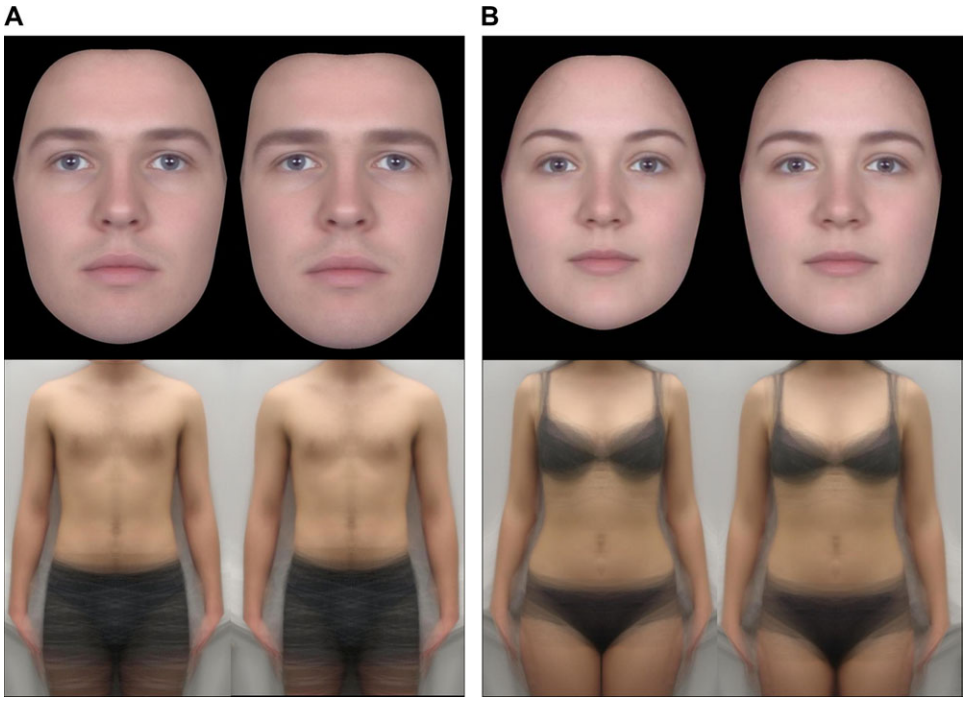

Figure 1
(A) Example images representing feminine (left) and masculine (right) male faces (top) and bodies (bottom). (B) Example images representing feminine (left) and masculine (right) female faces (top) and bodies (bottom). Body images are composite bodies and represent the transform applied to individual body images and not the individual images used in the study.

(Cronbach's alpha = 0.90). Mean scores were calculated, and the 5 aftershaves that were rated as being the most masculine were paired with a more feminine smelling counterpart. In order to try and maintain consistent variation in masculinity between pairs, masculine smells were paired with the reverse ordered most feminine smells (e.g., ranking smells from 1 to 15 on mean masculinity, 1 was paired with 11, 2 with 12, etc.). The mean score for feminine fragrances was 2.9 (SD = 0.15), and the mean score for masculine fragrances was 6.1 (SD = 0.30). These scores were significantly different in a paired-sample *t*-test ($t_4 = 18.83$, $P < 0.001$). For testing, each chosen fragrance was transferred into a small glass beaker with a lid, which was closed on decanting.

Procedure

The study was administered in the laboratory. Participants first completed a questionnaire addressing their age, gender, and sexuality. Participants then listened to 10 pairs of male voices presented via audio-technica ATH-M30 headphones. The test was presented on computer and participants could press a play and stop key for each voice. Controls for voices were presented on the left or right of the screen and side of presentation for masculine/feminine voices was random. Under each control were buttons labeled "prefer for a long-term relationship" and "prefer for a short-term relationship." After listening to each voice, participants were asked to identify which of the 2 voices they found the most attractive in terms of both a long-term and a short-term relationship. After this, they were asked to select "next voice pair," which saved their response and introduced the next pair of stimuli.

Following the voices, participants saw 10 pairs of male faces. Two images, 1 masculine and 1 feminine, randomly assigned to the left/right hand side, were presented in the same way as for voices above. Participants were then presented with ten pairs of masculine/feminine male bodies in the same way as for the face task.

Female participants also completed a smell preference task (men did not complete the smell preference test). Five pairs of odors were used as described in the stimuli section. Each fragrance was in a small glass beaker, and pairs were labeled "1A," "1B," etc. The experimenter asked the participants to imagine a person smelled like the different fragrances and to indicate which "person" (i.e., odor) they would prefer for short- and long-term relationships. On-screen boxes with selections were used to indicate preference, as previously, for both long-term and short-term relationships. This was repeated for the other 4 pairs of fragrances. The order in which the more masculine/feminine fragrances were presented was randomized across participants.

The order of the presentation of the stimuli was voices, faces, and then bodies. The smell task was introduced randomly either before or after the voice, face, or body task. Participants completed all tasks in their own time.

RESULTS

For each stimuli type, we calculated a percent masculinity preference. This was done by taking the proportion of masculine stimuli chosen from each pair of stimuli in each domain set and converting to a percentage. This provided a similar score that could be compared across domain.

Women

For short-term preferences, one-sample *t*-tests against chance (50%) revealed significant preferences for masculine stimuli for faces ($t_{24} = 2.69$, $P = 0.013$, $d = 1.10$), bodies ($t_{24} = 2.70$, $P = 0.013$, $d = 1.10$), and voices ($t_{24} = 2.98$, $P = 0.007$, $d = 1.22$) but no significant preference for masculinity for smell ($t_{24} = 0.91$, $P = 0.372$, $d = 0.37$). For long-term preferences, there were significant preferences for feminine stimuli for smell ($t_{24} = -2.26$, $P = 0.034$, $d = 0.92$), a close to significant preference for feminine stimuli for faces ($t_{24} = -1.86$, $P = 0.076$, $d = 0.76$) and no significant preferences for masculinity in bodies ($t_{24} = -1.71$, $P = 0.101$, $d = 0.70$) or voices ($t_{24} = -1.66$, $P = 0.110$, $d = 0.68$). Although not significant, we note the effect sizes of the latter 3 tests are all very similar.

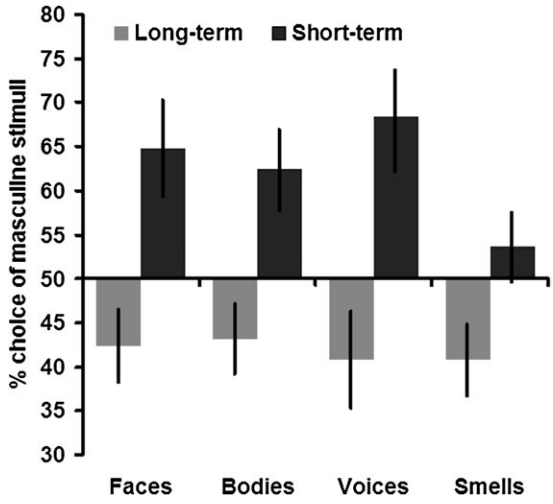

Figure 2
Percent choice of masculine stimuli (±1 standard error of the mean) for the 4 stimuli types for women. Preferences for masculine stimuli were higher for short-term than long-term judgments across all stimuli types. All differences between short- and long-term preferences were significant ($P < 0.05$).

A repeated-measures analysis of variance (ANOVA) was conducted with stimuli (face/body/voice/smell) and term (long/short) as within-participant factors. This revealed a significant main effect of term ($F_{1,24} = 22.79$, $P < 0.001$, $\eta_p^2 = 0.487$), no significant effect of stimuli ($F_{3,72} = 2.26$, $P = 0.089$, $\eta_p^2 = 0.086$) and no significant interaction between term and stimuli ($F_{3,72} = 0.63$, $P = 0.601$, $\eta_p^2 = 0.025$). Although there was a close to significant effect of stimuli type, this effect simply indicates that preferences for masculine smells generally tended to be weaker than preferences for masculinity in the other domains. Mean scores can be seen in Figure 2.

We conducted separate paired-sample *t*-tests to examine the effect of term on each type of stimuli. These revealed significant differences between long- and short-term preferences for faces ($t_{24} = 2.92$, $P = 0.007$, $d = 1.20$), bodies ($t_{24} = 2.62$, $P = 0.015$, $d = 1.07$), voices ($t_{24} = 2.62$, $P = 0.015$, $d = 1.07$), and smells ($t_{24} = 2.18$, $P = 0.039$, $d = 0.89$). In all cases, masculine stimuli were preferred more for short-term than long-term relationships.

To examine similarities in preferences across stimuli, we ran a principal component factor analysis with varimax rotation separately for long- and short-term preferences. Factors were extracted with eigenvalues greater than 1. For long-term preferences, this resulted in a 3-factor solution accounting for 90.8% of the variance. Face and voice masculinity preferences loaded positively on factor 1, whereas masculine body and smell preferences were largely positively loaded on factors 2 and 3, respectively. For short-term preferences, a single-factor solution emerged (and so was not rotated) accounting for 37.5% of the variance with all types of masculinity preference loading positively on the same factor. This analysis then demonstrates that those who prefer masculinity in one domain also have similar preferences in other domains, at least for short-term preferences. For long-term preferences, while facial and vocal masculinity preferences are positively related, smell and body masculinity preferences can follow different patterns. Factor loadings can be seen in Table 1.

To follow-up on the single-factor solution for short-term preferences, we ran Pearson correlations on the 4 variables. This revealed positive, but nonsignificant, correlations between face and body preferences ($r = 0.278$, $P = 0.170$), face and voice preferences ($r = 0.222$, $P = 0.277$), body and voice preferences ($r = 0.085$, $P = 0.681$), face and smell preferences ($r = 0.105$, $P = 0.619$), body and smell preferences ($r = 0.182$, $P = 0.384$), and voice and smell preferences ($r = 0.092$, $P = 0.663$).

Table 1
Factor loadings for long- and short-term masculinity preferences across stimuli type for women

	Long term			Short term
	Factor 1	Factor 2	Factor 3	Factor 1
Faces	**0.926**	0.178	−0.145	0.746
Bodies	0.100	**0.933**	0.178	0.657
Voices	**0.658**	−0.525	0.403	0.504
Smells	−0.049	0.137	**0.957**	0.498

For solutions with more than one factor, main factor loadings are in bold.

Men

For short-term relationships, one-sample *t*-tests against chance (50%) revealed significant preferences for feminine stimuli for faces ($t_{23} = 7.22$, $P < 0.001$, $d = 3.01$) and voices ($t_{23} = 3.60$, $P = 0.002$, $d = 1.50$) and significant preferences for masculine stimuli for bodies ($t_{23} = 2.91$, $P = 0.008$, $d = 1.21$). For long-term preferences, there were significant preferences for masculine stimuli for faces ($t_{23} = 2.22$, $P = 0.037$, $d = 0.93$) and voices ($t_{23} = 2.81$, $P = 0.010$, $d = 1.17$), and although the direction was for feminine stimuli to be preferred, there was no significant preference for bodies ($t_{23} = 1.12$, $P = 0.271$, $d = 0.47$).

A repeated-measures ANOVA was conducted with stimuli (face/body/voice) and term (long/short) as within-participant factors. This analysis revealed a significant main effect of term ($F_{1,23} = 19.66$, $P < 0.001$, $\eta_p^2 = 0.461$), a significant effect of stimuli ($F_{2,46} = 5.44$, $P = 0.008$, $\eta_p^2 = 0.191$) and a significant interaction between term and stimuli ($F_{2,46} = 18.70$, $P < 0.001$, $\eta_p^2 = 0.448$). The interaction qualifies the other effects and indicates that men preferred more feminine faces and voices for short-term than long-term preferences and this pattern was reversed for body stimuli. Mean scores can be seen in Figure 3.

We conducted separate paired-sample *t*-tests to examine the effect of term on each type of stimuli. These revealed significant differences between long- and short-term preferences for faces ($t_{23} = 5.22$, $P < 0.001$, $d = 2.18$), bodies ($t_{23} = 3.27$, $P = 0.003$, $d = 1.36$), and voices ($t_{23} = 3.93$, $P = 0.001$, $d = 1.64$). For faces and voices, more feminine stimuli were preferred more for short-term than long-term preferences, and this pattern was reversed for body stimuli.

To examine similarities in preferences across stimuli, we ran a principal component factor analysis with varimax rotation separately for long- and short-term preferences. Factors were extracted with eigenvalues greater than 1. For short-term preferences, this resulted in a 2-factor solution accounting for 86.0% of the variance. Face and body masculinity preferences loaded positively and negatively, respectively, on factor 1, whereas masculine voice preferences were loaded on factor 2. For long-term preferences, a single-factor solution emerged (and so was not rotated) accounting for 61.7% of the variance with all types of masculinity preference loading positively on the same factor. This analysis then demonstrates that those who prefer masculinity in one domain also have similar preferences in other domains for long-term preferences. For short-term preferences, facial and body masculinity

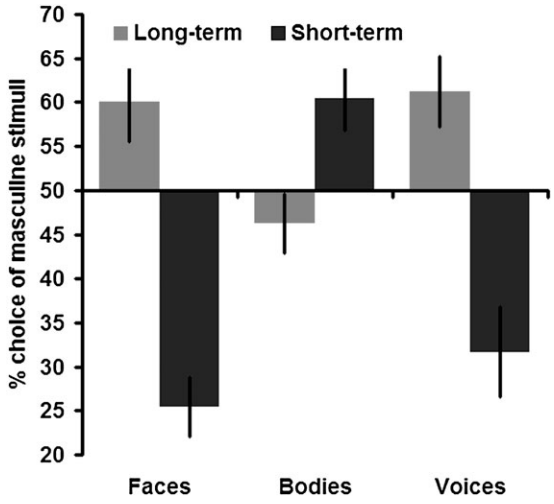

Figure 3
Percent choice of masculine stimuli (±1 standard error of the mean) for the 3 stimuli types for men. Preferences for feminine stimuli were higher for short-term than long-term judgments across face and voice stimuli but this pattern was reversed for body stimuli. All differences between short- and long-term preferences were significant ($P < 0.05$).

preferences are negatively related while voice masculinity preferences can follow a different pattern. Factor loadings can be seen in Table 2.

To follow-up on the single-factor solution for long-term preferences, we ran Pearson correlations on the 3 variables. This revealed positive correlations between face and body preferences ($r = 0.395$, $P = 0.055$), face and voice preferences ($r = 0.432$, $P = 0.035$), and body and voice preferences ($r = 0.448$, $P = 0.028$), though only the latter 2 were conventionally significant.

DISCUSSION

The current study demonstrates that, for both men and women, preferences for masculinity differ according to relationship context. The pattern of preferences was generally found to be consistent across modalities of vision, audition, and olfaction, except in male preferences for female bodies. Women's preferences for male masculinity were consistent across domains, both in terms of the relative preference for masculinity in short- versus long-term contexts and, within individuals, for short-term preferences for faces, bodies, voices, and smells. Men's preferences for female masculinity were less consistent across domains, but similarities were seen in terms of the relative preference for masculinity in short- versus long-term contexts for face and voice and, within individuals, for long-term preferences for faces, bodies, and voices.

Table 2
Factor loadings for long- and short-term masculinity preferences across stimuli type for men

	Short term		Long term
	Factor 1	Factor 2	Factor 1
Faces	**0.887**	−0.205	0.828
Bodies	**−0.841**	−0.312	0.804
Voices	0.021	**0.973**	0.948

For solutions with more than one factor, main one factor loadings are in bold.

Covariation was seen in preferences for masculinity across traits in both men and women. Covariation differed according to term with preferences for masculinity being consistent mainly for short-term judgments for women and long-term judgments for men. These data are in line with previous studies of female preferences demonstrating covariation for women's masculinity preferences in faces and voices (Feinberg et al. 2008) and faces and odor (Cornwell et al. 2004). We note that our main focus was in examining constancy across temporal context for different aspects of masculinity and that our small sample size means we should be cautious about strong conclusions concerning the factor analysis.

Previous studies have interpreted covariation as evidence that different aspects of masculinity all advertise a common underlying factor. We then also suggest that men's and women's masculinity, as signaled by multiple traits, are related to some common information about the underlying quality of the observed individual. Of course this does not mean that the signals are perfectly overlapping, and indeed, we discuss later that some of our data suggests the traits may also advertise something distinct. Given consistency was modulated by term, we also suggest that the commonality in trait use is different in men and women. Women appear to have consistent preferences when judging men as potential short-term partners, suggesting that the underlying factor driving preferences for masculine traits is more important for sexual than for investing relationships. In men, however, consistency was seen mainly for long-term judgments suggesting that the underlying factor driving preferences for feminine traits is something more related to long-term investment within a relationship.

A second source of evidence for these different traits all advertising the same underlying aspect comes from consistent variation according to relationship context. For women, the pattern was consistent with masculinity preferred over femininity for short-term preferences and femininity preferred over masculinity for long-term preferences across each trait studied. This is in line with previous studies demonstrating that women tend to prefer more masculine faces (Little et al. 2002), bodies (Pawlowski and Jasienska 2005), and voices (Puts 2005) when judging for a short-term than for a long-term relationship and also with studies on cycle effects where significant changes are more likely seen when women judge for short-term relations (for review, see Gangestad and Thornhill 2008; Jones et al. 2008). Short-term relations minimize the need to value investment from partners and hence remove the constraint of choosing a cooperative partner. Consistency in how context influences masculinity preferences across modality is further supported by consistency in the effects of cyclic shifts in masculine preferences. Increased preferences for facial, body, vocal, and odor masculinity are seen in the fertile phase of the menstrual cycle (Frost 1994; Penton-Voak et al. 1999; Johnston et al. 2001; Havlicek et al. 2005; Pawlowski and Jasienska 2005; Puts 2005; Feinberg et al. 2006; Little, Jones, and Burriss 2007; Little, Jones, and DeBruine 2008). The within-participant nature of analysis means cycle is unlikely to account for the pattern of our data, but future studies can usefully examine whether this pattern interacts with cycle, with, for example, greater differences between long- and short-term preferences at peak fertility as observed in previous studies.

The data from men were less consistent. Across faces and voices, feminine stimuli were preferred for short- versus long-term contexts. This finding is consistent with past research demonstrating that men under imagined conditions of environmental harshness prefer greater femininity in women's faces more in short- than for long-term preferences (Little, Cohen, et al. 2007). Our data for voices are also consistent with other recent demonstrations that men prefer more masculine female voices for short- than long-term relationships (Puts et al. 2011). One reason put forward for such strategic

choice is that men might face a similar trade-off between attraction and investment that women do. Attractive feminine women are likely to be most in demand and so men may pursue less attractive, more masculine women, for long-term relationships to minimize chances of desertion or cuckoldry (Little, Cohen, et al. 2007). Men may focus on attractive traits in short-term contexts because they do not have to be as concerned with behavioral traits (Little, Cohen, et al. 2007; Puts et al. 2011). The data from male preferences for female bodies followed a different pattern, with men preferring femininity in long-term and masculinity in short-term preferences. This potentially indicates that masculinity of body shape is associated with different factors to the other traits, perhaps mainly for short-term decisions as noted above, but more research on the value of masculinity in female body shape across relationship term is needed. One speculative reason may lie in perceived body weight. Although the feminized female body is indeed more feminine, it also appears to have increased body fat (see Figure 1B). Choice of masculine shape by men may then partly reflect selection of more "attractive" images for short-term relationships if men value thinness over femininity.

The question remains as to what underlying variable is advertised across masculine traits in men and women. One likely candidate is sex hormones. For example, researchers have previously argued that facial and vocal masculinity both indicate a male's level of testosterone (e.g., Feinberg 2008). As noted in the INTRODUCTION, sex hormones are related to the degree of masculinity displayed by men's faces (Penton-Voak and Chen 2004), voices (Dabbs and Mallinger 1999), and bodies (Knussmann and Sperwien 1988). It remains to be seen whether production of masculine odor is related to hormonal profile. We note that the fragrances used here vary in perceived masculinity but are artificially produced. Future studies can usefully extend the ecological validity of this work by using naturally produced male odors. Traits associated with hormones may also be taken as a sign of quality. For example, if masculine traits in males are testosterone dependent, they could then represent an honest immunocompetence handicap signaling quality (Folstad and Karter 1992). The suggestion that hormones are associated with different aspects of female femininity also appears plausible because both facial and vocal femininity in women are positively correlated with estrogen levels (Abitbol et al. 1999; Law-Smith et al. 2006) and estrogen-dependent characteristics of the female body that are correlated with health and reproductive fitness are found attractive (e.g., body shape, Singh 1993). Of course, advertisement of hormonal profile is not the only possible underlying quality and masculinity preference could develop via some other aspect of quality (Roberts and Little 2008).

Consistent with each trait advertising a single underlying quality in women, some attractive, feminine traits in women are positively correlated. For example, in women, rated face and body attractiveness (Thornhill and Grammer 1999), rated facial attractiveness and waist-to-hip ratio (Penton-Voak et al. 2003), pitch and facial femininity (Feinberg, Jones, DeBruine, et al. 2005), and facial and vocal attractiveness (Feinberg, Jones, DeBruine, et al. 2005) are all positively correlated. Facial masculinity is also related to facial symmetry, another proposed marker of mate quality, in both men and women (Little, Jones, Waitt, et al. 2008) as well as preferences for facial masculinity and symmetry being correlated themselves (Little, Jones, DeBruine, and Feinberg 2008) further suggesting that multiple traits are used in the perception of attractiveness. Multiple traits associated with the same underlying factor creates redundancy but given no single trait is a perfect correlate of past or present hormonal profile then individuals may produce multiple signals in order to reduce signal error (Candolin 2003).

We note that our data appear to strongly show effects of relationship context. One reason that term could play a more important role here than seen in other studies lies in the methodology. In previous studies, short- and long-term preferences have been assessed between participants (Little et al. 2002), with different individuals making short- and long-term choices, or within participant, with participants rating short- and long-term preferences separately (Li and Kenrick 2006; Little, Cohen, et al. 2007). Here, within-participant simultaneous presentation of both short- and long-term preference potentially encouraged participants to choose different stimuli for short- and long-term choices. In other words, simultaneous presentation polarized choices as participants were being asked to choose twice. Although this is a potential weakness to the ecological validity of the data here, we feel this method highlights that strategic choice can be readily seen using this method and future studies could explicitly force participants to pick one stimulus for short- and one for long term to help elucidate different preferences according to relationship type.

In summary, the current data demonstrate covariation in preferences for masculinity across domains. This covariation was apparent in short-term preferences for women and long-term preferences for men. We also demonstrated consistency in preferences for masculinity across both short-term and long-term preferences, although male preferences for body masculinity were not consistent with other domains. These data are consistent with the notion that different traits associated with masculinity in men and, to a lesser extent, femininity in women may be aspects of multiple signals of the same quality. The advertisement of hormone levels is one potential underlying cue that could be signaled by these multiple traits.

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