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Men's strategic preferences for femininity in female faces

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MEN'S STRATEGIC PREFERENCES FOR FEMININITY IN FEMALE FACES

ABSTRACT

Several evolutionarily relevant sources of individual differences in face preference have been documented for women. Here we examine three such sources of individual variation in men's preference for female facial femininity: term of relationship, partnership status and self-perceived attractiveness. We show that men prefer more feminine female faces when rating for a short-term relationship and when they have a partner (Study 1). These variables were found to interact in a follow-up study (Study 2). Men who thought themselves attractive also preferred more feminised female faces for short-term relationships than men who thought themselves less attractive (Study 1 and Study 2). In women similar findings for masculine preferences in male faces have been interpreted as adaptive. In men, such preferences potentially reflect that attractive males are able to compete for high quality female partners in short-term contexts. When a man has secured a mate, the potential cost of being discovered may increase his choosiness regarding short-term partners relative to unpartnered men, who can better increase their short-term mating success by relaxing their standards. Such potentially strategic preferences imply that men also face trade-offs when choosing relatively masculine or feminine faced partners. In line with a trade-off, women with feminine faces were seen as more likely to be unfaithful and more likely to pursue short-term relationships (Study 3), suggesting that risk of cuckoldry is one factor that may limit men's preferences for femininity in women and could additionally lead to preferences for femininity in short-term mates.

Key words: Facial attractiveness; masculinity/femininity; mate value; partner; condition-dependence; short-term/long term.

MEN'S STRATEGIC PREFERENCES FOR FEMININITY IN FEMALE FACES

Mature features in adult human faces reflect the masculinisation or feminisation of secondary sexual characteristics that occurs at puberty. These face shape differences in part arise because of the action of hormones such as testosterone. For example, smaller jawbones and fatter cheeks are features of female faces that differentiate them from male faces (e.g., Enlow, 1982). In terms of women's attraction to masculinity in male faces, the direction of relationship varies across studies and researchers have documented differences in the attractiveness of masculinity according to short-term versus long-term mating contexts and various sources of individual differences in preferences (Little, Jones, Penton-Voak, Burt, & Perrett, 2002; Penton-Voak et al., 1999). Men's preferences for female faces are not as well studied as women's preferences for male faces. This is potentially due in part to the unequivocal preferences for femininity in female faces.

Several researchers have proposed that femininity in human female faces may be a cue to heritable fitness or other benefits and therefore relate to attractiveness (e.g., Perrett et al., 1998). Facial femininity is associated with oestrogen levels (Law-Smith et al., 2006) and also health (Thornhill & Gangestad, 2006). Femininity of face shape is also associated with youth (Perrett, et al., 1998) and so preferences may also reflect male attention to youth, also linked to fertility and fecundity (Buss & Barnes, 1986). Increasing the femininity of female faces should therefore enhance attractiveness, and indeed there is considerable evidence that feminine female faces are considered attractive. Studies measuring facial features from photographs of

women (Cunningham, 1986; Grammer & Thornhill, 1994) and studies which manipulate facial femininity using computer graphic techniques (Perrett, et al., 1998) all indicate that feminine features increase the attractiveness of female faces. However, despite overall preferences for feminine faces, men may also display strategic preferences for femininity in the same way women show strategic preferences for masculinity. Three sources of individual differences in preferences are discussed here: condition, relationship context, and partnership status.

Condition-dependent mate choice is seen in females of some fish species (Bakker, Künzler, & Mazzi, 1999) and women (Little, Burt, Penton-Voak, & Perrett, 2001; Little & Mannion, 2006; Penton-Voak et al., 2003). This follows the logic that low-quality individuals of both sexes are expected to be less choosy (Parker, 1983), whereby individuals who are of high quality, or attractive, will be more discriminating of their potential partners than those of lower quality. Consequently, condition-dependent effects are also seen in male fish. For example, in three-spined sticklebacks (*Gasterosteus aculeatus*) attractive (more ornamented) males show stronger preferences for large females than do unattractive (drab-looking) males (Kraak & Bakker, 1998). Likewise, in the two-spotted goby (*Gobiusculus flavescens*), large and small males are equally eager to court females but only large males show discrimination via their greater interest in more colourful females (Amundsen & Forsgren, 2003). Attractive men may then be more discriminating than less attractive men and display greater preferences for femininity. Indeed, attractive men prefer more feminine female faces than their less attractive

counterparts, but only in short-term relationship contexts (Burriss, Welling, & Puts, 2011).

Relationship context can impact on preferences. Humans differ in their inclination to engage in short-term and long-term partnerships, often measured as willingness to have sex outside of loving relationships and with multiple people (Simpson & Gangestad, 1991), and there are different benefits to males and females in engaging in either type of mating (Buss & Schmitt, 1993). While men may report being more interested in short-term mating (Buss & Schmitt, 1993), there are benefits to women in engaging in short-term parings, such as acquiring good-genes from men who are unwilling to engage in long-term relationships, and also benefits to men engaging in long-term relationships, such as paternal investment leading to more successful offspring (Buss & Schmitt, 1993). For short-term relationships women pay more attention to men's physical attractiveness than to men's parenting skills and cooperative nature whereas the opposite is true in long-term contexts (Scheib, 2001). In face preferences, women judging for short-term relationships prefer more masculinity in faces than those judging for long-term relationships (Little, et al., 2002). It is possible this reflects choosing a long-term partner whose less masculine appearance suggests cooperation and extended paternal care and/or choosing short-term partners whose higher facial masculinity may indicate better genetic quality (Little, et al., 2001; Little, et al., 2002; Penton-Voak, et al., 1999). In other words, women can extract potential genetic benefits from attractive men by copulating and conceiving within a short-term relationship but such men may not make ideal long-term

partners because they are in demand and so may provide limited long-term investment (Gangestad & Simpson, 2000).

While men appear less constrained by investment issues, men can still be deserted by their partners or face possible cuckoldry and thus also face a trade-off in long-term and short-term mating. Because humans have bi-parental care and men often invest heavily in their children, for long-term relationships we might expect men to value cues to mothering ability and a cooperative personality. Not all men, however, will be able to attract and keep a partner who has physical traits associated with health and who will be cooperative. Attractive, feminine women, for example, may be more likely to leave a relationship being confident of finding another partner and/or be more likely to cheat on their partner if their partner is not of greater attractiveness than themselves (Buss & Haselton, 2005; Haselton & Gangestad, 2006). Men may then actually prefer less attractive/feminine women in their long-term choices. As there are few costs, males may be more focussed on cues to attractiveness and femininity in short-term contexts as the effects of any potentially negative behavioural traits associated with physical attractiveness are less relevant (Buss & Schmitt, 1993). Additionally, men may be attracted to different traits for short-term relationships than those they would find unattractive for long-term relationships, such as cues to interest in short-term mating.

Having a partner has also been shown to affect women's face preferences. An increased preference for traits other than parental investment may be expected when a woman has already acquired a long-term partner. When a woman has already secured investment within a long-term

partnership she may be able to pursue extra-pair relationships with more attractive men from whom little or no investment is available. Because physically attractive men are attractive for short-term relationships they are expected to be less inclined to long-term investment (Gangestad & Simpson, 2000), and so physical attractiveness may be valued higher if long-term investment is available from another man. Alternatively, a woman with a partner may be choosier in her preferences as she looks to acquire a new partner more attractive than her current partner. Such changes in preferences may then reflect differences in preferences either for extra-pair copulations or potential mate replacement. Little et al. (2002) have shown that women who have partners prefer relatively more masculine male faces than those without a partner. Further studies have shown that women without partners demonstrate stronger preferences for direct gaze (indicating social interest) from feminine male faces than from masculine male faces when judging men's attractiveness for long-term, but not short-term relationships (Conway, Jones, DeBruine, & Little, 2010) and that women's stronger preferences for femininity in men's faces when assessing men as long-term partners is most pronounced among women who see feminine men as trustworthy (Smith et al., 2009).

In terms of male preferences, many of the issues influencing female mating strategies may also apply. Like women, in long-term contexts, factors such as cooperation are likely to be important to men whereas such factors will be of decreased importance in short-term preferences. On the other hand, without the need to maintain a relationship, physical attractiveness is likely to be of increased importance for short-term preferences. In men, we would then

expect that long-term preferences may reflect a trade-off between certain personality traits and physical attractiveness. In women, this trade-off may be between a man's attractiveness and his willingness to invest or likelihood to desert. In men, investment may be less of an issue but desertion is still a risk of choosing an attractive partner. Further, men also face an additional risk: cuckoldry. Because only women can be 100% certain that their children are their own, if his partner cheats on him, a man risks raising a child which is not his own. There is evidence that women may be more likely to cheat on less attractive partners. Women with more asymmetric partners are more likely to express interest in other men when during the fertile phase of the menstrual cycle, suggesting that women may seek out alternative partners to father their children if their current partner is less attractive (Gangestad, Thornhill, & Garver, 2005). Because feminine women are more likely to pursue short-term relationships (Boothroyd, Jones, Burt, DeBruine, & Perrett, 2008), men may then not always be best served in preferring the most feminine woman and instead choose more masculine women for long-term relationships. These arguments also apply to male attractiveness influencing preferences, leading to the prediction that less attractive men may prefer more masculine women for long-term relationships to enhance the chances that they select someone who will remain faithful. Effects of male attractiveness are also likely for short-term ratings as attractive, feminine women, who may be more likely to pursue short-term relationships (Boothroyd, et al., 2008), are likely to do so only with attractive men (Little, et al., 2001). Indeed, attractive men report more short-term partners than less attractive men (Rhodes, Simmons, & Peters, 2005). Again, following similar logic applied to female preferences, those males who

have a current partner may also have more unconstrained preferences than their unpartnered counterparts. When, a man has a current partner, he does not have to consider issues of cuckoldry or cooperative behaviour in preferences for other women if he pursues only a short-term relationship. Men with partners may then focus more on physical traits associated with attractiveness.

As noted earlier, there is evidence that men show potentially strategic preferences. For example, men who score highly on sensation seeking, a trait on which men generally score higher than women (Zuckerman, 1984), prefer more feminine faced women (Jones et al., 2007), and men also prefer more feminine female faces when their testosterone levels are high (Welling et al., 2008). Men also appear to moderate their preferences according to context. Context has been shown to moderate the effects of some variables. For example, self-rated and other-rated attractiveness in men is positively correlated with their preferences for feminine faced women for short-term, but not long-term, relationships (Burriss, et al., 2011), an effect similar to that seen in women. For more direct effects of context, preferences for more feminine stimuli have been found to be greater for short-term than for long-term judgements for both face (Little, Connely, Feinberg, Jones, & Roberts, 2011), and voice stimuli (Little, et al., 2011; Puts, Barndt, Welling, Dawood, & Burriss, 2011), although one study using face stimuli did not show differences in men's preferences across contexts (Burriss, et al., 2011). In the case for female bodies, however, Little et al. (2011) found that men preferred more masculine body shapes for short-term versus long-term relationships. Whether men prefer femininity differently across context is therefore not clear

cut. Additionally, while partnership status is known to be associated with women's preferences for male faces (Little, et al., 2002), to date, the impact of partnership status on men's preferences remains unexamined.

Given the documented potentially strategic preferences that women display for male facial masculinity and theoretical reasons to expect men to vary in their preferences, we examined three sources of individual differences in regard to men's preferences for female facial femininity: context, condition, and relationship status. For condition-dependent preferences we used self-perceived attractiveness as a proxy for mate-value/condition following previous studies (e.g., Burriss, et al., 2011; Little, et al., 2001; Little & Mannion, 2006). We addressed the impact of short-term versus long-term context, self-rated attractiveness, and partnership status on men's preferences for female facial femininity in both laboratory based (Study 1) and internet based (Study 2) tests. We additionally noted that preferring feminine women may also carry a cost to men in regards to potential cuckoldry. Feminine faced women are more inclined to pursue short-term relationships (Boothroyd, et al., 2008), raising the possibility that men may be sensitive to this cue. To address whether men saw feminine faced women as less likely to be faithful, we also examined the relationship between femininity and perceived faithfulness/inclination to short-term mating (Study 3). If feminine faced women are seen to be less faithful and more promiscuous then this would be an important potential cost to choosing a very feminine partner.

STUDY 1

PARTICIPANTS

Seventy-five male participants (aged 17-38, mean age = 21.4, SD = 3.1) took part in the study. Participants were volunteers and were selected for reporting to be heterosexual (homosexual and bisexual participants were recruited but their data are not analysed here). Out of the 75 participants, 40 reported having a current partner and 35 reported no current partner.

STIMULI

Test stimuli were manufactured from sets of 90 male and 145 female Caucasian (aged 18-25 years) photographs taken under standardised lighting conditions and with a neutral expression. An additional set of 28 male and 28 female Japanese (aged 20-23 years) photographs also taken under standardised lighting conditions and with a neutral expression were used.

For every image 174 feature points were delineated on each face image. Individual images were divided into four Caucasian and one Japanese group for each sex and combined to make a composite image for each (to make 5 male and 5 male composite images). Composite images were created by warping, and then superimposing all of the images in each group into the relevant average face shape (Benson & Perrett, 1993). All images were made perfectly symmetrical by combining them with their mirror image prior to femininity-masculinity manipulation.

Each composite face was transformed along a feminine-masculine dimension by using the linear difference between feature points of a composite male and composite female face (Benson & Perrett, 1991; Perrett, et al., 1998; Tiddeman, Burt, & Perrett, 2001). The Caucasian composites were transformed using the difference between Caucasian composites (e.g.,

male composite 1 was transformed suing the difference between male composite 1 and female composite 1) and the Japanese composites were transformed using the difference between the Japanese male and Japanese female composite. For each composite image a sequence of 11 face shapes ranging from +50% masculinized to +50% feminised was constructed (the mid-point, 0% transform, represented the original image).

Final stimuli were ten sequences of faces (5 male and 5 female) to be used to assess preferences for femininity in faces. These image sequences have been used in previous studies (Penton-Voak, et al., 1999; Perrett, et al., 1998). Figure 1 shows an example of a masculinised and feminised female and male face (see Penton-Voak et al., 1999; Perrett et al., 1998 for further example images).

Figure 1 around here

PROCEDURE

The study was administered in the laboratory. Participants completed a short questionnaire addressing age, partnership status (yes/no), and sexuality (heterosexual/bisexual/homosexual). Self-reported attractiveness was measured by giving participants a seven-point scale to rate themselves upon (1 = low, 4 = average, 7 = high). Participants were then presented with 5 interactive face sequence trials. The interactive face sequence trials were presented in random order with subjects being cued to make judgements based on either short or long term relationships by the message “alter the face until you think it is closest to the appearance you would find attractive for a short [or long] term relationship.” Definitions of short-term and long-term

relationships were provided prior to rating for each condition following previous studies (see e.g., Little, et al., 2011 for full definitions).

During each trial left or right (counterbalanced between trials) mouse-movement instantly altered the shape of the face in the on screen image making it more or less masculine. The starting frame was randomly selected. Participants rated both for long- and short-term relationships and order of rating by term was randomised. Participants also judged same-sex male faces and did so after female face trials. The task was the same except that participants were asked to “alter the face until you think it is most attractive to someone of the opposite-sex”. Clicking the mouse button selected an image and a score corresponding to the image, between 0 and 10, was recorded.

RESULTS

We calculated % preference for femininity separately for short- and long-term judgements by averaging the recorded scores (converting to the corresponding %, i.e., 0=-50%) from each of the faces to give a score in percent that could range from -50% (preference for masculinity) to +50% (preference for femininity). Preferences were normally distributed using one-sample Kolmogorov-Smirnov tests (all z <.85, $p < .47$). A one-sample t-test against no preference (0%) revealed preferences for femininity for both short-term (mean =19.77, SD = 14.78, $t_{74} = 11.58$, $p < .001$) and long-term (mean = 15.12, SD = 21.05, $t_{74} = 6.22$, $p < .001$) relationships. The same test showed significant preferences for masculinity in male faces (mean = -7.50, SD = 19.11, $t_{74} = 3.40$, $p = .001$). There was a significant positive correlation between preferences for femininity in short- and long-term contexts (r = .520, $p < .001$) while preferences in both short-term (r = -.163, $p = .161$) and long-

term (r = -.181, *p* = .120) contexts were negatively, but not significantly, related to preferences for femininity in male faces. Age was not significantly correlated with either short-term (r = .012, *p* = .917), long-term (r = -.119, *p* = .308) or same-sex (r = -.080, *p* = .494) preferences. Using independent samples t-tests, self-rated attractiveness (partnered mean = 4.63, SD = 0.77, unpartnered mean = 4.38, SD = 1.25, t_{73} = 1.04, *p* = .303) and age (partnered mean = 22.09, SD = 3.72, unpartnered mean = 20.73, SD = 2.20, t_{73} = 1.96, *p* = .054) were not found to significantly differ between partnered and unpartnered men, although the effect for age was close to significance. To examine the influence of included Japanese face trials, we recalculated mean preferences leaving these trials out. White-only preferences were highly correlated with the original scores (long-term r = .95, short-term r = .87, same-sex r = .95), suggesting ethnicity of face had little influence on average preferences.

STRATEGIC PREFERENCES

A 2x2 mixed model ANOVA with femininity preference as the dependent variable, *term* (short-term/long-term) as a within-participant factor, *relationship status* (partner/no partner) as a between-participant factor, and *self-rated attractiveness* entered as a covariate revealed a significant main effect of *term* ($F_{1,72}$ = 4.93, *p* = .030), a significant interaction between *term* and *self-rated attractiveness* ($F_{1,72}$ = 7.94, *p* = .006)*,* and a significant main effect of *relationship status* ($F_{1,72}$ = 5.83, *p* = .018).There was no significant interaction between *term* and *relationship status* ($F_{1,72}$ = 0.12, *p* = .735) or main effect of *self-rated attractiveness* ($F_{1,72}$ = 0.35, *p* = .557). The significant main effects

indicated that men preferred femininity more for short-term relationships and when they had a partner. These effects are presented in Figure 2.

To examine the significant interaction between *self-rated attractiveness* and *term* we ran Pearson product moment correlations. These revealed a significant positive correlation between self-rated attractiveness and preference for femininity in female faces for short-term relationships (r = .306, p = .008). Self-rated attractiveness was not significantly correlated with long-term preferences (r = .066, p = .576). The interaction then indicates that self-rated attractiveness mainly influenced short-term and not long-term femininity preferences.

Figure 2 around here

SAME-SEX FACES

A univariate ANOVA with same-sex femininity preference as the dependent variable, *relationship status* (partner/no partner) as a between-participant factor, and *self-rated attractiveness* entered as a covariate revealed no significant effect of *relationship status* ($F_{1,72}$ = 0.79, p = .376) and no significant effect of *self-rated attractiveness* ($F_{1,72}$ = 2.63, p = .109).

Pearson product moment correlations confirmed that self-rated attractiveness was not related to preferences for femininity in same-sex faces (r = .176, p = .131).

Sequential Bonferroni correction for correlations

Alpha values were compared with sequential Bonferroni corrected levels of significance (Rice, 1989). This is done by ordering significant p-values by decreasing levels of significance and comparing with a Bonferroni corrected p-value based on the number of tests conducted (i.e., p1 compared to 0.05, p2

compared to 0.05/2, p3 compared to 0.05/3). All significant correlations remained significant using this correction.

STUDY 2

Study 1 demonstrated relationship term, partnership status, and male attractiveness were related to preferences for female facial femininity in a student sample of young adults. In Study 2, we examined the same variables and their relationship with men's preferences for female faces in a larger and more representative online sample of men to address the issue of whether these effects are applicable at a wider range of ages and backgrounds as well as probing more detailed questions regarding partnership status in a sub-sample of men. The method of assessing preference was also changed in Study 2 from the interactive test used in Study 1 to a two alternative forced choice (2AFC) test in Study 2. We note that online preference tests have been found to produce similar patterns of results to laboratory based tests (Jones et al., 2005; Little, Jones, & Burriss, 2007).

PARTICIPANTS

Three hundred and ninety three male participants (aged 17-45, mean age = 27.6, SD = 6.5) took part in the study. The study was administered over the internet and participants were volunteers visiting a research website and were selected for reporting to be heterosexual (homosexual and bisexual participants were recruited but not analysed here) and for being between 17 and 45 years old. Out of the 393 participants, 207 reported having a current partner and 186 reported no current partner. Of those reporting having a partner, 100 men filled in additional questions concerning their relationship and partner. Relationship data were available only for a sub-sample of men

because a revised version of test, with an expanded questionnaire including these questions, replaced the original version part way through testing.

STIMULI

Images were manufactured from 50 young adult male and 50 female photographs taken under standardised lighting conditions and with a neutral expression (all were Caucasian and aged 18-25 years). Composite images were used as “base” faces to which transforms were applied (10 male and 10 female composite images each made of 5 individual images). The composite images were made by creating an average image made up of 5 randomly assigned individual facial photographs using techniques outlined for Study 1. Faces were transformed in masculinity +/-50% in the same way as described for Study 1. Final images were 10 feminine/masculine female pairs. Transforms were equivalent to those depicted in Figure 1.

PROCEDURE

A short questionnaire was presented which was the same as in Study 1. Participants were then shown 10 pairs of masculine and feminine female faces. Participants were asked to choose the face from the pair that they found most attractive for either a short-term or long-term relationship using a set of eight buttons indicating a preference and confidence in their choice (only the binary choice was analysed below). Clicking a button moved participants on to the next face trial. Image order and side of presentation was randomised. Participants chose between the pairs of faces twice, once for long-term and once for short-term relationships. Order of rating of term was randomised. Definitions of short-term and long-term relationships were

provided prior to rating for each condition as in Study 1. A sub-sample of men also completed questions concerning their relationship and their partner: relationship length (in months), how happy they were in their current relationship (1=not happy, 7= very happy), how serious they considered their current relationship (1=not serious, 7=very serious), and how attractive they thought their partner was (1 = low, 7 = high).

RESULTS

We calculated % preference for femininity separately for short- and long-term judgements by taking the mean number of choices of the feminine image of each of ten pairs and converting the score into a percentage ranging from 0% (preference for masculinity) to 100% (preference for femininity). A one-sample t-test against zero preference (50%) revealed preferences for femininity for both short-term (mean = 68.47, SD =24.71, $t_{392} = 14.82$, $p < .001$) and long-term (mean = 69.26, SD =24.47, $t_{392} = 15.61$, $p < .001$) relationships. There was a positive correlation between preferences for femininity in short-term and long-term contexts (r = .553, $p < .001$). Age was not significantly correlated with either short-term (r = .008, $p = .870$) or long-term (r = -.045, $p = .379$) preferences. Using independent samples t-tests, self-rated attractiveness (partnered mean = 4.99, SD = 1.05, unpartnered mean = 4.71, SD = 1.13, $t_{391} = 2.56$, $p = .011$) and age (partnered mean = 28.16, SD = 6.96, unpartnered mean = 26.81, SD = 5.92, $t_{391} = 2.22$, $p = .017$) were found to differ between partnered and unpartnered men, although the lack of correlation between age and preference justifies not entering age as a covariate. Indeed, entering age as an additional covariate in the ANOVA below does not change the pattern or significance of the effects reported.

STRATEGIC PREFERENCES

A 2x2 mixed model ANOVA with femininity preference as the dependent variable, *term* (short-term/long-term) as a within-participant factor, *relationship status* (partner/no partner) as a between-participant factor, and *self-rated attractiveness* entered as a covariate revealed a significant main effect of *term* ($F_{1,390} = 4.72$, $p = .030$), a significant main effect of *self-rated attractiveness* ($F_{1,390} = 6.03$, $p = .015$), a significant interaction between *term* and *self-rated attractiveness* ($F_{1,390} = 4.17$, $p = .042$), and a significant interaction between *term* and *relationship status* ($F_{1,390} = 5.61$, $p = .018$). There was no main effect of *relationship status* ($F_{1,390} = 0.53$, $p = .466$). Mean scores from this analysis can be seen in Figure 3.

Figure 3 about here.

To examine the significant interaction between *self-rated attractiveness* and *term* we ran Pearson product moment correlations. These revealed a significant positive correlation between self-rated attractiveness and preference for femininity in female faces for short-term relationships ($r = .169$, $p = .001$). Self-rated attractiveness was not significantly correlated with long-term preferences ($r = .058$, $p = .251$). The interaction then indicates that self-rated attractiveness mainly influenced short-term and not long-term femininity preferences.

To examine the significant interaction between *term* and *relationship status,* independent samples t-tests were conducted comparing preferences of those with and without partners. This revealed no significant differences for long-term preferences ($t_{391} = 0.32$, $p = .750$) but that those with partners had significantly stronger preferences for femininity than those without partners for

short-term relationships (t_{391} = 2.16, p = .031). Splitting by partnership status, paired samples t-test revealed that those with a partner did not significantly differ in their preference for feminine faces for short-term versus long-term relationships (t_{206} = 1.30, p = .197) and that those without partners preferred more feminine faces for long-term versus short-term relationships (t_{185} = 2.45, p = .015).

Preferences and ratings of relationship partner attractiveness

For a sub-sample of men with partners we had additional questions concerning their opinions about their relationship and partner's. Partnership length ranged from 1 to 280 months (M = 58, SD = 69). We additionally computed a difference in attractiveness score by subtracting partner attractiveness from the man's self-rated attractiveness score. Positive scores then indicate a man thought he was more attractive than his partner while negative scores indicated he thought he was less attractive. We used this score instead of rated partner attractiveness to assess relative attractiveness.

We conducted partial correlations controlling for age because age was related to relationship length (r = .724, p < .001), although we note that all significant correlations remain so when not controlling for age. For short-term preferences, relationship seriousness was negatively related to (r = -.227, p = .024) and attractiveness difference was positively related (i.e. the more a man thought he was more attractive than his partner) to (r = .242, p = .016) preferences for femininity. Other correlations were not significant (relationship length, relationship happiness, all r .06 to .09, p > .360). For long-term preferences, no variable was significantly correlated with femininity preference (all r -.04 to .12, p > .220).

Sequential Bonferroni correction for correlations

Alpha values were compared with sequential Bonferroni corrected levels of significance as in Study 1. All significant correlations remained significant using this correction.

STUDY 3

Study 1 and Study 2 demonstrate that men who think they are attractive prefer more feminine female faces. Men's preferences for facial femininity also change according to partnership and relationship term. These effects suggest a cost to preferences for facial femininity. In Study 3 we examined one potential cost to preferences for femininity in long term relationships: a lack of faithfulness. Specifically, men preferring and forming relationships with more feminine women may incur a cost in terms of a lower likelihood of faithfulness from feminine women because feminine faced women report greater interest in short-term mating than masculine faced women (Boothroyd, et al., 2008). To address relationships between short-term and long-term attractiveness, femininity, and faithfulness we collected ratings of each of these variables using unmanipulated female faces.

PARTICIPANTS

Images: For photography 73 women (aged 18-26 years, mean = 21.6, S.D. = 1.4) came to the laboratory and were paid £5 for participation. Raters: Participants were 15 men (aged 19-30 years, mean = 22.3, S.D. = 3.2) who were all students participating for course credit. All participants reported to be heterosexual (homosexual and bisexual participants were not excluded in recruitment but their data would not have been analysed here).

STIMULI

For the photographs, female participants were photographed with a neutral expression and under standardized lighting conditions. Images were aligned on interpupillary distance to help standardize head size and images were presented masked based on the outline of the face so that ears, hair, and clothing were not visible in the picture. Images were taken two years prior to ratings leading to a lower likelihood that stimuli images were familiar to raters.

PROCEDURE

Testing took place under laboratory conditions. Participants were presented with a short questionnaire addressing their age. Female faces were presented to participants individually and in a random order. Order of rating was blocked by question, with each image appearing alongside one question within a block, and block order was also randomized. Images remained on screen until the face was rated, which moved the participant on to the next trial. Participants rated each face on a 7-point Likert scale, 1=low, 7=high, for the following traits: “How ATTRACTIVE is this face for a LONG-TERM relationship?”, “How ATTRACTIVE is this face for a SHORT-TERM relationship?”, “How MASCULINE is this face?”, “How FAITHFUL would this person be in a relationship with you?”, and “How interested in a SHORT-TERM relationship would this person be?”. Masculine ratings were reverse scored to give a rating of femininity.

RESULTS

Long-term and short-term attractiveness ratings were highly correlated ($r = .833$, $p < .001$). To address relative attractiveness for the two terms we subtracted short-term ratings from long-term ratings. This created a difference

score for which high scores indicated the face was found more attractive for long-term than short-term relationships while low scores indicated the face found more attractive for short-term than long-term relationships. We term this variable “relative long-term attractiveness”.

To address relationships with perceived femininity we ran Pearson product moment correlations. These revealed significant correlations between femininity and perceived faithfulness (r = -.339, *p* = .003), perceived short-term inclination (r = .338, *p* = .003), and relative long-term attractiveness (r = -.281, *p* = .016). More feminine female faces were seen as less likely to be faithful, more likely to engage in short-term relationships, and were less attractive for long-term relationships/more attractive for short-term relationships.

Perceived faithfulness (r = .370, *p* = .001) and short-term inclination (r = -.332, *p* = .004) were also significantly related to relative long-term attractiveness, with faces that were more attractive for long-term relationships being seen as more faithful and less likely to pursue short-term relationships and faces more attractive for short-term relationships being seen as less faithful and more likely to pursue short-term relationships. To address the impact of perceived faithfulness and short-term inclination on the relationship between femininity and relative long-term attractiveness we ran a partial correlation controlling for perceived faithfulness and short-term inclination. When controlling for these variables, a non-significant relationship between femininity and relative long-term attractiveness was found (r = -.160, *p* = .182).

Sequential Bonferroni correction for correlations

Alpha values were compared with sequential Bonferroni corrected levels of significance as in Study 1. All significant correlations remained significant using this correction.

GENERAL DISCUSSION

The current series of studies demonstrated individual differences in men's preference for female facial masculinity. Mirroring an effect seen in women's preferences, men who thought themselves attractive preferred more femininity in female faces when rating for short-term relationships than those who thought themselves less attractive (Study 1 and Study 2). There was also an effect of term and relationship status whereby men rating for short-term or who had partners preferred more feminine female faces (Study 1). These effects were seen somewhat differently in Study 2 in which we found an interaction between term and relationship status, with men who had partners generally preferring more feminine faces for short-term relationships than men without partners. Relationship status and self-rated attractiveness were not related to same-sex femininity preferences (Study 1) suggesting effects are not to do with general preferences for masculinity and are relevant only for mate-choice relevant attractiveness judgements. These effects were seen in both laboratory tests (Study 1) and internet based tests (Study 2). We also found perceptual relationships among perceived femininity, relative long-term attractiveness, faithfulness, and inclination to short-term mating. Feminine faced women were preferred for short-term relationships relative to long-term relationships and were also seen as less likely to be faithful and more inclined to pursue short-term relationships (Study 3).

Study 1 and Study 2 differed in sample (university student vs. internet sample), place of testing (lab vs. web,) and method of preference measurement (interactive sequence vs. forced choice). Despite such differences, the results of each study are comparable. In both studies there was an interaction between term and self-rated attractiveness in which self-rated attractive was positively correlated with long-term but not short-term femininity preferences. Both studies also suggested femininity preferences were greater when rating for short-term relationships and when a man already had a partner, although in Study 2 greater femininity preferences were only seen in men with a partner. Similar findings across samples of students and a broader sample recruited online and across web-based and laboratory-based tests are unsurprising. While the percentage preferences are calculated very differently across Study 1 and 2 (taking the mean % chosen from a sequence ranging from -50 to +50% or calculating the % chosen from pairs transformed either -50 or +50%), both measures should reflect relative preferences for femininity: men who prefer more feminine faces would be expected to both select more feminine images from the sequence (Study 1) and select more feminine vs. masculine images in force-choice tests (Study 2). We do note, however, there is no reason the mean preference for femininity would be the same in the two different measures. This difference is one potential explanation for why stronger preferences for femininity were seen in Study 1.

Little et al. (2001) found that women who thought they were physically attractive preferred more masculine faces for long-term relationships than those women who thought they were less attractive. The lower level of preference for proposed markers of good genes was interpreted as potentially

628 adaptive for women of low mate-value in order to avoid the costs of decreased
629 parental investment/potential desertion from the owners of masculine features
630 (Little, et al., 2001). Our findings in Study 1 and 2 here suggest that an
631 equivalent mechanism may be operating in male preferences (see also
632 Burriss, et al., 2011). In men, as in women, differences in mate preferences
633 based on self-perceived attractiveness may reflect different mate-choice
634 strategies between individuals. In men, self-rated attractiveness influenced
635 preferences for short- rather than long-term partners whereas the effect of
636 self-rated attractiveness on masculinity preferences is mainly seen for long-
637 term preferences in women (Little, et al., 2001; Penton-Voak, et al., 2003). In
638 women, the specificity of effects of self-rated attractiveness to long-term face
639 preferences is in line with the notion that women face a trade-off between
640 investment and quality, which is not applicable to short-term preferences. In
641 men, specificity of effects of self-rated attractiveness to short-term face
642 preferences is more suggestive that attractiveness effects are driven by
643 factors potentially related to likely reciprocation of interest by women in short-
644 term encounters.

645 Such condition dependent preferences suggest a cost to less attractive
646 men choosing very feminine partners even in short-term relationships. The
647 results of Study 3 are indicative of a trade-off between feminine traits and
648 perceived faithfulness. More feminine women were seen as less likely to be
649 faithful and so faithfulness potentially limits men's attraction to femininity for
650 long-term relationships. Conversely, femininity may be a more desirable trait
651 in short-term partners because perceptions of low faithfulness or promiscuity
652 may indicate a greater chance that interest will be reciprocated. One study

653 has shown that a woman's rated facial femininity is positively related to their
654 ideal number of children (Law-Smith et al., 2012). While Law-Smith et al.'s
655 (2012) findings are suggestive that men should prefer feminine women for
656 both long-term and short-term relationships, as men choosing to mate with
657 such women may then produce a greater number of offspring, the perceived
658 potential cuckoldry of feminine women, as shown in Study 3, could still
659 outweigh any benefits of preferring women with an increased interest in
660 children for men's long-term preferences. Men's perceptions of faithfulness
661 may be enough to drive preferences and some studies suggest attractiveness
662 is actually linked to the pursuit of short-term relationships in women
663 (Boothroyd, et al., 2008). If men use short-term mating as a means to assess
664 potential long-term partners, factors such as faithfulness may still impact on
665 such preferences. Given we found that effects of self-perceived attractiveness
666 were relatively specific to short-term relationships, an alternative explanation
667 is that a man's attractiveness more simply limits the likelihood of reciprocal
668 sexual interest. In other words, attractive men are more able to attract
669 feminine women whereas less attractive men demonstrate preferences for
670 less feminine women which will more likely lead to mating. Men of high
671 attractiveness may then maximise their reproductive success by maximising
672 phenotypic quality (indicating fertility, fecundity or some aspect of genetic
673 quality) in short-term partners and men of low attractiveness may maximise
674 their reproductive success by pursuing females most likely to reciprocate
675 interest in short-term relationships.

676 In Study 1, we found main effects of both term and relationship status
677 but in Study 2 we found these variables interacted. The reason for this

678 difference between the two studies is unclear, and perhaps reflects
679 differences in the sensitivity of the measures of preference or the mean age of
680 the participants (who were older in Study 2). For example, in terms of sample
681 age, partnerships may be less serious to a younger versus older group
682 leading to differences in how having a partner may impact on short-term
683 preferences. Despite the difference, the effects are generally consistent,
684 suggesting greater attraction to femininity for short-term preferences and
685 when a man has a partner, although in Study 2 men without partners
686 expressed preferences for feminine female faces for long-term over short-term
687 relationships. This interaction in Study 2 might help explain mixed findings for
688 preferences for more feminine stimuli being greater for short-term than for
689 long-term judgements in men (Burriss, et al., 2011; Little, et al., 2011; Puts, et
690 al., 2011), as the partnership status of the men being studied might be an
691 important variable (the participants in Burriss et al.'s study all had partners).
692 Again, similar phenomena are seen among women, whereby those who have
693 a partner or are rating a short-term partner prefer more masculine male faces
694 (Little, et al., 2002). For women's preferences, the logic put forward to explain
695 such effects is that the possession of a partner or judging in the context of a
696 short-term relationship are both circumstances in which a woman can be less
697 concerned by the potential of low investment from masculine faced men. The
698 higher preferences for femininity in female faces by men for short-term
699 judgements when they have a partner may be shaped by both similar and
700 different pressures. Changing preferences in women may in part reflect an
701 adaptation to become pregnant by men who are not their long term partners, a
702 factor not applicable to men. Men who cheat on their partner, however, risk

losing this partner if the infidelity is discovered. Potentially then, partnered men may be generally more choosy in terms of preferences for femininity than single males to somewhat offset the costs associated with this risk. In other words, because of an associated cost, the payoff must be larger for men to consider cheating on or leaving their current partner. From the unpartnered man's perspective, there is potentially greater pay-off in pursuing short-term relationships and so unpartnered men may be most likely to compromise their short-term partner preferences and relax their standards to favour more masculine women. In terms of generally greater preferences for masculinity in long-term partners, preferences for femininity may be relaxed because femininity is ranked as less important relative to other factors (such as cooperative tendencies, for example).

In Study 2, we additionally asked questions concerning the relationship and partner attractiveness for partnered men. Our measurement of relationship status in Study 1 as only a yes/no variable did not address the influence of relationship length and other relationship qualities that may have been important in determining how partnership affects preferences. However, in Study 2, where such information was available for a sub-sample of men, only limited effects of partnership length and happiness were seen. Relationship length and happiness were unrelated to either long-term or short-term preferences and no other variable was related to long-term preferences. For short-term preferences, relationship seriousness was negatively related to preferences for femininity indicating that lower levels of seriousness were related to greater preferences for femininity. One explanation for this finding is that some men may be prone to generally consider their relationships as less

728 serious. Such men may be inclined to take a long-term partner while
729 attempting to have extra-pair relationships with more feminine women even
730 when equivalently happy in these relationships to men who tend to consider
731 their relationships more serious. The difference in perceived attractiveness
732 between a man and his partner also predicted short-term preferences. Men
733 who thought they were more attractive than their partner preferred more
734 feminine female faces for short-term relationships. Again, this finding may
735 reflect dynamics within a relationship. A man may be happy with his partner,
736 but if he feels more attractive then he may pursue short-term relationships
737 with more feminine women.
738 In Study 3, we observed that more feminine women were seen as less
739 faithful and more likely to pursue short-term relationships. Both effects likely
740 reflect perceived opportunity, opportunities particularly important for less
741 competitive men. A male of average attractiveness may be at greater risk of
742 cuckoldry by partnering with a very feminine woman (Buss & Haselton, 2005).
743 While feminine women were also seen to be more likely to pursue short-term
744 relationships it is unlikely that they would be seen to do so with all men. As
745 noted above, some men may not direct their attention towards very feminine
746 women, even if they are seen as good short-term prospects, because of a low
747 likelihood of mating success. Indeed, attractive, feminine women may be more
748 likely to pursue short-term relationships (Boothroyd, et al., 2008) but they are
749 likely to do so only with attractive men. The findings of Study 3 may then also
750 offer another explanation for men's preference for femininity in the short-
751 term/when they have a partner: it may in fact be easier to secure a short-term

752 relationship with a woman with a more feminine than less feminine face, and
753 this may be most relevant to attractive men.
754 Overall, men, like women, might face a trade-off between attraction and
755 investment. Attractive men may be able to retain the interest of more feminine
756 women with lower risk of cuckoldry than less attractive men (Little, Cohen,
757 Jones, & Belsky, 2007). Attractive men may also be more competitive for
758 short-term partners allowing them to be choosier (Gangestad, et al., 2005).
759 Men may focus on attractive traits in short-term contexts when they have a
760 partner because they do not have to be concerned with behavioural traits that
761 are important in long-term relationships (Little, Cohen, et al., 2007; Puts, et al.,
762 2011) and because the potential costs of being discovered lead to an increase
763 in choosiness relative to un unpartnered men who are more willing to relax
764 their standards to increase potential short-term mating.
765 In summary, here we show individual differences in men's preferences
766 for female facial femininity. Such differences appear somewhat similar to
767 effects seen when women judge the attractiveness of masculinity in male
768 faces, being influenced by self-perceived attractiveness, short- and long-term
769 contexts, and partnership status. The data here are suggestive that men may
770 also face trade-offs when choosing a masculine or feminine faced partner
771 and, while the exact pressures may be less clear than for women, the
772 variation observed here may serve an adaptive function in driving male mate
773 preferences.
774
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Figure 1: Examples of feminised (left) and masculinised (right) female and male faces.

930 Figure 2: Study 1: Preferences for femininity in female faces (mean % based
931 on choice from sequence -50% to +50%) judged by men split by partnership
932 status and long- and short-term preferences (estimated marginal means
933 controlling for self-rated attractiveness, +/- 1 SE of mean).
934
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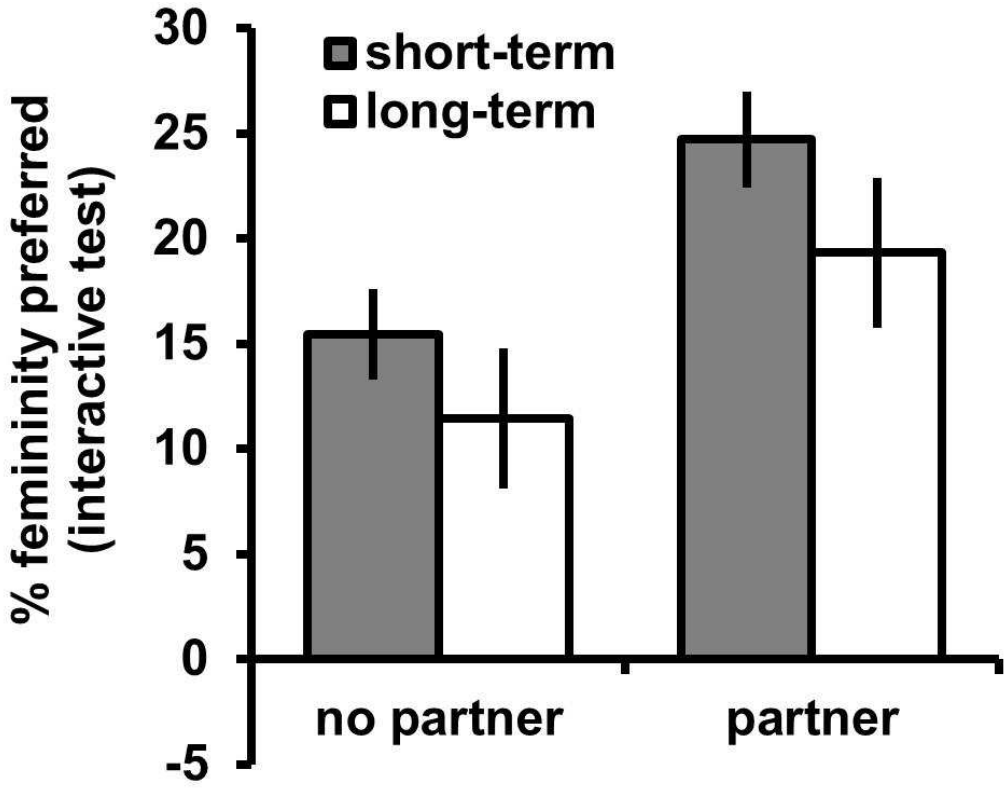

936

Figure 3: Study 2: Preferences for femininity in female faces (mean % of choice of feminine face in force choice trials, 0-100%, 50% = equal number of masculine and feminine faces chosen) judged by men split by partnership status and long- and short-term preferences (estimated marginal means controlling for self-rated attractiveness, +/- 1 SE of mean).