

Sociosexuality Predicts Women's Preferences for Symmetry in Men's Faces

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Abstract Although men displaying cues of good physical condition possess traits that are desirable in a mate (e.g., good health), these men are also more likely to possess antisocial characteristics that are undesirable in a long-term partner (e.g., aggression and tendency to infidelity). How women resolve this trade-off between the costs and benefits associated with choosing a mate in good physical condition may lead to strategic variation in women's mate preferences. Because the costs of choosing a mate with antisocial personality characteristics are greater in long- than short-term relationships, women's sociosexuality (i.e., the extent to which they are interested in uncommitted sexual relationships) may predict individual differences in their mate preferences. Here we investigated variation in 99 heterosexual women's preferences for facial symmetry, a characteristic that is thought to be an important cue of physical condition. Symmetry preferences were assessed using pairs of symmetrized and original (i.e., relatively asymmetric) versions of 10 male and 10 female faces. Analyses showed that women's sociosexuality, and their sociosexual attitude in particular, predicted their preferences for symmetry in men's, but not women's, faces; women who reported being more interested in short-term, uncommitted relationships demonstrated stronger attraction to symmetric men. Our findings present new evidence for potentially adaptive variation in women's symmetry preferences that is consistent with trade-off theories of attraction.

Keywords Sociosexuality Mating strategy Symmetry Fluctuating asymmetry Face perception

Introduction

Masculine physical characteristics in men (i.e., physical traits that are larger in men than in women, such as jaw size or brow prominence) are positively correlated with indices of their long-term health (Rhodes, Chan, Zebrowitz, & Simmons, 2003; Thornhill & Gangestad, 2006), physical strength (Fink, Neave, & Seydel, 2007), social status (Mueller & Mazur, 1996), reproductive potential (Puts, 2005; Rhodes, Simmons, & Peters, 2005), and, in natural fertility populations, reproductive success (Apicella, Feinberg, & Marlowe, 2007). While these findings suggest that there may be benefits to women who choose masculine mates (e.g., increased offspring health), masculine physical characteristics in men are also positively correlated with traits that are not desirable in a long-term partner (Little, Jones, Penton-Voak, Burt, & Perrett, 2002; Perrett, Lee, Penton-Voak, Rowland, Yoshikawa, et al., 1998). For example, masculine men demonstrate stronger preferences for short-term, uncommitted relationships (Boothroyd, Jones, Burt, DeBruine, & Perrett, 2008; Rhodes et al., 2005), are more likely to report having cheated on a long-term partner (Hughes, Dispenza, & Gallup, 2004), and are ascribed more antisocial personality characteristics by others (e.g., dishonesty) (Boothroyd, Jones, Burt, & Perrett, 2007; Perrett et al., 1998; Smith, Jones, Little, DeBruine, Welling, et al., 2009) than their less masculine peers. Thus, there may be both costs and benefits to women who choose a masculine mate (DeBruine, Jones, Crawford, Welling, & Little, 2010; Gangestad & Simpson, 2000; Little et al., 2002; Penton-Voak, Perrett, Castles, Burt, Koyabashi, et al., 1999). Importantly, variation in how women resolve this trade-off may give rise to individual differences in women's masculinity preferences (DeBruine,

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Jones, Crawford, Welling, & Little, 2010; Gangestad & Simpson, 2000; Little et al., 2002; Penton-Voak et al., 1999).

Sociosexuality refers to the extent to which an individual adopts a restricted sexual strategy (i.e., is not interested in uncommitted sexual relationships) or an unrestricted sexual strategy (i.e., is interested in uncommitted sexual relationships; Simpson & Gangestad, 1991) and has been the focus of a considerable amount of research on women's sexual behavior (see Penke & Asendorpf, 2008; Schmitt, 2005). Because the costs to women that are associated with choosing a mate who possesses anti-social traits (e.g., a masculine mate) are substantially lesser for short-term than long-term relationships (Gangestad & Simpson, 2000; Little et al., 2002; Penton-Voak et al., 1999), more "unrestricted" women may demonstrate stronger preferences for masculine men than will relatively "restricted" women (Glaszenberg, Feinberg, Jones, Little, & DeBruine, 2010; Provost, Kormos, Kosakoski, & Quinsey, 2006; Waynforth, Delwadia, & Camm, 2005). However, evidence for such an association from studies that have used the Sociosexual Orientation Inventory (SOI, Simpson & Gangestad, 1991) to assess individual differences in women's sociosexuality is equivocal. For example, although one study found that more unrestricted women demonstrated stronger preferences for masculinity in men's faces (Waynforth et al., 2005), other studies have not replicated this effect (Glaszenberg et al., 2010; Provost et al., 2006, but see Smith et al., 2009, for a quasi-replication using a different measure of sociosexuality). Although evidence that sociosexuality predicts variation in women's preferences for masculine characteristics in men's faces is somewhat mixed, studies of individual differences in women's preferences for masculine characteristics in men's body shapes (Provost et al., 2006) and point-light displays of their gait (Provost, Troje, & Quinsey, 2008) have reported that more unrestricted women demonstrated stronger preferences for masculine men. Given these rather inconsistent findings for sociosexuality and women's masculinity preferences, investigating possible relationships between sociosexuality and women's preferences for other putative health cues may clarify the role of sociosexuality for women's mate preferences.

While many studies have investigated the relationships

et al., 2005) suggest, then it might be predicted that the attitude component of the SOI-R would be the best predictor of women's preferences for symmetric men.

In addition to investigating individual differences in women's preferences for symmetry in men's faces, we also investigated the relationship between women's sociosexuality and their preferences for symmetry in women's faces. If the predicted link between sociosexuality and women's preferences for symmetric men reflects processes and cognitions that are relatively specific to mate preferences and choices, we would not necessarily expect there to be a positive correlation between sociosexuality and women's preferences for symmetry in the faces of other women.

Method

Participants

Participants in the study were 99 heterosexual women (M age = 20.9 years, $SD = 2.55$ years). All participants were undergraduate students at the University of Aberdeen, participating in return for course credit.

Procedure

Participants were presented 20 pairs of face images (10 male pairs, 10 female pairs), each pair consisting of the original (i.e., relatively asymmetric) and symmetrized version of the same individual, and were instructed to choose which face in each pair was more attractive and indicate whether they thought it was "much more attractive," "more attractive," "somewhat more attractive" or "slightly more attractive" by clicking on buttons above the face they chose that displayed these labels. Examples of symmetrized and original versions of faces are shown in Fig. 1. Trial

order and the side of the screen on which any given image was presented were both randomized across participants. This method for assessing individual differences in preferences for manipulated characteristics in face images has been used in many previous studies (e.g., Buckingham, DeBruine, Little, Welling, & Conway, et al. 2006; Jones, DeBruine, Little, Conway, Welling, et al., 2007; Welling, Jones, DeBruine, Smith, & Feinberg, et al., 2008). Face stimuli for the symmetry preference test were manufactured using procedures first described in Perrett, Burt, Penton-Voak, Lee, Rowland, et al. (1999) and have been used in many other previous studies (e.g., Little & Jones, 2003, 2006; Little et al., 2007). Briefly, full-color digital face photographs were taken of 10 young adult men and 10 young adult women with neutral expressions and direct gaze. Computer graphic methods were then used to warp each image into a more symmetric shape. This method for manipulating symmetry of face shape in digital images does not affect other aspects of facial appearance (e.g., identity, skin color and texture, aspects of face shape other than symmetry; Perrett et al., 1999).

In addition to the face preference test, each woman also completed the SOI-R (Penke & Asendorpf, 2008). The order in which women completed the face preference test and questionnaire was randomized across participants.

Measures

Individual differences in women's sociosexuality were assessed using the 5-point response scale version of the SOI-R questionnaire, which has previously been shown to have very good internal, external, and test-retest reliability (Penke & Asendorpf, 2008). The questionnaire consists of 9 items, each of which is answered using a 1–5 scale.

The SOI-R B component consists of 3 items (e.g., "With how many different partners have you had sex within the past

Fig. 1 Symmetrized (*left*) and original (*right*) versions of a face image from our study



12 months?”), for which 1 on the response scale corresponds to “0 sexual partners” and 5 corresponds to “8 or more sexual partners.” The SOI-R A component consists of 3 items (e.g., “Sex without love is OK”), for which 1 on the response scale corresponds to “totally disagree” and 5 corresponds to “totally agree.” The SOI-R D component consists of 3 items (e.g., “In everyday life, how often do you have spontaneous fantasies about having sex with someone you have just met?”), for which 1 on the response scale corresponds to “never” and 5 corresponds to “nearly every day.”

Scores for each component are calculated by averaging the individual scores for the 3 relevant items and can, therefore, range from 1 to 5. A total score (global SOI-R) can also be calculated by averaging the three component scores. This total score can also range from 1 to 5. On each measure, high scores indicate more unrestricted sociosexuality (i.e., greater short-term mating interest).

Data Processing

Following previous studies (e.g., Buckingham et al., 2006; Jones, DeBruine, Little, Conway, & Welling, et al., 2007; Welling et al., 2008), responses on the face preference test were coded using an 8-point scale: 0 = original face judged much more attractive than symmetrized face; 1 = original face judged more attractive than symmetrized face; 2 = original face judged somewhat more attractive than symmetrized face; 3 = original face judged slightly more attractive than symmetrized face; 4 = symmetrized face judged slightly more attractive than original face; 5 = symmetrized face judged somewhat more attractive than original face; 6 = symmetrized face judged more attractive than original face; 7 = symmetrized face judged much more attractive than original face.

For each participant, we used these values to calculate her average score on the face preference test when judging men’s faces and, separately, when judging women’s faces. These scores were used in subsequent analyses and higher scores indicated stronger attraction to symmetric faces.

Scores on the SOI-R questionnaire were calculated following Penke and Asendorpf (2008). For each participant, four scores were calculated: a score for global sociosexuality (global SOI-R: $M = 2.31$, $SD = 0.78$), a score for the sociosexual behavior component (SOI-R B: $M = 1.92$, $SD = 0.86$), a score for the sociosexual attitude component (SOI-R A: $M = 2.76$, $SD = 0.56$), and a score for the sociosexual desire component (SOI-R D: $M = 2.25$, $SD = 0.92$). Internal consistency for the global SOI-R and each of the three individual components was very high (all Cronbach’s alphas $>.80$).

Results

To establish whether women reported stronger attraction to symmetrized faces than to original versions, we used one-sample *t*-tests

to compare participants’ scores on the two face preference tests with what would be expected by chance alone (i.e., 3.5). The one-sample *t*-test for men’s faces showed that women reported stronger attraction to symmetrized male faces than to original versions, $t(98) = 4.52$, $p < .001$, $M = 3.66$, $SEM = 0.04$. Similarly, the one-sample *t*-test for women’s faces showed that women reported stronger attraction to symmetrized female faces than to original versions, $t(98) = 5.86$, $p < .001$, $M = 3.75$, $SEM = 0.04$. Although preferences for symmetry in women’s faces tended to be stronger than those for men’s faces, this difference was not significant, $t(98) = 1.72$, $p = .098$.

Next, we investigated the relationships between women’s scores on the two face preference tests and their global SOI-R. Global SOI-R was positively correlated with women’s preference for symmetry in men’s faces, $r = .22$, $N = 99$, $p = .028$, indicating that women with higher scores on the SOI-R reported stronger preferences for symmetrized male faces. By contrast, the relationship between global SOI-R and women’s scores for women’s faces was negative and not significant, $r = -.10$, $N = 99$, indicating that women’s scores on the SOI-R did not predict their judgments of women’s faces. Steiger’s test (Steiger, 1980) indicated that these correlations were significantly different from one another, $z = 2.33$, $p = .020$. Partial correlation analyses showed that the positive correlation between global SOI-R and women’s scores for men’s faces remained significant when controlling for possible effects of participant age, partial $r = .23$, $N = 99$, $p = .026$. The corresponding relationship for judgments of women’s faces was not significant, partial $r = -.10$, $N = 99$.

We also used correlations to investigate the relationships between women’s reported attraction to symmetrized male faces and each of the three components of the SOI-R. There was a significant positive correlation between women’s reported attraction to symmetrized male faces and their scores on the sociosexual attitude component (SOI-R A), $r = .25$, $N = 99$, $p = .012$. Additionally, women who scored high on the sociosexual desire component tended to report stronger attraction to symmetrized male faces, although this relationship was not significant (SOI-R D), $r = .18$, $N = 99$, $p = .08$. The relationship between women’s reported attraction to symmetrized male faces and their scores on the sociosexual behavior component was not significant (SOI-R B), $r = .10$, $N = 99$.

Next, we used linear regression to investigate which component of the SOI-R was the best predictor of the strength of women’s reported attraction to symmetrized male faces. Women’s scores for male faces were entered as the dependent variable and women’s scores on the SOI-R A, SOI-R B, and SOI-R D were each entered simultaneously as predictors. This analysis revealed a significant positive relationship between the strength of women’s reported attraction to symmetrized male faces and their scores on the SOI-R A, $t = 2.09$, standardized beta = $.22$, $p = .04$, and no other significant relationships, both absolute t s < 1.08 , both standardized betas $< .12$. Repeating this analysis with participant age as an additional predictor did not alter the pattern of results.

Variation in the strength of women's reported attraction to symmetrized female faces was analyzed in the same way as variation in their judgments of men's faces. None of the components of the SOI-R predicted the strength of women's reported attraction to symmetrized female faces, all absolute r s < .13. Similarly, the regression analysis for women's faces revealed no significant relationships between the strength of women's reported attraction to symmetrized female faces and any component of the SOI-R, all absolute t s < 1.15, all absolute standardized betas < .13. Repeating this analysis with participant age as an additional predictor did not alter the pattern of results.

Participant age did not predict either of the facial symmetry preference scores, both absolute r s < .02. Participant age was positively correlated with women's global SOI-R, $r = .27$, $N = 99$, $p = .006$, SOI-R A, $r = .25$, $N = 99$, $p = .012$, and SOI-R B, $r = .28$, $N = 99$, $p = .006$, but not with SOI-R D, $r = .13$, $N = 99$. Note that the previous analyses showed that the significant relationships between women's preferences for symmetric men and both the global SOI-R and the SOI-R A component remained significant when controlling for the effects of participant age.

Discussion

Consistent with many previous studies (reviewed in Little & Jones, 2006), women reported stronger attraction to symmetrized versions of faces than they did to original (i.e., relatively asymmetric) versions. Because symmetry alone was manipulated in our stimuli, these findings demonstrate that facial symmetry is a cue to attractiveness (see also, e.g., Little & Jones, 2003, 2006; Perrett et al., 1999). Although women generally preferred symmetric faces to relatively asymmetric faces, further analyses suggested that individual differences in women's sociosexuality predicted their preferences for symmetry in men's, but not women's, faces.

As we had predicted, global SOI-R was positively correlated with the strength of women's preferences for symmetry in men's faces, suggesting that women reporting more unrestricted sociosexuality (i.e., women who are more interested in uncommitted sexual relationships) demonstrated stronger attraction to symmetry in men's faces. Additional analyses also showed that the sociosexual attitude component of the SOI-R was a better predictor of the strength of women's preferences for symmetry in men's faces than either the sociosexual behavior or desire components. These latter findings suggest that attitude is the critical sociosexual component for variation in women's preferences for symmetric men. Attitudes to casual sex may be a better predictor of women's mate preferences than the extent to which women actually engage in casual sex because the latter is constrained by other factors (e.g., both the availability of, and access to, short-term mates).

Although we show that sociosexuality, and sociosexual attitudes in particular, predict women's preferences for symmetric

men, it is important to note that the correlations demonstrating this relationship are generally very weak. This is consistent with other work showing, for example, within-subjects variation in women's mate preferences that are related to changes in hormone levels and social experience and between-subjects variation in mate preferences that are related to other aspects of women's personality, experiences, and condition (see Little, Jones, & DeBruine, 2011).

While our analyses revealed associations between the strength of women's preferences for symmetry in men's faces and both their global SOI-R and their scores on the sociosexual attitudes component of the SOI-R, we found no evidence that any aspect of the SOI-R predicted individual differences in women's preferences for symmetry in women's faces. That sociosexuality predicted variation in women's preferences for symmetric men, but not symmetric women, suggests that the correlation between sociosexuality and judgments of male faces is not due to a general bias in the use of response scales, whereby women who scored higher on the SOI-R may simply have been more willing to use extreme points on response scales generally. Moreover, the pattern of results implicates sociosexuality in women's mate preferences, but not their general social preferences.

That sociosexuality predicted variation in women's preferences for symmetric men contrasts with Sacco et al. (2009), who recently observed no significant relationship between these variables. However, Sacco et al. used the original version of the SOI to explore the link between sociosexuality and women's mate preferences, which does not distinguish between the three components of sociosexuality highlighted by Penke and Asendorpf (2008). This is potentially noteworthy because our findings suggest that sociosexual attitude may be particularly important for systematic variation in women's symmetry preferences and because Penke and Asendorpf have previously reported that, of the three components, sociosexual attitude was the best predictor of women's reported interest in short-term relationships. Indeed, the original global SOI scores considered by Sacco et al. (2009) are not particularly highly correlated with the global SOI-R or its components, suggesting that they could reflect subtly different constructs (Penke & Asendorpf, 2008). For example, some researchers have suggested that the original SOI might overemphasize the importance of sociosexual behavior at the expense of sociosexual attitudes and desires (Penke & Asendorpf, 2008). Additionally, Sacco et al. (2009) used a median split on SOI scores and assigned women to restricted and unrestricted groups in order to explore the relationship between sociosexuality and symmetry preferences. Using median splits in this way has been criticized by some researchers because it reduces the variance in scores, potentially masking relationships that would be significant if the continuous variable had been retained (see, e.g., MacCallum, Zhang, Preacher, & Rucker, 2002).

Somewhat surprisingly, women tended to show stronger preferences for symmetry in women's faces than they did for men's faces. However, we suggest that this apparent difference in responses to men and women should be treated somewhat

cautiously for two reasons. First, the difference was not significant ($p = .098$). Second, several previo

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