Sexual orientation predicts women's preferences for sexually dimorphic face-shape characteristics

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Abstract

Trade-off theories of women's masculinity preferences propose that women's masculinity preferences vary according to the probability of reproduction. Consistent with the proposal that preferences for masculine men are stronger when probability of reproduction is higher, previous research reported that heterosexual women show stronger preferences for images of male faces displaying masculine shape characteristics than do homosexual women (Glassenberg et al., 2010). However, many reported findings for individual differences in women's masculinity preferences have not been replicated in subsequent studies. Consequently, we carried out a direct replication of Glassenberg et al.'s (2010) comparison of heterosexual and homosexual women's preferences for sexually dimorphic face-shape characteristics. Replicating the results from Glassenberg et al. (2010), we found that heterosexual women ($N = 20,360$) showed stronger preferences for masculine men than did homosexual women ($N = 1598$). This finding is consistent with the proposal that women's preferences for masculine men are stronger when the probability of reproduction is higher, presenting further evidence for trade-off theories of women's masculinity preferences.

Keywords

sexual orientation; femininity; masculinity; facial attractiveness

Introduction

Many researchers have suggested that masculine characteristics in men's faces are associated with traits such as immunocompetence and dominance that are thought to increase offspring reproductive fitness (e.g., Grammer et al., 2003; Thornhill & Gangestad, 1999; Little et al., 2011; but see also Lee et al., 2014 for criticisms of this proposal). However, women who choose male partners displaying relatively masculine facial characteristics may also incur direct costs if such men possess antisocial personality traits (e.g., Grammer et al., 2003; Thornhill & Gangestad, 1999; Little et al., 2011). For example, men displaying masculine facial characteristics are perceived to be less trustworthy and emotionally warm than those displaying relatively feminine facial characteristics (e.g., Perrett et al., 1998). Trade-off theories of women's preferences for masculine versus feminine men propose that women adjust their preferences for masculine versus feminine men in response to factors such as the probability of reproduction (e.g., Batres et al., 2020; Little et al., 2011). When probability of reproduction is high, women are hypothesized to place greater emphasis on cues associated with indirect benefits (e.g., heritable immunity to infectious illnesses) and attach less importance to the potential direct costs associated with such choices.

Studies testing the hypothesis that women adjust their mate preferences according to the probability of reproduction have typically investigated the possible effects of changes in conception risk during the menstrual cycle and the effects of hormonal contraceptive use. However, the results of such tests have been mixed, with null results being particularly common in large-scale, high-powered studies (e.g., Jones

et al., 2018; Marcinkowska et al., 2018, 2019; Zietsch et al., 2015; reviewed in Jones et al., 2019). Only two studies have tested for associations between probability of reproduction and women's attractiveness judgments of masculine versus feminine men by testing for associations between women's sexual orientation and women's face preferences (Batres et al., 2020; Glassenberg et al., 2010). Consistent with the proposal that probability of reproduction is associated with stronger preferences for masculine men, Glassenberg et al. (2010) found that heterosexual women showed stronger preferences for masculinized versus feminized versions of men's faces than did homosexual women. Also consistent with the proposal that probability of reproduction is associated with stronger preferences for masculine men, Batres et al. (2020) found that the strength of women's self-reported level of sexual attraction to men (assessed on a seven-point scale with the end points "not at all" and "very") was positively correlated with the strength of their preferences for masculine versus feminine characteristics in men's faces.

Because results from other types of tests of the proposal that women adjust their mate preferences according to the probability of reproduction do not appear to be reliable (e.g., Jones et al., 2018; Marcinkowska et al., 2018, 2019; Zietsch et al., 2015), we undertook a direct replication of Glassenberg et al.'s (2010) comparison of heterosexual and homosexual women's preferences for masculinized versus feminized versions of male and female faces.

Methods

Participants

Participants for the online study, which was run at faceresearch.org (DeBruine et al., 2020), were 20,360 women (mean age = 25.04 years, SD = 6.99 years) who reported that their preferred sex of partner was male (i.e., reported being heterosexual) and 1,598 women (mean age = 25.61 years, SD = 7.49 years) who reported that their preferred sex of partner was female (i.e., reported being homosexual). All participants provided informed consent and all procedures were approved by the Psychology Ethics Committee (University of Glasgow).

Materials

Following Glassenberg et al. (2010), we used prototype-based image transformations to objectively manipulate sexual dimorphism of 2D shape in face images. First, male and female prototype (i.e., average) faces were manufactured using established computer graphic methods that have been widely used in studies of face perception (Tiddeman et al., 2001; DeBruine, 2017). These prototypes were manufactured using face images of 20 young White male adults and 20 young White female adults, respectively. Next, 50% of the linear differences in 2D shape between symmetrized versions of the male and female prototypes were added to or subtracted from face images of 20 young White male adults and 20 young White female adults. This process created masculinized and feminized versions of the individual face images that differ in sexual dimorphism of 2D shape and that are matched in other regards. Stimuli are publicly available (DeBruine & Jones, 2017) and illustrated in Figure 1.

Figure 1. Examples of feminized (left) and masculinized (right) face images used in our study.

Procedure

Participants were shown the 40 pairs of face images and were asked to choose the face in each pair that was more attractive. As in Glassenberg et al. (2010), the specific instruction was “Which face do you consider more attractive?”. Participants also indicated the strength of these preferences by choosing from the options ‘slightly more attractive’, ‘somewhat more attractive’, ‘more attractive’, and ‘much more attractive’. The order in which pairs of faces were shown was fully randomized and the side of the screen on which any particular image was shown was also fully randomized. Responses were coded using a 0 (masculinized face judged as much more attractive than feminized face) to 7 (feminized face judged as much more attractive than masculinized face). These femininity-preference scores were centred on chance before being used in our analyses.

Results

Analyses were conducted using R v4.0.2 (R Team, 2020). Data, analysis code, and full results output are publicly available at <https://osf.io/x6spb/>. First, we analyzed preference scores using a mixed effect model using lmer and lmerTest (Bates et al.,

2015; Kuznetsova et al., 2016) with the factors *sexual orientation* (effect coded so that homosexual = -0.5 and heterosexual = 0.5) and *sex of face* (effect coded so that male = -0.5 and female = 0.5), and the covariate *participant age* (centred and scaled on mean of sample). We included participant age as a covariate to control for possible effects of age on face preferences (e.g., Marcinkowska et al., 2017). Random intercepts were included for participant and stimulus, with random slopes specified maximally (Barr, 2013; Barr et al., 2013). Results of this initial analysis are summarized in Figure 2.

The intercept was significant and positive (estimate = 0.484, SE = 0.075, df = 20.3, $t = 6.41$, $p < .001$), indicating that participants generally preferred feminized versions of faces. The main effect of sexual orientation was not significant (estimate = -0.003, SE = 0.014, df = 171, $t = -0.185$, $p = .854$). The main effect of sex of face was significant and positive (estimate = 0.865, SE = 0.011, df = 21958, $t = 75.6$, $p < .001$), indicating that women generally showed stronger preferences for feminized versions of faces when judging the attractiveness of female than male faces (see Figure 2). The effect of participant age was not significant (estimate = -0.002, SE = 0.007, df = 30.2, $t = -0.233$, $p = .817$). The interaction between sex of face and sexual orientation was significant (estimate = 0.219, SE = 0.023, df = 21958, $t = 9.55$, $p < .001$) and is illustrated in Figure 2.

Figure 2. The interaction between sexual orientation and sex of stimuli on femininity preference in our study. The box plots, points, and distributions represent the average femininity score for each individual face. The box plots are showing the

median, first and third quartile, and the minimum and maximum femininity score for homosexual (green) and heterosexual women (purple). On the y-axis, zero equals chance.

Next, we repeated the analysis described above separately for male and female faces and with sex of face removed from the model. Our analysis of male faces also showed a significant effect of sexual orientation (estimate = -0.111, SE = 0.021, df = 128, $t = -5.30$, $p < .001$), indicating that homosexual women showed stronger preferences for feminized versions of men's faces than did heterosexual women (see Figure 2). The effect of participant age was not significant (estimate = 0.009, SE = 0.012, df = 26.3, $t = 0.763$, $p = .452$). Our analysis of female faces showed a significant effect of sexual orientation (estimate = 0.106, SE = 0.017, df = 345, $t = 6.22$, $p < .001$), indicating that heterosexual women showed stronger preferences for feminized versions of women's faces than did homosexual women (see Figure 2). The effect of participant age was not significant (estimate = -0.012, SE = 0.008, df = 34, $t = -1.55$, $p = .131$).

Preferences for femininity did not differ significantly from chance when homosexual (estimate = 0.107, SE = 0.102, df = 21, $p = .307$) or heterosexual (estimate = -0.005, SE = 0.11, df = 20.1, $t = -0.04$, $p = .966$) women judged the attractiveness of men's faces. Preferences for femininity were significantly greater than chance when homosexual (estimate = 0.863, SE = 0.081, df = 21.6, $t = 10.7$, $p < .001$) and heterosexual (estimate = 0.97, SE = 0.08, df = 20.1, $t = 12.4$, $p < .001$) women judged the attractiveness of women's faces.

Discussion

We found that heterosexual women demonstrated stronger preferences for masculinized male faces than did homosexual women. This relationship between sexual orientation and women's masculinity preferences directly replicates the results reported by Glassenberg et al. (2010). It is also consistent with Batres et al. (2020), who reported that women's self-rated sexual attraction to men (rated on a seven-point scale) was positively correlated with the strength of their preferences for masculine shape characteristics in men's faces. Furthermore, it is consistent with the proposal that heterosexual women's preferences for sexually dimorphic shape characteristics in men's faces at least partly reflect the benefits to offspring of choosing mates displaying putative cues of heritable immunocompetence (e.g., Grammer et al., 2003; Thornhill & Gangestad, 1999; Little et al., 2011). Note that, although we found that heterosexual women demonstrated stronger preferences for masculinized male faces than did homosexual women, heterosexual women did not show an overall preference for masculine men.

In addition to the results for male faces described above, we also found that heterosexual women demonstrated stronger preferences for feminized female faces than did homosexual women. This relationship between sexual orientation and women's preferences for feminine women also directly replicates results reported by Glassenberg et al. (2010). Stronger preferences for feminine female faces among heterosexual women is arguably not an explicit prediction of the type of sexual selection accounts of mate preferences that propose preferences for sexually dimorphic shape characteristics partly reflect the benefits to offspring of choosing mates displaying putative cues of heritable immunocompetence (e.g., Grammer et

al., 2003; Thornhill & Gangestad, 1999; Little et al., 2011). However, many researchers have suggested that heterosexual women's sensitivity to facial femininity in other women is a function of within-sex competition for mates by allowing women to identify physically attractive competitors for mates (e.g., Welling et al., 2007; Fisher, 2004). Thus, one possibility is that stronger preferences for feminine female faces among heterosexual women occurs because they would benefit more from being able to identify potential competitors for mates (i.e., other women) that men find highly attractive.

There are three key limitations of the current work that we would like to take this opportunity to highlight. First, we used a two-alternative forced choice paradigm to assess preferences for sexually dimorphic face-shape characteristics in the current work to directly replicate the methods used by Glassenberg et al. (2010). However, recent work suggests that forced choice paradigm for assessing face preferences can produce patterns of results that are qualitatively different to those produced by other types of paradigms, such as rating the attractiveness of individual faces (Jones & Jaeger, 2019). Thus, it remains an open question whether the association between sexual orientation and women's face preferences observed in both the current study and Glassenberg et al. (2010) generalizes to face preferences assessed using other testing paradigms. Second, we assigned women to heterosexual or homosexual groups based on whether they reported preferences for male or female partners, rather than using a more established method for assessing sexual orientation, such as responses on the Kinsey Scale. However, because Glassenberg et al. (2010) used responses on the Kinsey Scale to assign women to heterosexual or homosexual groups and both the current study and Glassenberg et al. (2010) observed similar associations between sexual orientation and preferences for sexual dimorphism, it seems extremely unlikely that the method we used to allocate women to heterosexual or homosexual groups has caused the observed effect. Third, given that all of our stimuli were white faces, it is unclear whether this pattern of results would necessarily generalize to images that were more heterogeneous in terms of their ethnicity.

Replicating previous work, we found that heterosexual women showed stronger preferences for masculine men and feminine women than did homosexual women. We have focused on interpreting our results within the framework of sexual selection models of mate preferences. However, there are also other (non-mutually exclusive) explanations for our results. For example, it is well established in the face-processing literature that increasing exposure to masculine or feminine faces increases preferences for masculinity and femininity, respectively (e.g., Buckingham et al., 2006; Little et al., 2005, 2013). Thus, it is possible that associations between face preferences and sexual orientation partly reflect differences in the types of faces that people of different sexual orientations encounter. Having established that associations between sexual orientation and face preferences appear to occur somewhat reliably, further work that tests competing explanations of this pattern of results is needed to fully why these differences occur.

Ethical statement

All participants provided informed consent and all procedures were approved by the Psychology Ethics Committee (University of Glasgow).

Conflict of Interest

The authors declared that they have no conflict of interest.

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