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Self-Reported Sexual Desire in Homosexual Men and Women Predicts Preferences for Sexually Dimorphic Facial Cues

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Abstract Recent studies investigating the relationship between self-reported sexual desire and attraction to same- and opposite-sex individuals have found that homosexual men's sexual desire is positively correlated with their self-reported attraction to own-sex individuals only, while homosexual women's sexual desire is positively correlated with their self-reported attraction to both men and women. These data have been interpreted as evidence that sexual desire strengthens men's pre-existing (i.e., dominant) sexual behaviors and strengthens women's sexual behaviors in general. Here we show that homosexual men's ($n = 106$) scores on the Sexual Desire Inventory-2 (SDI-2) were positively correlated with their preferences for exaggerated sex-typical shape cues in own-sex, but not opposite-sex, faces. Contrary to the hypothesis that sexual desire strengthens women's preferences for sexual dimorphism generally, homosexual women's ($n = 83$) SDI-2 scores were positively correlated with their preferences for exaggerated sex-typical shape cues in opposite-sex faces only. Together with previous research in heterosexual subjects, our findings support the proposal that sexual desire increases the incidence of existing sexual behaviors in homosexual and heterosexual men, and increases the incidence of sexual responses more generally in heterosexual women, although not necessarily in homosexual women.

Keywords Sexual desire · Attraction · Sexual orientation · Faces · Sexual dimorphism

Introduction

Classic learning theories propose that higher levels of drive increase the probability of well-learned (i.e., dominant) behaviors (Hull, 1943; Spence, 1956; Zajonc, 1965). When applied to sexual desire (i.e., the desire or drive to behave sexually, not to be confused with sexual arousal) (see Ågmo, 2011; Janssen, 2011), these theories suggest that higher levels of desire should be associated with a strengthening of prevailing patterns of sexual attraction and response. In other words, compared to people with low levels of sexual desire, heterosexual people with high sexual desire should show higher attraction to opposite-sex individuals only, while homosexual people with high sexual desire should show higher attraction to same-sex individuals only (see discussion in Lippa, 2006). However, women appear to have a more flexible sexual orientation over the course of their lives than men (Baumeister, 2000; Diamond, 2000), suggesting that their attraction to, and desire for, same- and opposite-sex individuals may be more variable. Indeed, while heterosexual men demonstrate genital arousal primarily to female sexual stimuli and homosexual men primarily to male sexual stimuli, heterosexual and homosexual women exhibit genital arousal to both male and female sexual stimuli (Chivers, Rieger, Latty, & Bailey, 2004). In addition, heterosexual women, but not heterosexual men, showed genital arousal to a film of sexual behavior in a non-human primate (Chivers & Bailey, 2005). This research supports the premise that, at least in terms of physiological indicators of sexual arousal, men may have a more clearly defined sexual orientation than women.

Sexual desire may also manifest differently in men and women. Men tend to report higher levels of sexual desire than women (Baumeister, Catanese, & Vohs, 2001; Lippa, 2007b),

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heterosexual men report somewhat higher sexual desire than homosexual and bisexual men, and bisexual women report higher sexual desire than homosexual or heterosexual women (Lippa, 2007b). Recently, Lippa (2006, 2007b) found that self-reported sexual desire (measured by agreement on a 7-point scale to statements such as “I have a strong sex drive”) was positively associated with heterosexual women’s self-reported attraction to both men and women, but that heterosexual men’s self-reported sexual desire was positively correlated with their self-reported attraction to women only. Lippa (2006, 2007b) interpreted this as evidence that sexual desire in heterosexual women is a generalized energizer of sexual behaviors (i.e., strengthens sexual behaviors in general), while sexual desire in heterosexual men energizes dominant sexual behaviors toward potential mates (i.e., strengthens pre-existing sexual behaviors towards women only). These findings are consistent with the suggestion that sexual desire affects feelings of attraction in women and men differently.

Attraction is an important aspect of social interactions and behaviors (see, e.g., Chiu & Babcock, 2002, 2007; Marlowe, Schneider, & Nelson, 1996). Physical attractiveness influences whom we date (Huston, 1973), reproduce with (Gangestad, 1993; Gangestad & Buss, 1993), and possibly even vote for (Little, Burriss, Jones, & Roberts, 2007a). Facial sexual dimorphism (i.e., femininity in women and masculinity in men) is an aspect of facial structure that can be considered sexually attractive (Little, Jones, Penton-Voak, Burt, & Perrett, 2002; Scheib, 2001) (for a review, see also Rhodes, 2006) and is a putative marker of mate quality (see, e.g., Perrett et al., 1998; Thornhill & Gangestad, 1999). Previous studies have associated masculinity/femininity (i.e., sexual dimorphism) with long-term health in both men (Rhodes, Chan, Zebrowitz, & Simmons, 2003; Thornhill & Gangestad, 2006) and women (Thornhill & Gangestad, 2006). Indeed, sexually dimorphic cues appear to be important for attractiveness judgments, mate preferences, and sexual responsiveness (see, e.g., Miller & Todd, 1998; Puts, Welling, Burriss, & Dawood, 2012a; Rhodes, Simmons, & Peters, 2005; Thornhill & Gangestad, 1999).

Welling, Jones, and DeBruine (2008a) found a positive relationship between heterosexual women’s self-reported sexual desire and the strength of their preferences for sexual dimorphism in both male and female faces. Jones, Little, Watkins, Welling, and DeBruine (2011) built on this work, showing that heterosexual men’s self-reported sexual desire (see Spector, Carey, & Steinberg, 1996) was positively related to their preferences for feminized versions of women’s faces, but was not related to their judgments of other men’s faces. Taken together, these findings support Lippa’s (2006, 2007b) aforementioned proposal that sexual desire energizes heterosexual women’s general sexual behaviors, but energizes only dominant/typical sexual behaviors in heterosexual men (i.e., those directed at women).

Lippa (2006, 2007b) found that self-reported sexual desire among homosexual participants positively predicted women’s self-reported attraction to both men and women, but, in men,

predicted only self-reported attraction to other men. This complements the work on heterosexual participants and supports Lippa’s (2006, 2007b) hypothesis that sexual desire will predict men’s sexual behavior toward only their preferred sex, but will predict women’s sexual behavior more generally. However, as discussed by Welling et al. (2008a) and Jones et al. (2011), these findings invite research into the relationship between sexual desire and homosexual men’s and women’s preferences for cues to sexual dimorphism in own- and opposite-sex faces. Certainly, research into the relationship between sexual desire and preferences among people of different sexual orientations would provide more compelling evidence of the role of sexual desire in mate preferences.

Lippa’s (2006, 2007b) research would seemingly suggest that homosexual women’s self-reported sexual desire will predict their preferences for exaggerated sexually dimorphic traits in both men’s and women’s faces, while homosexual men’s self-reported sexual desire will predict their preferences for exaggerated sexually dimorphic traits in men’s faces only (see also Jones et al., 2011; Welling et al., 2008a). Conversely, Glassenberg, Feinberg, Jones, Little, and DeBruine (2010) recently showed that homosexual men and women have stronger preferences for masculinity in own-sex faces and weaker preferences for exaggerated sex-typical shape cues in opposite-sex faces than their heterosexual peers. This raises the possibility that homosexual women’s sexual desire may be positively correlated with their preferences for faces that do not possess exaggerated sexually dimorphic traits (i.e., masculine women and feminine men).

Consequently, we examined the relationships between homosexual men’s and women’s self-reported sexual desire and their preferences for sexual dimorphism in male and female faces. The purpose of this research was to test whether self-reported sexual desire predicted attraction to sexual dimorphism in male and female faces, and whether it did so differently for homosexual men and women. In line with Lippa’s (2006, 2007b) findings, we hypothesized that self-reported sexual desire will positively predict attraction to: (1) masculine male faces, but not feminine female faces, in homosexual men, and (2) sexually dimorphic traits more generally (i.e., masculine male faces and feminine female faces) in homosexual women.

Method

Participants

A total of 134 self-identified homosexual male adults and 163 self-identified homosexual female adults took part in this study. All participants completed the Kinsey Sexual Orientation Scale (Kinsey, Pomeroy, & Martin, 1948), which assesses each participant on a continuum ranging from 0 (exclusively heterosexual) to 6 (exclusively homosexual) (Kinsey et al., 1948; see also Sell,

1997). Participants who did not self-identify as exclusively homosexual and who did not score a minimum of a 5 (i.e., predominantly homosexual/only incidentally heterosexual) on the Kinsey Scale ($n = 108$, 28 male) were excluded from analysis, leaving 83 homosexual women ($M_{\text{age}} = 28.6$ years, $SD = 7.1$, range 18–45 years) and 106 homosexual men ($M_{\text{age}} = 30.8$ years, $SD = 10.2$, range 18–50 years). Participants were recruited through university Lesbian, Gay, Bisexual, Transgender, and Ally (LGBTA) Student Resource Centers in the United States and through a listserv of over 300 sex researchers. Participation was voluntary.

Procedure

Following previous studies of systematic variation in preferences for sexual dimorphism (DeBruine et al., 2006; Jones et al., 2007, 2011; Penton-Voak et al., 2003; Welling et al., 2007, 2008a), we used prototype-based image transformations to objectively manipulate sexual dimorphism of 2D face shape in digital photographs. Prototypes are constructed by averaging the shape, color, and texture of a group of faces that share a common property, such as biological sex. First, young adult male and female prototype faces were manufactured using established computer graphic methods. These prototypes were then used to transform other images by calculating the vector differences in position between corresponding points on two prototype images and applying a percentage of those differences onto corresponding points on a third image (for technical details, see Rowland & Perrett, 1995; Tiddeman, Burt, & Perrett, 2001).

Here, 50 % of the linear differences in 2D shape between symmetrized versions of a male and a female prototype were added to or subtracted from face images of 10 young adult White women ($M_{\text{age}} = 22.2$ years, $SD = 1.48$) and 10 young adult White men ($M_{\text{age}} = 22.6$ years, $SD = 2.27$). Thus, 20 pairs of images were produced, each pair consisting of a masculinized and a feminized version of the same individual. These face pairs differed in sexual dimorphism of 2D shape, but were matched in other regards (e.g., identity, skin color, and texture) (Rowland & Perrett, 1995). These transformation methods have been shown to produce perceptual effects that are equivalent to those produced using other methods (DeBruine et al., 2006; DeBruine, Jones, Smith, & Little, 2010b) and previous studies have demonstrated that this method of manipulating face shape affects masculinity/femininity perceptions in the predicted way (DeBruine et al., 2006; Jones et al., 2010; Welling et al., 2007). Examples of masculinized and feminized face images are shown in Fig. 1.

Participants completed a face preference test in which they were shown the 20 pairs of faces (each pair consisting of a masculinized and feminized version of the same individual) and were asked to indicate which face in each pair they thought was more attractive. The order of pairs and the side of the screen on which any particular image was shown was fully

randomized (see also Jones et al., 2011; Welling et al., 2008a).

Participants also completed the Sexual Desire Inventory-2 (SDI-2) (Spector et al., 1996). The SDI-2 is a 14-item questionnaire that has two subscales: one assessing solitary sexual desire (i.e., the desire to behave sexually by oneself) and one assessing dyadic sexual desire (i.e., the desire to behave sexually with another person) (Spector et al., 1996), with total scores ranging from 0 to 109. The SDI-2 is highly correlated with other measures of sexual motivation (e.g., King & Allgeier, 2000), and those who score high on the SDI-2 demonstrate larger physiological responses to sexual stimuli than those who score relatively low (Giargiari, Mahaffey, Craighead, & Hutchison, 2005).

This study was conducted online. Previous research comparing web- and lab-based studies has demonstrated equivalent findings for both individual differences in face preferences and sexual desire (e.g., Jones et al., 2007; Lipka, 2006; Welling et al., 2008a).

Data Analysis

Following previous research (e.g., Jones et al., 2007; Smith et al., 2009; Welling et al., 2007), we calculated the proportion of times



Fig. 1 Examples of a feminized (left column) and masculinized (right column) female and male face. Note that 2D face shape differs, but that other facial characteristics (i.e., skin color, texture, and identity) remain constant

each participant chose the masculinized face as more attractive than the feminized version for both male and female faces. Scores on the SDI-2 were calculated following Spector et al. (1996), and responses on the Kinsey Scale were calculated following Kinsey et al. (1948). High scores on the SDI-2 indicate high sexual desire and high scores on the Kinsey Scale indicate high attraction toward/sexual behavior involving same-sex individuals.

Results

Homosexual Men

For our sample of men, responses on the SDI-2 showed high internal consistency (Cronbach's $\alpha = .81$) and scores ranged from 43 to 104 ($M = 78.17$, $SD = 13.16$). While homosexual men's SDI-2 scores were normally distributed ($D_{105} = .077$), the distributions of their preferences for masculine female ($D_{105} = .218$, $p < .001$) and male ($D_{105} = .130$, $p < .001$) faces were significantly non-normal. We therefore report non-parametric one-sample Wilcoxon signed rank tests and Spearman's rho correlations below.

We first compared homosexual men's preference for masculinity in male and female faces with what would be expected by chance (i.e., .5) using one-sample Wilcoxon signed rank tests. Homosexual men preferred feminine female faces significantly more than chance ($Z = -8.20$, $p < .001$, $M = .21$, $SD = .21$), but had no preference for either masculine or feminine male faces ($Z = -.24$, $p > .81$, $M = .50$, $SD = .26$) (see Fig. 2). Homosexual men's SDI-2 scores were positively correlated with their preference for masculinity in male faces ($\rho = .211$, $p = .03$), but not their preference for masculinity in female faces ($\rho = .076$).

We further examined the relationship between homosexual men's SDI-2 scores and their preference for sexually dimorphic traits in male and female faces using multiple regression (enter method) with men's SDI-2 scores as the outcome variable and their masculinity preferences for male and female faces as predictors. The regression model yielded one significant predictor (preference for masculinity in male faces) out of the two predictors measured. Preference for masculinity in male faces accounted for 6 % of the variance, $R^2 = .06$, $F(1, 105) = 6.68$, $p = .011$; $\beta = .24$, $t(105) = 2.58$. Preference for masculinity in female faces did not predict homosexual men's SDI-2 scores.

Homosexual Women

Responses on the SDI-2 showed very good internal consistency (Cronbach's $\alpha = .86$), and scores ranged from 21 to 100 ($M = 66.49$, $SD = 16.86$). While the homosexual women's SDI-2 scores were normally distributed ($D_{82} = .085$, $p > .08$), the distributions of their preferences for masculine female ($D_{82} = .175$, $p < .001$) and male ($D_{82} = .122$, $p = .004$) faces

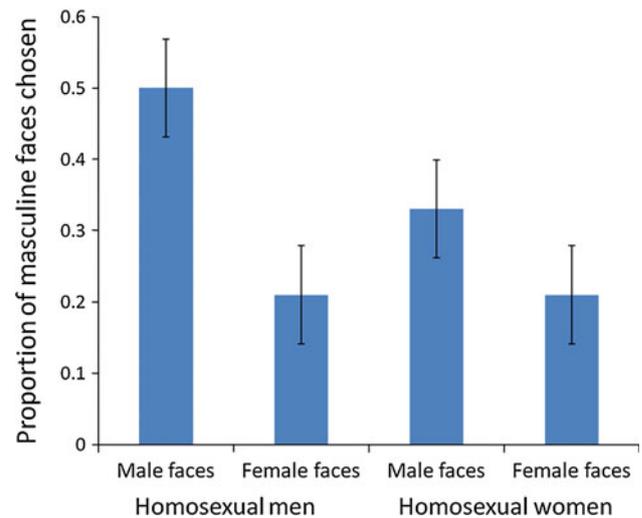


Fig. 2 Mean preferences for masculinity in male and female faces among male (left two bars) and female (right two bars) homosexual participants with standard error bars. Homosexual men preferred the feminine female faces significantly more than chance (i.e., .5; $p < .001$), but had no preference for either masculine or feminine male faces. Homosexual women preferred the feminine female faces ($p < .001$) and the feminine male faces ($p < .001$) significantly more than chance. Note that high scores indicate a higher preference for masculinity and low scores indicate a higher preference for femininity

were significantly non-normal. Therefore, as above, we report one-sample Wilcoxon signed rank tests and Spearman's rho correlations.

We first compared homosexual women's preferences for masculinity in male and female faces with what would be expected by chance using one-sample Wilcoxon signed rank tests. Homosexual women preferred feminine female faces ($Z = -7.06$, $p < .001$, $M = .21$, $SD = .23$) and feminine male faces ($Z = -5.69$, $p < .001$, $M = .33$, $SD = .22$) significantly more than chance (see Fig. 2). Homosexual women's SDI-2 scores were positively correlated with their preference for masculinity in male faces ($\rho = .216$, $p = .046$), but not with their preference for masculinity in female faces ($\rho = .198$). Excluding women with a 100 % preference for feminine female faces ($n = 35$) did not alter these findings.

We further examined the relationship between homosexual women's SDI-2 scores and their preference for sexually dimorphic traits in male and female faces using multiple regression (enter method) with women's SDI-2 scores as the outcome variable and their self-reported masculinity preferences in male and female faces as predictors. The regression model yielded one significant predictor (preference for masculinity in male faces) out of the two predictors measured. Preference for masculinity in male faces accounted for 9 % of the variance, $R^2 = .09$, $F(1, 84) = 3.68$, $p = .03$; $\beta = .22$, $t(82) = 2.03$. Preference for masculinity in female faces did not predict homosexual women's SDI-2 scores.

Discussion

The homosexual male participants in our study demonstrated the same pattern of preferences for sexually dimorphic traits as has been found in heterosexual men in many previous studies (for a review, see Rhodes, 2006), with overall preferences for feminine over masculine female faces, but no preference for either masculine or feminine male faces (for similar findings, see, e.g., Jones et al., 2007, 2011; Puts, Jones, & DeBruine, 2012b; Welling et al., 2008b). Furthermore, consistent with previous studies using heterosexual women, homosexual women in our study generally preferred feminine over masculine women (see also Rhodes, 2006) and feminine over masculine men (see also, e.g., Penton-Voak, Jacobson, & Trivers, 2004; Perrett et al., 1998; Puts et al., 2012b; Rhodes, Hickford, & Jeffery, 2000; Welling et al., 2007) (but see Johnston, Hagel, Franklin, Fink, & Grammer, 2001). These data also partially supported Glassenberg et al.'s (2010) findings for preferences for sexual dimorphism among homosexual participants, except that Glassenberg et al. reported a general preference for masculinity in male faces among homosexual men.

Previous research has investigated the relationships between sexual desire and self-reported attraction to own- and opposite-sex individuals (Lippa, 2006, 2007b), sexual desire and face preferences (Jones et al., 2011; Welling et al., 2008a), and sexual orientation and face preferences (Glassenberg et al., 2010). However, the current study was the first to test whether self-reported sexual desire predicted preferences for sexual dimorphism among homosexual individuals. We found that homosexual men's self-reported sexual desire (as indicated by SDI-2 scores) was positively related to their preference for masculinity in male faces, but was unrelated to their preference for sexually dimorphic traits in women's faces. These findings align with Chivers et al.'s (2004) finding (see also Chivers & Bailey, 2005) that homosexual men demonstrate genital arousal primarily to male sexual stimuli, but not female sexual stimuli. This is also consistent with Lippa's (2006, 2007b) assertion that sexual desire in men energizes dominant (i.e., pre-existing, typical) sexual behaviors only, and with Jones et al.'s (2011) finding that heterosexual men's self-reported sexual desire is positively related to their preference for femininity in women's faces, but not with their preference for masculinity in men's faces.

With women, the findings were less clear. While Welling et al. (2008a) found that self-reported sexual desire in heterosexual women was positively associated with preferences for masculine male and feminine female faces, here we found that self-reported sexual desire in homosexual women was positively associated with preferences for exaggerated sexually dimorphic shape in men's faces only. It is possible that this null finding was due to the high general preference for femininity in female faces among women in this sample, with 35 out of 83 women demonstrating a 100 % preference for the

feminized female faces. Therefore, a relationship may be apparent in a more variable sample or if the differences between the masculine and feminine female faces were more subtle (although we transformed our face stimuli by a standard amount, see, e.g., DeBruine, Jones, Crawford, Welling, & Little, 2010a; DeBruine et al., 2006; Jones et al., 2005; Little, Cohen, Jones, & Belsky, 2007b; Welling et al., 2007, 2008b). However, excluding the 35 women who demonstrated a 100 % preference for feminized female faces did not alter our findings. Thus, further research is needed to better understand the possible relationship between sexual desire and preferences for sexual dimorphism in homosexual women. For example, it is possible that other, unmeasured variables, such as menstrual cycle phase (e.g., Jones et al., 2008; Penton-Voak & Perrett, 2001; Welling et al., 2007), influenced women's preferences, obscuring correlations between sexual desire and homosexual women's judgments of women's attractiveness. Moreover, Lippa (2006) found that homosexual women showed the most inconsistent results compared to homosexual men or heterosexual participants, and suggested that differences between subgroups of homosexual women may account for differences across studies (see Singh, Vidaurri, Zambarano, & Dabbs, 1999). Future research experimentally manipulating sexual desire among both heterosexual and homosexual men and women could demonstrate effects on face preferences while controlling for potential confounds.

More generally, this research adds to the existing literature on mate preferences among homosexual men and women. Because it is not obvious how natural selection could have directly favored exclusive homosexuality, given that homosexual individuals tend to produce fewer offspring than their heterosexual counterparts (Bell & Weinberg, 1978), homosexual mate preferences have been of great interest to researchers (for a review, see Lippa, 2007a). Importantly, differences across sexes and sexual orientations may help distinguish among different theoretical explanations of sex differences in mate preferences (Bailey, Gaulin, Agyei, & Gladue, 1994; Kenrick, Keefe, Bryan, Barr, & Brown, 1995). Like heterosexual men, homosexual men tend to focus on a potential partner's youth and physical attractiveness (Lippa, 2007a) and express favorable attitudes towards uncommitted sex (Bailey et al., 1994; Kenrick et al., 1995). Correspondingly, like heterosexual women, homosexual women tend to focus on a potential partner's character traits (Lippa, 2007a) and express less favorable attitudes towards uncommitted sex (Diamond, 2003; Peplau, 2001). Interestingly, studies of dating advertisements suggest that homosexual men prefer masculinity even more than heterosexual women and that homosexual women prefer femininity even more than heterosexual men (Bailey, Kim, Hills, & Linsenmeier, 1997; Child, Graff Low, McDonnell McCormick, & Cociarella, 1996). Bailey et al. (1997) further found that, when assessing preferences for faces paired with vignettes that described a behaviorally masculine or feminine person, homosexual men prefer more masculine men, but homosexual women have no consistent preference for either

masculine or feminine women. Finally, Glassenberg et al. (2010) found that homosexual men prefer facial masculinity in male faces more than heterosexual men, and that homosexual women prefer facial masculinity in female faces more than heterosexual women. These studies, along with the current study, highlight that mate preferences among homosexual men and women do not necessarily mirror those of heterosexual members of the opposite-sex, although they may be equally complex.

In line with previous research (Jones et al., 2011; Lipka, 2006, 2007b), we found that homosexual men's sexual desire was positively correlated with their preferences for masculine characteristics in men's faces, but not their preferences for feminine women. However, in partial contrast to previous research (Chivers & Bailey, 2005; Chivers et al., 2004; Lipka, 2006, 2007b; Welling et al., 2008a), we also found that homosexual women's sexual desire was positively correlated with their preferences for masculine characteristics in men's faces, but not their preferences for feminine women. These results provide converging evidence for Lipka's (2006, 2007b) proposal that sexual desire energizes men's prevailing sexual responses, but only partially support previous findings suggesting that sexual desire is a generalized energizer of women's sexual behaviors. Notably, this study helps fill in a gap in the literature that has previously focused mainly on the responses of heterosexual participants only.

References

- Ágmo, A. (2011). On the intricate relationship between sexual motivation and arousal. *Hormones and Behavior*, *59*, 681–688.
- Bailey, J. M., Gaulin, S., Agyei, Y., & Gladue, B. A. (1994). Effects of gender and sexual orientation on evolutionarily relevant aspects of human mating psychology. *Journal of Personality and Social Psychology*, *66*, 1081–1093.
- Bailey, J. M., Kim, P. Y., Hills, A., & Linsenmeier, J. A. W. (1997). Butch, femme, or straight acting? Partner preferences of gay men and lesbians. *Journal of Personality and Social Psychology*, *73*, 960–973.
- Baumeister, R. F. (2000). Gender differences in erotic plasticity: The female sex drive as socially flexible and responsive. *Psychological Bulletin*, *126*, 347–374.
- Baumeister, R. F., Catanese, K. R., & Vohs, K. D. (2001). Is there a gender difference in strength of sex drive? Theoretical views, conceptual distinctions, and a review of relevant evidence. *Personality and Social Psychology Review*, *5*, 242–273.
- Bell, A. P., & Weinberg, M. S. (1978). *Homosexualities: A study of diversity among men and women*. New York: Simon and Schuster.
- Child, M., Graff Low, K., McDonnell McCormick, C., & Cocciarella, A. (1996). Personal advertisements of male-to-female transsexuals, homosexual men, and heterosexuals. *Sex Roles*, *34*, 447–455.
- Chiu, R. K., & Babcock, R. D. (2002). The relative importance of facial attractiveness and gender in Hong Kong selection decisions. *International Journal of Human Resource Management*, *13*, 141–155.
- Chivers, M. L., & Bailey, J. M. (2005). A sex difference in features that elicit genital response. *Biological Psychology*, *70*, 115–120.
- Chivers, M. L., Rieger, G., Latty, E., & Bailey, J. M. (2004). A sex difference in the specificity of sexual arousal. *Psychological Science*, *15*, 736–744.
- DeBruine, L. M., Jones, B. C., Crawford, J. R., Welling, L. L. M., & Little, A. C. (2010a). The health of a nation predicts their mate preferences: Cross-cultural variation in women's preferences for masculinized male faces. *Proceedings of the Royal Society B-Biological Sciences*, *277*, 2405–2410.
- DeBruine, L. M., Jones, B. C., Little, A. C., Boothroyd, L. G., Perrett, D. I., Penton-Voak, I. S., et al. (2006). Correlated preferences for facial masculinity and ideal or actual partner's masculinity. *Proceedings of the Royal Society B-Biological Sciences*, *273*, 1355–1360.
- DeBruine, L. M., Jones, B. C., Smith, F. G., & Little, A. C. (2010b). Are attractive men's faces masculine or feminine? The importance of controlling confounds in face stimuli. *Journal of Experimental Psychology: Human Perception and Performance*, *36*, 751–758.
- Diamond, L. M. (2000). Sexual identity, attractions, and behavior among young sexual-minority women over a 2-year period. *Developmental Psychology*, *36*, 241–250.
- Diamond, L. M. (2003). What does sexual orientation orient? A bi-behavioral model distinguishing romantic love and sexual desire. *Psychological Review*, *110*, 173–192.
- Gangestad, S. W. (1993). Sexual selection and physical attractiveness: implications for mating dynamics. *Human Nature*, *4*, 205–235.
- Gangestad, S. W., & Buss, D. M. (1993). Pathogen prevalence and human mate preferences. *Ethology and Sociobiology*, *14*, 89–96.
- Giargiari, T. D., Mahaffey, A. L., Craighead, W. E., & Hutchison, K. E. (2005). Appetitive responses to sexual stimuli are attenuated in individuals with low levels of sexual desire. *Archives of Sexual Behavior*, *34*, 547–556.
- Glassenberg, A. N., Feinberg, D. R., Jones, B. C., Little, A. C., & DeBruine, L. M. (2010). Sex-dimorphic face shape preference in heterosexual and homosexual men and women. *Archives of Sexual Behavior*, *39*, 1289–1296.
- Hull, C. L. (1943). *Principles of behavior theory*. New York: Appleton-Century.
- Huston, T. L. (1973). Ambiguity of acceptance, social desirability, and dating choice. *Journal of Experimental Social Psychology*, *9*, 32–42.
- Janssen, E. (2011). Sexual arousal in men: A review and conceptual analysis. *Hormones and Behavior*, *59*, 708–716.
- Johnston, V. S., Hagel, R., Franklin, M., Fink, B., & Grammer, K. (2001). Male facial attractiveness: evidence for hormone-mediated adaptive design. *Evolution and Human Behavior*, *21*, 251–267.
- Jones, B. C., DeBruine, L. M., Little, A. C., Conway, C. A., Welling, L. L. M., & Smith, F. G. (2007). Sensation seeking and men's face preferences. *Evolution and Human Behavior*, *28*, 439–446.
- Jones, B. C., DeBruine, L. M., Main, J. C., Little, A. C., Welling, L. L. M., Feinberg, D. R., et al. (2010). Facial cues of dominance modulate the short-term gaze-cuing effect in human observers. *Proceedings of the Royal Society B-Biological Sciences*, *277*, 617–624.
- Jones, B. C., DeBruine, L. M., Perrett, D. I., Little, A. C., Feinberg, D. R., & Law Smith, M. J. (2008). Effects of menstrual cycle phase on face preferences. *Archives of Sexual Behavior*, *37*, 78–84.
- Jones, B. C., Little, A. C., Boothroyd, L., DeBruine, L. M., Feinberg, D. R., Smith, M. J. L., et al. (2005). Commitment to relationships and preferences for femininity and apparent health in faces are strongest on days of the menstrual cycle when progesterone level is high. *Hormones and Behavior*, *48*, 283–290.
- Jones, B. C., Little, A. C., Watkins, C. D., Welling, L. L. M., & DeBruine, L. M. (2011). Reported sexual desire predicts men's preferences for sexually dimorphic cues in women's faces. *Archives of Sexual Behavior*, *40*, 1281–1285.
- Kenrick, D. T., Keefe, R. C., Bryan, A., Barr, A., & Brown, S. (1995). Age preferences and mate choice among homosexuals and heterosexuals: A case for modular psychological mechanisms. *Journal of Personality and Social Psychology*, *69*, 1166–1172.
- King, B. E., & Allgeier, E. R. (2000). The Sexual Desire Inventory as a measure of sexual motivation in college students. *Psychological Reports*, *86*, 347–350.

- Kinsey, A. C., Pomeroy, W. B., & Martin, C. E. (1948). *Sexual behavior in the human male*. Philadelphia: W. B. Saunders.
- Lippa, R. A. (2006). Is high sex drive associated with increased sexual attraction to both sexes? It depends on whether you are male or female. *Psychological Science*, *17*, 46–52.
- Lippa, R. A. (2007a). The preferred traits of mates in a cross-national study of heterosexual and homosexual men and women: An examination of biological and cultural influences. *Archives of Sexual Behavior*, *36*, 193–208.
- Lippa, R. A. (2007b). The relation between sex drive and sexual attraction to men and women: A cross-national study of heterosexual, bisexual, and homosexual men and women. *Archives of Sexual Behavior*, *36*, 209–222.
- Little, A. C., Burriss, R. P., Jones, B. C., & Roberts, S. C. (2007a). Facial appearance affects voting decisions. *Evolution and Human Behavior*, *28*, 18–27.
- Little, A. C., Cohen, D. L., Jones, B. C., & Belsky, J. (2007b). Human preferences for facial masculinity change with relationship type and environmental harshness. *Behavioral Ecology and Sociobiology*, *61*, 967–973.
- Little, A. C., Jones, B. C., Penton-Voak, I. S., Burt, D. M., & Perrett, D. I. (2002). Partnership status and the temporal context of relationships influence human female preferences for sexual dimorphism in male face shape. *Proceedings of the Royal Society B-Biological Sciences*, *269*, 1095–1100.
- Marlowe, C. M., Schneider, S. L., & Nelson, C. E. (1996). Gender and attractiveness biases in hiring decisions: Are more experienced managers less biased? *Journal of Applied Psychology*, *81*, 11–21.
- Miller, G. F., & Todd, P. M. (1998). Mate choice turns cognitive. *Trends in Cognitive Science*, *2*, 190–198.
- Penton-Voak, I. S., Jacobson, A., & Trivers, R. (2004). Populational differences in attractiveness judgements of male and female faces: Comparing British and Jamaican samples. *Evolution and Human Behavior*, *25*, 355–370.
- Penton-Voak, I. S., Little, A. C., Jones, B. C., Burt, D. M., Tiddeman, B. P., & Perrett, D. I. (2003). Female condition influences preferences for sexual dimorphism in faces of male humans (*Homo sapiens*). *Journal of Comparative Psychology*, *117*, 264–271.
- Penton-Voak, I. S., & Perrett, D. I. (2001). Male facial attractiveness: perceived personality and shifting female preferences for male traits across the menstrual cycle. *Advances in the Study of Behavior*, *30*, 219–259.
- Peplau, L. A. (2001). Rethinking women's sexual orientation: An interdisciplinary, relationship-focused approach. *Personal Relationships*, *8*, 1–19.
- Perrett, D. I., Lee, K. J., Penton-Voak, I. S., Rowland, D. R., Yoshikawa, S., Burt, D. M., et al. (1998). Effects of sexual dimorphism on facial attractiveness. *Nature*, *394*, 884–887.
- Puts, D. A., Jones, B. C., & DeBruine, L. M. (2012a). Sexual selection on human faces and voices. *Annual Review of Sex Research*, *49*, 227–243.
- Puts, D. A., Welling, L. L. M., Burriss, R. P., & Dawood, K. (2012b). Men's masculinity and attractiveness predict their female partners' reported orgasm frequency and timing. *Evolution and Human Behavior*, *33*, 1–9.
- Rhodes, G. (2006). The evolutionary psychology of facial beauty. *Annual Review of Psychology*, *57*, 199–226.
- Rhodes, G., Chan, J., Zebrowitz, L. A., & Simmons, L. W. (2003). Does sexual dimorphism in human faces signal health? *Proceedings of the Royal Society B-Biological Sciences*, *270*, S93–S95.
- Rhodes, G., Hickford, C., & Jeffery, L. (2000). Sex-typicality and attractiveness: Are supermale and superfemale faces super-attractive? *British Journal of Psychology*, *91*, 121–140.
- Rhodes, G., Simmons, L. W., & Peters, M. (2005). Attractiveness and sexual behavior: Does attractiveness enhance mating success? *Evolution and Human Behavior*, *26*, 186–201.
- Rowland, D. A., & Perrett, D. I. (1995). Manipulating facial appearance through shape and color. *IEEE Computer Graphics and Applications*, *15*, 70–76.
- Scheib, J. E. (2001). Context-specific mate choice criteria: women's trade-offs in the contexts of long-term and extra-pair matings. *Personal Relationships*, *8*, 371–389.
- Sell, R. L. (1997). Defining and measuring sexual orientation: A review. *Archives of Sexual Behavior*, *26*, 643–658.
- Singh, D., VIDAURI, M., ZAMBARANO, R. J., & DABBS, J. M. (1999). Lesbian erotic role identification: Behavioral, morphological, and hormonal correlates. *Journal of Personality and Social Psychology*, *76*, 1035–1049.
- Smith, F. G., Jones, B. C., Welling, L. L. M., Little, A. C., Vukovic, J., Main, J. C., et al. (2009). Waist-hip ratio predicts women's preferences for masculine male faces, but not perceptions of men's trustworthiness. *Personality and Individual Differences*, *47*, 476–480.
- Spector, I. P., Carey, M. P., & Steinberg, L. (1996). The Sexual Desire Inventory: Development, factor structure, and evidence of reliability. *Journal of Sex and Marital Therapy*, *22*, 175–190.
- Spence, K. W. (1956). *Behavior theory and conditioning*. New Haven, CT: Yale University Press.
- Thornhill, R., & Gangestad, S. W. (1999). Facial attractiveness. *Trends in Cognitive Science*, *3*, 452–460.
- Thornhill, R., & Gangestad, S. W. (2006). Facial sexual dimorphism, developmental stability, and susceptibility to disease in men and women. *Evolution and Human Behavior*, *27*, 131–144.
- Tiddeman, B. P., Burt, D. M., & Perrett, D. I. (2001). Prototyping and transforming facial texture for perception research. *IEEE Computer Graphics and Applications*, *21*, 42–50.
- Welling, L. L. M., Jones, B. C., & DeBruine, L. M. (2008a). Sex drive is positively associated with women's preferences for sexual dimorphism in men's and women's faces. *Personality and Individual Differences*, *44*, 161–170.
- Welling, L. L. M., Jones, B. C., DeBruine, L. M., Conway, C. A., Law Smith, M. J., Little, A. C., et al. (2007). Raised salivary testosterone in women is associated with increased attraction to masculine faces. *Hormones and Behavior*, *52*, 156–161.
- Welling, L. L. M., Jones, B. C., DeBruine, L. M., Smith, F. G., Feinberg, D. R., Little, A. C., et al. (2008b). Men report stronger attraction to femininity in women's faces when their testosterone levels are high. *Hormones and Behavior*, *54*, 703–708.
- Zajonc, R. B. (1965). Social facilitation. *Science*, *149*, 269–274.