



## Sexual arousal: The correspondence of eyes and genitals



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### ABSTRACT

Men's, more than women's, sexual responses may include a coordination of several physiological indices in order to build their sexual arousal to relevant targets. Here, for the first time, genital arousal and pupil dilation to sexual stimuli were simultaneously assessed. These measures corresponded more strongly with each other, subjective sexual arousal, and self-reported sexual orientation in men than women. Bisexual arousal is more prevalent in women than men. We therefore predicted that if bisexual-identified men show bisexual arousal, the correspondence of their arousal indices would be more female-typical, thus weaker, than for other men. Homosexual women show more male-typical arousal than other women; hence, their correspondence of arousal indices should be stronger than for other women. Findings, albeit weak in effect, supported these predictions. Thus, if sex-specific patterns are reversed within one sex, they might affect more than one aspect of sexual arousal. Because pupillary responses reflected sexual orientation similar to genital responses, they offer a less invasive alternative for the measurement of sexual arousal.

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Although most men are genitally aroused to one sex that is consistent with their reported sexual orientation, women's sexual orientation is weakly reflected in their genital response because they are sexually aroused to both sexes (Chivers, Rieger, Latty, & Bailey, 2004; Chivers, Seto, & Blanchard, 2007; Rieger, Chivers, & Bailey, 2005). Sex-specific selection pressures might explain this sex difference. The majority of men have evolved to be strongly sexually oriented toward women, facilitating prompt sexual responses required for reproduction. Women may have evolved to be sexually responsive in these situations to avoid genital injury; these pressures might have been so strong that they evolved to respond to any sexual cue, including sexual stimuli depicting either sex (Bailey, 2009; Suschinsky & Lalumière, 2011).

The congruence of various physiological reactions likely reflects the salience of orienting oneself to sexual stimuli (Safron et al., 2007). Thus, men's bodies might synchronize their genital responses with other psychological reactions to build sexual arousal to sexually desired targets. However, if women's, unlike men's, sexual responses have not evolved to orient to specific targets (Bailey, 2009), then their arousal system may not require

a coordination of different physiological reactions toward these targets. Consistent with this hypothesis, genital response relates stronger in men than women to subjective sexual arousal to sexual stimuli (Chivers, Seto, Lalumière, Laan, & Grimbos, 2010). If this sex difference in concordance is robust, other measures of sexual arousal should correspond more strongly in men than women with their genital and subjective responses.

Pupil dilation is one possible reaction to sexual stimulation. Pupils that dilate to stimuli indicate activation of the autonomic nervous system (Bradley, Miccoli, Escrig, & Lang, 2008; Lang & Bradley, 2010), which is associated with many automatic processes such as perspiration, digestion, blood pressure, and heart rate (ten Donkelaar, Němcová, Lammens, Overeem, & Keyser, 2011). Other research suggests that pupil dilation reflects attention that is likely not in the conscious control of participants (Heaver & Hutton, 2011). For these reasons, pupil dilation has been used as an indicator of automatic responses, including responses reflecting sexual arousal (Goldinger & Papesch, 2012; Laeng, Sirois, & Gredebäck, 2012).

Pupils dilate more to sexual stimuli depicting an individual's preferred sex than to stimuli of the other sex or to non-sexual stimuli (Hess & Polt, 1960; Hess, Seltzer, & Shlien, 1965; Rieger & Savin-Williams, 2012). In fact, dilation to sexually preferred stimuli appears to be the strongest pupillary response elicited by stimuli (Laeng et al., 2012). Moreover, sex and sexual

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orientation differences in pupil dilation are similar to those reported for genital arousal (Rieger & Savin-Williams, 2012). Yet, direct evidence regarding how these indices correspond with each other and with subjective arousal is missing. The present research is the first to simultaneously assess these indices within participants. We hypothesized a stronger correspondence of genital arousal, pupil dilation, subjective arousal, and self-reported sexual orientation in men than women.

This general sex difference in the congruence of arousal indices could, however, vary by sexual orientation. There is inconsistent evidence whether bisexual-identified men are sexually responsive to both men and women, both with respect to their genital arousal (Cerny & Janssen, 2011; Rieger et al., 2005; Rosenthal, Sylva, Safron, & Bailey, 2011) and pupil dilations (Rieger et al., 2013; Rieger & Savin-Williams, 2012). Yet, some bisexual-identified men are sexually aroused to both sexes. Hence, their arousal patterns are, compared to other men, more female-typical. We therefore hypothesized that the correspondence between bisexual men's genital arousal, pupillary response, and subjective arousal is weaker than for other men.

Contrarily, homosexual women have more male-typical sexual arousal patterns, compared to other women, because they respond somewhat stronger to their preferred sex than the other sex. Although this effect was weak in previous studies on genital arousal, it was detected in two independent samples (Chivers et al., 2004, 2007). Correspondingly, homosexual women dilate more strongly to their preferred sex than the other sex, whereas heterosexual women dilate equally to the sexes (Rieger & Savin-Williams, 2012). Hence, homosexual women could be more male-typical than other women in other aspects of their sexual arousal. We thus hypothesized that compared to other women, the congruency of homosexual women's sexual arousal indices will be stronger.

Based on the reviewed literature, the following hypotheses were tested:

The correspondence of sexual orientation, genital response, pupil dilation, and subjective arousal to sexual stimuli is stronger in men than women.

If bisexual men show bisexual, and hence female-typical sexual arousal, the correspondence of their sexual arousal indices will be weaker than in other men.

If homosexual women show more male-typical sexual arousal than other women, the correspondence of their sexual arousal indices will be stronger than in other women.

**1. Method**

*1.1. Participants*

Participants were uniquely recruited in 2013 for the present study. Advertisements were placed on several websites at Cornell University in Ithaca, NY, including those for dormitories, fraternities, athletic teams, and associations for sexual minorities. We also recruited from websites where men sought both men and women for sexual reasons. The latter method was used to find bisexual-identified men, a group less prevalent than other men. The recruited sample consisted of 76 men and 72 women who indicated their sexual orientation identity on a 7-point scale. Distributions of age, ethnicity, and recruitment venue (sexual website or not) are shown in Table 1.

*1.2. Measures*

*1.2.1. Sexual orientation*

In addition to reporting their sexual orientation identity (Table 1), participants indicated their sexual attractions and fantasies toward men and women on Kinsey-type Scales (Kinsey, Pomeroy, & Martin, 1948). These three measures were correlated in men (all  $p$ 's < .0001,  $.97 < r$ 's < .98,  $.95 < CI$ 's < .99) and women ( $p$ 's < .0001,  $.80 < r$ 's < .94,  $.70 < CI$ 's < .96) and averaged within participants. For this composite, a score of 0 indicated an exclusively heterosexual orientation, a score of 3 a bisexual orientation with equal preferences, and a score of 6 an exclusively homosexual orientation.

In general, people report a diverse range of sexual orientations and attractions between heterosexual, and homosexual (Savin-Williams, Joyner, & Rieger, 2012).

**Table 1**  
Distribution of sexual orientation identities across ages, ethnicities, and recruitment venues.

|                            | Men (N = 76)         | Exclusively straight | Mostly straight           | Bisexual leaning straight | Bisexual                 | Bisexual leaning gay | Mostly gay           | Exclusively gay      |
|----------------------------|----------------------|----------------------|---------------------------|---------------------------|--------------------------|----------------------|----------------------|----------------------|
| Number                     | 18                   | 10                   | 8                         | 3                         | 5                        | 16                   | 16                   | 16                   |
| Average age                | 22.00 [19.17, 24.83] | 27.60 [23.81, 31.35] | 31.50 [27.26, 35.74]      | 20.33 [13.41, 27.26]      | 22.20 [16.83, 27.57]     | 23.75 [20.75, 26.75] | 23.56 [20.56, 26.56] | 23.56 [20.56, 26.56] |
| Percentage Caucasian       | 72 [49, 88]          | 80 [49, 94]          | 75 [41, 93]               | 0 [0, 56]                 | 40 [12, 77]              | 56 [33, 77]          | 63 [39, 82]          | 63 [39, 82]          |
| Percentage sexual websites | 0 [0, 18]            | 20 [6, 51]           | 63 [31, 86]               | 0 [0, 56]                 | 20 [4, 62]               | 13 [4, 36]           | 0 [39, 82]           | 0 [39, 82]           |
| Women (N = 72)             | Exclusively straight | Mostly straight      | Bisexual leaning straight | Bisexual                  | Bisexual leaning lesbian | Mostly lesbian       | Exclusively lesbian  |                      |
| Number                     | 13                   | 16                   | 8                         | 5                         | 12                       | 10                   | 8                    |                      |
| Average age                | 23.15 [21.01, 25.30] | 21.88 [20.40, 23.36] | 23.88 [20.99, 26.75]      | 25.60 [17.47, 33.72]      | 23.50 [21.86, 25.13]     | 27.90 [22.06, 33.75] | 27.63 [24.00, 31.25] |                      |
| Percentage Caucasian       | 77 [50, 92]          | 63 [39, 82]          | 38 [14, 69]               | 20 [4, 62]                | 50 [25, 75]              | 80 [49, 94]          | 63 [31, 86]          |                      |

Note: Numbers in brackets represent 95% confidence intervals. Some sexual orientation identities differed, on average, in age, ethnicity (proportion of being Caucasian), or recruitment venue (sexual website or not). These differences had little influence on results: reported effects marginally changed by statistically controlling for these variables.

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