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## Research Report

## Sexual Arousal Patterns of Bisexual Men

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**ABSTRACT**—*There has long been controversy about whether bisexual men are substantially sexually aroused by both sexes. We investigated genital and self-reported sexual arousal to male and female sexual stimuli in 30 heterosexual, 33 bisexual, and 38 homosexual men. In general, bisexual men did not have strong genital arousal to both male and female sexual stimuli. Rather, most bisexual men appeared homosexual with respect to genital arousal, although some appeared heterosexual. In contrast, their subjective sexual arousal did conform to a bisexual pattern. Male bisexuality appears primarily to represent a style of interpreting or reporting sexual arousal rather than a distinct pattern of genital sexual arousal.*

Although bisexual behavior is not uncommon in men, there has long been skepticism that it is motivated by strong sexual arousal and attraction to both sexes. For example, the case studies of Krafft-Ebing (1886) suggest that most men with bisexual activity have sex with women because of social pressure but have sexual attraction exclusively or almost exclusively to men (Cases 127, 128, 135–153, and 167). Hirschfeld (1914/2001, pp. 197–215) speculated that most self-identified bisexual men are either heterosexual or homosexual and that men with substantial bisexual attractions are rare. Freund, who was a pioneer in measuring male genital arousal, wrote that, after assessing genital arousal in hundreds of men, he never found convincing evidence that bisexual arousal patterns exist (1974, p. 39). The existence of male bisexual attraction and arousal remains controversial and poorly understood (Fox, 2000; MacDonald, 2000; Zinik, 2000).

**BISEXUALITY: BEHAVIOR, IDENTITY AND AROUSAL**

Sexual orientation refers to the degree of sexual attraction, fantasy, and arousal that one experiences for members of the opposite sex, the same sex, or both. Men's self-reported sexual

orientation tends to be bimodal, with the large majority reporting exclusive sexual attraction to women and a minority reporting exclusive or near-exclusive attraction to men; the number of men who report substantial sexual attraction to both men and women is even smaller (Bailey, Dunne, & Martin, 2000; Diamond, 1993; Laumann, Gagnon, Michael, & Michaels, 1994).

Patterns of sexual behavior (i.e., sexual contact with men or women) are certainly influenced by sexual orientation, but may diverge from it for various reasons, including limitations in opportunity (e.g., imprisoned men without access to women), stigmatization (typically against homosexuality), or material reasons, as in the case of prostitution (Gagnon, Greenblat, & Kimmel, 1999). Unquestionably, during the course of their lives, some men have sex with both men and women. One survey of homosexual men found that about 69% had also been sexually active with women (Bell, Weinberg, & Hammersmith, 1981). Furthermore, some imprisoned men say that they are heterosexual even though they engage in homosexual sex (Kirkham, 2000). Given these discrepancies between reported sexual orientation and sexual behavior in some men, it is reasonable to ask whether male bisexual behavior reflects sexual arousal to both sexes.

*Sexual identity* refers to labels, including “homosexual,” “heterosexual,” or “bisexual,” that individuals often give themselves (Sell, 1997). In a national survey, 0.8% of American men identified as bisexual (Laumann et al., 1994). There may be varied reasons why some men adopt a bisexual identity. For example, they may have intense sexual attraction to both men and women, or they might have sex partners of both sexes. Furthermore, men who adopt a homosexual identity might go through a stage in which they consider themselves bisexual. In one study, up to 40% of homosexual men defined themselves as bisexual before adopting a gay identity (Lever, 1994). In another study, most bisexual men shifted over time toward homosexuality; however, a small number shifted toward heterosexuality (Stokes, Damon, & McKirnan, 1997). This suggests that some bisexually identified men might have homosexual feelings (i.e., substantial attraction and arousal only to men), whereas others might have heterosexual feelings (i.e., substantial attraction and arousal only to women).

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In terms of behavior and identity, bisexual men clearly exist. Skepticism about male bisexuality must therefore concern claims about bisexual feelings, that is, strong sexual attraction and arousal to both sexes. The primary methodological challenge for investigating this issue is to employ a measure of sexual feelings that does not depend on self-report. At present, this is possible only for genital sexual arousal.

### MEASURING MALE SEXUAL AROUSAL

Male genital arousal can be measured using a circumferential strain gauge that reflects the changes in penile girth during erection (Janssen, 2002). Homosexual men show substantially more genital arousal to sexual stimuli depicting men (male sexual stimuli) than to those depicting women (female sexual stimuli); heterosexual men have the opposite pattern (Chivers, Rieger, Latty, & Bailey, 2004; Freund, 1963; Freund, Watson, & Rienzo, 1989; Sakheim, Barlow, Beck, & Abrahamson, 1985). Subjective sexual arousal is measured by self-report and is typically highly correlated with genital arousal in men (Sakheim et al., 1985). However, when self-report is suspect, genital arousal may provide a more valid measure. For example, genital arousal to stimuli depicting children is an effective method of assessing pedophilia, even among men who deny attraction to children (Blanchard, Klassen, Dickey, Kuban, & Blak, 2001).

Few studies have investigated genital arousal among bisexual men. One study (McConaghy & Blaszczyński, 1991) measured genital sexual arousal to slides of nude men and women in 20 men with problematic sexual preferences (e.g., pedophilia, exhibitionism, bondage, and fetishism). The authors reported that the bisexual-identified men among their sample showed bisexual arousal. However, because of the heterogeneous study sample, and because the authors did not use rigorous statistical analyses to distinguish bisexual arousal from heterosexual or homosexual arousal, the study does not definitively demonstrate that bisexual men have bisexual arousal. Another study compared the genital arousal to male and female stimuli of 10 heterosexual, 10 bisexual, and 10 homosexual men (Tollison, Adams, & Tollison, 1979). Bisexual-identified men were indistinguishable from homosexual-identified men in their patterns of genital arousal. However, the group sizes in this study were relatively small, and thus the study may have lacked power to detect differences between the two groups.

### THE CURRENT STUDY

We recruited self-identified heterosexual, bisexual, and homosexual men and assessed their genital and self-reported sexual arousal to male and female sexual stimuli. Our analyses investigated three hypotheses:

Bisexual men are substantially aroused by both male and female stimuli.

Bisexual men, like homosexual men, are much more aroused by male than by female stimuli.

Bisexual men show a mixture of homosexual and heterosexual patterns of sexual arousal, with some having much more arousal to male stimuli and others having much more arousal to female stimuli.

Note that these hypotheses are not mutually exclusive.

### METHOD

#### Participants

We advertised in gay-oriented magazines and an alternative newspaper in Chicago for “heterosexual,” “bisexual,” and “gay men” for a paid study of sexual arousal. Men who called the lab were asked about their sexual attraction toward men and women, so that their sexual orientation could be determined (see Measures and Procedure). Participants included 30 heterosexual men, 33 bisexual men, and 38 homosexual men, categorized on the basis of their answers to those questions. We also asked men to describe their sexual identity as straight, bisexual, or gay. Sexual attraction and sexual identity (converted to a numeric 3-point scale) were highly correlated,  $r = .95$ . Mean ages (standard deviations in parentheses) were 31.6 (5.9), 31.2 (5.4), and 30.6 (5.8), for the heterosexual, bisexual, and homosexual men, respectively. The percentage of Caucasian participants was 49.3, and this percentage did not vary significantly across groups. The heterosexual and homosexual participants were included in an earlier study (Chivers et al., 2004).

#### Measures and Procedure

The measures and procedure of this study were identical to those of our earlier study (Chivers et al., 2004), and the report of that study provides more detail.

#### Sexual Orientation

Sexual orientation was assessed via self-report using the Kinsey Sexual Attraction Scale (Kinsey, Pomeroy, & Martin, 1948). Participants provided separate Kinsey ratings for their sexual orientation during the past year and during adulthood. The mean of these two ratings was used in all analyses. “Heterosexual men” were defined as men with Kinsey Attraction scores less than or equal to 1, “bisexual men” had Kinsey Attraction scores greater than 1 and less than 5, and “homosexual men” had Kinsey scores greater than or equal to 5.

#### Stimuli

Participants viewed an 11-min, neutral, relaxing film (e.g., landscapes), followed by several 2-min sexual films, and another neutral film. Two of the sexual films depicted two men having sex with each other, and two of the films depicted two women having sex with each other.

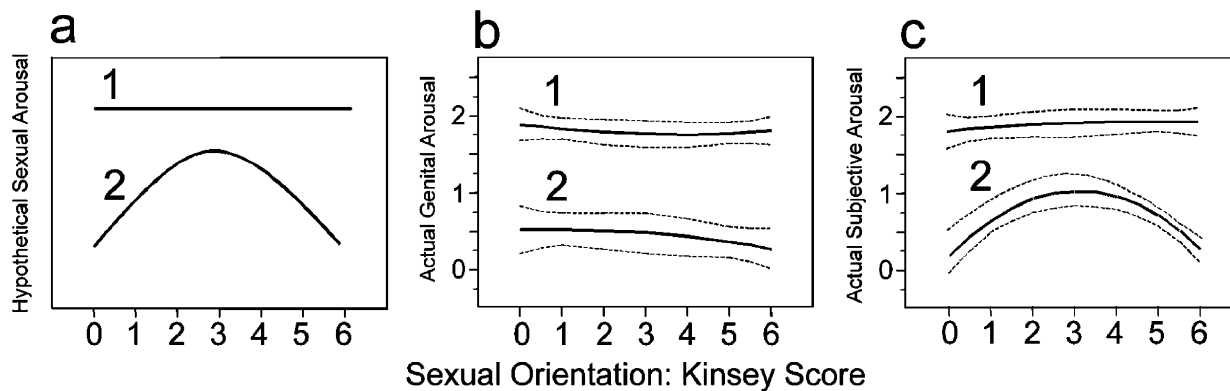


Fig. 1. Sexual arousal as a function of sexual orientation. In each panel, the curve labeled “1” presents the prediction or results for the more arousing sex, and the curve labeled “2” presents the prediction or results for the less arousing sex. The graph in (a) shows the hypothetical relation between arousal and orientation, assuming that bisexual men are substantially aroused to both sexes. If this hypothesis is correct, men who report substantial bisexual attraction (i.e., Kinsey scores above 1 and below 5) should show more arousal to the less arousing sex than heterosexual (scores of 0 or 1) and homosexual men (scores of 5 or 6); thus, the regression for the less arousing sex should be negatively quadratic. Results for genital and subjective sexual arousal in the current study are presented in (b) and (c), respectively; the dashed lines in these panels represent the 95% confidence intervals. Units are within-subjects standard deviations.

### Sexual arousal

Genital arousal was assessed using a penile mercury-in-rubber gauge measuring circumference changes during erection (Janssen, 2002). Participants indicated subjective arousal by moving a lever forward to indicate increasing arousal and backward to indicate decreasing arousal.

### Data Analyses

Because not all men become sufficiently sexually aroused for valid assessment, it is important to exclude nonresponders (Seto et al., 2001). We excluded participants whose genital response to any sexual stimuli was less than a 2-mm increase in penile circumference and whose subjective response was less than 5%, compared with response to neutral stimuli. The final sample contained 21 heterosexual, 22 bisexual, and 25 homosexual men with sufficient genital arousal for analyses and 24 heterosexual, 24 bisexual, and 31 homosexual men with sufficient subjective arousal.

For each combination of participant and film clip, we computed mean genital and subjective arousal. Next, for each participant, we standardized genital and subjective arousal across film clips. Finally, we averaged the standardized genital arousal across female sexual stimuli in order to compute mean genital arousal to female stimuli; analogous calculations yielded mean genital arousal to male sexual stimuli and to the neutral stimulus, and mean subjective arousal to female and to male sexual stimuli, and to the neutral stimulus. Whenever arousal to sexual stimuli was used in analyses, we first subtracted arousal to the neutral stimulus.

## RESULTS

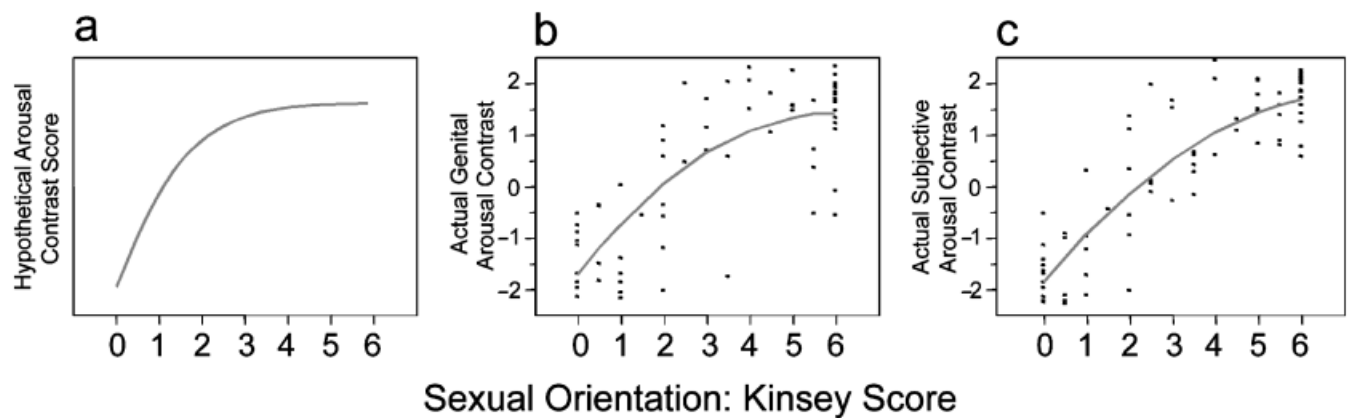
Our first analyses examined whether men who report bisexual feelings have a bisexual arousal pattern. Men with strong bi-

sexual arousal need not have precisely the same degree of arousal to both male and female stimuli. However, on average, their arousal to both male and female stimuli should be substantial. Furthermore, their arousal to male stimuli should exceed that of heterosexual men, and their arousal to female stimuli should exceed that of homosexual men. The hypothesis that bisexual men have bisexual arousal patterns thus implies a negative quadratic relation between self-reported sexual-attraction score (Kinsey score) and sexual arousal to the less arousing sex (Fig. 1a).

Figure 1b shows that the predicted curvilinear relation did not occur for genital arousal. The quadratic model was nonsignificant,  $p = .68$ ,  $\beta = -.05$ ,  $\Delta R^2 = .00$ . In contrast, bisexual men's subjective arousal did show the predicted curvilinearity; the negative quadratic relation was significant,  $p < .0001$ ,  $\beta = -.56$ ,  $\Delta R^2 = .29$  (Fig. 1c). Thus, we found no indication of a distinctly bisexual pattern of genital sexual arousal among bisexual men, although they did report a distinctly bisexual pattern of subjective sexual arousal.

Notably, on average all men, regardless of their sexual orientation, showed significantly more genital arousal to their less arousing sex than they did to neutral stimuli; the 95% confidence interval for the curve in Figure 1b is above zero. However, the figure also shows that arousal to the less arousing sex was markedly lower than arousal to the more arousing sex.

Our next analyses examined whether bisexual men tend to have homosexual arousal patterns, with greater arousal to male than to female stimuli. We computed a male-female contrast by subtracting each participant's arousal to female stimuli from his arousal to male stimuli; thus, higher scores indicate more arousal to men. If most bisexual men are primarily aroused by male stimuli, then there should be a negative quadratic relation between the participants' Kinsey scores and their arousal difference scores (Fig. 2a).



**Fig. 2.** Male-female arousal contrast (arousal to male stimuli sexual minus arousal to female sexual stimuli) as a function of sexual orientation. The graph in (a) shows the hypothetical relation, assuming that most bisexual men have a homosexual arousal pattern. If this hypothesis is correct, the regression of the male-female arousal contrast on Kinsey score will be negative quadratic. Regression lines for genital and subjective sexual arousal in the current study are presented in (b) and (c), respectively. Points represent data from individual participants. Units are within-subjects standard deviations.

With respect to genital arousal, the quadratic relation was significant (Fig. 2b)<sup>1</sup>; bisexual men were more aroused by male stimuli than by female stimuli,  $p < .01$ ,  $\beta = -.21$ ,  $\Delta R^2 = .04$ . The analogous quadratic relation for subjective arousal was also significant (Fig. 2c),  $p < .01$ ,  $\beta = -.16$ ,  $\Delta R^2 = .02$ ; bisexual men reported greater arousal to male than female stimuli.

Although these analyses suggest that bisexual men tend to show more arousal to male than to female sexual stimuli, inspection of Figure 2b suggests that not all do. Several men with Kinsey Attraction scores in the bisexual range tended to show most genital arousal to female sexual stimuli (i.e., their arousal contrast scores were negative). To investigate the hypothesis that bisexual men include a mixture of men with either homosexual or heterosexual arousal patterns, we computed the absolute residuals from the regressions shown in Figure 2. If this hypothesis is correct, then the residuals should be largest within the bisexual range of the Kinsey scale, and the relation between these residuals and Kinsey scores should be negative quadratic (Fig. 3a).

This quadratic relation was significant for both genital arousal (Fig. 3b),  $p < .05$ ,  $\beta = -.25$ ,  $\Delta R^2 = .04$ , and subjective arousal (Fig. 3c),  $p < .01$ ,  $\beta = -.33$ ,  $\Delta R^2 = .10$ . These results suggest that the bisexual men whose arousal patterns were least similar to those of homosexual men tended to have arousal patterns similar to those of heterosexual men.

## DISCUSSION

Men who reported bisexual feelings did not show any evidence of a distinctively bisexual pattern of genital arousal. One must be cautious, of course, in drawing conclusions from negative results. However, the crucial analysis of arousal to the less arousing sex did not provide even a hint of the expected effect. On average, both

homosexual and heterosexual men had much higher arousal to one sex than to the other, and this was equally true of bisexual men.

To be sure, most men were more genitally aroused to stimuli depicting their less arousing sex than to neutral stimuli. This finding contradicts some prior research in which men's arousal to their less preferred sex was comparable to their response to a neutral stimulus (Freund, 1974; Freund, Langevin, Cibiri, & Zajac, 1973). This suggests that most men may possess a certain capacity for bisexual arousal, although the magnitude of this arousal is quite modest.

In contrast to bisexual men's genital arousal, their subjective arousal did show to the expected pattern. The divergence between results for genital and subjective arousal is intriguing, because measures of genital and subjective arousal tend to be highly correlated in men (Sakheim et al., 1985). For example, across all our participants, the correlation between the genital and subjective male-female contrasts was .85. These results suggest that with respect to their less preferred sex, either bisexual men's subjective arousal has been exaggerated or their genital arousal has been suppressed. An earlier study suggests that the former explanation is more likely. In this study, bisexual men, compared with heterosexual and homosexual men, had greater discrepancies between their objectively measured and subjectively estimated genital arousal, and this was primarily due to an overestimation of their erections to female stimuli (Tollison et al., 1979). This issue may be clarified by studies using emerging technology identifying brain activation patterns associated with sexual arousal (Barch et al., 2003; Hamann, Herman, Nolan, & Wallen, 2004). In principle, such activation patterns could have higher validity than penile erection or self-reported arousal as a measure of sexual arousal. In any case, our results suggest that male bisexuality is not simply the sum of, or the intermediate between, heterosexual and homosexual orientation. Indeed, with respect to sexual arousal and attraction, it remains to be shown that male bisexuality exists. Thus, future research

<sup>1</sup>The curvilinear effect remained even after excluding 3 homosexual men who showed more arousal to women than to men,  $p = .01$ ,  $\beta = -.17$ ,  $\Delta R^2 = .03$ .



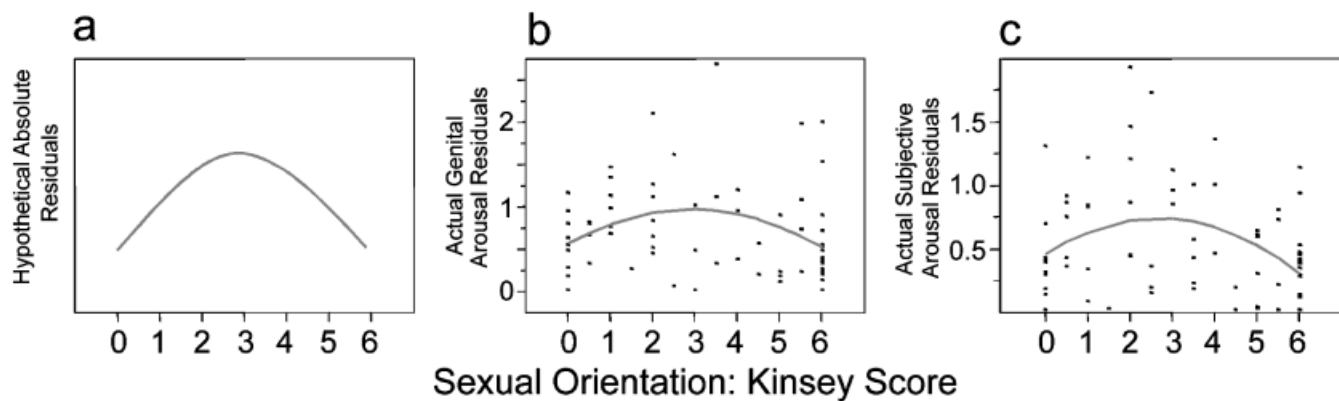


Fig. 3. Absolute residuals from the regressions of Figure 2 as a function of sexual orientation. The graph in (a) shows the hypothetical relation, assuming that the set of bisexual men is a mixture of men with either a homosexual or a heterosexual arousal pattern. If this hypothesis is correct, bisexual men should show larger residuals than other men, and the function should be negative quadratic. Regression lines for genital and subjective sexual arousal in the current study are presented in (b) and (c), respectively. Points represent data from individual participants.

should also explore nonsexual reasons why some men might prefer a bisexual identity to a homosexual or heterosexual identity.

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