Brain differentiation and preferred partner characteristics in heterosexual and homosexual men and women

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Abstract

OBJECTIVES: The current study examined and compared the preferred partner characteristics of heterosexual and homosexual men and women in relation to speculated patterns of brain differentiation underlying the preferences. Further, the study compared the preferences of butch versus femme homosexual women.
METHODS: Two hundred twelve heterosexual and homosexual men and women completed questionnaires on which they rated themselves and their idealized sexual partners on various morphological and behavioral characteristics.
RESULTS: Results of within-subjects multivariate analyses of variance (MANO-VAs) showed that the pattern of preferred partner characteristics of heterosexual women is most consistent with the theorized brain differentiation underlying those preferences. There was varying support for the theory as it applies to the other three groups. Between-subjects MANOVAs provided evidence to support some of the predictions generated by theory on the differences in brain differentiation between heterosexual and homosexual men and women and between homosexual women categorized as butch and femme.
CONCLUSION: The overall pattern of preferred partner characteristics among and between heterosexual and homosexual men and women does not support theory that holds that underlying brain differentiation between the groups is discrete and categorical. Rather, it supports theory that holds that differentiation manifests itself on a continuum leading to a variety of patterns of sexual orientation, and by extension, preferred partner characteristics.

ORIGINAL ARTICLE

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Introduction

Neurohormonal theories of sexual orientation development hold that prenatal, and possibly postnatal, hormonal influences affect neural structures that mediate sexual attraction and behavior [1, 2, 3]. There appears to be a consensus that a heterosexual orientation is associated with the neural differentiation pattern feminized/unmasculinized in women and defeminized/ masculinized in men [1, 2, 3].

There is disagreement on the relationship between brain differentiation patterns and homosexual orientation. Ellis and Ames [1] speculate that homosexual orientation is due to a sexual inversion of the differentiation seen in heterosexuals. In this view, the neural organization of homosexual men is feminized and unmasculinized, and the neural organization of homosexual women is defeminized and masculinized. Feierman [2] and Pillard and Weinrich [3] theorize that the brain organization of homosexual men is feminized and masculinized. Pillard and Weinrich [3] theorize that the brain organization of homosexual women is more variable and may be either feminized and masculinized or defeminized and unmasculinized. Pillard and Weinrich [3] speculate that there may be additional masculinization of the brain due to postnatal factors from adolescence to adulthood such that both heterosexual and homosexual males experience greater masculinization of the brain over development. There is also some evidence that the butch-femme classification of lesbians may be related to differences in neural differentiation [4].

Kauth [5] argues that the use of the terms feminization and masculinization imply a discrete difference in brain differentiation that does not exist between heterosexuality and homosexuality. For example, he argues that a feminized female brain is not the same as a feminized male brain. Woodson and Gorski [6] argue that the brain is not globally feminized or masculinized but that feminization and masculinization vary by structure. This creates a continuum rather than a dichotomy and may account for the complexity of expression of sexual orientations in humans. Consistent with this idea, Rahman and Wilson [7] have noted that homosexuality appears to include a constellation of predominantly sex-typical traits with some notable sex-atypical traits that vary unpredictably.

Indirect tests of neurohormonal theories of sexual orientation are possible through examination of the speculated behavior patterns associated with the various types of brain differentiation. Femininization of the brain is associated with sexual interest in targets more masculine than self (e.g., taller, heavier, greater muscle development) [2], and expression of proceptive and receptive sexual behavior [3]. Defeminization of the brain is associated with sexual interest in targets more feminine than self (e.g., shorter, lighter, less muscle development) [2], and little expression of proceptive or receptive behavior [3]. Masculinization of the brain is associated with interest in targets younger than self (because of age-related characteristics signal-

ing subordinate rather than dominant status) [2], and high mounting behavior [3]. Unmasculinization of the brain is associated with interest in targets older than self (because of age-related characteristics signaling dominant rather than subordinate status) [2] and low mounting behavior [3]. Research supports some of the predictions of preferred partner characteristics associated with the speculated patterns of brain differentiation in heterosexual and homosexual men and women [2, 8, 9,10].

The purpose of the present study was threefold. First, we examined the preferred partner characteristics of heterosexual and homosexual men and women to determine the degree to which these preferences are consistent with the patterns predicted by current neurohormonal theories of sexual orientation development. Second, we made systematic comparisons between the groups to determine how their preferred partner preferences differed. Third, we examined differences in preferred partner characteristics between homosexual women categorized as butch or femme.

Material and Method

A total of 212 participants ranging in age from 18 to 29 comprised four groups: 48 heterosexual men (mean age = 23.08), 53 heterosexual women (mean age = 22.7), 58 homosexual men (mean age = 20.2), and 53 homosexual women (mean age = 20.8). The participants' self-classification of ethnicity is as follows: 71 White, 58 Hispanic, 39 African American, 16 Afro Caribbean, 6 Asian, and 22 not classified. Analyses revealed that the heterosexual men and women were significantly older than the homosexual men and women, and the level of education of heterosexual men (M = 15.6 years) and women (M = 15.3 years) was significantly greater than that of homosexual men (M = 12.9 years) and women (M = 13.7 years). Also, the majority of heterosexual men (60%) were classified as White while ethnicity was more evenly distributed in the other three groups.

Participants rated themselves and their ideal partners on age (measured in years), height (measured in inches and reported here in centimeters), weight (measured in pounds and reported here in kilograms), and level of muscle development measured on a 7-point Likert Scale (1 = *least* and 7 = *most*). Participants answered the following questions on a 7-point Likert scale (1 = *strongly disagree* and 7 = *strongly agree*): "I prefer taking the dominant role during sexual activity"; "I prefer that my partner take the dominant role during sexual activity". Subjects rated on a 7-point Likert Scale (1= *very little* and 7 = *very much*) how closely their sexuality matched stereotypic descriptions of both male sexuality (i.e., "sexually aggressive, sexually dominant, initiates sexual activity, primary goal of sex is orgasm") and female sexuality (i.e., "likes to be seduced, likes romance, primary goal of sex is love and intimacy"). Homosexual women rated on a 7-point Likert Scale (1 = *strongly disagree* and 7 = *strongly*

Table I. Self versus Idealized Partner: Heterosexual Men and Women

	Men				Women			
	Self	Ideal	(df =	1, 44)	Self	Ideal	df =	1, 48
Variables	M	M	F	p	M	M	F	p
Age	22.96(2.50)	22.60(3.04)	.75	.39	22.78(2.33)	25.61(3.32)	77.34	<.001
Height	182.09(11.07)	170.08(5.00)	70.33	<.001	162.81(7.75)	181.69(6.71)	244.89	<.001
Weight	88.42(17.56)	58.01(5.67)	160.61	<.001	65.21(14.28)	84.06(11.69)	77.49	<.001
Muscle Development	4.42(1.32)	4.48(1.16)	.05	.82	3.86(1.54)	5.47(.84)	50.26	<.001
Preference for Sexual Dominance	4.53(1.31)	4.11(1.35)	1.61	.21	3.41(1.43)	5.43(1.10)	47.30	<.001

Note. Standard deviations are shown in parentheses.

Table II. Self versus Idealized Partner: Homosexual Men and Women

	Men				Women			
	Self	Ideal	(df =	1, 50)	Self	Ideal	(df =	1, 49)
Variables	M	M	F	p	M	M	F	p
Age	20.12(2.40)	22.29(3.05)	32.70	<.001	20.90(2.66)	22.84(3.54)	17.84	<.001
Height	178.33(7.72)	179.15(7.72)	.58	.45	165.96(8.61)	169.57(7.42)	11.54	.001
Weight	71.20(11.70)	73.82(9.04)	3.48	.07	73.69(18.68)	66.62(10.98)	10.78	.002
Muscle Development	3.82(1.62)	4.90(1.51)	27.04	<.001	4.00(1.52)	4.92(1.41)	21.67	<.001
Preference for Sexual Dominance	3.88(1.57)	4.51(1.76)	2.70	.11	4.82(1.59)	4.32(1.63)	2.04	.16

Note. Standard deviations are shown in parentheses.

Table III. *Mean Idealized Partner-Self Difference Scores Between Groups*

	Heterosexual		Homosexual	
Variable	Men	Women	Men	Women
Age	−.30(2.80)$_{abc}$	2.81(2.28)$_a$	2.22(2.73)$_b$	1.94(3.25)$_c$
Height	−12.12(9.83)$_{abc}$	19.10(8.38)$_{ade}$	.86(7.54)$_{bd}$	3.61(7.52)$_{ce}$
Weight	−31.00(16.21)$_{abc}$	19.09(15.06)$_{ade}$	2.53(10.12)$_{bdf}$	−7.07(15.22)$_{cef}$
Muscle Development	.12(1.95)$_a$	1.63(1.61)$_a$	1.08(1.50)	.92(1.40)
Preference for Sexual Dominance	−.49(2.22)$_a$	1.94(1.99)$_{ab}$.	.68(2.73)	−.50(2.48)$_b$

Note. Means in a row sharing a subscript are significantly different. Negative numbers indicate lower values for the partners' scores.

Table IV. Similarity to Sexual Stereotypes: Between Groups Comparison

	Heterosexual		Homosexual	
Sexual Stereotype	Men	Women	Men	Women
Male	4.46(1.13)$_a$	3.88(1.72)	3.58(1.82)$_a$	4.42(1.70)
Female	4.16(1.51)$_a$	5.75(1.25)$_{ab}$	4.58(1.90)$_b$	5.10(1.63)

Note. Means in a row sharing a subscript are significantly different. Standard Deviations are shown in parentheses.

agree) "I think of myself primarily as butch" and "I think of myself primarily as femme".

Results

In the first analysis four one-way within-subjects multivariate analyses of variance (MANOVAs) were used to compare ratings between self and ideal partner within each of the four groups on five measures: age, height, weight, level of muscle development and preference for sexual dominance. The MANOVAs were significant for all groups: heterosexual men, Wilks' Lambda = .19, $F(5, 40) = 34.02$, $p < .001$; heterosexual women, Wilks' Lambda = .12, $F(5, 44) = 74.62$, $p < .001$; homosexual men, Wilks' Lambda = .48, $F(5, 46) = 9.85$, $p < .001$; and homosexual women, Wilks' Lambda = .38, $F(5, 45) = 14.57$, $p < .001$. The Bonferroni correction was used to set the alpha levels

for follow up univariate *F* tests at the .01 level. *F* tests were significant for height and weight for heterosexual men, all five dependent variables for heterosexual women, age and muscle development for homosexual men, and age, height, weight, and muscle development for homosexual women. The results are seen in Table I and Table II.

In the second analysis, differences between the four groups were compared on seven variables. Difference scores (ideal partner – self) were calculated for age, height, weight, level of muscle development, and preference for sexual dominance for all participants. A negative score indicates the ideal partner exhibits less of the characteristic than the subject, and a positive score indicates that the ideal partner exhibits more of the characteristic than the subject. In addition to the difference scores for these five variables the scores for the similarity of the participants' own sexuality to the stereotype of male sexuality and stereotype of female sexuality were used. A one-way between-subjects MANOVA was conducted on the seven scores. The MANOVA was significant, Wilks' Lambda = .23, *F* (21, 520) = 16.72, *p* < .001. Post hoc comparisons between groups were made using the Bonferroni method with significance set at the .007 level. These results are seen in Table III and Table IV.

In the third analysis, homosexual women were categorized as butch or femme by creating difference scores ("I think of myself as primarily butch" – "I think of myself as primarily femme"). Positive scores were classified as butch (*N* = 18), negative scores were classified as femme (*N* = 23), and scores of zero were not included. Difference scores (ideal partner – self) were also calculated for age, height, weight, and preference for sexual dominance. A one-way between-subjects MANOVA was used to compare the ratings between butch and femme homosexual women on the four dependent variables. The MANOVA was significant, Wilks' Lambda = .73, *F* (4, 36) = 3.37, *p* = .02. The Bonferroni correction was used to set the alpha levels for the follow up *F* tests at the .01 level. Follow up *F* tests revealed that women classified as femme preferred partners much taller than themselves (*M* = 5.64, *SD* = 7.24) than did women classified as butch (*M* = –.43, *SD* = 6.53), *F* (1, 39) = 7.66, *p* = .009. Women classified as butch preferred their partners to be much less sexually dominant than themselves (*M* = –1.78, *SD* = 2.21) than did women classified as femme (*M* = .39, *SD* = 2.21), *F* (1, 39) = 9.72, *p* = .003.

Discussion

The first analysis indicated that the pattern of preferred partner characteristics of heterosexual women was the most consistent with the theory that the brain differentiation in this group is feminized and unmasculinized. Heterosexual women preferred partners who were older, taller, heavier, more muscularly developed, and more sexually dominant than themselves. Partially consistent with the speculated defeminized/masculinized differentiation pattern,

heterosexual men indicated a preference for partners shorter and lighter than themselves. However, results did not support predictions on the other variables. Contrary to expectations, heterosexual men in this sample did not indicate a preference for partners significantly younger than themselves. It is possible that the well-documented preference of heterosexual men for younger women develops with age and theoretically with increased masculinization of the brain.

Homosexual men preferred partners more masculine than self only in muscle development. Homosexual men also preferred partners slightly but significantly older than self. It is possible that the homosexual men in this study were developmentally closer to adolescence than to adulthood. If this is so, their preference for older partners is predicted by Feierman's [2, 10] theory which holds that the brains of adolescent homosexual and heterosexual males are not fully masculinized, directing attention to older targets. These results would be predicted by a feminized/unmasculinized pattern of differentiation.

Homosexual women indicated a preference for partners who were older, taller, and more muscular than themselves, but also lighter than themselves. According to the theory by Pillard and Weinrich [3] homosexual women would have been expected to show preferences that reflected a feminized and masculinized pattern of differentiation (partners younger, taller, heavier, more muscular, more sexually dominant) or a defeminized and unmasculinized pattern of differentiation (partners older, shorter, lighter, less muscular, less sexually dominant). These results indicated that this sample of homosexual women did not match either pattern.

The second analysis examined preferences between groups. Heterosexual men indicated a preference for same age partners whereas all other groups preferred partners older than self to the same degree, an average of 2.32 years. Heterosexual men, relative to all other groups, preferred partners shorter than self. Heterosexual and homosexual women both preferred partners taller than themselves, but heterosexual women preferred taller partners than did homosexual women. Weight difference preference appears to be the critical factor that clearly divides all groups. Heterosexual men and homosexual women prefer partners lighter than themselves, but heterosexual men prefer the weight difference to be over 4 times greater than the difference preferred by homosexual women. Both heterosexual women and homosexual men prefer partners heavier than themselves, but heterosexual women preferred a weight difference 7.5 times greater than that expressed by homosexual men. On level of muscle development only heterosexual men and women differ from each other with women preferring much greater difference in muscle development than do men.

On sexual dominance the difference between ideal and self is significantly greater for heterosexual women relative to heterosexual men and homosexual women. On similarity to the male sexual stereotype heterosexual men show more similarity than do ho-

mosexual men. Finally, on similarity to the female sexual stereotype heterosexual women show more similarity than do heterosexual and homosexual men. The measures on the last two variables also suggest that homosexual men perceive their sexuality as less stereotypically masculine than do heterosexual men but less stereotypically feminine than do heterosexual women. Homosexual women do not differ from any of the other groups on these two variables.

The third analysis provided additional support for the contention that there is a meaningful difference between homosexual women who identify primarily as butch or femme. Butch women preferred to take a much more dominant role in sexual activity than did femme women, and femme women preferred partners significantly taller than themselves relative to butch women.

In summary, the results do not support the idea that preferred partner characteristic in heterosexual and homosexual men and women are neatly and closely associated with speculated patterns of brain organization unique to each gender and sexual orientation combination. Furthermore, the results do not support the concept that preferences of homosexual men and women are predictable and perfect inversions of the patterns of heterosexual men and women. For some preferred partner characteristics homosexual men do appear to express the same pattern as heterosexual women, and homosexual women do appear to express the same pattern as heterosexual men. However, it is important to note that when this does occur, the degree of difference between ideal partner and self on the characteristics is much less than the difference desired by heterosexual men and women.

The overall pattern of preferred partner characteristics among and between heterosexual and homosexual men and women in this study tends to support the brain differentiation view put forth by Kauth [5] and Woodson and Gorski [6]. This holds that any brain differentiation involved in sexual orientation does not involve the manifestation of discrete categories, but rather a continuum that will lead to a variety of patterns of sexual orientation and, by extension, preferred partner characteristics.

One limitation of the study is the young age of the sample making it possible to speculate that results might relate to the period of late adolescence rather than adulthood. Other limitations include differences in education level and ethnicity between the groups. Future research should study preferences across developmental periods and take into account differences between homosexual women who identify primarily as butch or femme.

REFERENCES

1 Ellis BJ, Ames MA. Neurohormonal functioning and sexual orientation: A theory of homosexuality-heterosexuality. Psychol Bull 1987; **101:**233–258.
2 Feierman JR. A biosocial overview of adult human sexual behavior with children and adolescents. In: JR Feierman, editor. Pedophilia: Biosocial dimensions. New York: Springer-Verlag; 1990. pp. 8–68.
3 Pillard RC, Weinrich JD. The periodic table model of the gender transpositions: Part I. A theory based on masculinization and defeminization of the brain. J Sex Res 1987; **23:**425–454.
4 Sing D, Vidaurri M, Zambarano RJ, Dabbs, Jr. JM. Lesbian erotic role identification: Behavioral, morphological, and hormonal correlates. J Pers Soc Psychol 1999; **76:**1035–1049.
5 Kauth MR. True nature: A theory of sexual attraction. New York: Kluwer Academic/Plenum Publishers; 2000.
6 Woodson JC, Gorski RA. Structural sex differences in the mammalian brain: Reconsidering the male/female dichotomy. In A Matsumoto, editor. Sexual differentiation of the brain. Boca Raton: CRC Press; 2000. pp. 229–255.
7 Rahman Q, Wilson GD. Born gay? The psychobiology of human sexual orientation. Pers Individ Dif 2003; **34:**1337–1382.
8 Buss D. Evolutionary psychology: The new science of the mind. 2nd ed. Boston: Allyn & Bacon; 2004.
9 Bailey JM. The man who would be queen: The science of gender-bending and transsexualism. Washington, D.C.: Joseph Henry Press; 2003.
10 Muscarella F. Preferred partner characteristics in homosexual men in relation to speculated patterns of brain differentiation. Neuroendocrinol Lett 2002; **23:**299–302.