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Rethinking Women's Sexual Orientation: An Interdisciplinary,
Relationship-Focused Approach

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Abstract

What leads some women to form romantic and sexual relationships with men, and other women to form intimate relationships with women? This article presents a new conceptual paradigm for understanding women's sexual orientation that is emerging from research in such diverse fields as social psychology, sex research, evolutionary psychology, attachment theory, and neuroscience. This approach acknowledges the potential plasticity of women's sexuality and the emphasis that women place on close relationships as a context for sexuality. Research also raises the possibility that for women the biological determinants of sexual desire, attraction and attachment are not inherently linked to a partner's sex. This article begins with a brief survey of research on women's same-sex romantic and sexual relationships not only in the United States today but also in other cultures and historical periods. These and other findings are used to critique prevailing conceptual models of women's sexual orientation. Finally, key elements in an alternative paradigm are described.

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Why are some women lesbian and others heterosexual? This question is of growing interest to the general public and to scientific researchers. According to national opinion polls (Newport, 1999), Americans are increasingly turning to biology for answers. From 1977 to 1999 the proportion of adults saying that homosexuality is something a person is "born with" increased from 13% to 34%. Among academics, answers to this question often depend on a scholar's theoretical commitments and position in the debate between biological essentialism and social constructionism (DeLamater & Hyde, 1998). In this paper, I strive to take a fresh look at the topic of women's sexual orientation. Previous analyses have been limited in two important ways. First, researchers have depended primarily on the experiences of contemporary Americans in describing the phenomena of sexual orientation. Second, scholars have focused on types of women -- those who are identified as heterosexual, lesbian, or bisexual -- rather than on the types of relationships that women pursue. In contrast, an analysis that focuses on women's intimate relationships and draws on relevant findings from such diverse fields as anthropology, history, and neuroscience can provide much greater understanding.

This paper begins with a brief survey of research describing women's romantic and sexual relations with women across time and place. Next I evaluate the leading paradigm guiding most theoretical analyses of human sexual orientation. This approach emphasizes differences between heterosexual women, who are viewed as feminine in their core attributes, and lesbian women, who are viewed as masculine. Considerable research demonstrates that this model fails to provide a general framework for understanding women's sexual orientation. In a final section, I outline a

new interdisciplinary, relationship-focused paradigm that is gradually emerging from recent empirical research. Rather than looking for what is atypical or deviant about women who form intimate relationships with other women, this work emphasizes continuities, both social and biological, in the factors that influence women's sexuality and close relationships.

Describing Women's Intimate Relationships with Women

Good science begins with an adequate description of the phenomena under examination. Too often, researchers interested in sexual orientation have limited their analyses to the experiences of a very atypical population of women, namely contemporary Americans. Fortunately, a growing body of research by anthropologists, historians and others offers a broader perspective on women's romantic and sexual relations with women. As anthropologist Walter Williams recently observed (1998, p. 55), "what is most notable from the emerging cross-cultural scholarship is how common same-sex relationships are for many societies." This section offers a brief overview of major findings.

Exclusive Relationships Between Women

In the modern American context, many women who identify as lesbian are in a long-term, monogamous relationship with a woman partner (Peplau & Spalding, 2000). Yet in historical and cross-cultural perspective, such exclusive same-sex ties are atypical. Only under certain social and economic conditions has it been possible for women to forego marriage and to form relationships exclusively with women. Important prerequisites include women's financial independence and the existence of supportive ideologies and institutions.

In 19th century China, marriages were arranged and often oppressive to women (Blackwood, 2000). A new bride went to live with her husband's family and was supervised by her mother-in-law. In Guandon province, marriage was especially frightening to women because it meant moving from their own

village into enemy territory. Beginning in the mid 1800s, the establishment of silk factories permitted thousands of young women to avoid marriage and gain financial self-sufficiency as silk workers (Blackwood, 2000; Sankar, 1986). These women formed social institutions known as "sisterhoods." They lived in cooperative houses and provided mutual aid. Some women took formal vows never to marry. Loving partnerships and sexual relations between women were apparently common and accepted until 1949, when the communist government banned these sisterhoods.

In 19th century America, a pattern of long-term, monogamous relationships between two women known as "Boston marriages" flourished in New England (Faderman, 1981). These women were typically well-educated, feminist, and financially independent, either through inheritance or a career. The partners in a Boston marriage often lived together for many years. How frequently these loving relationships included genital sex is uncertain. At the end of the 19th century and into the 20th, these romantic friendships were quite common in academic settings, where women professors could not marry a man and retain their faculty position. The 30-year relationship between Mary Woolley, President of Mt. Holyoke College, and Jeannette Marks, Chair of the English Department, was illustrative.

Throughout the 20th century, the advances made by American women in education and paid employment expanded the opportunities for women to lead lives independent of men. Both feminism and the movements for gay/lesbian rights have provided ideologies and communities supportive of same-sex relationships and families. There is increasing social pressure for government and social institutions to recognize the rights of same-sex couples and to endorse same-sex marriage. Today, self-identified lesbian couples are an increasingly visible part of the social landscape.

Adolescent Passionate Friendships

In global perspective, the most frequent type of romantic liaison between women has probably been the passionate friendships formed among adolescent girls. For example, in a region of southern Africa it was common for adolescent school girls to engage in a form of institutionalized friendship known as mummy-baby relations (Gay, 1986). In this arrangement, an older girl (the "mummy" or mother) formed an emotionally close relationship with a younger girl (the "baby"). The girls exchanged love letters, and the older girl provided gifts and advice about becoming a woman. The most important aspect of mummy-baby friendship was the expression of affection and intimacy. These relationships sometimes but not always had a genital sex component. The mummy-baby relationship allowed teen girls to learn about their developing sexuality without fear of pregnancy and in a context condoned by parents and teachers. Although the intensity of these friendships usually ended when one of the women married, the friendships themselves often continued and strengthened both economic and emotional networks within the community.

Passionate friendships were also common among girls at European boarding schools during the early 20th century. Havelock Ellis (1928) reported that in Italy and England, a majority of school girls had intense friendships known as "flames" or "raves." During the same time period, American researcher Katharine Davis (1929) mailed a questionnaire about sexuality to 2200 graduates of women's colleges in the United States. The questionnaire asked, "Have you at any time experienced intense emotional relations with other women?" Fully 42% of the sample replied that they had. Of these, 52% said that the relationship was sexual in character. In other words, one woman in 5 reported a sexual relationship with a best woman friend in college. Some of these women continued to have intimate relationships with women after college but most did not.

Passionate friendships have also been documented among contemporary American adolescent women. Studies by Lisa Diamond and her colleagues depict modern-day passionate friends are usually preoccupied with each other, sometimes inseparable, and often voicing a serious commitment to their relationship (Diamond, 2000a; Diamond, Savin-Williams, & Dube, 1999). These relationships provide a sense of being valued and needed, and they offer intimacy, stability and trust. These passionate friendships may involve considerable physical intimacy and touching, but all begin as non-sexual and only a minority eventually become fully sexual.

Adult Relationships with Both Male and Female Partners

In many cultures, marriage and motherhood are prerequisites for full adult status and social respectability. Consequently, women's adult same-sex relationships have probably most often co-existed with male-female relationships.

In rural Lesotho prior to Western influences, it was common for married women to have a special, long-term female friend or motsoalle (Kendall, 1999). These loving sexual relationships were celebrated with a ritual feast in which the entire community acknowledged the commitment that the two women were making to each other. In an account of her personal experiences, a woman named Nthunya (1997) noted that both her husband and her motsoalle's husband were supportive of their friendship. This tradition continues today in more informal relationships between women that frequently involve passionate kissing, oral sex and other activities Americans would define as erotic. Interestingly, the women of Lesotho do not consider these friendships to be sexual relationships, explaining that you cannot have sex unless someone has a penis. "No [penis], no sex means that women's ways of expressing love, lust, passion, or joy in each other are neither immoral nor suspect" (Kendall, 1999, p. 167). A narrow cultural definition of sex

permitted considerable latitude for women's intimate behavior with each other.

In Suriname, many working class Creole women participate in the social institution known as mati. Mati are women who engage in sexual relationships with men and with women, either simultaneously or consecutively (Wekker, 1999). This socially accepted arrangement is made possible by the fact that most Creole women own or rent their own homes and are single heads of household. Female lovers provide not only sexual companionship but also reciprocal aid in raising children, financial assistance, and support in coping with everyday concerns. Patterns of socially recognized "bond friendship" were also reported among the Azande (e.g., Blackwood, 2000). These friendships were both economic and social in nature, involving the exchange of goods and services but also emotional and sometimes erotic ties between women.

In the 18th and 19th centuries, many adult American and European women formed intense romantic friendships with other women, often celebrating these passionate relationships in letters and poetry (Faderman, 1981). "Ah, how I love you," President Grover Cleveland's married sister Rose wrote to her friend Evangeline in 1890. "All my whole being leans out to you I dare not think of your arms." (cited in Goode, 1999, p. 33) After Rose's husband died, the two women spent their last years living together in Italy. At the time, society considered these enduring intimate relationships to be acceptable and normal. We do not know how often these relationships involved explicit sexuality. As Lillian Faderman explained (1981, p. 80), "it is probable that many romantic friends, while totally open in expressing and demonstrating emotional and spiritual love, repressed any sexual inclinations...since...women were taught from childhood that only men or bad women were sexually aggressive.... [Consequently] even a puritanical society

had little concern about allowing them fairly unlimited access to each other."

In America today, it is unusual for an adult woman to have openly loving and sexual relationships with both men and women at the same time. Nonetheless, most women who currently identify as lesbian or bisexual have had sexual relationships with men. For example, a recent study of 6935 self-identified lesbians from all 50 states found that 77% of lesbians had had one or more male sexual partners during their lifetime, often in the recent past (Diamant, Schuster, McGuigan, & Lever, 1999). We know relatively little about women who identify either privately or publicly as bisexual (e.g., Blumstein & Schwartz, 1976; Rust, 2000; Weinberg, Williams, & Pryor, 1994). For some women, the bisexual label describes a history of sequential or concurrent relationships with male and female partners. For others, the label indicates that a person has feelings of attraction to both men and women.

Having briefly reviewed the major forms that women's same-sex relationships have taken historically and cross-culturally, I now consider three other characteristics of women's same-sex romantic and sexual relationships that will be important in assessing the adequacy of theories of sexual orientation.

Within-Person Variability Across Time and Social Setting

Although some may think of sexual orientation as determined early in life and relatively unchanging from then on, there is growing evidence that the nature of a woman's intimate relationships can change throughout her life and differ across social settings. Several examples highlight this point.

In their interviews with lesbian, bisexual and questioning adolescent women, Lisa Diamond and Ritch Savin-Williams (2000) have found much evidence of discontinuity and change in young women's behavior over time. In one study (Diamond, 2000b), a quarter of the women who identified as lesbian at

a first interview had pursued a sexual relationship with a man by the time of the second interview two years later. In some cases, this led to a change in identity; in other cases, it was interpreted by the woman as "an exception" that did not affect her sexual identity. In Davis' (1929) study of women at single-sex colleges, most of the women who had emotional and sexual relationships with women in college formed relationships with men after graduation.

Changes such as these can occur throughout the lifespan. Several studies have described the experiences of American women who, after a long-term heterosexual relationship or marriage, began an intimate relationship with a woman (e.g., Blumstein & Schwartz, 1976; Kitzinger & Wilkinson, 1995). The reverse pattern also occurs: women who have identified as lesbians for many years and formed relationships only with women may begin a romantic or sexual relationship with a man (e.g., Bart, 1993).

The social context can influence a woman's choice of a female versus male partner. The frequency of passionate friendships among girls and women in sex-segregated schools provides one example. So do the experiences of women in American prisons (e.g., Giallombardo, 1966). It is fairly common for women inmates to create family-like relationships, sometimes including a sexual relationship. In the subculture of women's prison, a distinction is often drawn between "real" lesbians and "jailhouse turnouts," women who were heterosexual prior to incarceration but form a relationship with a woman while in prison. Paula Rust (2000, p. 210) has noted that "the reasons turnouts engage in sex with other women in prison -- the search for familiar family-type relationships, a sense of identity and self worth, affection, and connection to others -- are similar to the reasons women engage in heterosexual activities outside of prison."

The occupation of stripping can also foster same-sex relationships, especially when women are part of a touring group that moves from city to

city. One study found that about half of the women interviewed had developed a sexual liaison with another woman, often someone in the same touring group (McCaghy & Skipper, 1969). The researchers suggested that loneliness and isolation from previous social ties, unsatisfactory contacts with male clients, and a permissive social environment contributed to the creation of same-sex ties.

These research examples show that the lives of at least some women are characterized by temporal changes and discontinuities in the choice of male versus female partners. An adequate analysis of women's sexual orientation must be able to account for these within-person changes.

Same-Sex Relationships and Personal Identity

Recent research also provides useful information about the links between women's same-sex relationships and their identity. In our society, an individual's sense of personal identity as a lesbian, a bisexual, or a heterosexual is often assumed to be a core element of sexual orientation. Indeed, scientific studies of sexual orientation typically classify participants on the basis of their self-reported identity. The process of recognizing and coming to terms with one's sexual identity ("coming out") has been a prominent focus of research and counseling.

Yet in historical and cultural perspective, same-sex attractions and relationships are not inevitably linked to identity. The romantic friendships between American women in the 18th and 19th centuries had no implications for a woman's identity (Faderman, 1981). As the 20th century unfolded, however, sexologists formulated the concept of "lesbian," Freud suggested that sexual motivation is ubiquitous, and as a result the once respectable institution of women's romantic friendships became suspect. Historians contend that the creation of "homosexual" and "heterosexual" as defining identities or types of people is a relatively recent development (e.g. Katz, 1995).

Anthropologists also describes cultures in which women's same-sex relationships are unrelated to their personal or social identity. The women who participate in the mati pattern in Suriname do not acquire a special identity -- they are just women. The Lesotho women who formed a committed motsoalle friendship with another woman did not change their identity, nor did the school girls in a mummy-baby friendship. Furthermore, research has repeatedly found that in America today the links among behavior, attraction and personal identity are often complex. To be sure, some women are entirely consistent in their attractions, behavior and identity, but others are not. The loose associations among these elements that emerged in the National Health and Social Life Survey led Laumann et al. (1994, pp. 285-286) to suggest that "it makes more sense to ask about specific aspects of same-gender behavior, practice, and feelings during specific periods of an individual's life rather than a single yes-or-no question about whether a person is homosexual."

In short, the connection between having an intimate same-sex relationship and one's personal or social identity is variable, not fixed. The sexual identities found in the United States today are not universal, nor are they unchanging. The emergence of "bisexual" and "queer" as American social identities is a recent social phenomenon. One implication is that self-reported sexual identity is not necessarily the best starting point for a comprehensive analysis of women's sexual orientation.

Masculinity and Femininity in Same-Sex Couples

Finally, a description of empirical findings about women's same-sex relationships would be incomplete without a consideration of masculine and feminine roles. American stereotypes often depict same-sex couples as involving a masculine partner and a feminine partner who enact roles patterned after a traditional husband and wife. Cross-cultural and historical evidence clearly challenges this stereotype, and shows that the

links between women's sexual orientation and masculinity/femininity are highly variable.

In some settings, same-sex relationships are built on prevailing models of femininity. The American women who formed romantic friendships in the 18th and 19th centuries viewed their relationships as reflecting womanly ideals of purity, love and devotion (Faderman, 1981). Similarly, the mummy-baby pattern described earlier was also based on a feminine model, in this case the nurturant bond between mother and child.

In other contexts, women's same-sex relationships have been based on a distinction between a "masculine" and "feminine" partner. In America in the 1950s, an urban working class lesbian subculture emphasized that lesbian couples should have a "butch" and a "femme" partner (e.g., Davis & Kennedy, 1989). Among the Kaska Indians of Canada, parents depended on a son to hunt big game to provide food for the family. However, families without a son were permitted by social custom to designate one of their daughters to be raised as a son. As an adult, she was expected to take a wife, since it was believed that a female hunter who had sex with a man would have bad luck with game (Williams, 1998). Among the Mojave Indians in North America, it was acceptable for a woman to chose to live as a man and to marry a woman, so long as she adequately performed the traditional male social role. The wife, a traditionally feminine Mojave woman, was not considered homosexual or cross-gendered herself (Blackwood, 1984, p. 35). In contemporary Sumatra, the term tomboi (from the English word "tomboy") describes women who act in the manner of men and are erotically attracted to feminine women (Blackwood, 2000). The female partner of a tomboi has no special label; she is simply considered a woman.

In still other social environments, women's relationships with women are based on neither feminine nor masculine models but rather on friendship. The examples of the mati and the motsoalle friendships described earlier are

illustrative. Taken together, research finds that the links among masculinity, femininity and women's sexual orientation are variable rather than constant across cultures and historical periods.

In summary, a growing body of research documents the existence of romantic and sexual relationships between women in diverse cultures and historical periods. Passionate friendships between teenage girls appear to be common, especially when adolescents grow up in sex-segregated environments. The pattern of exclusive same-sex relationships and lifestyles found in America today is atypical in global perspective. More often, adult women's intimate same-sex friendships have co-existed with relationships with men. The nature of a woman's romantic attractions and sexual relationships can change during her lifetime. In our culture, women's choice of a male or female partner is often a defining element in her personal and social identity. In other cultures and time periods, however, this has not been the case. Even in modern society, there are often inconsistencies among a woman's attractions, behavior and identity. Finally, there is great variation in whether or not concepts of masculinity and femininity are relevant to the patterning of women's same-sex relationships.

The Inversion Model of Women's Sexual Orientation

Having summarized major empirical findings about women's relationships with women, I now evaluate the leading paradigm that has guided most theoretical analyses of women's sexual orientation for the past century. This is the inversion model of sexual orientation, articulated in the writings of Krafft-Ebing (1908/1950), Havelock Ellis (1928), and other early sex experts. This model proposed that sexual orientation is closely tied to gender. Normal heterosexual women are feminine in their physiology, personality and attractions to men. In contrast, lesbians are "sexual inverts," that is, women who are masculine in aspects of their physiology, personality and attraction to women. This model and its various modern

successors have dominated scientific efforts to understand sexual orientation. A brief review of unsuccessful efforts to confirm this model will make clear the need for a paradigm shift in the field. (For a detailed discussion, see Peplau, Spalding, Conley & Veniegas, 1999; Veniegas & Conley, 2000).

Biological Studies of the Inversion Hypothesis

Inversion theory asserts that heterosexuality is the biological norm and homosexuality results from a biological anomaly or defect. Compared to heterosexual women, lesbians are masculinized in some aspect of their anatomy or physiology. Early studies investigated possible anatomical correlates of women's sexual orientation, ranging from menstrual difficulties to atypical pelvic structures and clitoral development -- all without success (e.g., Ellis, 1963). Later it was suggested that sexual orientation might be affected by the circulating levels of testosterone, estrogen, or other sex hormones in adults. Eventually, this line of work was also abandoned for lack of evidence (e.g., Byne, 1995).

Currently, the most influential theory derived from the inversion paradigm focuses on the impact of prenatal hormones. As summarized by Ellis and Ames (1987, p. 248), this neuroendocrine theory states that "if a female fetus is exposed to high levels of testosterone in the latter half of gestation, her brain will function as a male brain. Following puberty, one manifestation of this male brain functioning will be a preference for female sex partners." In other words, exposure to particular prenatal hormones during a critical period before birth masculinizes the development of brain structures which in turn influence sexual orientation (see detailed reviews by Bailey, 1995; Byne, 1995; Meyer-Bahlburg, 1995; Peplau, et al., 1999).

Although the prenatal hormone model seems to work reasonably well in studies of laboratory animals where mounting and lordosis are the behaviors under investigation, it has not proved to be a general model of sexual

orientation in women. The strongest evidence for the theory comes from studies of women exposed to atypical prenatal hormone environments due to genetic anomalies or because of medication given to their mother during pregnancy. This research indicates that prenatal hormones do have modest masculinizing effects on some aspects of women's behavior, including their childhood play preferences and self-reports of sex-typed behavior in adulthood (e.g., Collaer & Hines, 1995; Udry, 2000). However, the impact of prenatal hormones on adult sexual orientation is minimal. The great majority of women known to have been exposed to masculinizing hormones report being heterosexual (e.g., Meyer-Bahlburg et al., 1995; Zucker, et al., 1996). Many supporters of the neuroendocrine model now recognize that it does not provide a general explanation for variations in women's sexual orientation (e.g., Meyer-Bahlburg, 1995, p. 147). Kenneth Zucker has observed that "the main bone of contention is whether variations in the prenatal hormonal milieu have any effect at all" on sexual orientation (Zucker, Bradley, & Lowry Sullivan, 1992, p. 93).

Childhood Gender Nonconformity and the Inversion Hypothesis

Another theory of sexual orientation based on the inversion hypothesis emphasizes gender nonconformity in childhood. Do girls who enjoy traditionally masculine activities and play with boys -- so-called "tomboys" -- grow up to become lesbians? According to Daryl Bem's (1996) "Exotic Becomes Erotic" theory of sexual orientation, the answer is yes. Empirical support for this hypothesis about girls is weak (see reviews in Peplau, et al., 1998; Peplau, et al., 1999). For example, if tomboyism is a precursor to lesbianism, which characterizes no more than 3% of adult women in the U.S. (Laumann, et al., 1994), we might expect tomboys to be rare. In fact, approximately half of American girls and women report being or having been tomboys (e.g. Burn, O'Neil, & Nederend, 1996, Plumb & Cowan, 1984). A meta-analysis of studies comparing the remembered childhood experiences of adult

lesbian and heterosexual women found significantly higher reports of tomboyism among lesbians ($d = .96$; Bailey & Zucker, 1995). However, these studies are all based on retrospective accounts that may be biased by current experiences. Lesbians may be prone to exaggerate their childhood gender atypicality, in line with stereotypes of lesbians as masculine. Furthermore, the overwhelming majority of tomboys become heterosexual adults, including tomboys with extreme scores on measures of gender nonconformity. Tomboyism does not provide an adequate explanation for the development of sexual orientation in most women.

Personality Studies of the Inversion Hypothesis

Inversion theorists believed that lesbians have masculine personalities including such qualities as assertiveness and independence that are traditionally associated with men. In contrast, heterosexual women were thought to have feminine personal attributes. Fourteen published studies have compared lesbian and heterosexual women using standardized M-F measures. A recent meta-analysis found no significant differences between lesbian and heterosexual women on measures of psychological femininity or androgyny (reported in Peplau, et al., 1999). On average, however, lesbians did score somewhat higher than heterosexual women on measures of masculinity. Lesbians rated themselves higher on such attributes as self-confidence and assertiveness, although the size of this difference ($d = .39$) was modest. In another comparative study of lesbian and heterosexual women, Lippa and Arad (1997) used self-ratings of masculinity and femininity but also developed additional measures of gender typicality based on a person's interest in gender-associated occupations (e.g., physician, elementary school teacher), activities (e.g., cooking, car repair), and hobbies (e.g., dancing, home electronics). They found that women's sexual attraction to women was not related to self-rated masculinity, femininity, or gender atypicality of interests in occupations, activities or hobbies.

In summary, there is little evidence that masculinity provides the key to understanding women's sexual orientation. Cross-cultural and historical research helps to explain why the inversion paradigm is of such limited usefulness. In broad perspective, the association between sexual orientation and attributes associated with masculinity or femininity varies by culture and setting. In modern-day Sumatra, tombois are likely to rate themselves high on masculine qualities, as might the American "butch" lesbians studied in the 1950s. Their female partners would likely score high on femininity. The Mojave Indian girl who chose to live her life as a male and the Kaska Indian girl whose parents selected her to be their "son" may well have been youthful tomboys who enjoyed masculine pursuits. In contrast, the personal attributes of women involved in long-term same-sex romantic friendships, of girls involved in passionate adolescent friendships, and of young women who escaped marital oppression by joining a silk factory sisterhood were probably indistinguishable from their female peers. Gender atypicality does not provide a general framework for understanding the varied forms of intimacy between women across time and place. Indeed, those who persist in pursuing inversion-based hypotheses about women's sexual orientation would benefit from specifying with some precision the specific population of women for whom their model may be relevant.

An Emerging New Paradigm

Inversion theorists focus on how lesbians differ from heterosexual women. In contrast, an emerging new paradigm asks a fundamentally different question: what is the nature of women's sexuality and how does it influence their intimate relationships? Core elements of the new paradigm, to be discussed below, are a recognition of the plasticity of female sexuality and the centrality of pair bonds to women's sexual orientation (Peplau & Garnets, 2000). The new paradigm crosses interdisciplinary boundaries, drawing on cross-cultural and historical research as well as advances in

such diverse areas as evolutionary psychology, attachment theory, and neuroscience.

Erotic Plasticity in Women

Scholars from many disciplines have long noted that women's sexuality tends to be fluid, malleable, and capable of change over time. In a recent review, Roy Baumeister (2000) provided persuasive evidence that erotic plasticity is more characteristic of women than men. Baumeister defined plasticity as the degree to which a person's sex drive can be shaped and altered by cultural, social and situational pressures. Baumeister considered three predictions concerning the fluidity of female sexuality.

First, some degree of erotic plasticity would make it possible for a woman to have nonexclusive attractions toward both women and men. In addition, plasticity would permit a woman to change aspects of her sexuality or sexual orientation across the lifespan. There is considerable evidence that such within-person changes do occur. For example, we have already seen that American women who are not exclusively heterosexual are more likely to be bisexual rather than exclusively homosexual in their attractions and relationships. At least some women describe major changes in their intimate relationships, for example, leaving a long-term heterosexual marriage for a relationship with a woman or vice versa. Similar patterns have been described in other cultures. When cultural institutions permit married women to maintain a long-term loving relationship with another woman, such romantic and sexual friendships are common.

The potential erotic plasticity of women does not mean that most women will actually exhibit change over time. At a young age, many women adopt patterns of intimate relating that are stable across their lifetime. To the extent that the social influences acting on a woman remain constant, there is little reason to expect change based on the sexual plasticity hypothesis. The key point is that at least some women are capable of variation and

change, and this plasticity appears to be more characteristic of women than men.

A second prediction is that if women's sexuality is plastic and malleable, then it can be shaped by a range of social and situational influences. Baumeister documented that in America such factors as education, religion, and acculturation have greater impact on aspects of women's sexuality than on men's. Education provides a striking illustration. Completing college doubles the likelihood that a man identifies as gay or bisexual, but is associated with a 900 percent increase in the percentage of women identifying as lesbian/bisexual (from .4% of women high school graduates to 3.6% of college graduates; Laumann, et al., 1994, p. 305). Also consistent with the plasticity hypothesis is evidence that active involvement in the 1970s feminist movement led some women to turn away from sexual relations with men and to establish relationships with women (e.g., Kitzinger, 1987). Pearlman (1987) explained that "many of the new, previously heterosexual, radical lesbians had based their choice as much on politics as on sexual interest in other women" (p. 318).

A third prediction concerns attitude-behavior consistency: "if women's behavior is more malleable by situational forces than men's, then women will be more likely than men to do things contrary to their general attitudes" (Baumeister, 2000, p. 359). Concerning sexual orientation, the plasticity hypothesis would predict that sexual desires, behavior, and identity are not invariably interconnected. To be sure, many individuals do report complete consistency: a woman might identify as lesbian, be attracted exclusively to women, and have sex with women partners only. But as we saw earlier, exceptions to this pattern of consistency are common. A woman may have strong attractions to both men and women but not identify as bisexual. A heterosexual woman may employ homoerotic fantasies when having sex with her male partner. Inconsistencies such as these are frequently noted in the

research literature (e.g., Diamond & Savin-Williams, 2000; Rothblum, 2000)

Research on the evolution of female sexuality provides further support for the erotic plasticity hypothesis. In his landmark book on the evolution of human sexuality, Donald Symons (1979, p. 311) noted that "female sexuality seems to be generally less rigidly channeled than male sexuality." Based on evolutionary theory, Symons argued that male and female sexuality are fundamentally different and, further, that the relationships of homosexuals, who do not need to "compromise" with a partner of the other sex, should provide important insights into male and female sexuality. Thus, Symons rejected the inversion notion that lesbians are similar to heterosexual men, and instead argued for basic commonalities among all women. He supported this assertion by referring to data showing that regardless of sexual orientation, women showed less interest than men in visual sexual stimuli and pornography, in having a variety of sexual partners, in casual sex, and in the importance of a partner's physical appearance. Recent research has repeatedly confirmed this idea that patterns of sexual thoughts and behaviors are strongly linked to gender but not to sexual orientation. As one example, a study by Bailey and colleagues (1994) compared homosexual and heterosexual men and women on seven aspects of "mating psychology" including an interest in uncommitted sex, frequency of casual sex, and the importance of the partner's physical attractiveness, youth or status. Male-female differences were found on all 7 measures. In contrast, lesbian and heterosexual women were indistinguishable on most measures.

Whereas the prenatal hormone theory of sexual orientation has been informed by studies of mounting and lordosis in laboratory rats, evolutionary analyses have often drawn on studies of our closest relatives, non-human primates. Research by Kim Wallen (1995) and others on female sexuality among primates is consistent with a view of erotic plasticity. A

striking difference between primates and other animals is the decoupling of female hormones and sexual behavior. Although female sexual motivation or desire does vary to some extent with hormonal fluctuations during the primate ovarian cycle, actual sexual behavior does not. Female primates are able to become sexually aroused and to engage in sex throughout their cycle. One consequence is that "sexual behavior in primates can, and does, occur in a wide variety of contexts, most of which have little to do with reproduction" (Wallen, 1995, p. 63). Perhaps the most striking examples come from the lives of bonobo chimps, a species of sexual enthusiasts who frequently engage in sex with both male and female partners to avoid conflict, reduce tension, make peace, or show solidarity (de Waal, 1995).

Also relevant is evidence that female primate sexual behavior varies as a function of the social context. For example, when rhesus monkeys are housed in male-female pairs, mating occurs throughout the female's cycle. In contrast, when rhesus monkeys live in larger social groups, mating is generally restricted to the female's period of fertility. Wallen (1995) explained this shift as resulting from the social structure and interaction patterns that emerge in larger groups.

Wallen proposed that a similar distinction between sexual desire versus sexual capacity or behavior is relevant to women's sexuality. Women's reports of sexual desire change markedly during the menstrual cycle (see review by Regan & Berscheid, 1999). In contrast, women's sexual behavior is not strongly determined by their hormone levels or sexual interest. For example, a study found that women were substantially more likely to have sexual intercourse on Saturdays and Sundays rather than during the rest of the week, indicating the impact of work schedules rather than hormones (Palmer, Udry, & Morris, 1982). More generally, people engage in sexual activities for a wide variety of reasons that may have little to do with sexual desire (Regan & Berscheid, 1999). This potential disjunction between

hormonally-based sexual desire and actual sexual behavior may be more characteristic of women than men. A review of research on adolescents and adults concluded that "hormone influences on [sexual] behavior are highly predictable in men but variable in women" (Nottelmann, Inoff-Germain, Susman, & Chrousos, 1990, p. 94).

In summary, the concept of erotic plasticity is the cornerstone of a new paradigm for understanding women's sexual orientation. Women's sexuality is not tightly scripted by genetic or hormonal influences. Rather, it is responsive throughout the lifespan to a wide variety of cognitive, social and environmental influences. The capacity for women to relate sexually to other women is not a biological anomaly, but rather part of a much broader pattern in which sexual behavior serves diverse social and emotional functions among both primates and humans.

Sexual Orientation or Relationship Orientation? The Importance of Pair Bonds

A new analytic paradigm for women's sexual orientation must deal directly with the importance that women so often give to love and intimate relationships as a context for sexuality. Gender differences in sexuality have been widely documented (e.g., Sprecher & McKinney, 1993) and appear to apply regardless of sexual orientation. We begin by briefly summarizing research showing that in general women have a relational or partner-centered orientation to sexuality and men a recreational or body-centered orientation (e.g., Baldwin & Baldwin, 1997; DeLamater, 1987). It is likely that these general patterns apply to gay men, lesbians and bisexuals as well as heterosexuals, although available research on homosexuals is limited.

On average, women hold less permissive attitudes than men do toward casual sex without a committed relationship, and the size of this sex difference is fairly large (Oliver & Hyde, 1993). We do not have comparable data for lesbians and gay men, but the greater availability of opportunities

for casual sex in gay male communities (e.g., bath houses) and reports of greater numbers of sex partners among gay men than lesbians suggest that gay men have more permissive attitudes toward casual sex than do lesbians.

DeLamater (1987) reviewed research indicating that adolescent women and men develop different beliefs about the types of persons who are appropriate sex partners and the time when sexual expression is acceptable. Women tend to have a relational orientation, in which sexuality is seen as an integral part of an ongoing, emotional relationship. Men are more likely to have a recreational orientation toward sex, in which most women are potential sex partners and no particular emotional relationship is needed as a prerequisite for sex. Similar patterns may also characterize lesbians and gay men. In an analysis of lesbian and gay novels, Rose (1996) found that the most common story line for women was a "romance script" emphasizing emotional intimacy, progress toward commitment, and sexual attraction rather than sexual activity. In contrast, the most common story line for gay men was an "adventure script" emphasizing the physical attractiveness of the partner, surmounting obstacles to love, and ambivalence about emotional intimacy. Another study asked lesbians and gay men to describe an actual recent first date (Klinkenberg & Rose, 1994). Lesbians dating scripts were more intimacy focused and less sexually oriented than those of gay men.

In a study asking young heterosexual adults to define sexual desire, Regan and Berscheid (1996) concluded that men were more likely to "sexualize" and women to "romanticize" the experience of sexual desire. One young man equated sexual desire with uninhibited sexual intercourse; a young woman explained that it was "a longing to be emotionally intimate and to express love to another person" (Regan & Berscheid, 1999, p. 75). Similarly, based on their study of bisexuals, Weinberg, Williams and Pryor (1994, p.7) concluded: "For men it was easier to have sex with other men than to fall in love with them. For women it was easier to fall in love with other women

than to have sex with them." Men and women also differ in their reasons for having sex. In samples of married and dating heterosexuals, women said they desired intimacy from their sexual encounter; they viewed the goal of sex as expressing affection to another person in a committed relationship (Hatfield, et al., 1989). In contrast men wanted sexual variety and partner initiative; they emphasized physical gratification as the goal of sex. In a study of lesbians and gay men, similar differences were found (Leigh, 1989).

In a review of research on gender differences in sexual fantasies, Ellis and Symons (1990) found that women's fantasies were more likely to include a familiar partner, to include affection and commitment, and to describe the setting for the sexual encounter. In contrast, men's fantasies were more likely to involve strangers, anonymous partners, or multiple partners and to focus on specific sex acts and/or sexual organs.

In summary, for many women, sexuality is closely linked to intimate relationships. An important goal of sex is intimacy; the best context for pleasurable sex is an ongoing relationship. Although the cross-cultural and historical record is far from complete, this focus on love and intimacy seems to be quite widespread. An African woman commented on the emotional quality of her special *motsoalle* friendship: "When a man chooses you for a wife, it's because he wants to share the blankets with you.... When a woman loves another woman, ... she can love her with a whole heart" (Nthunya, 1997, p. 69). One of the Victorian "sexual inverts" interviewed by Havelock Ellis (1928) rejected explicit sex in her relations with women, considering that it would have been a "sacrilege." She prided herself on suppressing sexual urges toward a loved partner.

One implication of this research is that the very concept of "sexual orientation" may be misguided. The phenomena of women's intimate relationships with women are only partly about sexuality and often primarily

about love, companionship and mutual assistance. The same might be said of women's relationships with men. To be sure, sex and erotic pleasure can be an important ingredient in intimate relationships, but sex is not necessarily their defining attribute. Nor, as feminist scholars have long argued, is sexual behavior necessarily the essential element in a woman's sexual orientation (e.g., Stearns, 1995). Researchers' tendency to accord greater weight to sex acts than to enduring relationships may be an unintended legacy of male-centered thinking. Indeed, if we were to conceptualize sexual orientation on the basis of women's experiences, we might well rename it "relationship orientation." An adequate understanding of women's sexual orientation will require a shift away from focusing on sexual behavior toward studying the formation of close pair bonds.

New Perspectives from Attachment Theory and Neuroscience

Recent work on adult attachment provides further insights into women's relationships with women. There is now considerable evidence that our most intimate adult relationships involve processes of attachment similar, in many respects, to those that develop between infants and their caretakers. In a new analysis of attachment in human mating, Hazan and Diamond (2000) argued that the attachment system, which initially evolved to insure infant survival, was later co-opted to keep adult mates together over time and so promote the survival of their offspring. In their analysis, the development of romantic relationships is seen as involving two distinct processes -- infatuation and attachment. Initially, a process of infatuation or passionate love, often fueled by sexual desire, brings two people together. Infatuation leads to such behaviors as physical intimacy and spending time together that eventually produce attachment. Hazan and Diamond rejected the idea that individuals have specific, gender-based images of a suitable partner and suggested instead that the "search image for human mating is ...

inherently flexible" (p. 195). Just as infants can form attachments to a wide range of potential caretakers, so too adults can become infatuated and bond with a range of partners. Proximity and familiarity typically constrain the pool of available partners, probably to an even greater extent in our evolutionary past than today. Within the pool of available partners, infatuation is triggered by finding someone who is responsive, competent and indicates that one's budding liking is reciprocated.

A somewhat similar analysis is provided by Helen Fisher (1998), who emphasized the possible neuroendocrine underpinnings for adult romantic relationships. Fisher distinguished among three major emotional systems that guide mammalian mating. The sex drive, associated primarily with estrogen and androgens, motivates individuals to seek sex with other members of their species but does not focus on a particular partner. Attraction, also called infatuation or passionate love in humans, is characterized by focused attention on a specific partner, increased energy and, in humans, with feelings of exhilaration and preoccupation. Research links this system with the catecholamines (e.g., dopamine and norepinephrine) and also with serotonin and phenylethylamine. The third system is attachment, characterized by close social contact and, in humans, by feelings of calm, comfort and emotional bonding. There is considerable evidence that attachment is associated with oxytocin and vasopressin. Fisher proposed that in the course of human evolution, the neural correlates of sexual desire, attraction and attachment became increasingly independent of one another. The result is that "mating flexibility is a hallmark of Homo sapiens." (p. 41) The relative independence of sexual desire, passionate love and attachment helps to make sense of relationships that lack one or more of these elements. Fisher (1998) noted that in arranged marriages, heterosexual partners develop attachment bonds that are not necessarily linked to infatuation or even sexual desire. Similarly, the 19th century women in

same-sex Boston Marriages created enduring attachment bonds that may have included initial infatuation but were not necessarily based on sexual desire.

This perspective also helps to explain variations in the typical sequencing of sexual desire, infatuation/attraction, and attachment in the development of romantic relationships. A common heterosexual sequence may be for initial sexual desire to motivate the search for a partner leading to infatuation and eventually to attachment. But the independence of these systems makes it possible for other sequences to occur. Consider the passionate same-sex friendships described among adolescent girls (e.g., Diamond, 2000a). Initially, these relationships are not usually sparked by sexual desire but rather by platonic infatuation. From an attachment perspective, this sequence seems quite plausible. During adolescence, teens shift their attachments from parents to peers, so this is a time of relational instability that may motivate a search for an attachment figure. Passionate friendships are particularly likely to develop in single-sex settings that constrain the pool of available partners or in situations where close female friendships are institutionally sanctioned. Further, social transitions occurring in adolescence including the demands of school and the loneliness of living away from home are often stressful. There is growing evidence that females are more likely than males to respond to stress by affiliating with other, specifically with other females (Taylor, et al., 2000). Finally, if the process of infatuation is a legacy of the infant's intense fascination with a caretaker, then there is no reason to assume that a partner's gender is relevant to triggering infatuation or establishing an attachment bond.

Although sexual desire, infatuation/attraction, and attachment are distinct processes, they are not entirely unrelated. Neuroscience offers hints about their possible interconnections. Although data are still

incomplete and rely more heavily on studies of nonhuman mammals than of people, oxytocin seems to play a uniquely important role in women's lives (Panksepp, 1998). Research suggests that oxytocin influences a range of behaviors in women. Oxytocin is implicated in maternal behavior and caregiving. It has been linked to affiliation and may be important to adult pair bonds (Carter, 1998). In females, environmental stress can increase oxytocin levels which in turn lead to nurturing behavior and increased tendencies toward affiliation, perhaps especially with females (Taylor, et al., 2000). Touch, massage and other types of positive physical contact can trigger the release of oxytocin (e.g., Uvnas-Moberg, 1998). Finally, oxytocin levels increase with sexual excitement and orgasm. In short, oxytocin may provide one mechanism that links attachment, caregiving and sexuality in women.

Neuroendocrine differences between men and women may contribute to women's greater relational orientation toward sexuality (Andersen, Cyranowski & Aarestad, 2000; Panksepp, 1998). Females have more extensive oxytocin circuits in their brain than do males. Whereas androgens antagonize the effects of oxytocin, estrogen enhances them, which may be one reason why women and men differ in the effects of oxytocin. Further, in females, the neurocircuitries for sexuality and nurturance are in closer proximity. For males, the neurocircuitry for sexuality is more closely aligned with the circuitry for aggression, and the hormones that promote male sexuality also increase certain types of aggression (Panksepp, 1998.)

Based on available research, we can speculate that oxytocin may help to explain a puzzling aspect of women's same-sex relationships -- how an emotionally intense friendship can kindle sexual desire. Some women report the transformation of a close platonic female friendship into a romantic and sexual relationship. For example, in a study of sexual-minority young

adults, 70% of women reported that their first sexual encounter with a woman occurred within an established friendship (Diamond & Savin-Williams (2000)). The comparable figure for young men was only 5%. Central to understanding this phenomenon may be the fact that in a woman's closest female friendship, attachment and caregiving behaviors are common and often considered socially acceptable. These may include physical touching, spending time together, nurturant acts, and supportive conversation. One possibility is that these behaviors activate oxytocin circuits and so foster feelings of sexual arousal.

In the future, our understanding of women's romantic and sexual relationships will benefit from advances in knowledge about attachment processes and the neuroendocrine underpinnings of social behavior.

Gender and Sexual Orientation

A hundred years ago, inversion theorists suggested that the key to understanding women's sexual orientation would be to identify differences between the masculine features of lesbian women and the feminine features of heterosexual women. Today, the cumulative research record clearly points in a different direction, documenting that regardless of sexual orientation, there are important commonalities among women and differences between women and men. Among these commonalities are the potential plasticity of women's sexuality and the emphasis that women place on close relationships as a context for sexuality. Some theorists will emphasize the social origins of these differences including the distinctive socialization of male and female children, the location of men and women in the power structures of society, and the social roles deemed appropriate for members of each sex (e.g., Hyde & Durik, 2000). Other researchers will look in more biologically-oriented directions. Here, similarities in research findings from women and from other mammals concerning such phenomena as female sexual plasticity

(Baumeister, 2000) and the neuroendocrine underpinnings of nurturance, attachment and sexuality (Panksepp, 1998) are intriguing. These cross-species similarities raise the possibility of similar evolutionary origins linked to differences in female and male roles in mammalian reproduction and care of offspring. However, whatever one's disciplinary loyalties, it is now evident that we will need to construct separate explanations for the sexual orientation of women and men reflecting their differing life experiences and biological characteristics.

Biological Specificity versus Flexibility

Perhaps the most fundamental question about women's sexual orientation has yet to be addressed in this paper, namely why some women form intimate relationships with women and others with men. What factors determine the sex of one's partner? Currently there is no adequate answer to this question. The general public often frames this question in terms of the influence of biology versus the environment, nature versus nurture. A more fruitful question, however, is whether the biological determinants of women's sex-of-partner choice are specific or flexible.

Biological Specificity

From an evolutionary perspective, it might seem beneficial for heterosexuality to be genetically determined, so that women would inherently be attracted to males and thus insure the continuation of their genes. If heterosexual choice is the basic human biological program, then women who have intimate relationships with women are atypical for the human species. The inversion hypothesis was an influential attempt to identify the relevant differences between heterosexual and lesbian women. As we have seen, however, efforts to link women's sex-of-partner choice to atypically masculinized physiology, hormone levels, and prenatal hormones have not been successful.

Currently, the most promising research evidence that women's sexual orientation may be biologically influenced comes from genetic studies (e.g., Bailey & Pillard, 1995). For example, lesbians are more likely than heterosexual women to report having homosexual relatives. Studies of twins reared together find greater concordance (similarity) between the sexual orientation of monozygotic ("identical") twins than between dizygotic twins or adoptive sisters. Although these findings are consistent with a genetic interpretation, critics emphasize possible limitations of the research (e.g., McGuire, 1995).

A first challenge for those studying genetic influences on women's sexual orientation will be to demonstrate this effect more conclusively, for instance with studies of twins reared apart or the identification of genetic markers for women's sexual orientation. If these efforts are successful, a second challenge will be to identify the mechanisms involved. Where in the processes leading to relationship formation do differences occur between women who bond with men versus women who bond with women? Do genetic influences come into play at the point of sexual desire or at the point of attraction/infatuation? Does sex-of-partner preference operate differently in relationships that are initiated due to sexual attraction versus those that begin as platonic friendships and later become sexual? What anatomical, psychological or social features of a male versus female partner are relevant to sex-of-partner choice? There are many important but unanswered questions.

Biological Flexibility

An alternative possibility is that human evolution has not produced a built-in sex-of-partner preference in women. Perhaps, as suggested by researchers studying bisexuals, "bisexuality is a universal human potential" and social experiences narrow our choice of intimate partners (Weinberg, et al., 1994, p. 285). Another possibility, increasingly popular, is that

flexibility in partner choice is uniquely characteristic of women. Writing from the perspective of evolutionary psychology, Mealey (2000, p. 343) observed that "biological inputs leading to homosexual orientation seem to be stronger in men than in women." In his review of erotic plasticity, Baumeister (2000, p. 356) suggested that "the currently available data offer the best guess that male homosexuality is more strongly linked to innate or genetic determinants while female homosexuality remains more subject to personal choice and social influence."

To the extent that erotic plasticity is a basic feature of women's "nature," then explanations for the phenomena described by the concept of sexual orientation will not start with the assumption of genetic, anatomical or other biological differences between heterosexual, bisexual or lesbian women. Rather, investigations will assume biological commonality among women and look instead to cognitive, psychological, and social circumstances that shape and change women's choice of partners across the lifespan. Such research will recognize that women, like their primate ancestors, have sex and form relationships for many purposes, and that sex-of-partner preferences may vary depending on the circumstances. It is unlikely that a single developmental trajectory will consistently lead women to form relationships with women versus men. The forces leading oppressed Chinese women to form same-sex relationships with fellow silk factory women were surely different from those that led 19th century American women college professors to share their adult lives with a female partner. So, too, were the circumstances leading American Indian women to live socially as men and to marry women. The prospect of charting the multiple pathways leading women to relationships with same-sex and other-sex partners is challenging and will require the talents of researchers from many disciplines.

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