

Does perceiver sex or target sex determine biases in sexual and commitment intent  
perception? A critical investigation with a homosexual sample

By

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### Abstract

Error management theory (EMT) posits that when there are asymmetrical costs of false-positive and false-negative errors over evolutionary history, selection will favor psychological mechanisms biased toward less costly errors. In the mating domain, EMT explains the fact that men consistently overperceive women's sexual intent (SI), while women consistently underestimate men's commitment (CI). From a sexual selection perspective, underestimating women's SI (false-negative) is more costly for men than overestimating (false-positive); whereas overestimating a man's CI (false-positive) would have been more costly for women than underestimating (false-negative). Though the pattern of sex differences in SI and CI perception has been replicated many times, it is unknown whether sex of the perceiver or sex of the target mate (or perhaps even sexual orientation) determines the type of error-minimizing strategy employed (over- or underestimation). Collecting data from homosexual and heterosexual samples allowed us to examine these previously untested distinctions. Participants rated the degree to which various behaviors indicated one's own, or a potential mate's, SI and CI. Results indicated that heterosexual women and lesbians perceived SI and CI similarly, whereas heterosexual and gay men did not. We conclude that homosexual mating strategy is complex: it is neither a simple continuation of heterosexual evolved mating psychology nor a gender-role reversal.

## Introduction

Within the past fifty years, researchers have begun to examine sex differences in sexual and commitment intent perception and how they relate to a variety of social issues from sexual assault and harassment to building romantic relationships (e.g. Berkowitz, 1992; Farris, Treat, Viken, & McFall, 2008; Lindgren, Jacques-Tiura, & Westgate, 2012), yet, there remains a definitive hole in the literature regarding same-sex intent perception. The lack of research including both heterosexual and homosexual participants prevents us from isolating whether it is the sex of the perceiver or the sex of the target mate that determines the biases evident in intent perception. Identifying these differences is important as it will help to indicate the degree to which men and women have evolved distinctive mating psychologies. This investigation contributes to the literature by employing previously tested sexual perception research methods using both heterosexual and homosexual participants. We hypothesize that mating psychology has evolved based on the sex of the initiator and not the target, so that biological sex will predict sexual intent and commitment intent perception errors regardless of sexual orientation.

### **A History of Sexual Misperception Research**

Empirical sexual perception research began in the early 1980s when Antonia Abbey began to study whether men overperceive women's friendly cues as sexual interest. In her original investigation, Abbey (1982) paired unacquainted college-aged men and women and instructed them to engage in a conversation about school while another male-female pair watched them through a one-way mirror. The participants estimated their conversation partner's sexual attraction to them, as well as how much their own behaviors indicated their level of sexual interest. The participants who

observed also rated the intentions and level of attraction of the participants who conversed. Both the male observer and male conversation partner rated the female conversation partner as higher in sexual interest, flirtatiousness, and attractiveness than either the female observers rated her or the female conversation partner rated herself. Since this pioneering result, men's heightened perception of women's sexual interest has been repeatedly documented in correlational studies using self-report measures, as well as a variety of laboratory experimental designs.

Similar to Abbey's original study design, in the majority of laboratory investigations third-party perceivers rate the sexual interest of target men and women to determine sex differences. For instance, when male and female college students watched short video clips of student-professor interactions in which the level of professor harassment and student acceptance varied, men rated the female student and female professor as more sexy, promiscuous, and seductive than women rated them (Johnson, Stockdale & Saal, 1991). A similar pattern of results emerged when college students rated photographs of male-female dyads studying together that depicted varying levels of interpersonal distance, eye contact, and touch (Abbey & Melby, 1986). Across conditions, men rated female targets as more sexy, promiscuous, and seductive than women did, and were also more likely to report that the female target was sexually interested in the male target. This pattern of male overperception was replicated in another study using written description in which college students read vignettes and rated the sexual interest of men and women during fictional interactions such as attending a baseball game or cocktail party together (Abbey & Harnish, 1995).

In addition to laboratory investigations, self-report studies have also indicated that men tend to naturally overperceive women's friendly cues. Female college students who were asked to recall every instance in their lifetime when men misperceived their sexual interest were more likely to report intent misperceptions and were more likely to be insulted or upset by these occurrences than were male college students (Abbey, 1987). Male students who were given the same instructions were less likely to report sexual intent misperception and were more likely to report that they enjoyed or were indifferent to female overperception of sexual interest. Haselton (2003) came to similar conclusions after asking college students to recall their misperception experiences within the past year alone. While men reported that women were equally likely to underperceive and overperceive their interest, women recounted that men were more likely to overperceive interest than to underperceive it. Furthermore, sex remained a significant predictor of false alarm rates even after controlling for additional factors, such as mate value, sociosexuality, and relationship experience. In a more recent self-report procedure, opposite-sex friend pairs indicated their sexual and romantic interest in each other as well as the degree to which they believed their friend had sexual and romantic interest in them (Koenig, Kirkpatrick & Ketelaar, 2007). Yet again, men overperceived and women underperceived sexual interest.

Real-world occurrences also provide an interesting glimpse into the implications of male sexual overperception. For example, Safeway supermarket chain made national news in 1998 when a group of female employees filed complaints that the company's newly reinstated "service-with-a-smile" policy, which required all employees to smile, make eye contact with, and call customers by name, was encouraging sexual harassment

(Haselton, 2007). The women reported that they were touched, grabbed, asked about their marital status, propositioned for dates, and even followed to their cars by interested men as a result of the new policy (Shackelford & Goetz, 2012). In light of the lawsuit, news outlets across the country began to interview women in customer service positions and uncovered the anecdotal consistency with which male customers misperceived friendliness, attentiveness, and professionalism as sexual interest (Mendell & Bigness, 1998). Female clerks recounted a wide variety of negative experiences such as being physically pulled into a dressing room by a male customer who misinterpreted her attentiveness to feeling so threatened by the unwavering advances of a patron that she called the police.

### **Previous Explanations of Misperception**

Researchers have developed several hypotheses to attempt to explain men's consistent overperception of women's sexual intent; however these explanations are unable to incorporate more recently identified nuances of sexual misperception. For example, Abbey's (1982) "general oversexualization hypothesis" proposed that because men are socialized to be sexual (whereas women are socialized to be demure) they overinterpret sexuality across contexts. But, if it is true that men are socialized to be overtly sexual whereas women are socialized to be sexually restricted—as the oversexualization hypothesis states—then it would follow that men might be less likely to overperceive women's sexual interest as they would be familiar with the idea that women tend not to be sexually interested; this is obviously not supported by empirical evidence (e.g., Haselton & Buss, 2000). Another variation proposed by Abbey (1991), the "media hypothesis" attributes men's overperception bias to their exposure to media portrayals of

women who, despite appearing initially modest or hesitant, eventually become overcome with sexual desire for their male pursuer. However, more recent data challenges the media hypothesis and the general oversexualization hypothesis's shared assumption that societal influences cause men to overperceive the sexual intent of all women. In particular, Haselton and Buss (2000) found that men do not overperceive the sexual intent of their sisters. Another antiquated explanation of sexual misperception, the "default model hypothesis" suggests that men's overestimation of female sexual interest is merely a function of men assuming that women's levels of sexual desire match their own (Shotland & Craig, 1988). However, experiments using same-sex third party perceivers revealed that men's reports of their own sexual intent were significantly lower than their reports of other men's sexual intent (Haselton & Buss, 2000). This is completely at odds with the default model hypothesis, which predicts that men should have similar sexual intent ratings for themselves, other men, and women. These hypotheses have serious limitations: they were each offered post hoc, merely attempt to explain why it is that men overperceive women's sexual interest without generating any novel predictions, and do not account for instances when men do not misperceive sexual intent. An alternative conceptualization of sexual misperception was needed that was able to incorporate these nuanced findings.

### **Introduction of Error Management Theory (EMT)**

Error management theory (EMT) proposes that biases that had recurrent survival and reproductive advantages in our evolutionary past could have evolved despite increasing the likelihood of cognitive errors (Haselton, Buss, & DeKay, 1998). While the ideal cognitive system would seemingly ensure 100% accuracy, this is impossible given



that many choices must be made under uncertain conditions. The classic illustration of the evolutionary benefits of an error minimizing bias is the intuitive human response to seeing a long, cylindrical, dark object in the tall grass. While it is equally feasible that the unknown object is a poisonous snake or a harmless stick, the automatic human response is to be cautious and avoid the potentially deadly object. This response pattern can be explained by the fact that these two errors are not equally costly; failing to identify a poisonous reptile would have much more serious consequences than misidentifying a stick. In this example, a false positive (Type I error)—acting as though a stick were a snake—introduces the inconvenience of having to actively avoid the object, but the cost of this is low. However, a false negative (Type II error)—acting as though a snake is only a harmless stick—might result in being bitten. While the likelihood that the object is a poisonous reptile is very low compared to the probability that it is a stick, the asymmetrical costs of Type I and Type II errors have made it beneficial for humans to bias their actions towards committing the least costly error. While this tendency might lead to more frequent errors overall (after all, most objects in the grass are actually sticks and not snakes), the total cost is lower.

EMT proposes that when the costs to reproductive success of false positive and false negative errors were recurrently unequal over evolutionary time, natural selection favors systematic biases toward committing errors that are less costly. Optimal reasoning, according to EMT, is defined as the ability to minimize overall costs or maximize overall benefits even if these adaptive biases produce more frequent errors (Galperin, & Haselton, 2012).

**EMT: A New Explanation of Misperception**

EMT is not only able to explain men's general tendency toward sexual overperception, but also generates new predictions—such as women's underestimation of men's commitment—that are consistent with our established understanding of evolved sex differentiated mating strategy. An individual's total reproductive effort is the sum of the time the individual spends searching for and securing mates and the time, energy, and opportunity costs associated with raising children (Geary, 2000). Any type of trade-off that an individual makes that benefits the child at the cost of the parent investing in other components of fitness, such as producing other offspring, is considered parental investment (Trivers, 1972). Despite men and women's shared interest in ensuring the survival of their offspring, the biological differences between the sexes dictate that women have a larger obligatory parental investment. For example, while the minimum cost of reproduction for the human male is simply the genetic material and brief time it takes to copulate, for a woman, the cost of pregnancy is quite high; she must endure nine months of gestation and months or years of lactation, as well as forgoing the opportunity to reproduce with a potentially more desirable partner in the near future. Because the opportunity cost of reproduction is so high for women, from an evolutionary perspective, it is adaptive for them to have high standards when choosing a mate.

Trivers (1972) argued that the sex with a greater minimum obligatory parental investment, usually the female, would evolve to be more selective when choosing a mate as reproduction has a higher opportunity cost. Alternately, the sex with lower obligatory investment, generally the male, would evolve to be highly competitive for access to members of the higher investing sex, but would be less choosy when selecting mates.

Because each copulation with a new partner has the potential to increase the number of children a man is able to produce in his lifetime, there are considerable reproductive advantages for men spending substantial effort seeking as many mateships as possible (Geary, 2000). However, as reproductive effort is not unlimited, increasing the amount of energy devoted to securing mates, limits the amount of energy that can be allocated towards parenting (Apicella & Marlowe, 2007).

Although investing in offspring can help to ensure their survival (Zeifman & Hazan, 1997), there are also risks for men who choose to allocate their reproductive effort towards parenting instead of seeking more mating opportunities. In particular, there is the danger that a man will unknowingly invest in a child that is not biologically related to him (Buss, 2002). Because of internal female fertilization, men in ancestral environments always had some degree of paternity uncertainty. Cuckolded men who invest in a child that is not theirs not only inadvertently promote a competitor's genes, but, more importantly, they miss out on alternative mating opportunities (Buss, 2002). Because of the associated risks, from an evolutionary perspective, it is often advantageous for men to mate indiscriminately without investing their limited resources in parenting. Due to biological constraints such as ovulation, gestation time, and amenorrhea while lactating, women are relatively limited in the total number of children they can produce in a lifetime and thus do not necessarily increase their reproductive success by seeking more sexual partners. Instead, for women, selecting a high quality mate who will invest in her children and help to ensure their survival is more likely to increase her reproductive fitness. Alternately, the more mateships a man is able to secure, the more likely he is to

pass on his genes. Because of this dynamic, males and females in species like humans have evolved differing reproductive priorities and therefore divergent mating strategies.

EMT explains sexual misperception then, by examining the recurring cost asymmetries of overestimating and underestimating commitment intent (CI) and sexual intent (SI) for men and women in the environment of evolutionary adaptedness. For ancestral men, wasted courtship effort would have been far less costly to reproductive success than missing a mating opportunity. To minimize the likelihood of failing to recognize a woman's interest, EMT proposes that men have evolved biases to overperceive female SI. Alternately, for ancestral women, an underestimation of a potential mate's CI would have had minimal costs, and may even have been beneficial by prompting a prospective mate to demonstrate his commitment (Buss, 1994). Conversely, an overestimation of a man's willingness to invest could have resulted in a pregnancy without paternal investment (Haselton & Buss, 2000). A woman whose partner was not committed to sharing the burden of raising a child to viability would have been forced into the costly and potentially even fatal task of child-rearing alone (Schmitt, Shackelford, & Buss, 2001), and might also have suffered reputational damage and a decrease in her mate value (Buss, 1994). These recurring sex-differentiated asymmetrical costs help to explain why it is that men are more likely to overperceive SI, whereas women are more likely to underperceive CI.

Haselton and Buss (2000) incorporated this perspective in their pioneering introduction of EMT and sexual misperception. They asked participants to rate their own SI and CI given that they engaged in each of 15 different behaviors (e.g., going on a date with or complimenting a member of the opposite sex). Participants also completed ratings

of how much SI and CI other same-sex and opposite sex participants would have if they engaged in those behaviors. While previous research relied on self-report measures to identify the contrast between men and women's perceptions of SI, Haselton and Buss's use of third-party same-sex observers revealed some previously unexamined differences. One such previously undocumented finding was that men's reports of their own SI were significantly lower than their reports of the SI of other men, whereas their reports of their own CI were significantly higher than their estimations of other men's. Within the context of EMT, this difference makes sense as men might try to appear to be more commitment-oriented and therefore a more desirable mate by suggesting that other men are interested solely in short term mating. A similar finding is that women's self-reported SI was much lower than their estimations of other women's SI. A possible explanation is that women's self-reports of SI might be artificially low because they recognize that signaling sexual promiscuity can cause reputational damage, whereas female third-party perceivers might overestimate other women's SI as a way to derogate potential competitors (Lees, 1989). Because of these differences, Haselton and Buss (2000) concluded that women and men's true SI lies somewhere between their self-ratings and the ratings provided by third-party same-sex observers.

In addition to helping to frame and explain past sexual misperception findings, EMT also correctly predicted a previously unstudied instance when men do not overperceive female SI. EMT predicted that though men systematically overperceive the SI of unrelated women who would be viable mates, they do not overperceive the SI of their sisters (Haselton & Buss, 2000). In this experiment, participants were asked to imagine the SI that an opposite-sex sibling would have if s/he smiled at an opposite-sex

person repeatedly while at a party, touched an opposite-sex person's arm while on a date, and went out to a bar. Men's perceptions of their sisters' SI were significantly lower than their perceptions of the SI of unrelated women. Furthermore, men's perceptions of their sisters' SI fell between women's estimations of other women's SI and women's self-reported SI. As men's perceptions of their sisters' SI were bracketed by women's self-reports and third-party reports, it suggests that men might actually perceive their sisters' SI accurately. This unique addition to sexual misperception findings suggests that men have evolved a bias to overperceive the SI only of women who are potential mates. No other known explanation of sexual misperception has predicted or incorporated these results into their theoretical framework (Haselton & Buss, 2000).

### **Beyond Heterosexual (Mis)perceptions**

Despite the robustness of EMT, thus far misperception research has focused solely on heterosexual SI and CI perceptions and therefore it is unknown whether it is the sex of the perceiver or the sex of the target mate that determines the type of error-minimizing strategy employed. For instance, heterosexual men overperceive heterosexual women's SI; however, it is unclear whether this is because men are biased to overperceive a potential partner's SI or whether individuals who are attracted to women are biased to overperceive SI. Similarly, it is unknown whether heterosexual women underperceive heterosexual men's CI because women are predisposed to underperceive CI or because individuals who are attracted to men are biased to underperceive CI. Collecting data from homosexual and heterosexual samples will allow us to examine these previously untested distinctions by differentiating between biological sex and the sex to which individuals are attracted. If misperceptions are predicted by the biological

sex of the initiator and not that of the target, it will provide support for the notion that men and women (regardless of orientation) have evolved differing modules to minimize gender-specific mating errors.

### **An Evolutionary Perspective on Homosexuality**

From an evolutionary standpoint, the primary function of mating is to increase reproductive success. Because reproduction results only from opposite-sex mateships, there should have been significant selection pressure to eradicate homosexual behavior, or at least exclusive homosexual orientation. Nevertheless, the prevalence of homosexuality remains relatively high with incidence estimated to be between 1 and 10% (Kirkpatrick, 2000). Furthermore, frequency data indicates that sexual orientation is attributable, at least in part, to genetic factors. Case in point, the likelihood that an individual identifies as homosexual is significantly predicted by number of homosexual siblings (Bailey & Bell, 1993). Furthermore, monozygotic (MZ) twins, who are genetically identical, are more concordant in sexual orientation than dizygotic (DZ) twins or nontwin sibling pairs, who share approximately half their genes (Kendler, Thornton, Gilman, & Kessler, 2000). However, the evolutionary origin of homosexuality remains inconclusive, with researchers advocating both adaptation and by-product explanations.

In the past half century, several theories have emerged to explain why homosexuality, and, in particular, male homosexuality, could have been adaptive. Some researchers have postulated that homosexuality could have evolved through group selection forces with families that have male homosexuals having advantages such as fewer conflicts over resources (Wade, 1982). More recently, Apostolou (2013) proposed that male homosexuality evolved in response to inadequate resources; limiting

interfamily conflict over property would have improved the reproductive success of older male siblings. Another group selection model of male homosexuality is the kin selection theory. In this framework, it is hypothesized that gay men incur inclusive fitness benefits by helping kin (siblings, nieces, nephews, cousins) survive and reproduce by allocating material and time resources (Wilson, 1975); however, empirical evidence does not support that gay men engage in these supportive behaviors more frequently than heterosexual men (Rahman & Hull, 2005). Another hypothesis is that homosexuality enables same-sex alliances (Kirkpatrick, 2000), but this seems unlikely given that same-sex friendships and coalitions can be maintained in ways that do not limit reproductive success.

Other researchers have suggested that homosexuality might be a by-product. Hutchinson (1959) claimed that homosexual behavior has been preserved because it co-occurs with an unidentified second trait under positive selection, a phenomenon known as balanced polymorphism. McKnight (1997) argued that this second trait might be femininity; women prefer men who display characteristics that can be interpreted as traditionally feminine, such as sensitivity, and therefore that what has been selected for is not male homosexuality, but rather feminine qualities that coincidentally co-occur with homosexuality. Another hypothesis is that a gene for male homosexuality has survived selection pressures because when that same gene is present in women it increases fecundity (Rahman et al., 2008). There is some empirical support for this claim as female relatives of male homosexuals do have more children (Camperio-Ciani et al., 2012). Regardless of the specific mechanism, it is highly unlikely that homosexuality has been untouched by the pressures of evolution.



**Male and Female Homosexuality Might Have Different Mechanisms**

Despite the variability in theories regarding the adaptive benefits of homosexuality, there is considerable evidence that female and male homosexuality are not merely two-sides of the same coin. Some data indicates that only male homosexuality is of a familial nature. For instance, gay men report having four times as many gay brothers as heterosexual men (and as would be predicted by the population prevalence of homosexuality); however, gay men do not report having more lesbian sisters than heterosexual men do (Pillard & Weinrich, 1986). DNA analysis also provides insight into the differences between the genetic basis of male and female sexual orientation. While a linkage between the X chromosome and sexual orientation was found for families containing two gay brothers, this link was not found for families with two lesbian sisters or families without homosexual siblings suggesting that this genetic code influences variations in sexual orientation in men but not in women (Hu et. al., 1995). In addition to studies suggesting a unique genetic component of male homosexuality, gay men report more consistency in their sexual preference than lesbians. While it is not uncommon for women who had previously identified as heterosexual to realize that they are sexually interested in the same-sex later in life, this phenomenon is rare among men (Diamond, 2008). Furthermore, researchers have consistently found that lesbians are more likely than gay men to have engaged in a variety of heterosexual sexual experiences (Kinsey, Pomeroy, Martin & Gebhard, 1953).

While male sexual orientation appears to be more canalized, a growing body of evidence suggests that female sexuality is relatively fluid in that female sexual preference is affected to a greater degree by sociocultural variables such as religiosity and

educational background than male sexuality (Baumeister, 2000). Furthermore, women, more so than men, exhibit changes in their sexual preferences, behaviors, and beliefs across time (i.e. women are more likely than men to change their partner gender preference and masturbation frequency as they age) (Baumeister, 2000). Women also have lower levels of sexual attitude-behavior synchronicity than men. For example, in one study, though women's subjective reports of arousal reflected their stated sexual orientation, lesbian and heterosexual women generated similar genital arousal patterns regardless of whether they viewed homosexual or heterosexual sexual acts, with some heterosexual women even demonstrating higher physiological responses to female-female sex acts than heterosexual sex acts (Chivers, Rieger, Latty & Bailey, 2004). One interpretation of these findings is that, for women, sexual fluidity, as opposed to homosexuality, may have been adaptive as, in condition-dependent circumstances (such as abuse or abandonment by a man), the ability to engage in strong pair bonds between women might have increased survival rates of themselves and of each other's offspring through allomothering (Radtke, 2013).

Men, unlike women, exhibit highly category-specific (CS) arousal patterns; CS refers to a person being aroused only by individuals of the sex and orientation they prefer to have sex with. Indeed, studies measuring genital and subjective sexual arousal to male and female sexual stimuli have indicated that whereas heterosexual men are more aroused by female sexual stimuli and gay men by male stimuli, women, regardless of orientation, are aroused by both heterosexual and homosexual stimuli (Chivers, Rieger, Latty, & Bailey, 2004). Interestingly, in this study male-to-female transsexuals showed a CS arousal pattern, which indicates that there may be a sex-specific genetic basis for male

sexual consistency. Functional magnetic resonance imaging (fMRI) has also supported that men's sexual arousal is highly canalized, while women's is not. Comparisons of brain activation to preferred sexual stimuli, non-preferred sexual stimuli, and nonsexual stimuli revealed that heterosexual and homosexual men had stronger visual, limbic, and anterior cingulate responses to preferred-sex stimuli than did women, but that women showed a stronger limbic response to non-preferred-sex stimuli. These findings further indicate that women have more similar responses to their preferred and non-preferred sexual targets than do men (Syla et al., 2013). FMRI data also indicates that heterosexual and homosexual men have differing neural activation in response to their preferred stimuli; homosexual men showed greater preference-related activity in the amygdala than did heterosexual men. Imaging alone cannot determine whether this activation difference is due to genetic or environmental factors (Safron et al., 2007). Nevertheless, some have argued that this type of fMRI data provides physiological evidence that gay men and homosexual men have distinct neural mechanisms, which supports the assertion that male homosexuality has been maintained by selection.

Although previous research has indicated that homosexuality—and in particular, male homosexuality—has a genetic component, there is also substantial evidence that men and women have unique mating psychologies, independent of orientation. Bailey, Gaulin, Agyei, and Gladue (1994) investigated seven dimensions of mating psychology by sex and orientation. The authors not only found sex differences in all seven domains, but also that these sex differences were largely identical regardless of sexual orientation. For instance, heterosexual and gay men were equally interested in visual sexual stimuli, the unimportance of a partner's status, uncommitted sex, and the importance of partner's

physical attractiveness. Heterosexual women and lesbians overlapped in terms of their stated interest in uncommitted sex, and their sociosexuality scores. The authors concluded that sex, far more so than orientation, influences human mating psychology.

### **Current Research**

In the present investigation, we are attempting to contribute to the literature by replicating previous mating psychology research methods using samples of heterosexual and homosexual participants. In particular, these samples will enable us to examine whether it is the sex of the perceiver or the sex of the target that determines the type of error-minimizing strategy employed in SI and CI perception (i.e., over- or under-estimation). This, in turn, will provide greater insight into the evolved nature of mating psychology. There are three possible ways that sexual orientation might relate to sexual misperception. First, it is possible that homosexual and heterosexual individuals of the same sex will perceive similarly (i.e., lesbians underperceive CI as heterosexual women do and gay men overperceive SI as heterosexual men do). This finding would support our hypothesis that mating psychology has evolved to be sex-specific. Conversely, homosexual individuals may perceive similarly to opposite-sex heterosexual individuals (i.e., lesbians perceive as heterosexual men do and gay men perceive as heterosexual women do). This would suggest that mating psychology might have evolved specifically in relation to target sex and not perceiver sex. A third possibility is that gay men and lesbians will not misperceive SI nor CI because they have direct access to the degree of sexual or CI they would intend if they did a particular action as they are the same sex as the potential partner they are rating.

Research that has indicated that men and women have unique mating psychologies, independent of sexual orientation (Bailey et al.,1994) which supports our first, and primary, hypothesis that men's and women's cognitive biases in the mating domain evolved based on the perceiver's sex and not the target's sex. Therefore, the sex of the initiator/perceiver and not the target should predict intent perception biases as well as additional mating strategy.

Prediction 1: Lesbians will perceive SI and CI as heterosexual women do, and gay men will perceive SI and CI as heterosexual men do because they share sex-differentiated mating psychology (Bailey et al., 1994).

Prediction 2: Heterosexual and gay men will have similar sociosexuality scores, which will be significantly higher than lesbian and heterosexual women's sociosexuality scores. Previous research using heterosexual samples has indicated that men report more positive attitudes towards and more experience engaging in casual sex without deeper emotional commitment (Penke & Asendorpf, 2008).

Prediction 3: Gay men will report the largest number of total sex partners, followed by heterosexual men, and lastly, lesbians and heterosexual women. Parental Investment theory explains why it is evolutionarily advantageous for women to be more selective when choosing mates, whereas it benefits men to be more sexually indiscriminate (Trivers, 1972). Women, regardless of orientation, are choosy and thus will report fewer partners. Men are less selective when picking a casual sexual partner; however heterosexual men are limited by the number of women willing to have sex with them, and therefore will report fewer partners than gay men who are not.

Prediction 4: Gay men will report deciding to engage in sex with a stranger without ever meeting him/ her in person more frequently than heterosexual men, and heterosexual men will report more frequency in this behavior than heterosexual women and lesbians. Similarly to the logic of Prediction (3), it is strategic for women to be discriminating when seeking mates, whereas it is advantageous for men to seek many casual sexual encounters (Trivers, 1972). Heterosexual men will report fewer instances of this type of sexual interaction than gay men not because of differences in desire, but because women are less willing to engage in uncommitted sex than men (Penke & Asendorpf, 2008).

Prediction 5: Women, regardless of orientation, will report feeling more attachment to a casual sexual partner than men. Previous research has indicated that heterosexual women report feeling more attached to uncommitted sexual partners than men (Townsend & Wasserman, 2011); this makes sense from an evolutionary perspective as uncommitted sex can result in pregnancy without paternal investment and is thus much more costly for woman than it is for men (Buss, 1994).

Prediction 6: Gay and heterosexual men will be more upset by a partner's sexual infidelity, whereas heterosexual women and lesbians will be more upset by a partner's emotional infidelity. This prediction is in line with the results of previous jealousy research using heterosexual samples (e.g., Kuhle, 2011) as previous jealousy research using homosexual participants has yielded varied results (e.g., Buunk & Dijkstra, 2001; Dijkstra et al., 2001) that are not theoretically grounded.

Prediction 7: Women will report having had sex with individuals who are not their preferred orientation (i.e. lesbians having sex with men and heterosexual women

having sex with lesbians) more frequently than men as previous research has consistently documented that men show stronger CS arousal and more lifetime sexual preference consistency than do women (e.g., Chivers et al., 2004; Kinsey et al., 1953).

## Method

### Participants

Participants were recruited and compensated \$0.30 through the online crowdsourcing website Amazon Mechanical Turk (MTurk). Participants who did not indicate both their sex and sexual orientation were excluded from the analysis ( $n = 3$ ). The final sample consisted of 191 female participants ( $n = 71$  lesbians) and 192 male participants ( $n = 79$  gay men). The average age of participants was 33.16 ( $SD = 11.66$ ) with an age range of 18-74.

### Measures

**Sex and Commitment Contrast Instrument.** The Sex and Commitment Contrast Instrument is comprised of 15 behaviors designed to measure the degree to which one believes specific behaviors indicate CI and SI (Haselton & Buss, 2000). Participants received either a male target or female target version of the instrument depending upon whether they identified themselves as attracted to women (i.e., homosexual female, heterosexual male) or men (i.e., homosexual male, heterosexual female). The female target and male target versions were identical except for the use of gendered pronouns. Participants were asked to imagine a person they might date or become sexually involved with, but with whom they had not yet had sex. They were told to assume that the individual identifies as having the same sexual orientation as they do,

and to imagine that the person engaged in each of the 15 listed acts. They were instructed to make two ratings for each act: (1) the person's interest in having sex with them, given that s/he engaged in that act (SI) and (2) the person's interest in developing a committed relationship with them, given that s/he engaged in that act (CI). The order of the behaviors was randomized for each participant. Afterwards, participants were asked to imagine that they themselves engaged in each of the behaviors. Again, participants made two ratings for each act: (1) their interest in having sex with an imagined partner if they engaged in that act (SI) and (2) their interest in developing a committed relationship with an imagined partner if they engaged in that act (CI). Ratings were made using a 7-point scale, where 1 indicated "extremely unlikely," 4 indicated "neither likely nor unlikely," and 7 indicated "extremely likely." Overall SI scores and CI scores were created by calculating the arithmetic mean of the SI items and the arithmetic mean of the CI items within the self-report and partner instruments.

**The Revised Sociosexual Orientation Inventory.** The Revised Sociosexual Orientation Inventory (SOI-R) asks participants to respond to nine questions about their previous sexual experiences as well as their beliefs regarding sexuality as a measure of their comfort engaging in short term sexual relationships without deeper emotional commitment (Penke & Asendorpf, 2008). The inventory includes separate assessments of three facets of sociosexuality: behavior (e.g., "With how many different partners have you had sex within the past 12 months?"); attitude (e.g., "I can imagine myself being comfortable and enjoying 'casual' sex with different partners"); and desire (e.g., "In everyday life, how often do you have spontaneous fantasies about having sex with someone you have just met?"). Responses are scored on a 9-point scale and summed to a



total SOI-R score ranging from 9 to 81 with lower scores indicating restricted sociosexual orientation and higher scores indicating unrestricted sociosexual orientation.

**Additional Measures of Sexual Attitudes.** Interspersed within the SOI-R inventory, we also included three questions to assess predictions (4), (5), and (7). We asked the number of times participants decided they would have sex with someone before ever meeting that person, the total number of lifetime opposite-sex and same-sex partners participants had had sex with, and the degree to which participants wanted to be emotionally involved with their sexual partners (adapted from Townsend & Wasserman, 2011). Furthermore, to assess prediction (6), we asked participants to choose whether they would ask an unfaithful partner if s/he had had sex with the other person or if s/he loved the other person.

### **Procedure**

MTurk users with an IP address within the United States and who had successfully completed at least 50 HITs with a 95% approval rating were able to view a general invitation to complete online questionnaires about their sexual attitudes and behaviors on MTurk. Participants anonymously completed the questionnaires online in approximately 10 minutes. Afterward, they were directed to a debriefing page that explained the goals of the investigation and gave them a code to enter to receive compensation.

### **Results**

A 2 (participant sex: male, female) x 2 (sex attracted to: male, female) analysis of variance (ANOVA) was calculated on participants' ratings of a partner's SI. There was a

main effect of participant sex, with women, regardless of sexual orientation, rating their partners as having higher SI,  $F(1, 377) = 22.20, p < .001$  ( $M = 1.38, SD = 0.87$ ) than men ( $M = 0.93, SD = 0.92$ ). The main effect of the sex the participant is attracted to was not significant,  $F(1, 377) = 0.13, p = .72$ . The interaction effect was also not significant,  $F(1, 377) = 1.50, p = .22$ . A 2 (participant sex: male, female) x 2 (sex attracted to: male, female) ANOVA was also calculated on participants' ratings of a partner's CI. There was a main effect of the sex the participant is attracted to with individuals attracted to women (i.e., heterosexual men and lesbians) rating their partners as having higher CI,  $F(1, 377) = 11.14, p = .001$  ( $M = 1.05, SD = 0.80$ ) than individuals attracted to men ( $M = 0.76, SD = 0.84$ ). The main effect of participant sex was not significant,  $F(1, 377) = 0.00, p = 0.98$ . The interaction effect was also not significant,  $F(1, 377) = 0.09, p = .76$ .

Single-sample *t*-tests were used to compare different groups' ratings to specific criteria (i.e., the self-reported SI and CI of the sex and orientation to which they were attracted). Heterosexual men overestimated the SI of the hypothetical heterosexual women ( $M = 0.96, SD = 0.89$ ), as revealed by a single-sample *t*-test with the criterion value of -0.26 (heterosexual women's mean self-reported SI),  $t(112) = 14.59, p < .001$ . Heterosexual men also overestimated the CI of the hypothetical heterosexual women ( $M = 1.06, SD = 0.82$ ), as revealed by a single-sample *t*-test with the criterion value of -0.07 (heterosexual women's mean self-reported CI),  $t(112) = 14.57, p < .001$ .

Gay men did not misperceive the SI of the hypothetical gay men ( $M = 0.86, SD = 0.97$ ), as revealed by a single-sample *t*-test with the criterion value of 0.74 (gay men's mean self-reported SI),  $t(78) = 1.29, p = .20$ . However, gay men underestimated the CI of the hypothetical gay men ( $M = 0.75, SD = 0.98$ ), as revealed by a single-sample *t*-test

with the criterion value of 1.21 (gay men's mean self-reported CI),  $t(78) = -4.22, p < .001$ .

Heterosexual women did not misperceive the SI of the hypothetical heterosexual men ( $M = 1.44, SD = 0.87$ ), as revealed by a single-sample  $t$ -test with the criterion value of 1.32 (heterosexual men's mean self-reported SI),  $t(119) = 1.52, p = .13$ . Heterosexual women did, however, underestimate the CI of the hypothetical heterosexual men ( $M = 0.77, SD = 0.74$ ), as revealed by a single-sample  $t$ -test with the criterion value 1.26 (heterosexual men's mean self-reported CI),  $t(119) = -7.22, p < .001$ .

Lesbians did not misperceive the SI of the hypothetical lesbians ( $M = 1.29, SD = 0.86$ ), as revealed by a single-sample  $t$ -test with the criterion value of 1.31 (lesbians' mean self-reported SI),  $t(68) = -0.18, p = .86$ . Lesbians underestimated the CI of the hypothetical lesbians ( $M = 1.03, SD = 0.76$ ), as revealed by a single-sample  $t$ -test with the criterion value 1.28 (lesbians' mean self-reported CI),  $t(68) = -2.71, p < .01$ .

Table 1. Correlations between sexual (SI) and commitment (CI) intent ratings and SOI-R scores.

	Estimation of partner		Self-report	
	SI	CI	SI	CI
Heterosexual male ( $N = 113$ )	.23	.14	.40*	.01
Homosexual male ( $N = 79$ )	.19	.16	.38*	.07
Heterosexual female ( $N = 120$ )	.27*	.18	.52	.05
Homosexual female ( $N = 69$ )	.03	.16	.33*	.01

Note: Bonferonni-corrected for four comparisons, \*  $p \leq 0.0125$

There was a positive correlation between SOI-R score and self-reported SI for heterosexual men, gay men, and lesbians. There was no correlation between heterosexual women's SOI and either their reported SI or reported CI; however, heterosexual women's SOI-R scores were correlated with their estimations of partners' SI. No other correlations were significant.

A 2 (participant sex: male, female) x 2 (sexual orientation: heterosexual, homosexual) ANOVA was calculated on participants' ratings of their likelihood of becoming emotionally attached to a casual sexual partner. There was a main effect of participant sex,  $F(1, 317) = 7.07, p = .01$ , with women, regardless of sexual orientation, ( $M = 6.16, SD = 2.40$ ) rating the likelihood of becoming emotionally attached to a casual sexual partner higher than men, regardless of orientation ( $M = 5.37, SD = 2.27$ ). The main effect of sexual orientation was not significant,  $F(1, 317) = 0.00, p = .98$  and there was no significant interaction,  $F(1, 317) = 0.79, p = .38$ .

Chi-Square analyses were performed to examine the relationship between biological sex and responses to infidelity (whether participants were more likely to inquire about a partner's sexual or emotional transgression). Heterosexual men were significantly more likely to report that they would ask if their partner had had sex with another person,  $\chi^2(1, N = 101) = 5.24, p = .022$ , while heterosexual women were significantly more likely to report that they would ask if their partner was in love with another person,  $\chi^2(1, N = 106) = 6.38, p = .012$ . Gay men,  $\chi^2(1, N = 57) = 0.02, p = .90$ , and lesbians,  $\chi^2(1, N = 59) = 1.37, p = .24$  did not differ from chance in their likelihood to ask about emotional or physical infidelity.

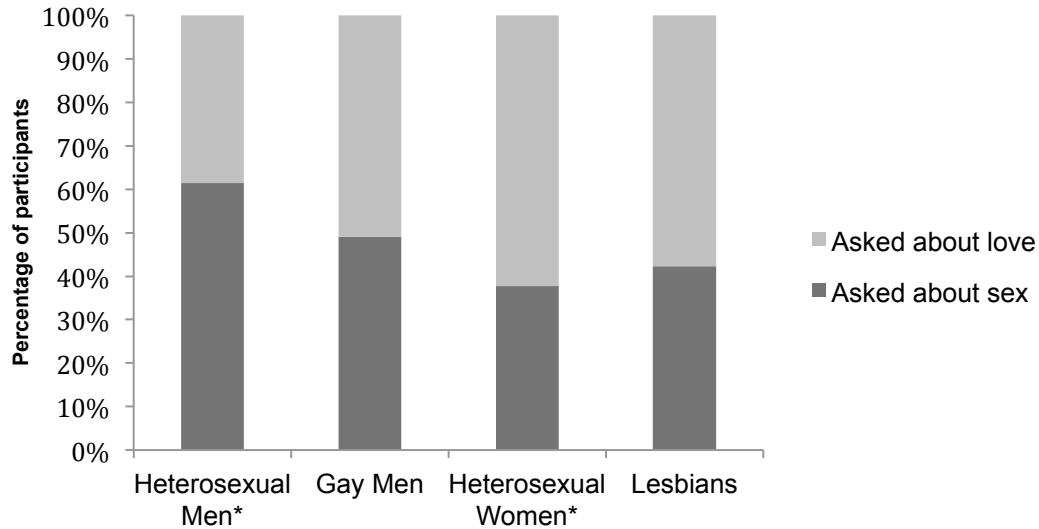


Figure 1. Forced choice response to learning of their partner's infidelity

Note: \*  $p < .05$

A one-way ANOVA of the likelihood of an individual deciding to engage in sex without ever having met their partner showed a non-significant trend  $F(3, 321) = 2.35, p = .07$ . It appears that the difference between gay men and heterosexual women is driving this pattern, if it exists. Though not significant, gay men indicated the highest likelihood of engaging in sex without ever having met their partner, whereas heterosexual women indicated the least likelihood, with heterosexual men and lesbians similarly in between.

A 2 (participant sex: male, female) x 2 (orientation: heterosexual, homosexual) ANOVA was calculated for the percentage of same sex partners. There was main effect of sex,  $F(1, 305) = 15.11, p < .001$ , and of orientation,  $F(1, 305) = 1149.92, p < .001$ ,

both of which were qualified by a significant interaction,  $F(1, 305) = 12.00, p = .001$ .

There was no difference between the percentage of same-sex partners reported by heterosexual men ( $M = 4.45, SD = 15.27$ ), and heterosexual women ( $M = 3.52, SD = 11.50$ ). However, gay men reported a significantly higher percentage of same-sex partners ( $M = 87.10, SD = 20.58$ ) than did lesbians ( $M = 70.85, SD = 29.13$ ). A post hoc Tukey HSD test revealed that all differences between groups were significant at  $p \leq .01$ , except for heterosexual men and women.

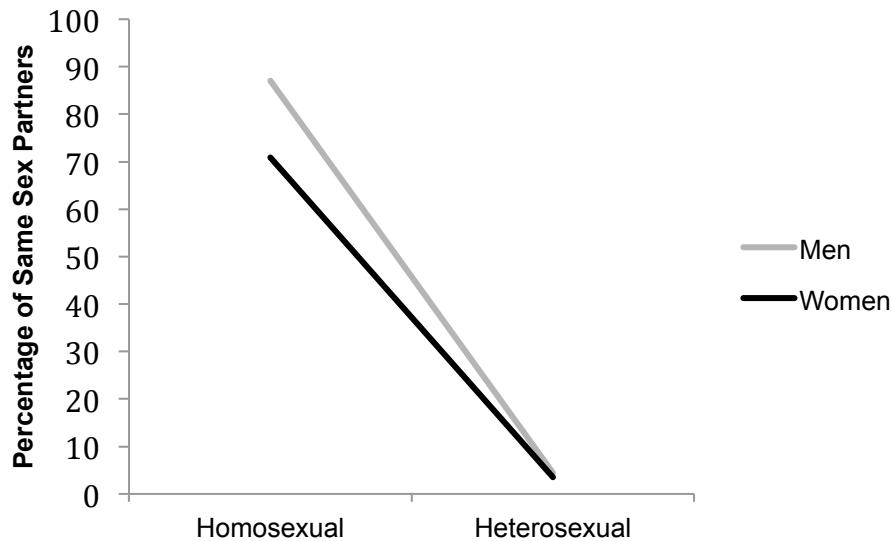


Figure 2. Percentage of total sex partners who were of the same-sex

A 2 (participant sex: male, female) x 2 (orientation: heterosexual, homosexual) analysis of variance (ANOVA) was also calculated for total number of reported sex-partners. Although orientation and a sex x orientation interaction did not reach conventional significance, there was a trend. Heterosexual men reported fewer total partners ( $M = 12.13, SD = 22.39$ ) than gay men ( $M = 33.44, SD = 90.56$ ), however

heterosexual and homosexual women reported approximately the same number of total partners ( $M = 14.51$ ,  $SD = 50.13$ , and  $M = 14.44$ ,  $SD = 19.00$ ), respectively.

### Discussion

Consistent with the literature (e.g., Abbey & Harnish, 1995; Abbey & Melby, 1986; Haselton & Buss, 2000; Johnson, Stockdale & Saal, 1991 etc.) and in line with our EMT-inspired prediction, we found that heterosexual men, but not lesbians nor heterosexual women, overperceived SI. Also following our prediction and replicating Haselton and Buss (2000), we found that heterosexual women and lesbians underestimated CI. Our results provide substantial support for our hypothesis that heterosexual and homosexual women rely on the same, evolved sex-specific error management system.

The additional measures we incorporated provide further support for our conclusion that women, regardless of orientation, rely on the same evolved sex-specific error management system. As predicted, women, regardless of orientation, rated their partner's as having more SI than men did; women also underestimated partner's CI. Furthermore, woman rated their likelihood of becoming emotionally attached to a casual sexual partner as higher than did both heterosexual and gay men. In addition, lesbian and heterosexual women reported comparable levels of aversion to casual sex. This series of results suggests that lesbians have co-opted the heterosexual female modules for the importance of commitment. Although the adaptive pressures that shaped women's modules for the importance of commitment are far less salient in the modern context, for

instance with the invention of birth control, women—regardless of orientation—seem to have maintained a preference for committed relationships.

In line with previous research (e.g., Abbey & Harnish, 1995; Abbey & Melby, 1986; Haselton & Buss, 2000; Johnson, Stockdale & Saal, 1991 etc.), and in support of EMT, we found that heterosexual men overperceived heterosexual women's SI. However, there were also some unexpected results. For instance, we found that gay men did not overperceive a potential partner's SI. This is not a function of gay men self-reporting higher SI than heterosexual women, but is reflective of gay men estimating lower SI of a potential partner than heterosexual men. There are several possible explanations for this result; perhaps gay men are consciously overriding their evolved biases to overperceive by thinking about what their own SI would be when they are asked to estimate the SI of a partner although it is not clear why lesbians do not do the same. Another possibility that is in line with quantitative evidence that male homosexuality is moderately heritable (Dawood, Bailey, & Martin, 2009) is that heterosexual and gay men may not have evolved the same mating psychology and cognitive biases.

Though we did not have a specific hypothesis regarding men's CI from an EMT perspective, we found that heterosexual men overperceived women's self-reported CI. This result might seem to indicate that women are less interested in committed relationships; however, it must be noted that the Sex and Commitment Contrast Instrument asks participants to rate how engaging in a series of behaviors would indicate their interest in developing a committed relationship with an imagined partner, and not their general desire for a committed partner. It might be that sexual encounters have become more casual in general such that activities that were once indicative of a



woman's interest in committing to a partner are no longer seen as meaningful, although she may still want to establish a committed relationship.

Another possibility explanation of our finding that heterosexual men overperceive women's CI is that heterosexual men might be biased to overestimate women's CI in order to avoid mistakenly underestimating CI. This would help them to more easily evade entangling romantic commitments that limit their ability to seek mates indiscriminately. This is in contrast to women's biases to underestimate potential partners' CI, which aids them in avoiding the costly task of raising a child without paternal investment (Trivers, 1972). Unlike heterosexual men, we found that gay men underestimated a potential partner's CI. While this may seem incompatible, it must be noted that Haselton and Buss (2000) also found that men underestimated the CI of other men. Although, because we did not ask heterosexual men to rate the SI or CI of other men, we cannot directly compare this to our sample. However, from an EMT perspective, men demonstrate that they are more commitment-oriented and therefore a more desirable long-term mate by indicating that other men are interested solely in short term mating. Gay men might have co-opted this module. Another possibility is that gay men assume that they are more commitment orientated than other gay men—perhaps due to experience—and thus estimate potential partners' CI as lower than their own. Men and women appear to have evolved unique perception biases, but individual differences in attitudes can also influence intent perception.

Logically, sociosexuality scores should predict self-reported SI for all four groups because the SOI-R is a measure of short-term mating orientation: individuals who are more oriented toward sexual relationships without deeper emotional commitment should

report that their behaviors denote more SI than individuals who prefer committed relationships. Gay men, heterosexual men, and lesbians' SOI-R scores predicted their self-reported SI, whereas heterosexual women's SOI-R scores only predicted their perceptions of their potential partner's SI. One possible explanation for this finding is that heterosexual women underreport their SI because they do not want appear overly interested in sexual relationships as women recognize that signaling sexual promiscuity might cause reputational damage (Haselton & Buss, 2000). An alternate explanation is that heterosexual women are less aware of the likelihood of their own behaviors preceding their decision to have sex. Within heterosexual couples, men are disproportionately more likely to perform risky relationship initiatives like asking a woman out or kissing her (Farrell, 1986), whereas women are more likely to subtly signal their willingness to engage in these behaviors (Clark, 2008). Because of this dynamic, women might be accustomed to detecting what behaviors men perform to increase the likelihood of sex, but might be less sensitive to how their own behavior indicates their SI. Women with high sociosexual orientations are probably signaling more SI whether they realize it or not, and thus—in their experience—men appear more sexually interested.

While not significant, heterosexual men's SOI-R scores were also trending toward predicting perceptions of partner's SI, although gay men and lesbians' SOI-R scores were not. These results may be a reflection of the reliability of heterosexual tactics. For example, heterosexual women may have past experiences that indicate that different male attraction tactics reliably indicate their SI, whereas there may be less consistency in the tactics that are used to attract, and that appeal to gay men and lesbians (Howard & Perilloux, 2014) and thus they do not feel confident that specific behaviors predict a

potential partner's SI. Furthermore, unlike heterosexual men and women, gay men and lesbians face the additional problem of having to identify whether a same-sex individual with whom they are interacting shares their sexual orientation (Nicholas, 2004; Rieger, Linsenmeier, Gygax, Garcia, & Bailey, 2010). In our method, participants were instructed to imagine a potential partner who shared their orientation; however, gay men and lesbians might have reflected on their previous inconsistent experiences when interactions with members of the same sex did not necessarily indicate that person's orientation or SI.

Consistent with previous jealousy research (Kuhle, 2011), heterosexual men who were informed that their partner was unfaithful were more likely to ask about sexual infidelity, while heterosexual women were more likely to ask about emotional infidelity. In contrast to Dijkstra et al. (2001) who found that homosexuals responded to sexual and emotional jealousy similarly to heterosexuals of the opposite sex, we found that neither gay men nor lesbians were significantly more likely to ask about emotional or sexual infidelity. That gay men and lesbians did not demonstrate differential sexual or emotional jealousy supports the idea that homosexual mating psychology has not evolved to be unique. Instead, gay men and lesbians might be unsure of how to react in relation to infidelity as their evolved sex-specific tendencies may not coincide with their personal experiences. For example, while sexual jealousy is beneficial for heterosexual men as it helps to prevent cuckoldry (Kuhle, 2011), gay men consciously understand that they do not face this issue and may attempt to override their evolved tendencies to care about sexual infidelity over emotional infidelity.

Our descriptive statistics provide support for the well-documented finding that women are the limiting factor in sexual interactions. Heterosexual men reported fewer total partners than gay men, whereas heterosexual women and lesbians reported approximately the same number of total partners. These findings are in line with parental investment theory, which argues that the sex with the greater minimum obligatory parental investment in reproduction would evolve to be more selective when choosing a mate, whereas the sex with lower obligatory investment would evolve to be less choosy. Gay men, the only dyad without at least one woman, reported more partners than women or heterosexual men. Presumably gay and heterosexual men are equally interested in diverse sexual encounters, but heterosexual men are limited by the interest of women whereas gay men are not.

### **Limitations and Future Research**

One potential limitation of our design is that we only looked at self-report perceptions and perceptions of the SI and CI of the sex to whom the individual was attracted. We did not ask participants to rate third-party, same-sex perceivers. Haselton and Buss (2000) have argued that women's self-reports of SI are artificially low so that they do not appear overly eager and that female third-party reporters overestimate women's SI to derogate competitors, and thus that women's actual SI is bracketed by these two measures. Because we were collecting data from heterosexual and homosexual participants, we did not ask participants to estimate the SI of another same-sex individual as this would have been the same as asking gay men and lesbians to rate the SI of a potential partner. Instead, we used self-report scores as the criterion value in single samples *t*-tests to see whether ratings of the sex to which an individual was attracted

were significantly different from the self-report measure. Without same-sex third-party reports for heterosexual participants and without the ability to have third party raters for homosexual participants (who are not also potential partners), it is impossible to identify whether some of our findings are a result of differences between heterosexual and homosexual mating strategies or because of evolved tendencies to rate same-sex individuals more negatively (e.g., men rate other men as having lower CI and women rate other women as having higher SI) than opposite-sex individuals, or the self.

Another methodological concern is that in order to test our hypotheses, we used hypothetical written scenarios rather than real-life interpersonal encounters. While vignettes have been used to document men's overperception of women's SI as well as women's commitment skepticism, no other studies, as far as we know, have used vignettes to assess homosexual participants' SI and CI. Vignettes may be problematic when assessing gay men and lesbian's SI and CI because, although participants were instructed to estimate how much SI and CI an individual of their same sex and sexual orientation would have if they engaged in different behaviors, it is possible that gay men and lesbians may have recalled previous experiences when they were unsure of a potential mate's sexual orientation. As the majority of people are heterosexual and assume heteronormativity (Ward & Schneider, 2009), heterosexual men and women do not face this challenge. Future research could incorporate a laboratory design utilizing heterosexual and homosexual actors as well as heterosexual and homosexual third-party perceivers to ensure that all participants assess the same interactions and do not rely on internal representations.

Our research design necessitated that we asked participants to indicate whether they more closely identified as heterosexual or homosexual. However, women who are attracted to women and men who are attracted to men might not identify as being gay or lesbian. Sell, Wells and Wypij (1995) argue that sexual identity is more affected by social and cultural norms and is therefore less intrinsic than the sex that one is attracted to. Future research could remove identity words such as “homosexual” and “heterosexual” and simply ask participants to identify their biological sex and the sex to which they are most attracted. Furthermore, we did not offer participants the option of selecting a bisexual orientation; from a methodological perspective it would be incredibly difficult to use bisexual participants in a similarly designed study. We used a branching method to ensure that participants received measures with language and pronouns that reflected their sex and the sex they were attracted to; however, because bisexuals can be equally attracted to men and women, it would be necessary to create a non-gendered measure. A non-gendered measure, however, would present another problem as to test the predictions of interest in this investigation the individual would need to clarify if s/he were thinking about the SI or CI of a man or woman for every single question. Future researchers may want to consider how to design a misperception study capable of using a Kinsey-scale type sexuality designation (Kinsey, Pomeroy & Martin, 1948).

We did not ask participants to recount any real-world experiences of misperception or to report their conscious SI or CI perception strategy. While previous misperception studies have corroborated that men overperceive SI using women’s real-life reports (Abbey, 1987), it is possible that gay men and lesbians have unique misperception experiences as a function of their uncertainty that others share their sexual

orientation. It is possible that individual experiences influence, or perhaps are even capable of helping an individual to bypass evolved perception biases that do not minimize errors in homosexual interactions.

Future research may attempt to measure the degree to which heterosexual and homosexual mating strategy is influenced and revised to reflect real-world experience. For instance, to try to distinguish which elements of homosexual mating strategy reflect evolved psychological mechanisms and which might be intentional reactions to previous experiences, researchers could use a between-subjects design to compare the responses of participants who have been instructed to think about an attractive person who shares their orientation and those who have been instructed to think about an attractive person whose sexual orientation is ambiguous. If homosexual participants who have been instructed to consider the ambiguous orientation stranger exhibit less similarity to same-sex heterosexual participants in CI and SI perception than homosexual participants who have been instructed to consider an individual of the same orientation, it will support the idea that a conscious understanding of the unreliability of homosexual mating tactics compared to heterosexual mating tactics could account for at least some of the within-sex variation in mating psychology. Differences between heterosexual and gay men and heterosexual women and lesbians' mating strategies might simply be a result of homosexual men and women attempting to navigate a heteronormative mating landscape.

## **Conclusions**

Main effects of sex suggest that homosexual mating strategies have not evolved independently, nor are they simply a reversal of heterosexual perceptions. In general, our

findings support the notion that CI and SI perception are part of a larger error management system “designed” for heterosexual interactions. In most measures used in this investigation lesbians and heterosexual women did not differ; however, gay men and heterosexual men did. These findings further support the growing body of literature that indicates that female sexuality is fluid. From an EMT and sexual misperception perspective, women have evolved a consistent mating psychology and lesbians simply apply it to female instead of male targets. On the other hand, research suggests that male sexuality is not only more canalized, but that male homosexuality may have specific genetic origins. The dissimilarity between heterosexual and gay men’s responses suggest that unique mating psychology might have evolved for each orientation in men. An alternate possibility is that gay men may have developed a seemingly unique mating strategy as a by-product of learning that their innate biases do not minimize errors when interacting with potential male mates. Of course, there is still much research to be done.

Where individuals who are attracted to the same sex (i.e., heterosexual women and gay men) overlap in their intent perception is perhaps an indication of homosexuals consciously modifying their perceptions as a result of feedback. EMT proposes that cognitive biases evolved to minimize costly errors for our ancestors. However, it must be recognized that these biases in SI and CI perception continue to serve a valuable function for heterosexual men who are pursuing a short term mating strategy and heterosexual women who are pursuing a long term mating strategy. If gay men and lesbians have had enough experiences where their biases actually resulted in more costly errors, they may have learned that their intuitive biases are inaccurate and thus might actively try to combat them. By way of illustration, both heterosexual women and gay men



underestimate a potential partner's CI. While this is an evolved bias for women and continues to serve a function by limiting the likelihood that she will face abandonment, gay men may have consciously co-opted this strategy after realizing that their tendency to overestimate a partner's commitment had negative outcomes such as unexpected rejection.

Our results combine with previous findings to suggest that homosexual mating strategy is more complex than either a complete continuation of heterosexual mating psychology or a gender-role reversal. In general, it appears that women, regardless of orientation, share similar mating psychology—perhaps an indication that female sexuality is relatively fluid. In comparison, there was greater variation between heterosexual men and gay men—supporting the idea that male sexuality is more canalized and that unique orientations may have an evolved function.

## References

- Abbey, A. (1982). Sex differences in attributions for friendly behavior: Do males misperceive females' friendliness? *Journal of Personality and Social Psychology*, *42*, 830-838.
- Abbey, A. (1987). Misperceptions of friendly behavior as sexual interest: A survey of naturally occurring incidents. *Psychology of Women Quarterly*, *11*, 173-194.
- Abbey, A. (1991). Misperception as an antecedent of acquaintance rape: A consequence of ambiguity in communication between men and women. In A. Parrot & L. Bechhofer (Eds.), *Acquaintance rape: The hidden crime* (pp. 96-111). New York: Wiley.
- Abbey, A. & Harnish, R.J. (1995). Perception of sexual intent: The role of sex, alcohol consumption, and rape supportive attitudes. *Sex Roles*, *32*, 297-313.
- Abbey, A., & Melby, C. (1986). The effects of nonverbal cues on sex differences in perceptions of SI. *Sex Roles*, *15*, 283-298.
- Apicella, C.L. & Marlowe, F.W. (2007). Men's reproductive investment decisions: Mating, parenting, and self-perceived mate value. *Human Nature*, *18*, 22-34.
- Apostolou, M. (2013). Interfamily conflict, reproductive success, and the evolution of male homosexuality. *Review Of General Psychology*, *17*, 288-296.
- Bailey, J.M., Gaulin, S., Agyei, Y., & Gladue, B.A. (1994). Effects of sex and sexual orientation on evolutionary relevant aspects of human mating. *Journal of Personality and Social Psychology*, *66*, 1081-1093.
- Bailey, J.M. & Bell, A.P. (1993). Familiarity of female and male homosexuality. *Behavioral Genetics*, *23*, 313-322

- Baumeister, R.F. (2000). Gender differences in erotic plasticity: Female sex drive as socially flexible and responsive. *Psychological Bulletin*, *126*, 347-374.
- Berkowitz, A. (1992). College men as perpetrators of acquaintance rape and sexual assault: A review of recent research. *Journal Of American College Health*, *40*, 175-181.
- Buunk, B. P., & Dijkstra, P. (2001). Evidence from a homosexual sample for a sex-specific rival-oriented mechanism: Jealousy as a function of a rival's physical attractiveness and dominance. *Personal Relationships*, *8*, 391-406.
- Buss, D. M. (1994). *The evolution of desire: Strategies of human mating*. New York: Basic Books.
- Buss, D.M. (2002). Human Mating Strategies. *Samfundsokonomien*, *4*, 47-58.
- Camperio Ciani, A. S., Fontanesi, L., Iemmola, F., Giannella, E., Ferron, C., & Lombardi, L. (2012). Factors associated with higher fecundity in female maternal relatives of homosexual men. *Journal Of Sexual Medicine*, *9*, 2878-2887.
- Chivers, M. L., Rieger, G., Latty, E., & Bailey, J. (2004). A sex difference in the specificity of sexual arousal. *Psychological Science*, *15*, 736-744.
- Clark, A. (2008). Attracting interest: Dynamic displays of proceptivity increase the attractiveness of men and women. *Evolutionary Psychology*, *6*, 563-574.
- Dawood, K., Bailey, J., & Martin, N. G. (2009). Genetic and environmental influences on sexual orientation. In Y. Kim (Ed.). *Handbook of behavior genetics* (pp. 269-279). New York, NY US: Springer Science + Business Media.
- Dijkstra, P., Groothof, H. K., Poel, G. A., Laverman, T. G., Schrier, M., & Buunk, B. P. (2001). Sex differences in the events that elicit jealousy among homosexuals.

*Personal Relationships*, 8, 41-54.

Galperin, A. & Haselton, M. G. (2012). Error management and the evolution of cognitive bias. In J. P. Forgas, K. Fiedler, & C. Sedikides (Eds.), *Social Thinking and Interpersonal Behavior*. (pp. 45-64). New York: Psychology Press.

Geary, D. C. (2000). Evolution and proximate expression of human paternal investment. *Psychological Bulletin*, 126, 55-77.

Haselton, M.G. (2003). The sexual overperception bias: Evidence of a systematic bias in men from a survey of naturally occurring events. *Journal of Research in Personality*, 37, 34-47.

Haselton, M. G. (2007). Error management theory. In R. F. Baumeister & K. D. Vohs (Eds.), *Encyclopedia of Social Psychology* (Vol. 1, pp. 311-312). Thousand Oaks, CA: Sage.

Haselton, M.G., & Buss, D.M. (2000). Error management theory: A new perspective on biases in cross-sex mind reading. *Journal of Personality and Social Psychology*, 78, 81-91.

Haselton, M. G., Buss, D. M., & DeKay, W. T. (1998, July). A theory of errors in cross-sex mindreading. Paper presented at the Human Behavior and Evolution Society Meeting, Davis, CA.

Howard, R.M. & Perilloux, C. (2014, February). The interaction of sex and sexual orientation on perceived effectiveness of attraction tactics. Roundtable report at the Society of Personality and Social Psychology Evolutionary PreConference, Austin, TX.

Hu, S., Pattatucci, A.M.L., Patterson, C., Li, L., Fulker, D.W., Cherny, S.S., Kruglyak, L.

- & Hamer, D.H. (1995). Linkage between sexual orientation and chromosome Xq28 in males but not in females, *Nature Genetics*, 11, 248-256.
- Farrell, W. (1986). *Why men are the way they are*. NY: McGraw-Hill.
- Farris, C., Treat, T. A., Viken, R. J., & McFall, R. M. (2008). Sexual coercion and the misperception of SI. *Clinical Psychology Review*, 28, 48-66.
- Fichten, C.S., Tagalakis, V., Judd, D., Wright, J., Amsel, R. (2001). Verbal and nonverbal communication cues in daily conversations and dating. *The Journal of Social Psychology*, 132, 751-769.
- Galperin, A. & Haselton, M. G. (2012). Error management and the evolution of cognitive bias. In J. P. Forgas, K. Fiedler, & C. Sedikides (Eds.), *Social Thinking and Interpersonal Behavior*. (pp. 45-64). New York: Psychology Press.
- Johnson, C. B., Stockdale, M. S., & Saal, F. E. (1991). Persistence of men's misperceptions of friendly cues across a variety of interpersonal encounters. *Psychology Of Women Quarterly*, 15, 463-475.
- Kendler, K.S., Thorton, L.M., Gilmen, S.E., & Kessler, R.C. (2000). Sexual orientation in a U.S. national sample of twin and nontwin sibling pairs, *American Journal of Psychiatry*, 157, 1843-1846.
- Kenrick, D. T., Keefe, R. C., Bryan, A., Barr, A., & Brown, S. (1995). Age preferences and mate choice among homosexuals and heterosexuals: A case for modular psychological mechanisms. *Journal Of Personality And Social Psychology*, 69, 1166-1172.
- Kinsey, A. C., Pomeroy, W. B., & Martin, C. E. (1948). *Sexual Behavior in the Human Male*. Philadelphia: W.B. Saunders; Bloomington: Indiana U. Press.

Kinsey, A. C., Pomeroy, W. B., Martin, C. E., & Gebhard, P. H. (1953). *Sexual behavior in the human female*. Philadelphia: Saunders.

Kirkpatrick, R.C. (2000). The Evolution of Human Sexual Behavior. *Current Anthropology*, 41(3), 385-413.

Koenig, B. L., Kirkpatrick, L. A., & Ketelaar, T. (2007). Misperception of sexual and romantic interests in opposite-sex friendships: Four hypotheses. *Personal Relationships*, 14, 411-429.

Kuhle, B. X. (2011). Did you have sex with him? Do you love her? An in vivo test of sex differences in jealous interrogations. *Personality and Individual Differences*, 51, 1044-1047.

Lees, S. (1989). Learning to love, sexual reputation, morality and social control of girls. In M. Cain (Ed.), *Growing up good—Policing the behaviour of girls in Europe*, Sage, London.

Lindgren, K. P., Jacques-Tiura, A. J., & Westgate, E. C. (2012). Sexual-intent perceptions: A primer on methods, theories, and applications. In M. A. Paludi (Ed.), *The psychology of love (Vols 1–4)* (pp. 141-155). Santa Barbara, CA US: Praeger/ABC-CLIO.

Mendell, D. & Bigness, J. ( 1998, September 6). For clerks, smiles can go too far. *The Chicago Tribune*. Retrieved from [http://articles.chicagotribune.com/1998-09-06/news/9809060130\\_1\\_store-clerks-male-customer-smile](http://articles.chicagotribune.com/1998-09-06/news/9809060130_1_store-clerks-male-customer-smile).

McKnight, J. (1997). *Straight science? Homosexuality, evolution, and adaptation*. New York, NY: Routledge.

Nicholas, C. L. (2004). Gaydar: Eye-gaze as identity recognition among gay men and

- lesbians. *Sexuality & Culture: An Interdisciplinary Quarterly*, 8, 60-86.
- Penke, L., & Asendorpf, J. B. (2008). Beyond global sociosexual orientations: A more differentiated look at sociosexuality and its effects on courtship and romantic relationships. *Journal of Personality and Social Psychology*, 95, 1113-1135.
- Pillard, R.C. & Weinrich, J.D. (1986). Evidence of familial nature of male homosexuality, *Archives of General Psychiatry*, 43, 808-812.
- Pillsworth, E. G. & Haselton, M. G. (2006). Women's sexual strategies: The evolution of long-term bonds and extra-pair sex. *Annual Review of Sex Research*, 17, 59-100.
- Radtke, S. (2013). Sexual fluidity in women: How feminist research influenced evolutionary studies of same-sex behavior. *Journal Of Social, Evolutionary, And Cultural Psychology*, 7, 336-343.
- Rahman, Q., Collins, A., Morrison, M., Orrells, J., Cadinouche, K., Greenfield, S., & Begum, S. (2008). Maternal inheritance and familial fecundity factors in male homosexuality. *Archives Of Sexual Behavior*, 37, 962-969.
- Rahman, Q., & Hull, M. S. (2005). An empirical test of the kin selection hypothesis for male homosexuality. *Archives Of Sexual Behavior*, 34, 461-467.
- Rieger, G., Linsenmeier, J. W., Gygax, L., Garcia, S., & Bailey, J. (2010). Dissecting "gaydar": Accuracy and the role of masculinity–femininity. *Archives Of Sexual Behavior*, 39, 124-140.
- Safron, A., Barch, B., Bailey, J., Gitelman, D. R., Parrish, T. B., & Reber, P. J. (2007). Neural correlates of sexual arousal in homosexual and heterosexual men. *Behavioral Neuroscience*, 121, 237-248.

- Schmitt, D.P., Shackelford, T.K. & Buss, D.M. (2001). Are men really more 'oriented' toward short-term mating than women? A critical review of theory and research. *Psychology, Evolution & Sex* 3.3, 211–239.
- Sell, R.L., Wells, J.A., & Wypij, D. (1995). The prevalence of homosexual behavior in the United States, the United Kingdom and France: Results of national population-based samples. *Archives of Sexual Behavior*, 24, 235-248.
- Shackelford, T.K. & Goetz, A.T. (2012). *The Oxford Handbook of Sexual Conflict in Humans*. Oxford University Press, USA.
- Shotland, R. L., & Craig, J. M. (1988). Can men and women differentiate between friendly and sexually interested behavior? *Social Psychology Quarterly*, 51, 66-73.
- Syla, D., Safron, A., Rosenthal, A.M., Reber, P.J., Parrish, T.B., & Bailey, J.M. (2013). Neural correlates of sexual arousal in homosexual and heterosexual men and women. *Hormones and Behavior*, 63, 673-684.
- Townsend, J.M. & Wasserman, T.H. (2011). Sexual hookups among college students: Sex differences in emotional reactions. *Archives of Sexual Behavior*, 40, 1173-1181.
- Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man: 1871–1971* (pp. 136–179). Chicago: Aldine.
- Wade, M. J. (1982). Evolution of interference competition by individual, family, and group selection. *Proceedings of the National Academy of Sciences of the United States of America*, 79, 3575–3578.



Ward, J., & Schneider, B. (2009). The reaches of heteronormativity: An introduction. *Gender & Society*, 23(4), 433-439.

Wilson, E. O. (1975). *Sociobiology: The new synthesis*. Cambridge, MA: Harvard University Press.

Zeifman, D. & Hazan, C. (1997) 'Attachment: the bond in pair-bonds', in J. Simpson and D.T. Kenrick (Eds), *Evolutionary Social Psychology*, Hillsdale, NJ: Erlbaum.

Zietsch, B. P., Morley, K. I., Shekar, S. N., Verweij, K. H., Keller, M. C., Macgregor, S., & Martin, N. G. (2008). Genetic factors predisposing to homosexuality may increase mating success in heterosexuals. *Evolution And Human Behavior*, 29, 424-433.