

AN EXAMINATION OF OVULATORY SHIFTS IN EXTRA-PAIR ATTRACTIONS  
AMONG SEXUAL MINORITY WOMEN

by

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## THESIS ABSTRACT

### AN EXAMINATION OF OVULATORY SHIFTS IN EXTRA-PAIR ATTRACTIONS AMONG SEXUAL MINORITY WOMEN

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There is a growing body of research suggesting that women's preferences and behaviors differ during different phases of their menstrual cycle. However, the vast majority of past research focuses solely on heterosexual women. The present study furthers prior research by examining sexual minority women when they are most likely to be fertile (versus during other points in their menstrual cycles), and their attraction to potential partners outside their current relationships. Participants were 73 women (38 heterosexual;  $M_{\text{age}} = 19.78$ , 35 sexual minority women;  $M_{\text{age}} = 29.69$ ) in exclusive romantic relationships. Women's fertility status, sexual orientation, and sexual attraction to partners outside of their romantic relationships were assessed during two separate times in their menstrual cycle in the form of an online survey. Findings reveal that consistency of sexual attraction to men versus women among sexual minority women predicts the target of

their extra pair attractions during their most fertile phase of the menstrual cycle. These findings suggest the importance of examining evolutionary adaptations promoting reproductive fitness among women of diverse sexual orientations.

## Introduction

During the few fertile days of their menstrual cycle, women have been found to think and behave differently than during other cycle days (e.g. Gangestad, Thornhill & Garver-Apgar, 2010; Hasleton & Miller, 2006; Gangestad & Thornhill, 1998; Havlicek, Roberts & Flegr, 2005; Johnston, Hagel, Franklin, Fink & Grammer, 2001; Markey & Markey, 2010). Evolutionary theorists (e.g., Gangestad & Thornhill, 1998) have argued that these changes occur to maximize reproductive and genetic benefits for a woman's offspring, aiding in the proliferation of her genes. However, this research has mainly focused on heterosexual women and their romantic relationships with *men*. Consequently, research to date has not fully explored sexual minority women (i.e., women who are attracted to women) and how their behavior and preferences may change throughout their cycles. To address this gap in the literature, the present study examined sexual minority women and their sexual attractions during two different phases of their menstrual cycle.

It has been suggested that behaviors and preferences that shift throughout a women's menstrual cycle are related to the complexity of female mating strategies (e.g. Gangestad & Thornhill, 1998; Gangestad et al., 2010; Havlicek, Roberts & Flegr, 2005; Hasleton & Miller, 2006; Johnston et al., 2001; Little, Jones, & Burris, 2007). Women, unlike their male counterparts, have several factors that limit their ability to reproduce: the high investment needs of their offspring, their finite number of potential children over the course of a lifetime, and the very small window of fertility during a woman's menstrual cycle (during which they are actually able to conceive) (Andersson, 1994; Buss, 1994; Trivers, 1972). From an evolutionary standpoint, these factors may contribute to a woman's proclivity to be choosy when picking a partner (Andersson,

1994; Buss, 1994; Buss, 2003; Darwin, 1871; Trivers, 1972). To be clear, evolutionary psychologists do not suggest that women are *consciously* thinking in terms of a “mating strategy.” Rather, in the past women who have made strategic mate selections were more likely to maximize the chances of their children’s survival and ultimately their own genetic pool than were their peers who did not make such mate selections. Thus, over time, it is hypothesized that the adaptation to be choosy (and arguably, wise) when making mate selections persisted through generations and thus an inborn inclination is still present in women today (Andersson, 1994; Buss, 1994; Buss, 2003; Gangestad & Thornhill, 1998).

Given these conjectures, women should ideally mate with men who will provide stable and consistent resources while also possessing favorable genetic traits to pass onto their child. Yet, male partners are unlikely to fill both of those roles due to their own mating strategies (i.e., males with favorable genetic traits would be likely to adopt a short term mating strategy to increase their reproductive fitness, whereas men without favorable traits would be more likely to adopt long term mating strategies to secure a female and invest in guaranteed genetic offspring; Trivers, 1972). Thus, considering the intricate nature of a female’s reproductive capacities and mating strategies, researchers have closely examined the difference in women’s preferences and behaviors when they are likely to conceive (during their period of high fertility) versus not likely (during their period of low fertility).

Changes in women’s attitudes and behaviors during the ovulatory phase of their menstrual cycle have become known as the “Ovulatory Shift Hypothesis” (Gangestad & Thornhill, 1998). According to this hypothesis, women’s preferences for long term mates

(those who will provide wealth, parental care, and faithfulness) should not fluctuate, yet their preferences for short term mates (those possessing desirable reproductive traits such as attractiveness and health - measured by facial and body symmetry [e.g. Moller & Pomiankowski, 1993], strength, or dominance) are hypothesized to peak during the small window of fertility in their cycle when they are actually able to conceive (Gangestad & Thornhill, 1998). Shifting preferences towards males with favorable genetic traits (who inopportunely are likely to adopt short term mating strategies themselves) during the few days they are actually able to conceive, may trigger women to mate with a male who can provide favorable genes to pass onto a child. Additionally, *only* shifting these preferences during the few days of their menstrual cycle when women are actually able to conceive may prompt women to secure reliable and dependable mates (who are less likely to possess favorable traits and therefore more likely to choose long term mating strategies) to provide care and resources for her and her children (Gangestad & Thornhill, 1998).

Previous research supporting the Ovulatory Shift Hypothesis has shown changes in female preferences for many different traits that epitomize short-term mates during the period of high fertility (Gangestad & Thornhill, 1998; Gangestad et al., 2010; Hasleton & Miller, 2006; Havlicek et al., 2005; Johnston et al., 2001; Little et al., 2007; Pawlowski & Jasienska, 2005). Olfactory studies have shown that during the fertile period women prefer the scent of symmetrical men (men who are the same size on two opposite features, such as ears, perceived as an indicator of health) (Gangestad & Thornhill, 1998) and the scent of dominant men (men who scored high on a dominance scale from the International Personality Items Pool) (Havlicek et al., 2005). Women experiencing the fertile phase of their cycle also show greater preference and interest in attractive bodily

features (Gangestad et al., 2010). Specifically, fertile women show greater preferences for masculine faces (compared to faces rated as feminine) (Johnston et al., 2001), taller and masculine body types (as compared to less muscular feminized male bodies) (Little et al., 2007; Pawlowski & Jasienska, 2005). Women also show a preference for talent (described as creative intelligence) over wealth in periods of high fertility versus low fertility (Hasleton & Miller, 2006). These traits (i.e. symmetry, dominance, attractiveness, and masculinity) are all features that may have served to enhance an individual's chance of survival (see Thiessen, 1996; Shoemaker, 2007). Again, these findings are aligned with the theory that the benefits of a short-term mate are particularly appealing or desirable to women when they are most likely to conceive versus when they are least likely to conceive a child.

Beyond changes in women's preferences during periods of high fertility, changes in women's behaviors also align with shifts in their menstrual cycle. For instance, researchers have repeatedly found that women's choice of clothing differs during their fertile phase compared to non-fertile phases of the menstrual cycle (Durante, Li & Haselton, 2008; Haselton, Mortezaie, Pillsworth, Bleske-Rechek & Frederick, 2006). Haselton and colleagues (2006) photographed women and had judges rate their pictures. The results showed that photographs from women in the high fertility phase were judged as more stylish and showing more skin than those in their low period of fertility (Hasleton et al., 2006). This finding was replicated when women were asked to illustrate what they would wear in a social context (such as a party) so the results would reflect women's clothing choice in more of a "mating context." As expected, during the fertile phase, women preferred sexier and more revealing clothing than during non-fertile phases

(Durante et al., 2008). These changes could potentially be adapted to increase a women's access to mates over other females (or, according to the language of evolutionary psychology, enhance a women's intrasexual competition; Buss & Deddon, 1990; Darwin, 1871; Fisher, 2004; Palombit, Cheney, & Seyfarth, 2001).

In addition to changes in women's choice of clothing, previous research has demonstrated changes in the way women interact with men during the different phases of their cycles (Gueguen, 2009; Markey & Markey, 2010). To align with men's most idealized interpersonal style (warm and agreeable – see Markey & Markey, 2010), women in their period of high fertility are more likely to demonstrate interpersonal warmth than when they are in the low-fertile periods of the cycle (Markey & Markey, 2010). By behaving in a way that men find most appealing, women are increasing the likelihood of attracting desirable mates. Furthermore, women in the fertile phase of their cycles appear to be more likely to accept attractive confederates' solicitations than women in non-fertile phases (Gueguen, 2009). These findings suggest that the way women socially interact with men during the fertile period aligns with traits and behaviors that are most desirable to men and may maximize their mating choices.

The Ovulatory Shift Hypothesis has also been examined in the contexts of romantic relationships (Gangestad, Thornhill, & Garver, 2002; Gangestad, Thornhill, & Garver-Apgar, 2005; Pillsworth, Haselton, & Buss, 2004). Women with partners who had less facial symmetrical had greater attraction to extra-pair mates (i.e., partners outside their relationships) during their fertile phase compared to their non-fertile phase (Gangestad et al., 2002; Gangestad et al., 2005; Pillsworth et al., 2004). This study also considered partner facial symmetry when assessing female attraction to their own mate



during fertile phases. Compared to women with symmetrical partners, women reported less attraction to their own partner during their period of high fertility if their partner was low in facial symmetry (Gangestad et al., 2005).

Previous research has also extended the Ovulatory Shift Hypothesis to demonstrate potentially adaptive behaviors among men during women's period of high fertility (Gangestad et al., 2002; Haselton & Gangestad, 2006). When assessing female-reported mate retention behaviors (such as being vigilant of a partner's whereabouts, monopolizing their time, expressing dependency on them, etc.), women reported a greater number of mate-retention behaviors from their partner when they were fertile than when they were not (Gangestad et al., 2002). Stronger differences among mate retention behaviors were reported in non-exclusive relationships than exclusive relationships (Gangestad et al., 2002). Similarly, women reported that their partners express more jealousy during their fertile phase (Haselton & Gangestad, 2006). Keeping in line with previous findings, less attractive male partners showed significant increases in jealousy and possessive behaviors than did attractive male partners during their female partner's period of high fertility (Haselton & Gangestad, 2006).

Although the literature supporting the Ovulatory Shift Hypothesis has dramatically grown over the last two decades, there is little application of this theory to sexual minority women. From an evolutionary perspective, same-sex relationships or attractions are not logically fitting considering their inability to lead to natural reproduction. Not surprisingly, the evolutionary explanations offered to date are conflicting and do not fully explain same-sex relationships in terms of their adaptive value (Alexander, 1974; Buss, 2003; Hutchinson, 1959; Muscarella, Cevallos, Siler-

Knoql, & Peterson, 2005; Wilson, 1975). Nonetheless, an evolutionary perspective would maintain that all women should still instinctually adapt to allow for the proliferation of their genes.

Despite their shortcomings, several theories have emerged to explain same-sex relationships among humans from an evolutionary standpoint (Alexander, 1974; Buss, 2003; Hutchinson, 1959; Muscarella et al., 2005; Wilson, 1975). One of the more well-known evolutionary theories of same-sex relationships is Wilson's *kin altruism theory* (1975), which suggests that sexual minority individuals altruistically invest their time and resources into the offspring of their relatives (Wilson, 1975). Then, given that same-sex relationships are non-reproductive bonds, their genes are passed on through the lines of their relatives. Another somewhat similar evolutionary argument for the adaptive nature of same sex relationships is the *alliance formation hypothesis* (Muscarella et al., 2005). This theory proposes that forming same-sex bonds was historically advantageous as a survival strategy, increasing resources and social status among individuals (Muscarella et al., 2005). Additionally, it was hypothesized that sexual relations occurred in these bonds to strengthen the emotional attachment between the couples (Muscarella et al., 2005). Although these theories do not fully explain why individuals would engage in same-sex relationships versus just being asexual, they do suggest a possibility as to why same-sex relationships may have an evolutionary value, in spite of the fact that they do not result in direct reproduction.

The adaptive value of sexual attraction to the same sex may remain elusive. Nonetheless, previous research suggests that women who are attracted to other women may be more variable in their attractions than often realized (i.e. Baumeister, 2000;

Diamond, 2000; Diamond, 2008; Kitzinger & Wilkinson, 1995; Pillard, 1990; Shuster, 1987). In particular, female sexuality was once characterized as determined more by situational demands than male sexuality (Kitzinger & Wilkinson, 1995; Pillard, 1990; Shuster, 1987). Yet, research has come to identify stable sexual minority identities in women, albeit varying greatly in their degree, from bisexual women (whose sexual attraction fluctuates loosely between men and women) to lesbian women (whose sexual attraction may remain unwavering to only women) (Baumeister, 2000; Diamond, 2000; Diamond, 2008; Golden, 1996). Although there is not a clear consensus as to why female sexuality may vary among sexual minority women (for a review see Peplau & Garnets, 2000), novel research has begun to explore ovulatory shifts in sexual motivation and behaviors among sexual minority women (Burleson, Trevathan, & Gregory, 2002; Diamond & Wallen, 2011; Matteo & Rissman, 1984).

Research indicates that lesbian women have shown a self-reported increase in the amount of sexual encounters and orgasms during their period of high fertility (Matteo & Rissman, 1984). Also, both lesbian and heterosexual women showed a peak in allosexual behaviors (sexual encounters with a female or male, respectively) during their period of high fertility compared to autosexual behaviors (self-stimulating behaviors) (Burleson et al., 2002). These findings indicate a potential adaptive shift in both lesbian and heterosexual women to engage in sexual behaviors with another person when they are most likely to conceive, regardless of the sex of the sexual partner.

The consistency of lesbian women's sexual identity also seems to play a role in their shifting attractions during the menstrual cycle (Diamond & Wallen, 2011). Lesbian women who consistently identified as a lesbian (i.e. lesbian women who did not fluctuate

in their sexual identity and attraction) during a 10-year study appeared to show an increased amount of sexual motivation towards same-sex partners during a period of high fertility (measured by peaked estrogen levels in this study, typically associated with ovulation; Diamond & Wallen, 2011). Furthermore, women who consistently reported as bisexual during the study's duration showed significantly smaller increases in sexual motivation towards other women, compared to their lesbian peers (Diamond & Wallen, 2011). However, this research did not address the possibility of sexual minority women expressing sexual motivation towards *men* during their period of high fertility. From an evolutionary perspective, it seems likely that women should be attracted to men when they are most likely to conceive to better their chances of reproduction, yet prior research suggests differences in the increase of same-sex sexual motivation among lesbian and bisexual women. Thus, the current study extended previous literature showing ovulatory changes in sexual behaviors and motivation by considering the consistency of sexual minority women's sexual attraction during the menstrual cycle. Additionally, the present study included both men and women as a potential targets of sexual attraction during sexual minority women's period of high fertility.

Past research has examined changes in behaviors, attractions, preferences, and relationship factors in the context of the female menstrual cycle, yet there has been little examination of the shifting behaviors and attitudes of sexual minority women (Burleson et al., 2002; Diamond & Wallen, 2011; Durante et al., 2008; Gangestad & Thornhill, 1998; Gangestad et al., 2002; Gangestad et al., 2010; Gueguen, 2009; Haselton et al., 2006; Haselton & Gangestad, 2006; Hasleton & Miller, 2006; Havlicek et al., 2005; Johnston et al., 2001; Little et al., 2007; Markey & Markey, 2010; Matteo & Rissman,

1984). To replicate and extend prior studies that examined extra-pair attractions across the menstrual cycle, commitment levels in sexual minority women's relationship and sexual permissiveness (female's willingness to engage in sexual acts – also known as sociosexuality) were considered in the current study. Past research suggests that women in strongly committed relationships are less likely to be attracted to potential partners outside of their current relationship during their period of high fertility (Pillsworth et al., 2004). Further, women who exhibit high levels of sociosexuality showed increased levels of sexual opportunism during their period of high fertility, which prior research outlines as a potential moderator to extra-pair attractions (Gangestad et al., 2010). A heterosexual comparison group was also assessed in an attempt to replicate prior findings. It was hypothesized that:

(1) Women who identify as heterosexual will show stronger sexual attraction towards extra-pair mates when in their period of high fertility versus low fertility. This finding would replicate findings by Gangestad and colleagues (2002; 2005).

(2) Women who identify as lesbian will show stronger sexual attraction towards extra-pair mates when in their period of high fertility versus low fertility. This finding would be consistent with findings presented by Gangestad and colleagues (2002; 2005).

(3) Women who consistently report attraction to only women (among past and present sexual attractions and behaviors) will show greater interest towards extra-pair mates that are female when in their period of high fertility versus low fertility. This hypothesis has never been examined in past research, but is

furthering research demonstrating that women consistently reporting sexual attraction to women may experience an increase in sexual motivation towards female partners during their period of high fertility (Diamond & Wallen, 2011).

(4) Women who report sexual attraction to both women and men (among past and present sexual attractions and behaviors) will show greater interest towards extra-pair mates that are male when in their period of high fertility versus not. This hypothesis has never been examined before, but is furthering research indicating that sexual minority women who do not consistently report sexual attraction to women do not have an increase in sexual motivation towards female partners during their period of high fertility (Diamond & Wallen, 2011). Further, this hypothesis is consistent with evolutionary explanations offered by Gangestad and Thornhill (1998) that women's ovulatory changes are steered towards reproductive benefits.

(5) When controlling for the level of commitment in sexual minority participants' relationships, participants who report higher levels of commitment will show less extra-pair desires than those with lower levels of commitment during their period of high fertility. This finding would be consistent with Pillsworth and colleague's (2004) research on ovulatory shifts in extra-pair sexual desire.

(6) When controlling for sexual minority participants' sexual permissiveness, participants who score higher (showing higher degrees of sexual permissiveness) will show more extra pair desires than those who score lower (showing lower degrees of sexual permissiveness) during their period of high fertility. This

finding has not been previously examined in the context of ovulatory shifts in extra pair attractions and will build on previous research examining potential covariates of extra pair attractions (Gangestad et al., 2010).

## Method

### Participants

One hundred and two women participated in the present study (55 heterosexual, 47 sexual minority women). Sexual orientation groups were based on self-reported identification information. Participants identifying as heterosexual were grouped as such and all remaining participants were grouped as sexual minorities (comprised of the following options: “homosexual,” “bisexual,” “not sure,” and “other”). Eligibility criteria established for this study (consistent with previous studies of this nature; i.e., Burleson et al., 2002; Durante et al., 2012; Gangestad et al., 2001; Gangestad et al., 2005; Havlicek et al., 2005;) required participants to be a natural born female (1 participant needed to be excluded), free of all forms of birth control (1 participant needed to be excluded), not currently pregnant (1 participant needed to be excluded), have regular menstrual cycles (4 participants needed to be excluded), not experiencing any premenstrual symptoms at the time of survey completion (as symptoms could influence participants’ mood and feelings of sexual desire; 18 participants needed to be excluded), and provide complete data for the dependent measure at both survey administration times (5 participants needed to be excluded). Consequently a total of twenty-five participants were removed from the present analyses (some participants were ineligible due to multiple criteria described above). Thus, analyses reported in the present paper reflect a total of 73 participants, 38 heterosexual women ( $M_{age} = 19.78$ ,  $SD = 4.63$ ) and 35 sexual minority women ( $M_{age} = 29.69$ ,  $SD = 6.58$ ).



The heterosexual women's sample (N=38) ranged in age from 18 to 42 years old, with 94.7% of the sample under the age of 30. Heterosexual women reported an average relationship length of 27.0 months (SD=41.03) and the majority were not cohabitating with their partners (86.8%). Participants' ethnic backgrounds were: 55.3% White/European Americans, 13.2% African American, 15.8% Latino/ Hispanic, 7.9% Asian/Pacific Islander, 2.6% Native American and 5.3% "Other". Of this sample, 89.5% reported being sexually active, of those 82.4% claimed to be "somewhat regularly" or "regularly" sexually active.

The sexual minority women's sample (N=35) ranged from 18 to 47 years old, with only 62.9% of the sample under the age of 30. Sexual minority women reported an average relationship length of 71.7 months (SD=67.49) and the majority were cohabitating with their partners (88.6%) for an average length of 64.20 months. Participants' ethnic backgrounds were: 87.5% White/ European Americans, 5.7% African American, 2.9% Latino/ Hispanic, and 2.9% "Other". Of this sample, 94.1% reported being sexually active, of those 78.8% claimed to be "somewhat regularly" or "regularly" sexually active.

## **Recruitment**

The present study used an online survey to administer questionnaires to participants. Therefore, women were recruited using numerous online venues, such as social media websites, forums, LGBT focused websites, and list-serv. Recruitment materials advertised that the study was looking at "factors affecting the menstrual cycle" (see appendix for flyer example). Additionally, sexual minority participants from prior

studies in the researcher's lab were contacted via email to inquire about their interest in participating in the present study. Two \$50 prizes were offered; one raffled among participants who completed survey 1 and a second prize raffled among participants who completed survey 2. This was used as an incentive for participants to complete both survey dates as they had a chance to win two separate \$50 prize drawings if they completed the questionnaire at both survey phases (fertile phase and non-fertile phase).

### **Procedure**

Data collection for the present study took place in the form of an online survey. There were at least three points of contact with each participant. First, women contacted the researcher to participate in the current study at which point their most recent menstrual cycle information was obtained. Next, women's cycle position was individually assessed and each participant was administered the survey (sent a link to complete the survey on a particular day) in accordance with their individual menstrual cycle. Each participant was then sent the same survey at the opposite position of their menstrual cycle (i.e. ovulating versus non ovulating) to obtain the two points of data collection. If a participant was unsure of their most recent cycle information, the researcher estimated the start of their next cycle and contacted the participant at such date to confirm. Then, data collection dates were assigned based off their newly confirmed menstrual cycle. Participants took approximately 15 minutes to complete each survey. Participants provided demographics information and completed the below-described study measures.

Depending on each participant's current position in the menstrual cycle at the time of survey administration, participants completed the surveys in their period of high fertility and period of low fertility randomly. Although not strategically counterbalanced, this resulted in 59<sub>n</sub> of subjects completing the survey while in their period of high fertility first and 14<sub>n</sub> of subjects completing the survey while in their period of low fertility first. Analyses showed no difference between groups based on fertility status administration order.

In order to match participants' first survey response to their second, they were asked to give the last four digits of their cell phone number and their childhood street name to ensure anonymity. After completion of the first survey, participants were instructed to send their contact information to a lab email for entry in the prize drawing.

## **Measures**

**Demographics.** Participants were asked various questions such as ethnicity, age, length of current relationship, and other questions relevant to their eligibility for participation in the present study (i.e., "are you currently pregnant?").

**Ovulation.** To assess women's position in their menstrual cycle at the time of reporting, 5 items were asked. First, a series of questions assessed women's current or past use of hormonal contraceptives to assure eligibility requirements were met. Next, women were prompted to give the date of the first day of their last menstrual cycle, the date of the onset of their next menses and the average length of their cycle. If participants were unsure of the start of their last cycle they were asked to log the start of their next cycle and contact the researcher again at an appropriate date with this information.

Participants with cycles that on average last for more than 31 or less than 26 days were excluded from the study as their cycles do not fit the current methodical needs (this decision rule was implemented following the example of Wilcox, Dunson, & Baird, 2000). Finally, participants were asked to report on the regularity of their menstrual cycle through four choices (previous research shows women's ability to produce reasonably accurate details of their menstrual cycle – see Jukic, Weinberg, Wilcox, McConnaughey, Hornsby, & Baird, 2008): “My cycle is almost always the same length month to month,” “My cycle is practically always within a day or two of the same length each month,” “My cycle is usually within a week of the same length each month,” and “My cycle length is highly irregular; I never know when I’ll begin menstruating.” Women who identified as “My cycle length is highly irregular; I never know when I’ll begin menstruating,” were removed from the study as previous investigations suggest that such irregular cycles do not produce reliable or consistent periods of high fertility (Little & Jones, 2012; Wilcox et al., 2000).

The “reverse cycle day method” was used to assess position in the menstrual cycle for each participant (see Hasleton & Gangestad, 2006; Little et al., 2005; Pillsworth et al., 2004; Thornhill & Gangstad, 1999). Using the expected onset of their next menses, 15-19 days were counted back to mark each participant's period of high fertility; deeming the 15<sup>th</sup> day as the peak in ovulation. Prior research has established the peak of ovulation to represent when the egg is released into the ovaries and because of sperm endurance, the period of high fertility includes approximately 4 days leading up to this (Lenton, Landgren, Sexton, & Harper, 1984). Although variability across women is expected, assessing fertility status using this methodology as a standard has been successful in

studies of this nature (see Hasleton & Gangestad, 2006; Little et al., 2005; Little & Jones, 2012; Pillsworth et al., 2004; Thornhill & Gangstad, 1999). To provide a conservative estimate of women's "fertile phase" the present study focused on 3 days (the day of estimated ovulation and two days leading up to to) instead of 5; this was used as participants' period of high fertility. Excluding days when a participant was menstruating, and three days prior, the low fertility phase was comprised of days estimated to be in the luteal phase of the menstrual cycle (last phase of a menstrual cycle occurring after ovulation) as routinely done in this research (Hasleton & Gangestad, 2006; Little & Jones, 2012; Pillsworth et al., 2004; Thornhill & Gangstad, 1999).

**Sexual Orientation Consistency.** Klein's sexual orientation grid (Klein, Sepekoff, & Wolf, 1985) was used to assess participants' sexual orientation in different facets of life, such as sexual attraction, sexual behavior, sexual fantasies, emotional preference, social preference, lifestyle, and self-identification. Participants were asked to rate each of these dimensions for the past and present using a 7-point likert scale ranging from (1) Other sex only to (7) same sex only and for lifestyle and self-identification dimensions (1) heterosexual only to (7) homosexual only. (*Cronbach's Alpha: High Fertility Phase = .96, Low Fertility Phase = .96*)

**Sexual Attraction and Behavior.** The dependent variable, sexual attraction, was measured using a 14-item measure to assess participants' sexual behaviors and attractions within the prior two days of taking the survey (see Gangestad, et al., 2002). These scores were assessed at both survey administration times (the period of high fertility and low fertility) to assess within subject differences. Questions regarding sexual attractions and behaviors with a primary current partner and with someone other than a primary current

partner were amended to assess gender of potential extra pair attractions (i.e. “In the past two days, how often were you sexually aroused by a male other than your primary partner?”). Participants were asked to rate how often they experienced the listed sexual attractions using a 4-point likert scale ranging from (0) not at all to (3) more than a few times. A complete list of questions is available in the appendix. (*Cronbach’s Alpha: High Fertility Phase* = .80, *Low Fertility Phase* = .83; prior studies utilizing this measure had similar consistency scores, see Gangestad et al., 2002).

**Sociosexuality Orientation Inventory.** Participants were also asked about their willingness to engage in sexual behaviors and attitudes towards sex. To assess this, the revised Sociosexual Orientation Inventory (SOI-R) was used (Penke, & Asendorpf, 2008). This measure includes 9-items using a 5-point Likert scale. Three questions refer to behavioral choices, such as the number of sexual encounters or partners. Three questions refer to an individual’s attitudes towards sex (i.e., whether sex without love is ok). Finally, three questions pertain to the desires or fantasies an individual feels about people they encounter every day. (*Cronbach’s Alpha: High Fertility Phase* = .78, *Low Fertility Phase* = .80; prior studies utilizing this measure had similar consistency scores, see Gangestad et al., 2010)

**Relationship Commitment.** The Multiple Determinants of Relationship Commitment Inventory (MDRCI) was used to assess relationship commitment among participants (Kurdek, 1995). This 24-item measure examined six aspects of relationship commitment: rewards, costs, match to ideal comparison level, alternatives, investments, and barriers. Participants were asked to rate the extent to which they agree with each statement using a 5-point likert scale ranging from (1) strongly disagree to (5) strongly

agree. A complete list of questions is available in the appendix. (*Cronbach's Alpha: High Fertility Phase* = .82, *Low Fertility Phase* = .85; prior studies utilizing this measure had similar consistency scores, see Pillsworth et al., 2004)

## **Results**

The two samples (heterosexual and sexual minority women) varied on their demographics and therefore descriptive analyses were performed separately. The two samples were categorized based on participants' answer to the following question, "What is your sexual orientation?" Participants reporting as "heterosexual" were coded into one sample (N=38) and participants reporting as "homosexual," "bisexual," "not sure," or "other" were coded into a second sample of sexual minority participants (N=35). The data was split using these two categories to perform all subsequent analyses.

*Hypotheses 1: Women who identify as heterosexual will show stronger sexual attraction towards extra-pair mates when in their period of high fertility versus low fertility.*

The first hypothesis aimed to replicate previous findings and predicted that heterosexual women would show stronger attraction towards extra pair mates in general when in their period of high fertility versus low fertility. To test this claim, a paired samples t-test was performed on the heterosexual sample (N =38). A composite score was computed for "extra pair desires" by aggregating three items from the Sexual Attraction and Behavior scale: "felt strong feelings of sexual desire," "felt strong sexual attraction toward someone other than my current partner," and "fantasized about sex with a stranger or acquaintance/past partner" (see Gangestad et al., 2002). As seen in Figure 1, the results

did not support the first hypothesis that heterosexual women ( $t(37) = -.784, p = .43$ ; *High Fertility*<sub>mean</sub> = 1.32, *SD* = .49; *Low Fertility*<sub>mean</sub> = 1.41, *SD* = .58) would show stronger attraction towards extra pair partners during their period of high fertility versus low fertility.

*Hypothesis 2: Women who identify as a sexual minority will show stronger sexual attraction towards extra-pair mates when in their period of high fertility versus low fertility.*

The second hypothesis predicted that sexual minority women would show stronger attraction towards extra pair mates in general during their period of high fertility versus low fertility. To test this claim, a paired samples t-test was performed on the sexual minority sample ( $N = 35$ ). As with the first hypothesis, a composite score was computed for “extra pair desires” by aggregating three items from the Sexual Attraction and Behavior scale: “felt strong feelings of sexual desire,” “felt strong sexual attraction toward someone other than my current partner,” and “fantasized about sex with a stranger or acquaintance/past partner” (see Gangestad et al., 2002). As seen in Figure 1, the results did not support the second hypothesis that sexual minority women ( $t(34) = .475, p = .63$ ; *High Fertility*<sub>mean</sub> = 1.53, *SD* = .75; *Low Fertility*<sub>mean</sub> = 1.49, *SD* = .72) would show stronger attraction towards extra pair partners during their period of high fertility versus low fertility.

*Hypothesis 3: Women who consistently report attraction to only women (among past and present sexual attractions and behaviors) will show greater interest towards extra-pair mates that are female when in their period of high fertility versus low fertility.*



The third hypothesis predicted that sexual minority women who reported consistent sexual attraction and sexual behavior toward only women would show extra pair desires towards *females* other than their primary partner. To test this claim, a single item from the Sexual Attraction and Behavior scale was used: “felt strong sexual attraction toward a female other than my current partner.”

To consider the consistency of participants’ sexual identities, a composite score was created using four items from Klein’s Sexual Orientation Grid: past value for “sexual attraction, e.g. erotic desire, physical arousal,” present value for “sexual attraction, e.g. erotic desire, physical arousal,” past value for “sexual behavior, e.g. erotic thoughts, sexual day dreams,” and present value for “sexual behavior, e.g. erotic thoughts, sexual day dreams.” Participants answered on a scale from (1) Other sex only to (7) Same sex only. The data was then split into three categories to create groups of consistency: consistent sexual attraction towards only men (scores of a 1 or 2), inconsistent sexual attraction towards men or women (scores of 3, 4 or 5), and consistent sexual attraction towards women (scores of 6 or 7). No sexual minority participants reported having consistent sexual attractions towards men and thus only the two subsequent categories were included in the following analyses.

A paired samples t test was performed using participants’ report of extra pair attraction as the dependent variable and their fertility status as the within subjects factor. As seen in Figure 2, the results for hypothesis 3 were approaching significance. This is potentially suggestive that women with consistent sexual attraction towards the same sex show stronger sexual attraction to women other than their primary partner during their

period of high fertility compared to their period of low fertility ( $t(20) = 1.784, p = .090$ ,  $High\ Fertility_{mean} = 1.71, Low\ Fertility_{mean} = 1.38$ ).<sup>1</sup>

*Hypothesis 4: Women who consistently report sexual attraction to both women and men (among past and present sexual attractions and behaviors) will show greater interest towards extra-pair mates that are male when in their period of high fertility versus not.*

The fourth hypothesis predicted that women who consistently reported sexual attraction to both men and women would show extra pair attraction to men during their period of high fertility versus low fertility. To test this claim a single item from the Sexual Attraction and Behavior scale was used: “felt strong sexual attraction toward a female other than my current partner.”

As with the third hypothesis, a composite score was created using four items from Klein’s Sexual Orientation Grid to measure sexual attraction consistency: past value for “sexual attraction, e.g. erotic desire, physical arousal,” present value for “sexual attraction, e.g. erotic desire, physical arousal,” past value for “sexual behavior, e.g. erotic thoughts, sexual day dreams,” and present value for “sexual behavior, e.g. erotic thoughts, sexual day dreams.” Participants answered on a scale from (1) Other sex only to (7) Same sex only. The data was then split into three categories to create groups of consistency: consistent sexual attraction towards only men (scores of a 1 or 2), inconsistent sexual attraction towards men or women (scores of 3, 4 or 5), and consistent sexual attraction towards women (scores of 6 or 7). No sexual minority participants

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<sup>1</sup> Power analyses for a dependent t test reveals that with 21 participants statistical power is .58 (58%) to find a moderate effect.

reported having consistent sexual attractions towards men and thus only the two subsequent categories were included in the following analyses.

A paired samples t test was performed using extra pair attraction to men as the dependent variable and participants' fertility status as the within subjects factor. As seen in Figure 3, the results for Hypothesis 4 supported the claim that women with inconsistent sexual identities towards the same sex show stronger sexual attraction to males other than their primary partner during their period of high fertility compared to their period of low fertility ( $t(9) = 2.236, p < .05, High\ Fertility_{mean} = 1.50, Low\ Fertility_{mean} = 1.00$ ).<sup>2</sup>

*Hypothesis 5: When controlling for the level of commitment in participants' relationships, who report higher levels of commitment will show less extra-pair desires than those with lower levels of commitment during their period of high fertility.*

The fifth hypothesis predicted that sexual minority participants' level of commitment would act as covariate when assessing women's reports of extra-pair desires during their period of high fertility. To assess commitment levels, a composite score was created using the Relationship Commitment Scale (Kurdek, 1995). Items 4, 10, 14, 16, 20, and 22 were reverse coded and then all 24 items were aggregated to create a relationship commitment score. A repeated measures general linear model was performed with a covariate for commitment level. The results did not support the claim that controlling for commitment level ( $F(1,30) = .37, p = .55$ ) would strengthen the report of extra-pair desires during participants' period of high fertility.

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<sup>2</sup> Power analyses for a dependent t test reveals that with 10 participants statistical power is .29 (29%) to find a moderate effect.

*Hypothesis 6: When controlling for participants' sexual permissiveness, participants who score higher (showing higher degrees of sexual permissiveness) will show more extra pair desires than those who score lower (showing lower degrees of sexual permissiveness) during their period of high fertility.*

The sixth hypothesis predicted that sexual minority participants' sociosexuality score (or sexual permissiveness) would act as covariate when assessing women's reports of extra-pair desires during their period of high fertility. To assess women's sexual permissiveness, a composite score was created using the Sociosexuality Sexuality Inventory (Penke, & Asendorpf, 2008). Item 6 was reverse coded and all 9 items were aggregated to compute a sociosexuality score. A repeated measures general linear model was performed with a covariate for sociosexuality scores. The results did not support the claim that controlling for sexual permissiveness ( $F(1,30) = .08, p = .77$ ) would strengthen the report of extra-pair desires during participants' period of high fertility.

## Discussion

Decades of research examining the Ovulatory Shift Hypothesis has confirmed that heterosexual women tend to show different preferences and behaviors during the most fertile days of their menstrual cycle compared to their less fertile days (Durante et al., 2008; Gangestad & Thornhill, 1998; Gangestad et al., 2002; Gangestad et al., 2005; Gangestad et al., 2010; Gueguen, 2009; Haselton & Gangestad, 2006; Haselton et al., 2006; Haselton & Miller, 2006; Johnston et al., 2001; Little et al., 2007; Markey & Markey, 2010; Thornhill, & Garver-Apgar, 2005). These findings are grounded in a basic evolutionary paradigm that suggests women unconsciously behave in ways that are most conducive to the proliferation of their genes through reproduction. Yet, the vast majority of these studies do not include or address how sexual minority women fit into this evolutionary paradigm. The present study provides preliminary evidence for sexual minority women's susceptibility to the adaptation of extra pair desires during their period of high fertility.

The data collected from the heterosexual subsample was intended to replicate previous findings that heterosexual women report stronger sexual attractions towards men other than their primary partner during their period of high fertility (Gangestad et al., 2005). However, the results of the current study did not replicate these prior findings. This does not necessarily suggest that prior findings should be discredited, as they have been replicated in this literature before (Larson, Pillsworth, & Haselton, 2012). However, given the small effect sizes of these previous studies (Dawson, Suschinsky, & Lalumiere, 2012; Durante et al., 2012; Haselton et al., 2006; Haselton & Gangestad, 2006; Little & Jones, 2012), this may suggest that this finding is more vulnerable to varying

methodologies and samples. The present findings also include small effect sizes and should be considered with caution when interpreting the results.

It was also predicted that sexual minority women would report stronger extra pair attractions during their period of high fertility. This prediction was not confirmed. These analyses examined general extra pair attractions without specifying the gender of the target. Follow up analyses revealed that when asked about their sexual attraction to specific genders, sexual minority women significantly reported stronger attractions towards *males* other than their primary partner during their period of high fertility. This finding directly aligns with the Ovulatory Shift Hypothesis, which suggests that during the period of high fertility sexual minority women's sexual attractions are aimed towards men who can provide reproductive value despite their same-sex orientation. Moreover, this finding highlights a need to further investigate sexual minority women's overall extra pair attractions and the methodological means of assessing them.

The current study also aimed to differentiate consistency in sexual attraction among sexual minority women as a predictor of their extra pair desires (i.e., males or females). When broken into two categories (sexual attraction *only* to women and sexual attraction to both men and women) there was a clear difference in the gender of extra pair attractions, such that women in the “consistent sexual attraction only to women” category showed extra pair attractions towards females and women in the “consistent sexual attraction to both men and women” category showed extra pair attractions towards males. This is a novel finding that highlights the importance of sexual identity in this evolutionary paradigm. Here, women who reported consistent sexual attraction towards women and men still showed the evolutionary adaptation of increased sexual attraction

towards men during their period of high fertility despite their attraction to same sex partners. Yet interestingly, women who reported being consistent in their sexual attraction towards only women still showed vulnerability towards the evolutionary adaptation of extra pair attractions during the period of high fertility, but their attractions were aimed towards other women rather than men.

There are a number of conflicting theories that attempt to explain same-sex attraction through an evolutionary lens (i.e., Alexander, 1974; Buss, 2003, Hutchinson, 1959; Muscarella et al., 2005; Wilson, 1975). Yet, the present data does not allow us to differentiate among them nor does it give credence towards any particular theory of same-sex attraction. For instance, these findings do not lend any justification as to why some individuals would actively choose to forgo their own reproduction to invest more time into their relatives' offspring (Wilson, 1975). However, these data may demonstrate that women with consistent same-sex attractions have inherent attraction to women during their most fertile period, which is potentially relevant to the alliance formation theory (Muscarella et al., 2005). Here, increases in sexual attraction to other women may act as an adaptive strategy to form stronger bonds with other females who are collectively supporting the survival and health of the woman's children. Yet, it is also possible that hormonal fluctuations influence sexual minority women's (e.g., bisexual women's) attraction towards men. These shifts in attraction are somewhat contradictory to the alliance formation theory and limit the applicability of the present findings to this perspective.

Nonetheless, the findings presented here do highlight the potential relevance of sexual identity in the evolutionary adaptations that have been established in the literature

pertaining to the Ovulatory Shift Hypothesis. They suggest a unique interaction between underlying adaptations and sexual identity that more appropriately addresses and acknowledges diverse women's experiences. Thus, it is important to recognize and examine same-sex relationships in evolutionary paradigms similar to the Ovulatory Shift Hypothesis.



## **Limitations and Conclusions**

Although the present study did provide interesting evidence to support some sexual minority women's vulnerability to evolutionary-driven extra pair attractions, there are several limitations that restrict the generalizability of these findings. First, the reverse cycle day method used to assess fertility status is an imperfect methodology. Ovulation tests that employ urine or blood are the preferred practice in ovulatory studies of this nature (i.e. Durante et al., 2008; Durante et al., 2012; Gangestad et al., 2002; Gangestad et al., 2005; Gangestad et al., 2010; Haselton et al., 2007), although they are more costly and less efficient to collect. Thus, future investigations using a more precise measure of fertility status are needed.

Additionally, the measure used to assess extra pair attractions is a fairly new measure that has only been utilized in a small number of studies (Gangestad et al., 2002; Haselton & Gangestad, 2006). The lack of replication in the present study potentially suggests the need for multiple methodologies to assess extra pair attractions as participants may not be accurately responding to such direct questions (e.g., "felt strong sexual attraction to someone other than my current partner"). Thus, future research should consider asking multiple questions about extra pair desires and aim to incorporate new methodologies aside from survey questionnaires.

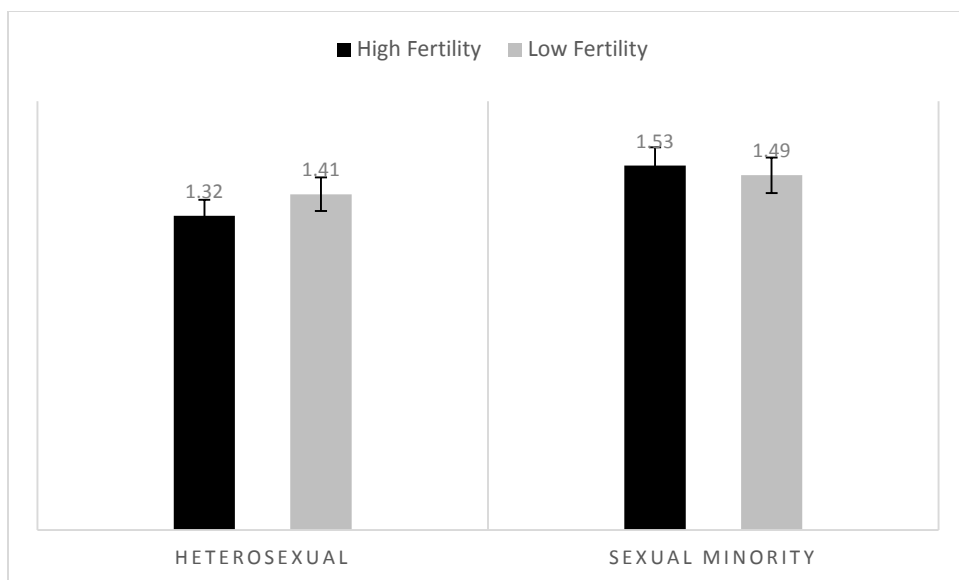
Although small sample sizes are not atypical of studies examining ovulatory changes in women (Dawson et al., 2012; Durante et al., 2012; Haselton et al., 2006; Haselton & Gangestad, 2006; Little & Jones, 2012), the modest sample size of the present study is a limitation worth mentioning. This is especially true for the analyses that

considered consistency of sexual attraction. Future research seeking replication should aim for larger sample sizes to increase the likelihood of detecting these type of results.

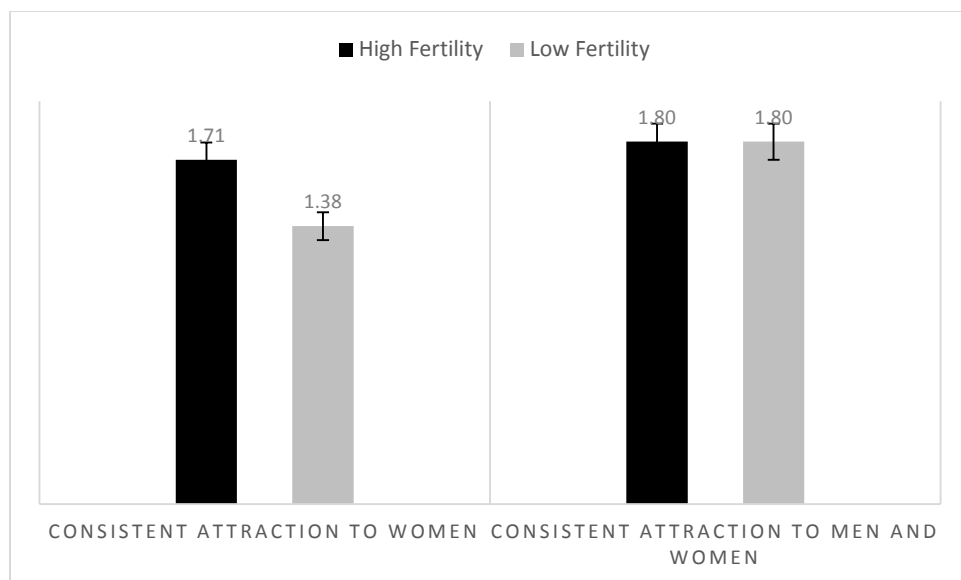
Finally, previous studies that investigate extra pair attractions among heterosexual women took into consideration their partners' indicators of good genes (specifically facial symmetry) (Gangestad et al., 2005). Due to restrictions inherent in this methodology (i.e., an online survey) and the novelty of the present study, women's partners' facial symmetry was not measured as a potential moderator for extra pair attractions. Future investigations of extra pair attractions among sexual minority women should examine partner facial symmetry, as well as potential female indicators of good genes as indicated by evolutionary theorists.

Despite these limitations, the present findings are novel and add to the scientific understanding of potential evolutionary adaptations among sexually minority women. Although the mating strategies that act as a framework for the Ovulatory Shift Hypothesis may no longer be necessary today, evidence continues to suggest that these behaviors have persevered. The present findings suggest that these ovulatory inclinations go beyond the behaviors that are expected in heterosexual women and are potentially applicable to sexual minority women, who form relationships with sexual partners not naturally conducive to reproduction. As a result, there is an evident need to incorporate sexual minority women into evolutionary paradigms even though (or perhaps, because) theorists have not yet established a consensus regarding the adaptive value that same-sex relationships may have.

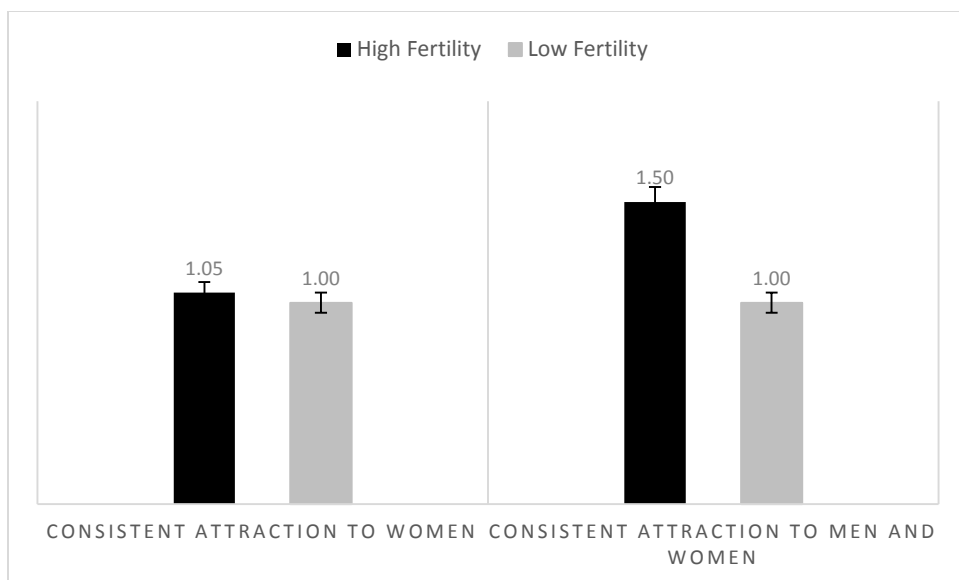
Beyond the novelty of the questions addressed in this research, the present findings also contribute to the literature examining the varying degrees of sexual attraction among sexual minority women. Although these findings do not fully explain why some sexual minority women vary greatly in their sexual attraction and others do not, they do highlight the role that ovulatory changes have in sexual attraction variation among sexual minority women. Additionally, these findings demonstrate an inherent attraction towards same-sex partners in consistently stable lesbians (i.e. women who consistently report attractions only to women), despite evolutionary adaptations that appear to elicit less consistent sexual minority peers to gear their extra pair attractions towards men in the fertile phase. Although same-sex stereotypes and prejudice are undoubtedly still prevalent, this research may contribute to further the understanding of female sexuality as a continuum. Female sexuality warrants examination beyond the distinct separate categories such as “gay” or “straight” that trigger impartial treatment.



*Figure 1:* Ovulatory shifts in extra-pair attractions among heterosexual and sexual minority women.



*Figure 2:* Ovulatory shifts in extra-pair attractions to **females** among women of varying sexual attractions.



*Figure 3:* Ovulatory shifts in extra-pair attractions to **males** among women of varying sexual attractions.

## Appendix

### Study Questionnaire

#### Background Information

1. Are you currently using any hormonal contraceptives?  
Yes      No
  
2. Are you currently pregnant?  
Yes      No
  
3. Are you currently lactating (breastfeeding)?  
Yes      No
  
4. Have you begun experiencing menopausal symptoms?  
Yes      No
  
5. What is your gender?  
  
Male      Female      Other
  
6. How old are you now (in years) \_\_\_\_\_ ?
  
7. What is your ethnicity (circle all that apply)?  
Black/African American  
  
White  
  
American Indian/Native American/  
  
Asian/Pacific Islander  
  
Hispanic  
  
Other \_\_\_\_\_ -
  
8. Are you currently in a romantic relationship with a \_\_\_\_\_?  
Man              Woman              Other
  
9. If you answered “yes” to question 8, how long have you been in your romantic relationship?  
\_\_\_\_\_ months/years (please specify)
  
10. If you answered “yes” to question 8, Are you currently cohabitating with your romantic partner?  
Yes      No

11. If you answered “yes” to question 10, how long have you been cohabitating with your romantic partner?

12. \_\_\_\_\_ months/years (please specify)

13. Are you sexually active?

Yes    No

14. If you answered “yes” to question 8, would you say that you are (circle one):

Regularly sexually active (more than once a week)

Somewhat regularly sexually active (more than once per month)

Occasionally sexually active (less than once per month)

15. Have you had a baby in the last 12 months?

Yes    No

16. Are you currently trying to get pregnant?

Yes    No

17. Are you currently taking any medications?

Yes    No

If you answered “yes”, please list all medications you are taking (including birth control and antibiotics)

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18. Are you currently experiencing any symptoms associated with menstruation (for example, cramps, bloating, etc.)?

Yes    No

19. What is your **personal income** from all sources before taxes?

Under \$20,000

\$20,000 to \$49,000

\$50,000 to \$75,000

\$75,000 or greater

20. What is your **household income** (your income combined with other family members/significant others that you reside with) before taxes?

Under \$20,000

\$20,000 to \$49,000

\$50,000 to \$75,000



\$75,000 or greater

21. What is the highest grade or level of school that you have completed?

12<sup>th</sup> grade, GED, or high school diploma

Some vocational/technical/ or business school

Some vocational/technical/ or business school diploma

Some college/no degree

Associates degree

Bachelor's degree

Graduate/professional degree (Master's, Ph.D., M.D., etc.)

22. What is your religious preference?

Protestant

Roman Catholic

Mormon

Orthodox (such as Greek or Russian)

Jewish

Muslim

I do not consider myself religious

Other \_\_\_\_\_

23. What is your sexual orientation?

Heterosexual

Homosexual

Bisexual

Not Sure

Other \_\_\_\_\_

24. Do you currently use a contraceptive pill?

Yes (Which one? \_\_\_\_\_)

No

25. If you do not currently use the pill, have you previously?

Yes When did you last use it? \_\_\_\_\_

No

26. Do you use a contraceptive injection such as Depo-Provera or an implant such as Norplant?

Yes

No, and I have never used one

No, but I have used it previously; my last injection was \_\_\_\_\_ (month), \_\_\_\_ (year)

27. Were you taking any form of hormonal contraception (i.e., birth control pills, Depo-Provera, or Norplant) when you first became romantically interested in your current partner?

Yes No

28. When did your last menstrual period begin? That is, what was the first day of menstrual flow during your last period? Please state the precise date, if possible. Consult the attached calendar to identify the date if it is helpful. (If you are currently menstruating, list the date your current menstruation began.)

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29. What is the usual length of your menstrual cycle? That is, what is the typical time span between the first day of menstrual blood flow one month to the first day of menstrual blood flow the next month? (Circle one.)

In days:      <22    22    23    24    25    26    27    28

29    30    31    32    33    34    >35

30. How much does the length of your cycle vary from month to month?

- ☐ My cycle is almost always the same length month to month
- ☐ My cycle is practically always within a day or two of the same length each month
- ☐ My cycle is usually within a week of the same length each month
- ☐ My cycle length is highly irregular; I never know when I'll begin menstruating

Rate yourself on the following items on a 1-7 scale:

- (1) Never like me
- (2) Rarely like me
- (3) Sometimes like me
- (4) Equally like and unlike me
- (5) Like me
- (6) Frequently like me
- (7) Always like me

- |                                          |                                      |
|------------------------------------------|--------------------------------------|
| 1. ___ self-reliant                      | 31. ___ makes decisions easily       |
| 2. ___ yielding                          | 32. ___ compassionate                |
| 3. ___ helpful                           | 33. ___ sincere                      |
| 4. ___ defends own beliefs               | 34. ___ self-sufficient              |
| 5. ___ cheerful                          | 35. ___ eager to sooth hurt feelings |
| 6. ___ moody                             | 36. ___ conceited                    |
| 7. ___ independent                       | 37. ___ dominant                     |
| 8. ___ shy                               | 38. ___ soft-spoken                  |
| 9. ___ conscientious                     | 39. ___ likable                      |
| 10. ___ athletic                         | 40. ___ masculine                    |
| 11. ___ affectionate                     | 41. ___ warm                         |
| 12. ___ theatrical                       | 42. ___ solemn                       |
| 13. ___ assertive                        | 43. ___ willing to take a stand      |
| 14. ___ flatterable                      | 44. ___ tender                       |
| 15. ___ happy                            | 45. ___ friendly                     |
| 16. ___ strong personality               | 46. ___ aggressive                   |
| 17. ___ loyal                            | 47. ___ gullible                     |
| 18. ___ unpredictable                    | 48. ___ inefficient                  |
| 19. ___ forceful                         | 49. ___ acts as a leader             |
| 20. ___ feminine                         | 50. ___ childlike                    |
| 21. ___ reliable                         | 51. ___ adaptable                    |
| 22. ___ analytical                       | 52. ___ individualistic              |
| 23. ___ sympathetic                      | 53. ___ does not use harsh language  |
| 24. ___ jealous                          | 54. ___ unsystematic                 |
| 25. ___ has leadership abilities         | 55. ___ competitive                  |
| 26. ___ sensitive to the needs of others | 56. ___ loves children               |
| 27. ___ truthful                         | 57. ___ tactful                      |
| 28. ___ willing to take risks            | 58. ___ ambitious                    |
| 29. ___ understanding                    | 59. ___ gentle                       |
| 30. ___ secretive                        | 60. ___ conventional                 |

Please respond honestly to all of the following questions. Your responses will be treated confidentially and anonymously.

1. With how many different partners have you had sex within the past 12 months?

0                      1                      2 to 3                      4 to 7                      8 or more

2. With how many different partners have you had sexual intercourse on *one and only one* occasion?

0                      1                      2 to 3                      4 to 7                      8 or more

3. With how many different partners have you had sexual intercourse without having an interest in a long-term committed relationship with this person?

0                      1                      2 to 3                      4 to 7                      8 or more

4. Sex without love is OK.

1                      2                      3                      4                      5

Totally Disagree

Totally Agree

5. I can imagine myself being comfortable and enjoying “casual” sex with different partners.

1                      2                      3                      4                      5

Totally Disagree

Totally Agree

6. I do *not* want to have sex with a person until I am sure that we will have a long-term, serious relationship.

1                      2                      3                      4                      5

Totally Disagree

Totally Agree

7. How often do you have fantasies about having sex with someone you are *not* in a committed romantic relationship with?

1	2	3	4	5
Never	Very seldom	About once a Month	About once a week	Nearly every day

8. How often do you experience sexual arousal when you are in contact with someone you are *not* in a committed romantic relationship with?

1	2	3	4	5
Never	Very seldom	About once a Month	About once a week	Nearly every day

9. In everyday life, how often do you have spontaneous fantasies about having sex with someone you have just met?

1	2	3	4	5
Never	Very seldom	About once a Month	About once a week	Nearly every day

1. Overall, how satisfied would you say that you currently are with your body? Circle the number that best represents how satisfied you are.

1 Not very satisfied	2	3	4	5	6	7	8	9	10 Very satisfied
-------------------------------	---	---	---	---	---	---	---	---	-------------------------

2. Overall, how satisfied would you say that you currently are with your physical appearance in general? Circle the number that best represents how satisfied you are.

1 Not very satisfied	2	3	4	5	6	7	8	9	10 Very satisfied
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3. Overall, how satisfied would you say that you currently are with your romantic relationship? Circle the number that best represents how satisfied you are.

1 Not very satisfied	2	3	4	5	6	7	8	9	10 Very satisfied
-------------------------------	---	---	---	---	---	---	---	---	-------------------------

4. Overall, how satisfied would you say that you currently are with your sex life? Circle the number that best represents how satisfied you are.

1 Not very satisfied	2	3	4	5	6	7	8	9	10 Very satisfied
-------------------------------	---	---	---	---	---	---	---	---	-------------------------

5. Overall, how attractive do you feel you are to members of the opposite sex? Circle the number that best represents how satisfied you are.

1 Not very satisfied	2	3	4	5	6	7	8	9	10 Very satisfied
-------------------------------	---	---	---	---	---	---	---	---	-------------------------

Please report how much you have engaged in the following behaviors in the **past two days** using the following scale:

0 = not at all

1 = once

2 = a few times

3 = more than a few times

\_\_\_\_\_ felt strong feelings of sexual desire

\_\_\_\_\_ felt strong attraction toward my primary current partner

\_\_\_\_\_ fantasized about sex with my current partner

\_\_\_\_\_ felt strong sexual attraction toward someone other than my current partner

\_\_\_\_\_ fantasized about sex with a stranger or acquaintance/past partner

\_\_\_\_\_ felt sexually aroused by the sight of someone very physically attractive (other than my primary partner)

\_\_\_\_\_ felt sexually aroused by the scent of someone (other than my primary partner)

\_\_\_\_\_ felt strong sexual attraction toward a female other than my current partner

\_\_\_\_\_ had sex with my primary current partner

\_\_\_\_\_ had sex with someone other than my primary current partner

\_\_\_\_\_ experienced orgasm with my primary current partner

\_\_\_\_\_ experienced orgasm with someone other than my primary current partner

\_\_\_\_\_ felt strong sexual attraction toward a male other than my current partner

\_\_\_\_\_ initiated sex with my primary current partner

\_\_\_\_\_ initiated sex with someone other than my primary current partner

\_\_\_\_\_ flirted with someone other than my primary current partner



For the following questions, please look at the pictures on the top of the page. To answer these questions, chose the number that corresponds to your answer.

Which figure looks most like you?	1	2	3	4	5	6	7	8	9
Which figure would you like to look like?	1	2	3	4	5	6	7	8	9
Which figure do you think your partner would like you to look like?	1	2	3	4	5	6	7	8	9
Which figure looks like the average person?	1	2	3	4	5	6	7	8	9
Which figure looks most attractive?	1	2	3	4	5	6	7	8	9
Which figure looks most healthy?	1	2	3	4	5	6	7	8	9
Which figure looks most like your partner?	1	2	3	4	5	6	7	8	9
Which figure would you like your partner to look like?	1	2	3	4	5	6	7	8	9

Circle the number that best represents how you would rate each item.

**1. One advantage to my relationship is having someone to count on.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**2. I give up a lot to be in my relationship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**3. My current relationship comes close to matching what I would consider to be my ideal relationship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**4. As an alternative to my current relationship, I would like the freedom to do what I want to do whenever I want to do it.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**5. I've put a lot of energy and effort into my relationship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
---------------------------	---------------------------	---------------------------------------	------------------------	---------------------

**6. It would be difficult to leave my partner because of the emotional pain involved.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
---------------------------	---------------------------	---------------------------------------	------------------------	---------------------

**7. One advantage to my relationship is that it provides me with companionship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**8. I have to sacrifice a lot to be in my relationship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
------------------------	------------------------	---------------------------------	---------------------	---------------------

**9. My current relationship provides me with an ideal amount of affection and companionship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
------------------------	------------------------	---------------------------------	---------------------	---------------------

**10. As an alternative to my current relationship, I would like to date someone else.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
------------------------	------------------------	---------------------------------	---------------------	---------------------

**11. A part of me is tied up in my relationship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
------------------------	------------------------	---------------------------------	---------------------	---------------------

**12. I would be difficult to leave my partner because I would still feel attached to him/her.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
------------------------	------------------------	---------------------------------	---------------------	---------------------

**13. One advantage to my relationship is being able to share affection.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
------------------------	------------------------	---------------------------------	---------------------	---------------------

**14. It takes a lot for me to be in my relationship**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**15. My current relationship provides me with an ideal amount of equality in the relationship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**16. As an alternative to my current relationship, I would like to find other ways to occupy my time.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**17. I have invested a part of myself in the relationship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**18. I would find it difficult to leave my partner because I would feel obligated to keep the relationship together.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**19. Overall, I derive a lot of rewards and advantages from being in my relationship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**20. Overall, there are a lot of personal costs involved in being in my relationship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**21. Overall, there is not much difference between my current relationship and my ideal relationship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**22. Overall, alternatives to being in my relationship are appealing.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**23. Overall, I'd say I have a lot invested in my relationship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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**24. Overall, there are many things that prevent me from ending my relationship.**

1 Strongly disagree	2 Somewhat disagree	3 Neither disagree nor agree	4 Somewhat agree	5 Strongly agree
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Please rate yourself on the following 7 variables of sexual orientation. For each variable, please choose the number according to the scoring key above the grid. Please complete the “Past” column, then “Present”, and then “Ideal” column.

- 1-Other sex only
- 2-Other sex mostly
- 3-Other sex somewhat more
- 4-Both sexes equally
- 5-Same sex somewhat more
- 6-Same sex mostly
- 7-Same sex only

Variable	Past	Present	Ideal
Sexual Attraction (e.g., erotic desire, physical arousal)			
Sexual Behavior (e.g., kissing, foreplay, manual/oral/vaginal/anal sex)			
Sexual Fantasies (e.g., erotic thoughts, sexual daydreams)			
Emotional Preference (e.g., romantic love, intimate feelings)			
Social Preference (e.g., friendships, colleagues)			

- 1-Heterosexual only
- 2-Heterosexual mostly
- 3-Heterosexual somewhat more
- 4-Heterosexual/Homosexual equally
- 5-Homosexual somewhat more
- 6-Homosexual mostly
- 7-Homosexual only

Variable	Past	Present	Ideal
Lifestyle (e.g., affiliations, hangouts, and events)			
Self-Identification (e.g., personal and/or social identity)			

Below are a number of personalit traits that may or may not apply to you. Please write a number next to the statement to indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

- 1 – Disagree strongly
- 2 – Disagree moderately
- 3 – Disagree a little
- 4 – Neither agree nor disagree
- 5 – Agree a little
- 6 – Agree moderately
- 7 – Agree Strongly

Extraverted, enthusiastic \_\_\_\_\_

Critical, quarrelsome \_\_\_\_\_

Dependable, self-disciplined \_\_\_\_\_

Anxious, easily upset \_\_\_\_\_

Open to new experiences, complex \_\_\_\_\_

Reserved, quiet \_\_\_\_\_

Sympathetic, warm \_\_\_\_\_

Disorganized, careless \_\_\_\_\_

Calm, emotionally stable \_\_\_\_\_

Conventional, uncreative \_\_\_\_\_

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