THE EFFECT OF FEMALE ORGASM FREQUENCY ON FEMALE MATE SELECTION AND MALE INVESTMENT

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ABSTRACT

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In the current research predictions derived from three hypotheses regarding the adaptive function of female orgasm were tested. In Study 1, 199 female undergraduate students participated in an experiment that tested the Mr. Right and long-term pair bonding hypotheses that female orgasm functions as a long-term mate selection device and to promote attachment and bonding, respectively. In Study 2, 144 male undergraduate students participated in an experiment that tested the paternity confidence hypothesis that female orgasm functions as a signal of fidelity to males, which calibrates male investment. In both studies, participants imagined themselves as a member of a romantic relationship provided in a scenario. Within these scenarios, the relationships varied between either short-term or long-term and the frequency that the female experienced orgasm during intercourse varied between never, occasionally, and almost always. Participants were randomly assigned to one condition of this 2 (relationship context: short-term, long-term) x 3 (female orgasm frequency: never, occasionally, almost always) between-subjects design. Females answered questions regarding relationship satisfaction and males answered questions regarding investment. Tentative support for the Mr. Right hypothesis was found, with moderate effect sizes indicating a relationship between female orgasm frequency and female relationship satisfaction in short-term relationship contexts. Clear support was found for the long-term pair bonding hypothesis with a statistically significant relationship between female orgasm frequency and female relationship satisfaction in long-term relationship contexts being completely mediated by the female’s love for her partner. No support was found for the paternity confidence hypothesis as there was no relationship between female orgasm frequency and male investment in long-term relationship contexts.
To Genevieve: For your inexhaustible love and support.
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CHAPTER I. INTRODUCTION

A national survey in the United Kingdom recently found that during their last sexual encounter 95% of male but only 69% of female respondents reported having an orgasm (Richters, de Visser, Rissel, & Smith, 2006). A separate study with over 3,000 female respondents found that 39.2% reported having regular sexual problems, including trouble becoming aroused, not producing adequate lubrication, pain during intercourse, and not being able to orgasm (Lutfey, Link, Rosen, Wiegel, & McKinlay, 2009). Clearly, there is a significant difference between the sexes in the expression of orgasm. What might account for these discrepancies between male and female orgasm?

For the purposes of this research, female orgasm refers to the collection of physical and psychological changes that occur within women during the peak of sexual pleasure. Among the defining features of female orgasm are an altered state of consciousness followed by feelings of contentment that is accompanied by rhythmic contractions of the muscles surrounding the vagina and typically the uterus as well (Meston, Levin, Sipski, Hull, & Heiman, 2004). Male orgasm also occurs during sexual peak and involves various muscle contractions; however, a major difference between male and female orgasm is that male orgasm is accompanied by the ejaculation of seminal fluid (for additional details, see Masters & Johnson, 1966). During vaginal intercourse the ejaculation that accompanies male orgasm propels the male gametes (sperm) into the female reproductive tract where fertilization of the female gamete (egg) could occur. From an evolutionary perspective the evolved function of the male orgasm is no mystery. Male orgasm is a necessary component of sexual reproduction. A similar process is involved in the sexual reproduction of numerous species.
In contrast to male orgasm, female orgasm is not necessary for fertilization and sexual reproduction to occur. For this and other reasons a few prominent scholars (Don Symons, Stephen J. Gould, Elizabeth Lloyd) have concluded that female orgasm is most likely not an adaptation that has helped women solve a recurrent adaptive problem. Instead, they believe it is most appropriate to think of female orgasm as an evolutionary by-product of the male orgasm. Many others, however, have offered hypotheses regarding the potential adaptive benefits of female orgasm and the processes by which female orgasm may have evolved as an adaptation in its own right. The debate regarding whether female orgasm qualifies as an adaptation or a by-product is ongoing.

In the current research, we will describe the criteria for adaptation, review the case for considering female orgasm to be a by-product of male orgasm, as well as the most relevant and plausible hypotheses that have been proffered regarding possible evolved functions of female orgasm. Along these lines, we will describe the evidence in support of these hypotheses. Finally, we will outline a set of experiments that are designed to test predictions derived from three of the most compelling adaptationist hypotheses for female orgasm.

**The Criteria for Adaptation**

An adaptation is a trait that, through the processes of natural or sexual selection, helped solve a reoccurring adaptive problem and, in doing so, contributed to the organism’s ancestor’s reproductive success (Puts & Dawood, 2012).^{1} George C. Williams, in his influential book, *Adaptation and Natural Selection* (1966), described the criteria for an adaptation, stating that an adaptation must be reliable in developing and performing, be efficient in fulfilling its role, and be relatively economic in this function (see also Buss, 2012). In other words, when evaluating female orgasm as an adaptation, the following questions become relevant: Is female orgasm
found in species other than humans? Are most women around the world capable of experiencing orgasm? Does female orgasm help solve a recurrent adaptive problem, thereby helping women to survive or get their genes replicated? Does the benefit associated with female orgasm, on average, outweigh any costs associated with it?

Female Orgasm as a By-product of Male Orgasm

An adaptation is an inherited trait that has been selected for because it contributes to the solving of an adaptive problem (Buss, 2012). As noted, one possibility is that female orgasm exists not as an adaptation but as a functionless by-product of male orgasm. A by-product is a trait that does not serve an evolutionary function but exists simply because it is paired with an adaptive trait. Thus, the umbilical cord is an adaptation, and the belly button is a byproduct of it. An example of an adaptation in one sex producing a by-product in the other sex is that of female nipples as an adaptation, and male nipples as a by-product of female nipples. Nipples in females are adaptive and were selected for as a means for mothers to feed their young. In males, nipples serve no evolutionary function. However, males have nipples because the genes that have been selected for in females to produce nipples are passed on to males as well.

Donald Symons (1979) in his seminal book, *The Evolution of Human Sexuality*, was among the first to address the possible evolutionary foundation of the female orgasm. After reviewing the then-available evidence, Symons concluded that the female orgasm is most appropriately thought of as a by-product of the male orgasm. In other words, he concluded that orgasm in males is adaptive and was selected for and that females are capable of experiencing orgasm only because they have analogous sexual morphology to men. For example, some of the anatomical structures that were selected for in males that enable them to be capable of orgasm (such as the penis and the neuronal pathways leading from it) have counterparts in females (e.g.,
the clitoris being analogous to the penis), thereby allowing them to be capable of orgasm as well (Lloyd, 2005). Similar to the processes involved in the production of nipples, embryological development of the sex organs in males and females is highly similar, up to a point, with both progressing along almost the same pathway. If the anatomical structures leading to orgasm were selected for to develop in males, females would, in turn, develop analogous structures as well (Barash, 2012).

Those who consider female orgasm to be a by-product of male orgasm evaluate the known characteristics of female orgasm as not meeting the aforementioned criteria of adaptation. Regarding the criteria of reliability, Symons (1979) notes that the ability to experience orgasm seems to vary greatly between females and argues that most women do not experience orgasm consistently with intercourse as would be expected if female orgasm was an adaptation. He notes a study by Chevalier-Skolnikoff (1974) in which female stumptail monkeys were observed experiencing orgasm but this was highly variable, only observed in captive animals, and required prolonged clitoral stimulation. Regarding the criteria of efficiency, Harvard philosopher Elizabeth Lloyd (2005) in her book, *The Case of the Female Orgasm: Bias in the Science of Evolution*, extends Symons arguments stating that female orgasm is not optimally reached during heterosexual intercourse, with the clitoris usually not being directly stimulated. The further the distance from the clitoris to the point of penile entry the less likely a female is to experience orgasm (Wallen & Lloyd, 2011). Lloyd interprets these findings as indicating that the female orgasm is not efficient in serving its proposed function, as would be expected if it was an adaptation.
Female Orgasm as an Adaptation

As noted, despite the fact that arguments have been made for viewing female orgasm as a by-product of male orgasm, numerous adaptationist hypotheses for female orgasm have been generated. Although this is not an exhaustive list, the most compelling adaptationist arguments for female orgasm are the sperm retention hypothesis, the good genes hypothesis, the Mr. Right hypothesis, the long-term pair bonding hypothesis, and the paternity confidence hypothesis. Each of these five hypotheses will be discussed; however, only the Mr. Right hypothesis, the long-term pair bonding hypothesis, and the paternity confidence hypothesis will be tested in the current research.

The Sperm Retention Hypothesis. According to the sperm-retention hypothesis female orgasm is an adaptation that causes more sperm to be retained within the reproductive tract after intercourse, thereby increasing the likelihood of conception. The main evidence for this hypothesis comes from Baker and Bellis (1993). Baker and Bellis found that approximately 35% of the sperm from ejaculate is released from the female shortly after intercourse, termed “flowback.” However, if a female experiences orgasm from one minute before to 45 minutes after the male has ejaculated, she releases less “flowback” and more sperm is retained (Baker & Bellis, 1993).

Also, the endogenous chemical oxytocin is a part of the efferent neuronal pathways of the clitoris and vagina (Gelez, Poirier, Facchinetti, Allers, Wayman, Alexandre, & Giuliano, 2010). During female orgasm oxytocin is released, causing the cervix to dip and muscles to contract (Carmichael, Humbert, Dixen, Palmisano, Greenleaf, & Davidson, 1987; Carmichael, Warburton, Dixen, & Davidson, 1994). Both of these processes lead to increased sperm transport and fewer sperm being expelled from the female's body immediately following intercourse,
making conception more likely to occur (Kunz, Beil, Deininger, Wildt, & Leyendecker, 1996; Wildt, Kissler, Licht, & Becker, 1998).

**The Good Genes Hypothesis.** According to the good genes hypothesis female orgasm functions to maximize the likelihood that the female will become impregnated by a mate with good genes, thereby maximizing any resultant offspring’s likelihood of surviving and thriving. Selecting a mate with good genes is an adaptive problem that women (and men) face within both short- and long-term mating contexts (Buss & Schmitt, 1993). Initially, the good genes hypothesis was designed to explain female finches' preference for colorful males (Hamilton & Zuk, 1982). However, it has more recently been used to generate testable hypotheses regarding ovulatory shifts in mate preferences among females (see Gangestad & Thornhill, 1998; Johnston, Hagel, Franklin, Fink, & Grammar, 2001) as well as the evolution of orgasm in females.

Evidence for this hypothesis, as it pertains to the evolution of female orgasm, comes from research on bilateral symmetry. Symmetry is a signal of good genes, because symmetry indicates an organism's ability to resist environmental stressors and parasites (which cause asymmetry). For this reason, bilateral symmetry is found to be attractive (Thornhill & Gangestad, 1993; Grammar & Thornhill, 1994). In support of the good genes hypothesis as applied to female orgasm, research suggests that females are more likely to experience orgasm with men who are more physically attractive (Shackelford, Weekes-Shackelford, LeBlanc, Bleske, Euler, & Hoier, 2000) and more symmetrical (Thornhill, Gangestad, & Comer, 1995; Puts, Welling, Burriss, & Dawood, 2012).

**Parental Investment Theory.** The next two hypotheses, the Mr. Right hypothesis and the long-term-pair-bonding hypothesis, are best understood in light of parental investment theory (Trivers, 1972). This theory states that whichever sex has the higher minimum obligate
investment in offspring will be more selective regarding mating. In humans, females, due to nine
month internal gestation of offspring (during which they are highly vulnerable) and the
production of relatively large, nutrient-rich eggs, have a far greater minimum investment in
offspring than males, who are only minimally necessary for the act of intercourse and the
production of sperm, which are far “cheaper” to produce. Due to this difference in obligate
minimum investment in offspring, males and females have evolved different mate preferences.
Most relevant to the current research is the notion that females, due to their greater minimum
investment, prefer long-term mates who demonstrate commitment to the relationship as well as
the ability and willingness to invest resources and provide protection to the female and their
offspring (Buss, 1989).

The Mr. Right Hypothesis. According to the Mr. Right hypothesis female orgasm
functions as a long-term mate-selection device for females. According to this hypothesis, females
use a males’s ability to bring her to orgasm as a piece of information that helps her decide his
value as a long-term mate. Many psychosocial factors have been found to interfere with a
female's ability to achieve orgasm, including feelings of guilt toward sex, overall stress levels,
and general unhappiness (Meston, Levin, Sipski, Hull, & Heiman, 2004). Thus, a males's ability
to bring a female to orgasm may function as a signal of his care and concern for a female's needs
and desires. Thus, by caring enough to address a female's emotional and sexual needs, a male
may also be demonstrating his more general willingness to stay with her, invest in her, and invest
her offspring. Thus, this hypothesis is based on the premise that females are, by design,
differentially orgasmic with different males (Buss, 2003). In other words, the aforementioned
"problems" that many females experience that prevent them from achieving orgasm may actually
best be thought of as design features rather than problems that should be fixed.3
The main evidence in support of the Mr. Right hypothesis for female orgasm, comes from Pollet and Nettle (2009), who found that self-reported frequency of orgasms by females is positively correlated with their partner’s income, after controlling for several other variables (age, happiness, etc.). Also, a study of nonhuman primates (Japanese macaques) found that female orgasm rates were a product of the male’s dominance, once the number of mounts and pelvic thrusts was controlled for statistically (Troisi & Carosi, 1998). Thus, to date, there is only limited and indirect empirical support for the Mr. Right hypothesis.

The Long-Term Pair Bonding Hypothesis. According to the long-term pair bonding hypothesis female orgasm functions to promote a female's commitment to a relationship partner by promoting emotional bonding with and attachment to him. This hypothesis, like the Mr. Right hypothesis assumes differential orgasm rates in females as a function of the male partner, with orgasm being more likely to occur with men who make better long-term partners, increasing the likelihood that females will remain in long-term relationships with these “better partners.” In this way, female orgasm is adaptive, because long-term monogamous relationships promote male investment in offspring, allowing the female to successfully pass along her genes, with the offspring being better able to survive and thrive. Thus, according to the Mr. Right hypothesis the relationship between female orgasm and mate selection is the male’s demonstration of care and commitment, according to the long-term pair bonding hypothesis this relationship is mediated by the female’s feelings of attachment and closeness to her mate.

Evidence in support of the long-term pair bonding hypothesis for female orgasm comes from research on the role of oxytocin in emotional bonding between sex partners. As previously stated, oxytocin levels rise during intercourse, particularly during orgasm (Carmichael et al., 1987). Along with causing muscular contractions, oxytocin has been found to be involved in
emotional bonding. Animal research, both with prairie voles and nonhuman primates, suggests that oxytocin is involved in mating and mate bonding (Insel & Hulihan, 1995; Smith, Agmo, Birnie, & French, 2010; Young & Wang, 2004). In humans, oxytocin seems to be connected to mating in a similar way, with levels elevating after 10 minutes of warm contact between couples (Grewen, Girdler, Amico, & Light, 2005). Additionally, variation in one specific gene related to the oxytocin receptor has been correlated with female pair-bonding behavior (Walum, Lichtenstein, Neiderhiser, Reiss, Ganiban, Spotts, Pedersen, Anckarsäter, Larsson, & Westberg, 2012). This last study shows a direct relationship, in humans, between oxytocin and pair-bonding behavior.

The Paternity Confidence Hypothesis. Males face the unique adaptive problem of paternity uncertainty. Females conceive internally and, thus, are always certain of their biological relatedness to a child. However, males can never be certain that an offspring is truly their own. From an evolutionary perspective, sexual jealousy evolved in males because it helped them solve the problems associated with paternal uncertainty. In other words, males are highly sensitive to cues of a female partner's sexual infidelity because investing one’s resources in another’s offspring wastes resources and squanders opportunities to father one’s own offspring (Buss & Schmitt, 1993). Because there has been a strong selection pressure for males to invest in biologically-related offspring, it would be adaptive to be sensitive to cues of a partner’s likelihood of fidelity and infidelity (see also Platek, Burch, Panyavin, Wasserman, & Gallup, 2002; Alvergne, Faurie, & Raymond, 2009). According to the paternity confidence hypothesis female orgasm functions to signal to a man that his female mate is satisfied and likely sexually faithful. A central tenet of this hypothesis is that males are expected to invest more resources in females who experience orgasm with them. Thus, the evolved function of female orgasm is to
An assumption of the following evidence is that females are more likely to remain faithful when they are satisfied in the relationship. Female orgasm frequency during penile-vaginal intercourse has been found to positively correlate with both sexual satisfaction and overall relationship satisfaction for the female (Haning, O’Keefe, Randall, & Kommor, 2007; Costa & Brody, 2007). However, these studies do not directly test the central tenet of this hypothesis, that males invest in their mate differentially as a product of her orgasm. A recent study did find a positive correlation between female orgasm frequency and intensity with male investment. However, no relationship was found between female orgasm frequency and intensity with female fidelity or with male’s perception of female fidelity (Ellsworth & Bailey, 2013). Another study found a relationship between male’s investment and interest in their partner’s orgasms. Additionally, this relationship was moderated by time the couples had spent apart, which was intended to measure the likelihood of female infidelity (McKibbin, Bates, Shackelford, Hafen, & LaMunyon, 2012).

The Importance of Context

Before describing the current research, it is important to note that both males and females have evolved psychological mechanisms associated with short- and long-term mating but have faced somewhat different adaptive problems within these different mating contexts (Buss & Schmitt, 1993). Long-term mating refers to relationships in which both parties intend to remain together and the presence of a mutual obligation of care and commitment. In the psychological literature, long-term mating is commonly operationalized as steady dating and marriage. Short-term mating refers to relationships often with shorter temporal durations in which the intention of
the relationship lasting and mutual obligation of care and commitment are not present or are reduced. Short-term mating is commonly operationalized as brief-affairs, one-night stands, and temporary liaisons (Buss & Schmitt, 1993). In the current research the distinction between short- and long-term mating is relevant because when evaluating the adaptationist hypotheses for female orgasm it should be noted that female orgasm may have evolved to help females solve an adaptive problem that is unique to short-term mating, one that is unique to long-term mating, or because it helped females solve an adaptive problems within both short- and long-term mating contexts. In this study, predictions derived from different hypotheses regarding female orgasm will be tested. Some of these hypotheses regard adaptive problems specific to short-term mating while others regard adaptive problems specific to long-term mating.

Summary and Overview of the Current Research

The various hypotheses that have been proffered as explanations for how female orgasm may have helped females solve one or more recurring adaptive problems related to short- and/or long-term mating are interesting and compelling. However, for the most part the specific predictions that can be derived from them have not been subjected to rigorous empirical test. Thus, the current research aims to begin to fill a gap in the literature on the possible evolved functions of the female orgasm.

Before detailing the specifics of the current research it is important to recall that female orgasm may have evolved because it helped females solve more than one specific adaptive problem. Thus, more than one hypothesis regarding the evolved function of the female orgasm may be valid, and empirical support for one hypothesis need not call into question the validity of another hypothesis. For example, empirical support for the Mr. Right hypothesis for female orgasm need not be interpreted as contradicting the paternity certainty hypothesis for female
orgasm. Along these lines, we conducted two separate studies. In Study 1 the predictions regarding possible evolved functions of female orgasm were derived from the Mr. Right hypothesis as well as from the long-term pair bonding hypothesis and were examined using female participants. In Study 2 a prediction regarding a possible evolved function of female orgasm was derived from the paternity confidence hypothesis and was examined using male participants.

**Study 1**

According to the Mr. Right hypothesis the frequency of female orgasm acts as an indicator that helps females evaluate males during short-term mating contexts as potential long-term mates. This function of orgasm would be adaptive in increasing the likelihood that a female engages in a long-term relationship with a male who is committed and cares about her, which is very important to females due to their higher minimum investment in offspring. If this hypothesis is valid then when evaluating a male's care and commitment toward her, females should be sensitive to information about a man's ability to bring her to orgasm.

According to the long-term pair bonding hypothesis, female orgasm promotes female attachment to a male with whom she experiences orgasm, promoting long-term relationships. This function of orgasm would be adaptive in increasing the likelihood that a female remains with a mate who is a good long-term partner. If this hypothesis is valid then a female’s feelings of attachment and closeness to a mate should be affected by experiencing orgasm with the mate in long-term contexts.

In Study 1, *female* participants read a scenario about a relationship between a male and a female and imagined themselves as the female in the relationship. Within these scenarios two independent variables were manipulated—female orgasm frequency and relationship context.
The female's frequency of orgasm varied among three levels—never, occasionally, and almost always. The relationship context varied between two levels—short-term or long-term. The main dependent measures included female's perceptions of the relationship's quality, including her degree of relationship satisfaction and commitment.

Thus, the expected relationship between female orgasm frequency and relationship satisfaction, whether derived from the Mr. Right hypothesis or the long-term pair bonding hypothesis, is the same in Prediction 1 and 2. However, in Prediction 1, derived from the Mr. Right hypothesis, the relationship between female orgasm frequency and female's relationship satisfaction was predicted to be mediated by her trust, perceived male care, and male commitment in short-term mating contexts. In Prediction 2, derived from the long-term pair bonding hypothesis, the relationship between female orgasm frequency and female's relationship satisfaction was predicted to be mediated by her perceived love and intimacy in long-term mating contexts.

**Prediction 1:** Based on the Mr. Right hypothesis, we expected that females, within a short-term relationship context, who role-played experiencing higher frequencies of orgasm would report greater relationship satisfaction. Additionally, we expected this relationship between female orgasm frequency and relationship satisfaction to be at least partially mediated by females' perceptions of their partner's commitment.

**Prediction 2:** Based on the long-term pair bonding hypothesis, we expected that females, within a long-term relationship context, who role-played experiencing higher frequencies of orgasm would report greater relationship satisfaction. Additionally, we expected this relationship between female orgasm frequency and relationship satisfaction to be at least partially mediated by love for her partner.
CHAPTER II. STUDY 1 METHOD

Participants and Design

Participants were 199 female undergraduates at Bowling Green State University (BGSU) who signed up for a study, using the SONA online experiment management system, called “Mating and Dating.” Participants completed the study online. Data from two participants who did not follow instructions were excluded from analysis. Additionally, data from 19 participants who identified their sexual orientation as homosexual/gay/lesbian or bisexual, or "Other" were excluded from analysis. These data were excluded because a) the study’s theoretical basis applies only to heterosexuals; b) the study’s methodology involves role playing a member of a heterosexual romantic/sexually-active relationship; and, c) these individuals were disproportionally represented within a few of the study’s conditions, which could have introduced a source of systematic error into the study’s results. In the end, the working sample was comprised of 178 females.

On average, participants were approximately 19 years old (\(M = 19.24, SD = 1.70\)). A majority of participants (80.7%) were White/Caucasian; 9.7% were Black/African American; 3.4% were Hispanic/Latina; 3.4% were Biracial/Multiracial; 1.1% were Asian, 1.1% identified their race/ethnicity as “Other”; and .6% were Native American. In terms of their current relationship status, 27.7% of participants were not dating anyone; 14.1% were casually dating someone; 52% were in a serious, committed relationship; 2.8% were cohabiting/engaged/married; and, 3.4% listed their relationship status as “Other”. For analytic purposes, we dichotomized relationship status into the categories of “not involved in a serious relationship” (41.8%) and “involved in a serious relationship” (54.8%).
Participants were randomly assigned to one condition within a 2 (relationship context: short-term, long-term) x 3 (female orgasm frequency: never, occasionally, almost always) between-subjects factorial design. The number of participants per condition ranged from 26 to 32.

Materials and Procedure

Informed Consent. The study began with participants being provided with an online informed consent document, which stated that participation was voluntary, ensured anonymity, and provided contact information for the primary researcher as well as for the Human Subjects Review Board (see Appendix B).

Overview of the Study. Next, participants read an “Overview of the Study” that conveyed to participants the importance of the study, explained that the study involved role-playing a member of a romantic relationship, stressed the importance of reading the scenario carefully, and encouraged them to try their best to imagine and visualize themselves being in the kind of relationship that was described to them (see Appendix C).

Relationship Scenarios. Next, participants read a description of their hypothetical relationship with Michael. Before reading this section, entitled, "Your Relationship with Michael," participants were reminded to imagine themselves in the described relationship, regardless of their current relationship status. The opening information contained the manipulation of relationship context. Depending on condition, participants either read, “Imagine that you have been involved with Michael for approximately one month, and you both view the relationship as a casual, short-term relationship” or “Imagine that you have been involved with Michael for approximately one year, and you both view the relationship as a serious, long-term relationship.”
Next, some general information about the hypothetical relationship was provided (e.g., where the two met, what they have in common). The next section, "Your sexual relationship with Michael," contained the manipulation of female orgasm frequency. Depending on condition, participants read either, “In your relationship with Michael, you never experience an orgasm,” “In your relationship with Michael, you occasionally experience an orgasm,” or “In your relationship with Michael, you almost always experience an orgasm” (see Appendix D).

Measures. Dependent Measures: Next, participants completed items that measured their perceptions of their hypothetical relationship. Two items that measured relationship satisfaction and commitment were borrowed and modified from the Perceived Relationship Quality Components (PRQC) inventory (Fletcher, Simpson, & Thomas, 2000). These items (e.g., How satisfied are you with your relationship with Michael?) were measured using a 7-point scale (1 = not at all, 7 = extremely). These items were averaged to form the primary dependent variable of relationship satisfaction ($\alpha = .78$).

Participants also completed three items concerning the participant’s perceived likelihood of remaining in the relationship, ending the relationship in the near future, and staying sexually faithful to Michael, (e.g., How likely do you think it is that you will end the relationship in the near future?). These items were measured using a 7-point scale (1 = not very likely, 7 = extremely likely). These three items were created for the purposes of this study and were intended to form a secondary dependent variable. The items measuring the likelihood of spending the rest of one’s life in the relationship and the likelihood of ending the relationship in the near future (reverse scored) were averaged to form a composite measure of expected relationship duration ($\alpha = .75$). The item measuring likelihood of sexual infidelity was not included in the composite because it did not contribute to the composite's internal reliability.
Potential Mediators: In Prediction 1, the relationship between female orgasm frequency and relationship satisfaction was expected to be mediated by female participants' perception of her male partner's commitment. Along these lines, participants completed three items concerning their trust in Michael and their perception of Michael’s care and commitment. The first item, concerning trust, was adopted from the PRQC, whereas the items concerning their partner’s care and commitment were created for this study. These items (e.g., How much do you think Michael cares about you?) were measured using a 7-point scale (1 = not at all, 7 = extremely) and were averaged to form a composite of male partner's commitment ($\alpha = .91$).

In Prediction 2, the relationship between female orgasm frequency and relationship satisfaction was expected to be mediated by female participants' love for their partner. Along these lines, participants completed three items concerning their love for Michael and the degree of emotional intimacy and passion that characterizes the relationship. These items (e.g., How passionate is your relationship with Michael?) were adopted from the PRQC. They were measured using a 7-point scale (1 = not at all, 7 = extremely) and were averaged to form a composite of love for her partner ($\alpha = .85$).

Additional Items: Participants completed six items that concerned the degree to which they would invest time or money in Michael and their relationship with him. Participants completed two additional items that assessed perceived partner relationship satisfaction and sexual fidelity. These eight items pertain to the hypothesis and prediction of Study 2 and will be described in detail in that study's Method section. These items were completed by female participants for control/comparison purposes only.

There were also two items in the survey that were not directly related to the predictions of Study 1 but were included as exploratory measures. These items pertain to how upset the
participants would be if Michael committed a sexual or emotional infidelity. These items (e.g., How upset would you feel if you found out Michael was sexually interested in another woman?) were measured using a 7-point scale (1 = not at all, 7 = extremely). These items, key dependent measures, and potential mediators can be found in Appendix E.

*Short-term Mating Orientation.* Next, participants completed 10 items borrowed from Jackson and Kirkpatrick’s (2007) revised Sociosexual Orientation Inventory (SOI-r). This survey measures the degree to which an individual is oriented toward short-term mating and long-term mating. Females vary widely in their attitudes toward short-term mating (but not in their attitudes toward long-term mating). Because we manipulated relationship context (short- or long-term) within a role-playing paradigm we expected personal attitudes toward and experience with short-term mating to potentially influence how easy or difficult it would be for participants to imagine their assigned relationship context. Therefore, we were interested in measuring short-term mating orientation as a potential control variable, and to do so we borrowed items that assess the degree to which the participants were oriented toward short-term mating (e.g., I believe in taking sexual opportunities when I find them.). These items were measured using a 7-point scale (1 = strongly disagree, 7 = strongly agree) as the anchors (\( \alpha = .91 \); see Appendix F).

*Personal Experience with Orgasm.* Females vary widely in their degree of personal experience with orgasm. Because we manipulated orgasm frequency within a role-playing paradigm we expected personal experience with orgasm to potentially influence how easy or difficult it would be for participants to imagine their assigned level of orgasm frequency. Therefore, participants responded to an item designed for this study that was designed to assess their personal experience with orgasm. We included this item as a potential control variable. This item stated, “Women vary in their ability to experience an orgasm consistently. Some
women are able to experience orgasms very readily and consistently, and others are not. Looking back on your own personal experiences, how easy/difficult would you say it is for you to experience an orgasm?” Participants responded using a seven-point scale (1 = Extremely Difficult; 7 = Extremely Easy; see Appendix F).

*Post-Experimental Questionnaire.* Next, participants completed a questionnaire that asked them to describe in their own words the purpose of the study. Participants were also asked to provide any additional comments about the study. These questions were included to help us assess the degree to which the participants were able to determine the purpose of the study and if demand characteristics were a potential problem (see Appendix G).

*Manipulation Checks.* Next, participants completed items designed to measure whether they paid attention to and perceived the independent variables as intended. The first manipulation check asked, “How was your relationship with Michael described to you?” Participants responded by choosing one of two options (“Approximately one month long and casual, short-term” or “Approximately one year long and serious, long-term”).

The second manipulation check asked, “How was your sex life with Michael described to you?” Participants responded by choosing one of three options (“You never experience an orgasm with Michael,” “You occasionally experience an orgasm with Michael,” or “You almost always experience an orgasm with Michael”; see Appendix H).

*Demographics.* Next, participants completed a demographics questionnaire. This questionnaire assessed information such as age, sex, ethnicity, current relationship status, and sexual orientation (see Appendix I).
Debriefing. Finally, participants read a debriefing, which provided a general overview of the study as well as the basic hypotheses being tested. Additionally, the principle investigator’s contact information and relevant research references were provided (see Appendix J).
CHAPTER III. STUDY 1 RESULTS

Manipulation Check

The first manipulation check referred to relationship context (short or long); 91% of participants correctly identified their assigned level of relationship context. The second manipulation check referred to female orgasm frequency (never, occasionally, or almost always); 87.5% of participants correctly identified their assigned level of female orgasm frequency. Taken together, these results indicate that our manipulations were successful. Data from those who failed one or both manipulation checks were retained in all analyses.

Short-Term Mating Orientation, Experience with Orgasm, and Relationship Status

In Study 1, we measured three potential covariates: participant’s current relationship status (measured with a single item), participants’ short-term mating orientation (measured by 10 items that were averaged to form a composite measure), and participants’ personal experience with orgasm (measured with a single item). Results reported below include a covariate only when the covariate was statistically significant within the analysis.

The Mr. Right Hypothesis

As stated in Prediction 1, we expected that females, within a short-term relationship context, who role-played experiencing higher frequencies of orgasm would report greater relationship satisfaction. To test this prediction, we examined the simple effects of female orgasm frequency on relationship satisfaction, the primary dependent variable, for participants in the short-term-relationship context. This one-way ANOVA indicated that the effect of female orgasm frequency on relationship satisfaction was not significant, $F(2, 86) = 2.08, p = .131,$
\( \eta^2 = .074 \). However, post hoc comparisons using the Tukey HSD test indicated, consistent with Prediction 1, that female participants role playing almost always having orgasms with their partner \((M = 4.68, SD = 1.21)\) reported higher relationship satisfaction than those role playing having never had an orgasm with their partner \((M = 4.00, SD = 1.26; p = .03, d = .55)\).

Relationship satisfaction among females who role played having occasional orgasm with their partner \((M = 4.47, SD = 1.37)\) did not differ from that of those who either never (but \(d = .36)\) or almost always had orgasms with their partner \((d = .16)\).

To further test Prediction 1, we examined the simple effects of female orgasm frequency on expected relationship duration, the secondary dependent variable, for participants in the short-term relationship context. This one-way ANCOVA, which controls for previous orgasm experience, \(F(1,73) = 4.32, p = .041\), was marginally significant, \(F(2, 73) = 2.46, p = .092\), \(\eta^2 = .063\). Post hoc comparisons using the Tukey HSD test indicated no difference in expected relationship duration between females who role played having never had an orgasm with their partner \((M = 2.93, SD = .80)\) and those who role played almost always having an orgasm with their partner \((M = 3.63, SD = 1.21, but \ d = .68)\). Relationship duration among females who role played having occasional orgasm with their partner \((M = 3.27, SD = 1.46)\) did not differ from that of those who either never (but \(d = .29)\) or almost always had orgasms with their partner (but \(d = .27)\).

In Prediction 1 we postulated that in a short-term mating context the relationship between female orgasm frequency and the dependent variables of relationship satisfaction and expected relationship duration would be at least partially mediated by the participants' perceptions of her male partner's commitment. The first step in a mediation analysis is to show that the independent variable and the mediator are statistically related to one another (See Baron & Kenny, 1986).
However, results indicated that female orgasm frequency was not significantly related to perceptions of partner commitment, $r(176) = .038$, $p = .615$, making it untenable to complete the mediation analyses. Thus, contrary to expectation, neither the relationship between female orgasm frequency and relationship satisfaction nor the relationship between orgasm frequency and expected relationship duration were mediated by perceived partner commitment.

Taken together, these results provide some preliminary support for the two predictions that were derived from the Mr. Right hypothesis. When effect size rather than statistical significance alone is considered, female participants who role played almost always having an orgasm with their partner reported greater relationship satisfaction and a longer expected relationship duration than female participants who role played never having an orgasm with their partner. Thus, we have obtained some experimental evidence to suggest that females use their orgasm frequency as a means of partner evaluation and selection within short-term mating contexts. However, the proposed mediator was not responsible for these effects.

The Long-Term Pair Bonding Hypothesis

As stated in Prediction 2, we expected that females, within a long-term relationship context, who role-played experiencing higher frequencies of orgasm would report greater relationship satisfaction. To test this prediction, we examined the simple effects of female orgasm frequency on relationship satisfaction, the primary dependent variable, for participants in the long-term-relationship context. This one-way ANOVA indicated that the effect of female orgasm frequency on relationship satisfaction was significant, $F(2, 86) = 4.39$, $p = .015$, $\eta^2 = .093$. Post hoc comparisons using the Tukey HSD test indicated, consistent with Prediction 2, that female participants role playing almost always having an orgasm with their partner reported
greater relationship satisfaction ($M = 6.10$, $SD = .89$) than those who role played occasionally having orgasms with their partner ($M = 5.45$, $SD = .93$, $p = .013$, $d = .71$). Relationship satisfaction among females who role played having never had an orgasm with their partner ($M = 5.63$, $SD = .82$) did not differ from that of those who either occasionally (but $d = .21$) or almost always had orgasms with their partner (but $d = .55$).

In Prediction 2 we postulated that in the long-term mating context the relationship between female orgasm frequency and the dependent variable of relationship satisfaction would be at least partially mediated by the participant’s perceptions of her love for her partner. First, we regressed relationship satisfaction on love for her partner in addition to orgasm frequency. There was a significant effect of love for her partner ($\beta = .78$, $t(84) = 10.86$, $p = .000$) on relationship satisfaction; however, there was no effect of orgasm frequency ($\beta = -.04$, $t(84) = -.61$, $p = .547$) on relationship satisfaction. However, the indirect effect of orgasm frequency on relationship satisfaction through love for her partner was significant ($\beta = .21$, $t(86) = 2.04$, $p = .044$). Taken together, this set of results is consistent with Prediction 2, that the relationship between orgasm frequency and relationship satisfaction is fully mediated by love for her partner.

To further test Prediction 2, we examined the simple effects of female orgasm frequency on expected relationship duration, the second dependent variable, for participants in the long-term-relationship context. This one-way ANOVA was significant, $F(2, 85) = 4.02$, $p = .021$, $\eta^2 = .086$. Post hoc comparisons using the Tukey HSD test indicated, consistent with Prediction 2, that female participants role playing almost always having orgasms with their partner reported a longer expected relationship duration ($M = 5.37$, $SD = 1.26$) than those who role played having an occasional orgasm with their partner ($M = 4.48$, $SD = 1.39$) $p = .026$, $d = .67$). Expected relationship duration among females who role played almost always having an orgasm with their
partner was somewhat longer than those who role played never having an orgasm with their partner \((M = 4.60, SD = 1.32, p = .09, d = .60)\). Expected relationship duration did not differ between those who role played never having orgasms and those who role played occasionally having orgasms with their partner \((d = .09)\).

In Prediction 2 we postulated that in the long-term mating context the relationship between female orgasm frequency and the secondary dependent variable of expected relationship duration would be at least partially mediated by the participant’s perceptions of her love for her partner. First, we regressed expected relationship duration on love for her partner in addition to female orgasm frequency. There was a significant effect of love for her partner \((\beta = .68, t(83) = 8.13, p = .000)\) on female relationship duration, but there was no effect of orgasm rate on female relationship duration \((\beta = .03, t(83) = .30, p = .768)\). However, the indirect effect of orgasm rate on expected relationship duration through love for her partner was significant \((\beta = .24, t(85) = 2.25, p = .027)\). Taken together, this set of results is consistent with Prediction 2, that the relationship between orgasm frequency and expected relationship duration is fully mediated by love for her partner.

Overall, these results provide preliminary support for the two predictions that were derived from the long-term pair bonding hypothesis. Significant simple main effects indicated that an increase in female orgasm frequency caused an increase in female’s relationship satisfaction and a longer expected relationship duration. Additionally, and as predicted by the long-term pair bonding hypothesis, the effect of female orgasm frequency on relation satisfaction and expected relationship duration were fully mediated by love for her partner. Thus, we have obtained experimental evidence to suggest that higher rates of female orgasm increase self-
reported love and intimacy toward their partner, which predicts female’s reported level of relationship satisfaction and expected relationship duration.
CHAPTER IV. STUDY 1 DISCUSSION/SUMMARY

In Study 1, we tested predictions derived from the Mr. Right hypothesis and long-term pair bonding hypothesis regarding possible evolved functions of female orgasm. These predictions were tested using a sample of female participants. The prediction regarding the Mr. Right hypothesis was specific to how female orgasm operates within a short-term mating context. The prediction regarding the long-term pair bonding hypothesis was specific to how female orgasm operates within a long-term mating context. Across the two dependent variables of relationship satisfaction and expected relationship duration there was a moderately large (average $d = .625$) effect of frequency of female orgasm, when focusing on the differences between those role-playing having never experienced an orgasm with their partner and those role playing having almost always experienced an orgasm. Thus, we have obtained the first experimental evidence in support of the Mr. Right and long-term pair bonding hypotheses regarding the possible evolved functions of female orgasm. Support for the mediator proposed by the Mr. Right hypothesis was not obtained. However, results indicated that, as expected according to the long-term pair bonding hypothesis, within a long-term mating context the relationship between female orgasm frequency and both relationship satisfaction and expected relationship duration were fully mediated by female's love for her partner.

In Study 2 we tested a prediction regarding a possible evolved function of female orgasm derived from the paternity confidence hypothesis. This hypothesis pertains to the male’s perspective in a heterosexual relationship and, therefore, was tested using a sample of male participants.
CHAPTER V. STUDY 2

According to the paternity confidence hypothesis the frequency of female orgasm signals to her male partner her degree of satisfaction with the relationship and, therefore, likelihood of being sexually faithful to him. If this hypothesis is valid then a male's willingness to invest time and money in a female as a long-term relationship partner is expected to be sensitive to her frequency of experiencing orgasm with him. However, this relationship between female orgasm frequency and male investment should not be present in short-term relationship contexts, where males do not face the adaptive problems of paternal uncertainty and assessing fidelity (Buss & Schmitt, 1993). This proposed function of female orgasm as informing males' decisions about the allocation of resources would be adaptive for males in terms of helping them allocate resources in a manner that would aid in gene propagation. In a long-term mating context orgasm would be adaptive for females in terms of helping them acquire resources from the male for herself and any current and future offspring.

In Study 2, male participants read a scenario about a relationship between a male and a female and imagined themselves as the male in the relationship. As in Study 1, within these scenarios two independent variables were manipulated—female orgasm frequency and relationship context. The female's orgasm frequency varied between never experiencing orgasm, occasionally experiencing orgasm, and almost always experiencing orgasm. The relationship context was described as either short- or long-term. The main dependent measures included male’s reported willingness to invest time and money in the relationship.

Prediction: Based on the paternity confidence hypothesis, we expected that males, within a long-term relationship context, would be more willing to invest time and money in a female partner who experiences orgasm more frequently. We expected that, within a
short-term relationship context, males' willingness to invest time and money in a female partner would be unaffected by her orgasm frequency. Furthermore, we expected the relationship between female orgasm frequency and male investment, within a long-term relationship context, to be at least partially mediated by perceived relationship satisfaction of the female and perceived likelihood of the female committing an infidelity.
CHAPTER VI. STUDY 2 METHOD

Participants and Design

Participants were 144 male undergraduates at BGSU who signed up for a study, using the SONA online experiment management system, called “Mating and Dating.” Participants completed the study online. Data from one participant who did not follow instructions was excluded from analysis. Additionally, data from 7 participants who identified their sexual orientation as homosexual/gay/lesbian or bisexual, or “Other” were excluded from analysis. As before, these data were excluded because a) the study’s theoretical basis applies only to heterosexuals; b) the study’s methodology involves role playing a member of a heterosexual romantic/sexually-active relationship; and, c) these individuals were disproportionally represented within a few of the study’s conditions, which could have introduced a source of systematic error into the study’s results. In the end, the working sample was comprised of 136 males.

On average, participants were approximately 19 years old (M = 19.43, SD = 1.44). A majority of participants (87.5%) were White/Caucasian; 7.4% were Black/African American; 2.2% were Hispanic/Latino; and 2.2% were Asian. In terms of their current relationship status, 44.1% of participants were not dating anyone; 13.2% were casually dating someone; 39% were in a serious, committed relationship; 1.5% were cohabiting/engaged/married; and 2.2% listed their relationship status as “Other.” For analytic purposes, we dichotomized relationship status into the categories of “not involved in a serious relationship” (57.4%) and “involved in a serious relationship” (40.4%).

Participants were randomly assigned to one condition within a 2 (relationship context: short-term, long-term) x 3 (female orgasm frequency: never, occasionally, almost always)
between-subjects factorial design. The number of participants per condition ranged from 20 to 24.

Materials and Procedure

*Informed Consent and Overview of the Study.* As before, the study began with participants completing an informed consent and reading an overview of the study. These materials are the same as described in Study 1 (see Appendices B and C).

*Relationship Scenarios.* Next, participants read a description of their hypothetical relationship with Jessica. These relationship scenarios are largely the same as used in Study 1. Before reading this section, entitled, "Your Relationship with Jessica," participants were reminded to imagine themselves in the described relationship, regardless of their current relationship status. The opening information contained the manipulation of relationship context. Depending on condition, participants either read, “Imagine that you have been involved with Jessica for approximately one month, and you both view the relationship as a casual, short-term relationship” or “Imagine that you have been involved with Jessica for approximately one year, and you both view the relationship as a serious, long-term relationship.”

Next, some general information about the hypothetical relationship was provided (e.g., where the two met, what they have in common). The next section, "Your sexual relationship with Jessica," contained the manipulation of female orgasm frequency. Depending on condition, participants read either, “In your relationship with Jessica, she never experiences an orgasm,” “In your relationship with Jessica, she occasionally experiences an orgasm,” or “In your relationship with Jessica, she almost always experiences an orgasm” (see Appendix D).

*Measures.* Control and Exploratory Items: Participants completed the eleven items that made up the dependent variables and mediators for Study 1. These items are described under
Study 1 Materials and Procedures and were completed by male participants for control/comparison purposes only.

There were also two items in the survey that were not directly related to the predictions of Study 2 but were included as exploratory measures. These items pertain to how upset the participants would be if Jessica committed a sexual or emotional infidelity. These items (e.g., How upset would you feel if you found out Michael was sexually interested in another woman?) were measured using a 7-point scale (1 = not at all, 7 = extremely).

Dependent Measures: Next, participants completed items that formed the first operationalization of the primary dependent measure, willingness to invest in Jessica and their relationship (see Griskevicius, Sundie, Miller, Tybur, Cialdini, & Kenrick, 2007; Sundie, Griskevicius, Vohs, Kenrick, Tybur, & Beal, 2011). Two items asked participants to indicate how much money they would spend on their partner for her birthday and on a date. These items (e.g., “Imagine you have $200 in your bank account that you don’t need and you are looking to buy Jessica something for her birthday. How much would you be willing to spend?”) were followed by eight response options that corresponded to varying amounts of money (e.g., $0 - 25, $26 - 50, $176-200). These two items were averaged to form a composite measure of financial investment ($\alpha = .66$).

Participants completed an item in which they imagined winning $1,500 worth of products or services. Participants were then asked to select three items from a list of eight items to purchase (e.g., “Each of these items is worth $500, choose the three you would most want to buy”). Five of the items were for the participant (e.g., new computer), and three of the items were for their relationship partner (e.g., jewelry for Jessica). The total number of items selected
for Jessica (between 0 and 3) comprised the second operationalization of male investment, generosity toward Jessica.

Participants also completed an item concerning time allocation to the relationship. Participants were asked to allocate 50 hours within a week to various domains of their life (e.g., studies/academics, family), including their relationship with Jessica. The number of hours the participant allocated to their relationship comprised the third operationalization of male investment, time investment.

Lastly, participants completed two items in which they were asked to indicate how likely they would be to disrupt their own plans to help Jessica. One item asked about the likelihood of helping Jessica study for her upcoming exam even though they were themselves busy with schoolwork. The other item asked about the likelihood of canceling their plans to drive and pick up Jessica, whose car had broken down. These items were measured using a 7-point scale (1 = not very likely, 7 = extremely likely). These two items were intended to form one dependent variable; however, these items had poor internal reliability ($\alpha = .57$) and, thus, were analyzed as individual operationalizations of male investment in the form of helping, called help with exam and help with car.

Potential Mediators: According to the paternity confidence hypothesis, the relationship between female orgasm frequency and the various forms of female investment was expected to be at least partially mediated by male participants' perception of his female partner's fidelity. Along these lines, participants completed two items concerning their perception of Jessica’s satisfaction in the relationship and likelihood of committing a sexual infidelity. These items (e.g., How likely do you think it is that Jessica will have sex with someone else while still seeing you?) were measured using a 7-point scale (1 = not at all, 7 = extremely) and were averaged to form a
composite of perception of partner fidelity ($\alpha = .67$). These items, key dependent measures, and control/exploratory items can be found in Appendix E.

*Short-term Mating Orientation.* As in Study 1, we measured participants' short-term mating orientation (Study 2, $\alpha = .91$), for use as a potential covariate. This survey is described in Study 1 (see Appendix F).

*Post-Experimental Questionnaire.* This material is described in Study 1 (see Appendix G).

*Manipulation Checks.* As in Study 1, participants next completed items designed to measure whether they paid attention to and perceived the independent variables as intended. The first manipulation check asked, “How was your relationship with Jessica described to you?” Participants responded by choosing one of two options (“Approximately one month long and casual, short-term” or “Approximately one year long and serious, long-term”).

The second manipulation check asked, “How was your sex life with Jessica described to you?”. Participants responded by choosing one of three options (“Jessica never experiences an orgasm with you,” “Jessica occasionally experiences an orgasm with you,” or “Jessica almost always experiences an orgasm with you”; see Appendix H).

*Demographics and Debriefing.* These materials are described in Study 1 (see Appendices I and J).
CHAPTER VII. STUDY 2 RESULTS

Manipulation Check

The first manipulation check referred to relationship context (short or long); 81.6% of participants correctly identified their assigned level of relationship context. The second manipulation check referred to female orgasm frequency (never, occasionally, or almost always); 88.2% of participants identified their assigned level of female orgasm frequency. Taken together, these results indicate that our manipulations were successful. Data from those who failed one or both manipulation checks were retained in all analyses.

Short-Term Mating Orientation and Relationship Status

In Study 2, we measured two potential covariates: participant’s current relationship status (measured with a single item) and participants' short-term mating orientation (measured by 10 items that were averaged to form a composite measure). Results reported below include a covariate only when the covariate was statistically significant within the analysis.

The Paternity Confidence Hypothesis

In order to test the prediction derived from the paternity confidence hypothesis, the 5 dependent variables that correspond to different operationalizations of male investment were each submitted to a 3 (frequency of female orgasm: never, occasionally, almost always) by 2 (relationship context: short term, long term) between-subjects ANOVA.

The 3 (orgasm rate) by 2 (relationship context) between-subjects ANOVA on the financial investment composite yielded a significant main effect of relationship context with participants reporting more money spent in the long-term context ($M = 3.83, SD = 1.49$) than in
the short-term context \((M = 3.21, SD = 1.18), F(1,129) = 7.42, p = .007, d = .46\). There was no main effect of female orgasm frequency, \(F(2,129) = .336, p = .715\). The expected interaction effect between relationship context and female orgasm frequency was not obtained, \(F(2,129) = .328, p = .721\).

The 3 (orgasm rate) by 2 (relationship context) between-subjects ANOVA on the next dependent measure, generosity, yielded no significant effects (main effect of relationship context, \(F(1,130) = .947, p = .332\); main effect of female orgasm frequency, \(F(2,130) = .392, p = .677\); interaction effect, \(F(2,130) = 1.32, p = .270\)).

The 3 (orgasm rate) by 2 (relationship context) between-subjects ANOVA on the next dependent measure, time investment, yielded only a marginally significant main effect of relationship context, with participants allocating more time to their relationship in the long-term context \((M = 9.50, SD = 3.95)\) than the short-term context \((M = 8.26, SD = 3.95)\), \(F(1,130) = 3.21, p = .076, d = .31\). There was no main effect of female orgasm frequency, \(F(2,130) = .289, p = .750\). The expected interaction effect between relationship context and female orgasm frequency was not obtained, \(F(2,130) = .126, p = .882\).

The results regarding the next dependent measure, help with exam, includes the covariate of participant’s short-term mating orientation, \(F(1,124) = 4.51, p = .036\). The 2 x 3 ANCOVA yielded only a marginally significant main effect of relationship context, with participants reporting a greater likelihood to help with the exam in the long-term context \((M = 4.63, SD = 1.59)\) than the short-term context \((M = 4.24, SD = 1.25)\), \(F(1,124) = 2.95, p = .088, d = .27\). There was no main effect of female orgasm frequency, \(F(2,124) = .14, p = .869\). The expected interaction effect between relationship context and female orgasm frequency was not obtained, \(F(2,124) = .68, p = .507\).
The 3 (orgasm rate) by 2 (relationship context) between-subjects ANOVA on the next dependent measure, help with car, yielded no significant effects (main effect of relationship context, $F(1, 130) = .54, p = .465$; main effect of female orgasm frequency, $F(2, 130) = 1.22, p = .300$; interaction effect, $F(2, 130) = .59, p = .557$).

We postulated that the relationship between female orgasm frequency and the various dependent variables of investment would be at least partially mediated by the participants' perceptions of his mate's likelihood of committing an infidelity. However, no effect was found with these dependent variables, and thus, there is no relationship to mediate. Because the mediator of males' perceptions of partner fidelity could not be used as predicted, we decided to analyze it separately.

In order to assess a component of the paternity confidence hypothesis, that female orgasm frequency is related to the male's perception of her fidelity, an individual item (“How likely do you think it is that Jessica will have sex with someone else while still seeing you?”) was assessed. A 3 (orgasm frequency) x 2 (relationship context) ANCOVA includes the covariate of participant's short-term mating orientation, $F(1, 124) = 6.51, p = .012$. There was no main effect of relationship context, $F(1, 124) = .001, p = .973, \eta^2 = .000$. In support of the paternity confidence hypothesis, there was main effect of female orgasm frequency, $F(2, 124) = 6.44, p = .002, \eta^2 = .094$. A Tukey post-hoc test revealed that male participants role-playing having a partner who almost always experiences an orgasm ($M = 2.43, SD = 1.64$) reported a lower perceived likelihood of partner infidelity than male participants role-playing having a partner who never experiences an orgasm ($M = 3.40, SD = 1.62, d = .60$). Additionally, there was a significant difference with male participants role-playing having a partner who occasionally experiences an orgasm ($M = 2.35, SD = 1.43$) reporting a lower perceived likelihood of partner
infidelity than male participants role-playing having a partner who never experiences an orgasm ($d = .69$). There was no significant difference in perceived likelihood of partner infidelity between males role-playing having a partner who almost always experiences an orgasm and occasionally experiences an orgasm ($d = .03$). The interaction effect between relationship context and female orgasm frequency was not significant, $F(2, 124) = 1.15, p = .320, \eta^2 = .018$.

Taken together, the results from Study 2 provide no evidence in support of the paternity confidence hypothesis. Female orgasm frequency was related to the male partner’s perceptions of her infidelity; however, despite using multiple operationalizations of investment, female orgasm frequency was not related to male investment of money, time, or help. Thus, we have obtained no experimental evidence to suggest that males use their female partner’s orgasm frequency as a signal of how much to invest in the relationship.
CHAPTER VIII. GENERAL DISCUSSION

In this research, we examined three separate adaptationist hypotheses regarding possible evolved functions of the female orgasm. In testing these hypotheses we utilized an experimental methodology that relied on participants role-playing being a member of a heterosexual relationship.

According to the Mr. Right Hypothesis females use a male’s ability to bring her to orgasm as a signal of his potential as a long-term mate. To date, support for this hypothesis has come from research showing a positive correlation between husband's income and wives' orgasm rate (Pollet & Nettle, 2009) and in non-human primates a positive correlation between male status and female orgasm frequency (Troisi & Carosi, 1998). In the current research, we obtained some evidence (when considering effect size rather than statistical significance) in support of the notion, derived from the Mr. Right hypothesis, that females, within a short-term relationship context, who role-played experiencing higher frequencies of orgasm report greater relationship satisfaction and a longer expected relationship duration. However, we expected these relationships between female orgasm frequency and relationship satisfaction and expected relationship duration to be at least partially mediated by females' perceptions of their partner's commitment, and they were not. Thus, Study 1 contributes the first experimental support for the Mr. Right hypothesis regarding a possible evolved function of female orgasm; however, as will be discussed, future research will be needed to further establish the robustness of the effect as well as to explore the validity of the mediation of the effect via male commitment.

According to the long-term pair bonding hypothesis a woman’s orgasm functions to increase the female’s commitment to her relationship by increasing emotional bonding with her male partner. To date, support for this hypothesis has come from research that has shown that
oxytocin is released during female (and male) orgasm (Carmichael et al., 1987) and that oxytocin leads to pair-bonding behavior (in prairie voles, Insel & Hulihan, 1995, Young & Wang, 2004; in non-human primates, Smith et al., 2010). In the current research, we obtained some evidence in support of the notion, derived from the long-term pair bonding hypothesis, that females, within a long-term relationship context, who role-played experiencing higher frequencies of orgasm report greater relationship satisfaction and longer expected relationship duration. Additionally, we expected and found that the relationships between female orgasm frequency and relationship satisfaction and expected relationship duration were fully mediated by love for her partner. This collection of findings contributes the first experimental support for the long-term pair bonding hypothesis regarding a possible evolved function of female orgasm.

According to the paternity confidence hypothesis men use their female partner’s orgasm frequency as a signal of her likelihood of fidelity and use this information to calibrate their degree of investment, such that they invest more in relationships in which the female experiences frequent orgasm. To date, support for this hypothesis has come from research showing a positive correlation between female orgasm rate and her relationship satisfaction (Costa & Brody, 2007; Haning et al., 2007). The assumption here is that satisfied women are less likely to commit infidelity. Additionally, research has found a positive relationship between female orgasm frequency and male partner investment of time, although the connection between female orgasm frequency and female fidelity has only been indirectly inferred (Ellsworth & Bailey, 2013; McKibbin et al., 2010). In the current research, we did not obtain any evidence in support of the notion, derived from the paternity confidence hypothesis, that males, within a long-term relationship context, invest more in female partners who experienced higher frequencies of orgasm.
Methodological Considerations

It is possible that the lack of significant results for the Mr. Right hypothesis (Study 1) and the paternity confidence hypothesis (Study 2) could be attributed to various features of the studies. First, the use of role-playing and hypothetical scenarios may have undermined the internal validity of the study. Participants may not have been able to accurately predict how they would have thought, felt, and acted if they were truly in the situation, specifically because these hypotheses are based on physiological processes (i.e., release of oxytocin during orgasm) or cognitive processes that may operation outside of awareness (i.e., relating a female’s orgasm frequency to her fidelity).

However, the findings that supported the long-term pair bonding hypothesis (Study 1) suggest that these potential limitations were not insurmountable. Participants did describe how they would have felt and acted in these role-play relationships, and these descriptions were consistent with at least one theoretically-derived prediction. In regards to the Mr. Right hypothesis, it is possible that this study failed to find effects of female orgasm frequency on relationship satisfaction and expected relationship duration within a short-term relationship context due to being underpowered. Moderate effects sizes of female orgasm on these dependent variables suggest that increasing the number of participants in the study may have allowed these differences to be detected. However, we do not believe that the lack of support for the paternity confidence hypothesis is due to methodological limitation, in that the effect sizes from Study 2 were consistent with the nonsignificant statistical tests. Thus, we interpret the collection of findings from these two studies as providing support for the long-term pair-bonding hypothesis, as providing tentative (though not unequivocal) support for the Mr. Right hypothesis, and no support for the paternity confidence hypothesis.
Conceptual Considerations

The predictions that we derived from the Mr. Right and long-term pair bonding hypotheses (Study 1) were different in two ways. The Mr. Right hypothesis was conceptualized as being relevant to short-term mating contexts, and the long-term pair bonding hypothesis was conceptualized as being relevant to long-term mating contexts. For both hypotheses, other than having different expected mediators, the expected relationship between female orgasm frequency and the dependent measures was the same. However, the Mr. Right hypothesis may be interpreted as applying to long-term relationships, and the long-term pair bonding hypothesis may be interpreted as applying to short-term relationships. This is, in part, due to the fact that there can be a grey area between short- and long-term relationships in many real-life situations. Additionally, one could argue that the Mr. Right hypothesis could be interpreted as suggesting that the relationship between female orgasm frequency and the dependent measures should be mediated by the female’s love and attachment, similar to the mediator expected under the long-term pair bonding hypothesis. Because these two hypotheses make highly similar predictions, it is somewhat arbitrary how one interprets them in terms of specifying the mediating variables. In light of these considerations, the lack of statistical significance for the Mr. Right hypothesis may be an artifact of testing the prediction solely within the short-term mating contexts, whereas, with the benefit of hindsight, it may have made more sense to test both of these hypotheses as main effects (rather than simple effects) that occur when collapsing across short- and long-term mating contexts (see Appendix A for these analyses).
Evolved Function versus Benefit

The predictions associated with the long-term pair bonding hypothesis were supported, providing evidence that female orgasm may exist because of the adaptive function of promoting long-term relationships through bonding. However, this study simply shows that female orgasm may provide a benefit to women by promoting long-term relationships. It does not necessarily mean that this is the evolved function of the female orgasm. For example, it is possible that the female orgasm exists as a by-product, as discussed previously, but as a by-product, happens to benefit women by promoting feelings of love and affection. Differentiating between female orgasm as an adaptation or a byproduct of male orgasm would require future research. For example, the use of physiological measures rather than self-report may help to increase the ecological validity of the studies and access information not available via self-report. Future research should continue to examine multiple hypotheses regarding possible functions or benefits of female orgasm, as it is possible that more than one hypothesis can account for the evolution of the female orgasm.

Conclusions

Sexual functioning has great implications for relationship satisfaction and conflict (Costa & Brody, 2007; Haning et al., 2007). An evolutionary approach to understanding the evolved function of the female orgasm will increase understanding of why orgasm is more variable for females than for males. It has been argued that, because of their large parental investment and risk of being of becoming pregnant and abandoned (Trivers, 1972), women would not have benefited by easily becoming sexually aroused or by experiencing orgasm quickly and invariably (Symons, 1979). Thus, the evolutionary study of female orgasm, by
highlighting that a lack or low rate of female orgasm may be normal and not a sign of pathology, can help lessen the stigma women feel when they can't achieve orgasm (Cooper, Fenigstein, & Fauber, 2013).

In closing, this study is, to the knowledge of the researchers, the first study to test adaptationist accounts of female orgasm using an experimental paradigm. The use of role-play scenarios, although having certain limitations, allowed us to control for a number of extraneous variables and assess a causal link, including mediation, predicted by these hypotheses. Additionally, the use of multiple dependent variables allowed for more than one test of each hypothesis. In most every case, the different dependent measures yielded the same results or same lack of results, increasing the convergent validity of the findings. In his landmark book, *The Evolution of Desire*, Buss (2003) discusses the topic of female orgasm as one of the "remaining mysteries" of human sexuality. It is our hope that the current research moves the field one step closer toward demystifying this important topic.
REFERENCES


Behavior, 3(2), 95-116.


FOOTNOTES

1 Here reproductive success is being used as shorthand for ease of explanation. William D. Hamilton (1964) proposed the theory of inclusive fitness. He stated that reproductive success in addition to the effect of one’s actions on the reproductive success of genetic relatives is the true representation of fitness, in terms of successfully passing on one’s genes.

2 Perhaps some of the best evidence in support of good genes hypothesis comes from research regarding women’s ovulatory cycles. Gangestad and Thornhill (1998) found that females who were near peak fertility in the cycle showed an olfactory preference for physically symmetrical males. It has also been found that female’s preferences toward male’s faces shift during the peak-receptivity phase of their ovulatory cycle to preferring more masculine faces (Johnston, Hagel, Franklin, Fink, & Grammar, 2001).

In general, it has been found that mated females’ sexual desires do increase as they become more fertile in their phase, and they prefer more competitive males at this time, as well as a number of other fitness-related traits (Pillsworth, Haselton, & Buss, 2004; Gangestad, Simpson, Cousins, Garver-Apgar, & Christensen, 2004; Gangestad, Garver-Apgar, Simpson, & Cousins, 2007). Finally, a study by Pillsworth and Haselton (2006) found that the male’s sexual attractiveness moderated the effect fertility had on extra-pair desires, meaning that the less attractive a female perceives her mate to be, the more she desires to mate with someone outside the relationship.

3 An important aspect of the Mr. Right hypothesis, as well as the good genes and long-term pair bonding accounts, is that it may explain the apparent “problem” with female orgasm. Advocates of the by-product account often state that the high degree of variability (both between women and within individual women between contexts) indicates that it is not an adaptation.
However, the Mr. Right hypothesis, as well as the good genes and long-term pair bonding accounts, enforce the idea that female orgasm is a facultative adaptation. Female orgasm is not consistently present by design, rather being elicited by specific contexts. If the female orgasm does act as a mate-choice mechanism, than it would only be effective if it varied between mates. If female’s experienced orgasm during every act of intercourse, then it would not serve the function of distinguishing between good potential long-term mates who are willing to care and invest in the female. The fact that female orgasm occurrence rates are lower than male orgasm denote that female orgasm is fulfilling a different function, in which it should present itself depending on the specific context (Puts, 2007).

4 Of course, in many contexts there is a conceptual grey area between short-and long-term mating because a) short-term mating often turns into long-term mating b) often one individual has the impression or desire of a long-term context while the other does not c) there are many relationships that fall in between the two ends in terms or temporal duration and mutual obligation, such as dating and intermediate-length affairs.

5 There are two additional hypotheses that are commonly discussed in the literature but have not received much empirical support. The hedonic hypothesis states simply that female orgasm promotes intercourse in general, which should lead to more offspring. The paternity confusion hypothesis is derived from non-human primates, that female orgasm promotes promiscuity. This leads to males never being sure if a child is their own and thus not wanting to harm the child, although this conclusion may be true for some non-human primates, it has not found much of any support in humans.
Traditionally the Tukey HSD, and other similar post hoc tests, are utilized to determine which means are significantly different from one another after the analysis of variance is found to be significant. In this case, a Tukey post hoc test was run even though the ANOVA was found to be nonsignificant. This study is the first of its kind, and when theory testing, it is not uncommon to approach the data in an explorative manner. In this instance, we determined that it was more important to fully explore the data and ensure that no effect was missed in the analysis.
APPENDIX A. ADDITIONAL ANALYSES

Additional Analyses on the Study 1 Sample

To further test the predictions derived from the Mr. Right and long-term pair bonding hypotheses, the dependent variable of relationship satisfaction was subject to a 3 (orgasm frequency) x 2 (relationship context) ANOVA using the female sample from Study 1. A significant main effect of relationship context with female participants reporting greater satisfaction in the long-term context ($M = 5.73$, $SD = .92$) than in the short-term context ($M = 4.40$, $SD = 1.30$, $d = 1.18$), $F(1, 172) = 66.01$, $p = .000$, $\eta^2 = .277$. There was also a significant main effect of female orgasm frequency, $F(2, 172) = 4.27$, $p = .016$, $\eta^2 = .047$. A Tukey post-hoc test revealed that female participants role-playing almost always experiencing an orgasm ($M = 5.39$, $SD = 1.28$) reported greater relationship satisfaction than female participants role-playing never experiencing an orgasm ($M = 4.80$, $SD = 1.34$, $d = .45$). Additionally, there was a nearly significant difference with female participants role-playing almost always experiencing an orgasm reporting greater relationship satisfaction than female participants role-playing occasionally experiencing an orgasm ($M = 4.97$, $SD = 1.26$, $d = .33$). There was no significant difference in relationship satisfaction between females role-playing occasionally and never experiencing an orgasm ($d = .13$). There was no significant interaction effect between relationship context and female orgasm frequency, $F(2, 172) = 1.33$, $p = .268$, $\eta^2 = .015$.

The dependent variable of expected relationship duration was subject to a 3 (orgasm frequency) x 2 (relationship context) ANOVA using the female sample from Study 1. A significant main effect of relationship context with female participants reporting a longer expected relationship duration in the long-term context ($M = 4.83$, $SD = 1.37$) than in the short-term context ($M = 3.33$, $SD = 1.31$, $d = 1.12$), $F(1, 171) = 57.19$, $p = .000$, $\eta^2 = .251$. There was also a significant main effect of female orgasm frequency, $F(2, 171) = 8.19$, $p = .010$, $\eta^2 = .052$. 
A Tukey post-hoc text revealed that female participants role-playing almost always experiencing
an orgasm ($M = 4.49, SD = 1.53$) reported a longer expected relationship duration than female
participants role-playing occasionally experiencing an orgasm ($M = 3.92, SD = 1.55, d = .37$) and
never experiencing an orgasm ($M = 3.77, SD = 1.45, d = .48$). There was no significant
difference in expected relationship duration between females role-playing occasionally and never
experiencing an orgasm ($d = .10$). There was no significant interaction effect between
relationship context and female orgasm frequency, $F(2, 171) = .91, p = .406, \eta^2 = .010$.

Thus, these results seem to indicate that the effect of female orgasm frequency on the
female partner’s relationship satisfaction and expected relationship duration should be better
thought of as a main effect rather than a simple effect only in long-term relationship contexts.
This notion supports both the long-term pair bonding hypothesis as well as the Mr. Right hypothesis.

For comparative purposes, the main dependent variables regarding male investment from
Study 2 were examined with the female sample from Study 1. Thus, the following analyses
pertain to the question of whether females invest more in relationships in which they themselves
experience more frequent orgasms.

The 3 (orgasm frequency) by 2 (relationship context) between-subjects ANOVA on the
financial investment composite ($\alpha = .84$) yielded a significant main effect of relationship context
with participants reporting spending more money on Michael in the long- ($M = 3.97, SD = 1.56$)
versus short-term context ($M = 2.63, SD = 1.25, d = .95$), $F(1, 169) = 38.46, p = .000, \eta^2 = .185$.
There was no main effect of female orgasm frequency on financial investment, $F(2, 169) = .63, p = .532, \eta^2 = .007$. There was no significant interaction between relationship context and female
orgasm frequency on financial investment, $F(2, 169) = .893, p = .411, \eta^2 = .010$. 
The 3 (orgasm frequency) by 2 (relationship context) between-subjects ANOVA on generosity (single item that ranged from 0 to 3) yielded a significant main effect of relationship context with participants wanting to buy more items for Michael in the long- \((M = 1.28, SD = .59)\) versus short-term context \((M = .76, SD = .63, d = .85)\), \(F(1, 169) = 34.32, p = .000, \eta^2 = .169\).

There was no main effect of female orgasm frequency on female generosity, \(F(2, 169) = .72, p = .487, \eta^2 = .008\). There was no significant interaction between relationship context and female orgasm frequency on female generosity, \(F(2, 169) = 1.95, p = .145, \eta^2 = .023\).

The 3 (orgasm frequency) by 2 (relationship context) between-subjects ANOVA on time investment yielded a significant main effect of relationship context with participants allocating more time to their relationship with Michael in the long- \((M = 9.72, SD = 4.35)\) versus short-term context \((M = 7.79, SD = 3.72, d = .48)\), \(F(1, 172) = 9.70, p = .002, \eta^2 = .053\). There was no main effect of female orgasm frequency on time investment, \(F(2, 172) = .78, p = .460, \eta^2 = .009\). There was no significant interaction between relationship context and female orgasm frequency on time investment, \(F(2, 172) = .36, p = .695, \eta^2 = .004\).

The 3 (orgasm frequency) by 2 (relationship context) between-subjects ANOVA on the dependent measure, help with exam, yielded a significant main effect of relationship context with participants reporting a greater likelihood to help Michael with his exam in the long- \((M = 4.29, SD = 1.53)\) versus short-term context \((M = 3.76, SD = 1.55, d = .34)\), \(F(1, 171) = 4.99, p = .027, \eta^2 = .028\). There was no main effect of female orgasm frequency on help with exam, \(F(2, 171) = .77, p = .465, \eta^2 = .009\). There was no significant interaction between relationship context and female orgasm frequency on help with exam, \(F(2, 171) = .24, p = .784, \eta^2 = .003\).

The 3 (orgasm frequency) by 2 (relationship context) between-subjects ANOVA on the dependent measure, help with car, yielded a significant main effect of relationship context with
participants reporting a greater likelihood to help Michael in the long- ($M = 5.27, SD = 1.24$) versus short-term context ($M = 4.82, SD = 1.47, d = .33$), $F(1, 172) = 5.28, p = .023, \eta^2 = .030$. There was no main effect of female orgasm frequency on help with car, $F(2, 172) = 1.55, p = .215, \eta^2 = .018$. There was a marginally significant interaction between relationship context and female orgasm frequency on help with car, $F(2, 172) = 2.50, p = .085, \eta^2 = .028$. However, this interaction was not found in any of the convergent measures and is most likely a type 1 error. For this reason, it will not be discussed further.

In order to assess a component of the paternity confidence hypothesis, that female orgasm frequency is related to the female’s fidelity, an individual item (“How likely do you think it is that you will have sex with someone else while still seeing Michael?”) was assessed using the female sample from Study 1. A 3 (orgasm frequency) x 2 (relationship context) ANCOVA includes the covariate of participant’s short-term mating orientation, $F(1,162) = 11.55, p = .001$. There was no main effect of relationship context, $F(1, 162) = .15, p = .702, \eta^2 = .001$. There was no main effect of female orgasm frequency, $F(2, 162) = .07, p = .935, \eta^2 = .001$. The interaction effect between relationship context and female orgasm frequency was not significant, $F(2, 162) = .96, p = .386, \eta^2 = .012$.

**Additional Analyses on the Study 2 Sample**

For comparative purposes, the main dependent variables regarding Study 1 were examined with the male sample from Study 2. The 3 (orgasm frequency) by 2 (relationship context) between-subjects ANCOVA on the relationship satisfaction composite ($\alpha = .75$) includes the covariate of participant’s short-term mating orientation, $F(1,123) = 5.21, p = .024$. A significant main effect of relationship context was found with participants reporting greater relationship satisfaction in the long- ($M = 5.28, SD = 1.38$) versus short-term context ($M = 4.50,$
SD = 1.25, \( d = .59 \), \( F(1, 123) = 14.55, p = .000, \eta^2 = .106 \). There was also main effect of female orgasm frequency, \( F(2, 123) = 7.64, p = .001, \eta^2 = .110 \). A Tukey post-hoc text revealed that male participants role-playing having a partner who almost always experiences an orgasm (\( M = 5.29, SD = 1.25 \)) reported greater relationship satisfaction than male participants role-playing having a partner who never experiences an orgasm (\( M = 4.31, SD = 1.42, d = .73 \)). Additionally, there was a significant difference with male participants role-playing having a partner who occasionally experiences an orgasm (\( M = 5.02, SD = 1.27 \)) reporting greater relationship satisfaction than male participants role-playing having a partner who never experiences an orgasm (\( d = .53 \)). There was no significant difference in relationship satisfaction between males role-playing having a partner who almost always experiences an orgasm and occasionally experiences an orgasm (\( d = .21 \)). The interaction effect between relationship context and female orgasm frequency was not significant, \( F(2, 123) = .681, p = .508, \eta^2 = .011 \).

The 3 (orgasm frequency) by 2 (relationship context) between-subjects ANCOVA on the expected relationship duration composite (\( \alpha = .67 \)) includes the covariate of participant’s short-term mating orientation, \( F(1,122) = 7.77, p = .006 \). A significant main effect of relationship context was found with participants reporting a longer expected relationship duration in the long-\( (M = 4.40, SD = 1.42) \) versus short-term context (\( M = 3.73, SD = 1.13, d = .52 \), \( F(1, 122) = 10.97, p = .001, \eta^2 = .082 \). There was no main effect of female orgasm frequency, \( F(2, 122) = 2.00, p = .140, \eta^2 = .032 \). The interaction effect between relationship context and female orgasm frequency was not significant, \( F(2, 122) = 1.71, p = .186, \eta^2 = .027 \).
APPENDIX B. INFORMED CONSENT

Mating & Dating - SPRING 2014

INFORMATION SHEET

Before the study begins, there are several things for you to note:

1. You are invited to participate in a research study in which we are interested in asking you some questions about your perceptions and feelings about sexual relationships.

   NOTE: Some items you will be asked are personal, in nature. Additionally, some items concern your beliefs, attitudes, and prior experiences in sexual relationships. You may decide to skip any question that you are not comfortable answering.

2. You are eligible to participate in this study if you are at least 18 years old, and an undergraduate student at BGSU.

3. In this study, there are multiple sections, each of which is expected to take no more than 10-15 minutes. In total, we anticipate that your participation will take between 30 and 60 minutes.

4. The benefits of participating in this project include helping us to understand people's views and perceptions on relationships. By participating in this study, you will learn about how psychologists conduct research on these kinds of topics. You may also benefit, personally, from an increased awareness of your own views toward relationships.

5. We do not anticipate any risks associated with participating in this study. If there are any questions in this study that you are not comfortable answering you may skip those items.

6. Your participation is completely voluntary. You are free to withdraw at any time. You may decide to skip questions or discontinue participation at any time without penalty. Deciding to participate or not will not affect your grades or class standing or your relationship with Bowling Green State University, your professors, the Psychology department, or the researchers.

7. In order for you to receive credit, the SONA system is linked to your name. However, the SONA system only indicates that you participated in the study and is not linked to any of your responses. Please note that your questionnaire answers are anonymous. We will not be collecting any information from you that would enable us to connect you, personally, with your
survey responses. Your responses will not be saved until you click the “Submit” button at the end of the survey.

8. Because the Internet is not 100% secure in terms of privacy, please do not leave the partially completed survey open or unattended if completing it on a public computer. You should clear the browser page history and cache when finished with the survey.

9. At the end of the study you will be given information about the purpose of this study.

10. If you have any questions about the study, you may contact the principal investigator:

   o Patrick Nebl, Principle Investigator, Psychology Department, BGSU, (419) 372-4457, pjnebl@bgsu.edu

   o Anne K. Gordon, Ph.D., Associate Professor of Psychology, Psychology Department, BGSU, (419) 372-8161, akg@bgsu.edu

   o The Human Subjects Review Board at Bowling Green State University (Human Subjects Review Board approval, 529160-2) approved this research study.

   o You may also contact the Chair, Human Subjects Review Board, Bowling Green State University, (419) 372-7716 (hsrb@bgsu.edu), if any problems or concerns arise during the course of the study.

Participation in this project is voluntary. Please click on the button below to indicate your informed decision regarding your participation in this study. If you do not wish to participate, you may simply close out the window and not continue.

_____ Yes, I have read and been informed of risks and benefits associated with participating in this study, and I agree to participate. I certify that I meet the eligibility requirements for this study.
Overview of Study
Romantic relationships are an important part of many adults' lives. Because romantic relationships can bring people a great amount of happiness or misery, psychologists are interested in understanding what contributes to relationships being either happy or unhappy.

In this research, you will be asked to imagine yourself as a member of a romantic relationship and then answer a series of questions about how you think you would feel about being involved in the kind of relationship that is described.

Some of the information about the relationship you will be asked to imagine yourself involved in may be similar to your actual experiences. However, it is possible that you will be asked to imagine yourself in a relationship that is different from anything you have ever personally experienced. Recognizing this, please do your best to imagine yourself in the kind of relationship that is described to you and answer the questions to the best of your ability regarding how you would think, feel, and act in this kind of relationship.

IMPORTANT: Please read the information provided to you about the relationship slowly and carefully. Try to visualize the relationship and really imagine how you think you would feel about the relationship and the relationship partner that is described.
APPENDIX D. RELATIONSHIP SCENARIOS

Instructions: As previously stated, please try to imagine yourself in the described relationship regardless of your current relationship status.

Your Relationship with Michael/Jessica

Imagine that you have been involved with Michael/Jessica for approximately one month and you both view the relationship as a casual, short-term relationship.

OR

Imagine that you have been involved with Michael/Jessica for approximately one year and you both view the relationship as a serious, long-term relationship.

Where is Michael/Jessica from?

Ohio, near Bowling Green

Michael/Jessica’s major:

Psychology

Where did you meet Michael/Jessica?

In a psychology class.

What do you and Michael/Jessica have in common?

Similar academic interests as well as taste in movies and music.

What do you and Michael/Jessica do together?

You go on regular dinner dates and like to have movie nights together.

Your sexual relationship with Michael/Jessica:

In your relationship with Michael/Jessica, you/she never experience(s) an orgasm.

OR

In your relationship with Michael/Jessica, you/she occasionally experience(s) an orgasm.

OR

In your relationship with Michael/Jessica, you/she almost always experience(s) an orgasm.
**APPENDIX E. MEASURES**

**Instructions:** This survey has to do with how you think and feel about your relationship with Michael. To answer the questions, circle the appropriate number on the scale provided. Please answer the questions honestly, and remember, there are no right or wrong answers. Please base your answers solely on the relationship description.

1. How satisfied are you with your relationship with Michael/Jessica?

   1  2  3  4  5  6  7
   Not at all   Extremely

2. How emotionally intimate is your relationship with Michael/Jessica?

   1  2  3  4  5  6  7
   Not at all   Extremely

3. How committed are you to your relationship with Michael/Jessica?

   1  2  3  4  5  6  7
   Not at all   Extremely

4. How much do you trust Michael/Jessica?

   1  2  3  4  5  6  7
   Not at all   Extremely

5. How passionate is your relationship with Michael/Jessica?

   1  2  3  4  5  6  7
   Not at all   Extremely
6. How much do you love Michael/Jessica?

   1 2 3 4 5 6 7
   Not at all            Extremely

7. How likely do you think it is that you will have sex with someone else while still seeing Michael/Jessica?

   1 2 3 4 5 6 7
   Not very likely          Extremely likely

8. How likely do you think it is that you will spend the rest of your life with Michael/Jessica?

   1 2 3 4 5 6 7
   Not very likely          Extremely likely

9. How likely do you think it is that you will end the relationship in the near future?

   1 2 3 4 5 6 7
   Not very likely          Extremely likely

10. How committed do you think Michael/Jessica is to your relationship?

    1 2 3 4 5 6 7
    Not at all            Extremely

11. How much do you think Michael/Jessica cares about you?

    1 2 3 4 5 6 7
    Not at all            Extremely
12. How satisfied do you think Michael/Jessica is with your relationship?

1 2 3 4 5 6 7
Not at all Extremely

13. How likely do you think it is that Michael/Jessica will have sex with someone else while still seeing you?

1 2 3 4 5 6 7
Not very likely Extremely likely

14. How upset would you feel if you found out Michael/Jessica was emotionally interested in another woman?

1 2 3 4 5 6 7
Not at all Extremely

15. How upset would you feel if you found out Michael/Jessica was sexually interested in another woman?

1 2 3 4 5 6 7
Not at all Extremely
16. Imagine you have $200 in your bank account that you don’t need and you are looking to buy Michael/Jessica something for his/her birthday. How much would you be willing to spend?

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17. Imagine you have $200 in your bank account that you don’t need and you are looking to take Michael/Jessica out on a date. How much would you be willing to spend?

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18. Imagine you have just won $1,500 worth of products and services because a friend entered you into a drawing without your knowledge. You have only today to spend the entire $1,500 and can only spend it on products and services listed below. If you don’t spend all the money today, you will lose it.

Each of these items is worth $500, choose the three you would most want to buy (you can only choose each item once).

- New Computer
- Season Tickets to Michael’s Favorite Sports Team (for him)/Jewelry for Jessica
- New Clothes
- Books for Class/School Supplies
- A Small Vacation with Michael/Jessica
- New TV or Gaming System
- Jewelry/Season Tickets to Your Favorite Sports Team
- New Clothes for Michael/Jessica
19. Imagine that you have 50 hours a week of free time to allocate to various aspects of your life. Using full hours (not halves), please allocate across these various responsibilities how you would choose to spend your time for the week. (The hours you enter for each of these seven options must add to 50.)

Your studies/academics

Your job

Extracurricular/Athletics

Your friends

Your relationship with Michael/Jessica

Your family

Time to yourself

TOTAL = 50 Hours

20. Imagine that it is getting close to the middle of the semester, and you have several papers and exams coming up. Michael/Jessica calls you and is stressed out about an upcoming exam he has.

How likely are you to help Michael/Jessica study for an exam for three straight hours on a weekday night?

1 2 3 4 5 6 7
Not very likely Extremely likely
21. Imagine that you have plans with your friends that you have been looking forward to all week. Michael/Jessica calls you and says that he is an hour’s drive away and his car has broken down.

How likely are you to cancel your plans in order to drive and pick-up Michael/Jessica?

1  2  3  4  5  6  7
Not very likely  Extremely likely
APPENDIX F. SHORT-TERM MATING ORIENTATION

Instructions: This questionnaire has to do with your attitudes and beliefs about relationships. Please answer all of the following questions honestly. For the questions dealing with thoughts and attitudes, circle the appropriate number on the scale provided. For the questions dealing with behavior, write your answer in the blank spaces provided.

1. I believe in taking sexual opportunities when I find them.
   
   1 2 3 4 5 6 7
   Strongly disagree  Strongly agree

2. I would consider having sex with a stranger if I could be assured that it was safe and he/she was attracted to me.
   
   1 2 3 4 5 6 7
   Strongly disagree  Strongly agree

3. Sex without love is OK.
   
   1 2 3 4 5 6 7
   Strongly disagree  Strongly agree

4. I can imagine myself enjoying a brief sexual encounter with someone I find very attractive.
   
   1 2 3 4 5 6 7
   Strongly disagree  Strongly agree

5. Sometimes I would rather have sex with someone I did not care about.
   
   1 2 3 4 5 6 7
   Strongly disagree  Strongly agree
6. I would never consider having a brief sexual relationship with someone.

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

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

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

8. I could easily imagine myself enjoying one night of sex with someone I would never see again.

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

9. I could enjoy sex with someone I find highly desirable even if that person does not have long-term potential.

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

10. I would have to be closely attached to someone (both emotionally and psychologically) before I could feel comfortable and fully enjoy having sex with him or her.

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree
Part II: The following questions have to do with your sexual history. Please answer these questions only if you feel comfortable doing so. You are free to skip any questions that you do not want to answer.

11. With how many partners have you had sexual intercourse within the past year?

   Please write the total here:
   ______________________________________________________

12. With how many partners have you had sex on one and only one occasion?

   Please write the total here:
   ______________________________________________________

13. During your entire life, with how many partners have you had sexual intercourse?

   Please write the total here:
   ______________________________________________________

(Only Female Participants Received This Question)
14. Women vary in their ability to experience an orgasm consistently. Some women are able to experience orgasms very readily and consistently, and others are not.

Looking back on your own personal experiences, how easy/difficult would you say it is for you to experience an orgasm?

   1  2  3  4  5  6  7
   Extremely Difficult          Extremely Easy
APPENDIX G. POST-EXPERIMENTAL QUESTIONNAIRE

Post-Study Questionnaire

On the following lines, please describe in your own words, what you believe to have been the purpose(s) of this study.

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

Please describe any additional comments regarding anything that was asked of you during your participation in this study. Any feedback you provide may be very helpful in terms of how we design future experiments.

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
APPENDIX H. MANIPULATION CHECKS

Instructions: Now that the study has come to an end, think back to the relationship description you read previously and answer the following questions. For each of the questions, please select one answer.

1. How was your relationship with Michael/Jessica described to you? (please choose one)
   
   Approximately one month long and casual, short-term
   
   -OR-
   
   Approximately one year long and serious, long-term

2. How was your sex life with Michael/Jessica described to you? (please choose one)
   
   You never experience an orgasm with Michael/
   Jessica never experiences an orgasm with you
   
   -OR-
   
   You occasionally experience an orgasm with Michael/
   Jessica occasionally experiences an orgasm with you
   
   -OR-
   
   You almost always experience an orgasm with Michael/
   Jessica almost always experiences an orgasm with you
APPENDIX I. DEMOGRAPHICS

Instructions. This survey asks you to provide some demographic and other descriptive information about yourself. Please answer honestly and skip any item for which you do not know the answer.

1. Please enter your current age (in years). __________

2. I am a _____ female. ______ male. (Please check one.)

3. What is your ethnicity? (Please check one.)
   - White/Caucasian ______
   - Black/African American ______
   - Hispanic/Latino(a) ______
   - Asian ______
   - Native American ______
   - Pacific Islander ______
   - Biracial/Multiracial ______
   - Other: ________________________

4. What is your current relationship status? (Please check one.)
   - Not currently dating ______
   - Some casual dating ______
   - In a serious, committed relationship ______
   - Cohabitating/engaged/married ______
   - Other: _____________________________

5. What is your sexual orientation? (Please check one.)
   - Heterosexual/Straight ______
   - Homosexual/Gay/Lesbian ______
   - Bisexual ______
   - Other ______
Thank you for participating in our study!

In this study, you read about a fictional relationship and imagined yourself as a part of the relationship. Then, you were asked a variety of questions pertaining to your satisfaction with the relationship, your commitment to the relationship, and your willingness to invest time and money into the relationship. Following this, you completed a survey regarding your sexual attitudes and behaviors.

With this study, we are trying to see whether or not certain aspects of a couple's sex life (such as if the female experiences orgasm) affect different aspects of the overall relationship, such as each partner's feelings of commitment and willingness to invest. It has been proposed that certain aspects of a couple's sex life may act as a signal to both partners, indicating whether or not they are with a good mate. These signals may foster feelings of attachment and commitment as well as a greater willingness to invest in the relationship.

Contact information:

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References:

If you are interested in learning more on topics related to this research, see:


DATE: February 11, 2014

TO: Patrick Nebl
FROM: Bowling Green State University Human Subjects Review Board

PROJECT TITLE: [529160-2] Mating & Dating
SUBMISSION TYPE: Revision

ACTION: APPROVED
APPROVAL DATE: February 10, 2014
EXPIRATION DATE: December 16, 2014
REVIEW TYPE: Expedited Review
REVIEW CATEGORY: Expedited review category # 7

Thank you for your submission of Revision materials for this project. The Bowling Green State University Human Subjects Review Board has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

The final approved version of the consent document(s) is available as a published Board Document in the Review Details page. You must use the approved version of the consent document when obtaining consent from participants. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require that each participant receives a copy of the consent document.

Please add the text equivalent of the HSRB IRBNet approval/expiration date stamp to the "footer" area of the electronic consent document.

Please note that you are responsible to conduct the study as approved by the HSRB. If you seek to make any changes in your project activities or procedures, those modifications must be approved by this committee prior to initiation. Please use the modification request form for this procedure.

You have been approved to enroll 350 participants. If you wish to enroll additional participants you must seek approval from the HSRB.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. All NON-COMPLIANCE issues or COMPLAINTS regarding this project must also be reported promptly to this office.

This approval expires on December 16, 2014. You will receive a continuing review notice before your project expire. If you wish to continue your work after the expiration date, your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date.

Good luck with your work. If you have any questions, please contact the Office of Research Compliance at 419-372-7716 or hrsb@bgsu.edu. Please include your project title and reference number in all correspondence regarding this project.