The Effect of Female Orgasm Frequency on Female Mate Selection: A Test of Two Hypotheses

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Abstract
Female orgasm has been a mystery that psychologists have been attempting to understand for decades. Many have contended that female orgasm is a functionless by-product of male orgasm, while others have argued that female orgasm may be an adaptation in its own right, offering several adaptationist accounts of female orgasm. In the current research, we tested predictions derived from two hypotheses regarding adaptive functions of female orgasm: female orgasm indicates partner mate value or female orgasm promotes long-term, pair bonding. 199 female undergraduates participated in an experiment where they imagined themselves as a member of a romantic relationship provided in a scenario. Within these scenarios, the relationships varied between either short- or long-term and the frequency that the female experienced orgasm during intercourse varied between never, occasionally, and almost always. Participants answered questions regarding relationship satisfaction and perceptions of the fictional relationship. A series of analysis of variance (ANOVAs) indicated that females assigned to conditions of experiencing more frequent orgasms reported greater relationship satisfaction, across both short- and long-term relationships. The relationship between female orgasm frequency and relationship satisfaction was fully mediated by the female’s perceived love for her hypothetical partner but not by perceptions of her hypothetical partner’s commitment. Taken together, this study provides preliminary support for the hypothesis that female orgasm evolved as a mate-selection tool for females and promotes long-term, pair bonding but does not provide support for the hypothesis that female orgasm evolved as an indicator of male value.

Keywords
orgasm, female orgasm, human sexuality, human mating, mate selection

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 have concluded that female orgasm is most likely not an adaptation that has helped women solve a recurrent adaptive problem (see Lloyd, 2006; Symons, 1979). Instead, they suggest 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 review 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 an experiment that is designed to test predictions derived from two of the most compelling adaptationist hypotheses for female orgasm.

One of the most prominent evolutionary explanations for female orgasm is that it functions to select males, known as the mate-choice hypothesis. Female orgasm may act to increase sperm retention (Kunz et al., 1996; Wildt et al., 1998). It has been proposed that female orgasm may increase the likelihood of reproducing with a mate who has good genes (Baker &

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Bellis, 1993; Puts & Dawood, 2012). Along these lines, much of the current research on female orgasm has focused on its function as a mate selection tool for males with good genes (see Thornhill et al., 1995; Puts et al., 2012a; 2012b; Shackelford et al., 2000; Yael et al., 2015). However, female orgasm may also function to select mates for long-term relationships who are willing to commit and invest in the relationship (Wheatley & Puts, 2015). There are several proposed mechanisms through which the selection of good long-term partners might occur.

The “Mr. Right” Hypothesis

According to the “Mr. Right” hypothesis, females use a male’s ability to bring her to orgasm as a piece of information that helps her decide his value as a long-term mate. A male’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.

The main evidence in support of the “Mr. Right” hypothesis for female orgasm, comes from Gallup et al. (2014) who found that partner family income predicted female orgasm frequency, which was still true after controlling for partner attractiveness. It was also found that partner age (often associated with status and resources) predicted female orgasm frequency, and females were more likely to initiate intercourse with a partner who was more determined, focused, motivated, and intelligent (traits associated with resources). Additionally, 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. 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. Oxytocin levels rise during intercourse, particularly during orgasm (Carmichael et al., 1987; Carmichael et al., 1994). Oxytocin is known to be related to the physiology of the act of copulation (Gelez et al., 2010). Along with causing muscular contractions, oxytocin has also 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 et al., 2010; Young & Wang, 2004). In humans, oxytocin seems to be connected to mating in a similar way, with levels elevating after 10 min of warm contact between couples (Grewen et al., 2005). Additionally, variation in one specific gene related to the oxytocin receptor has been correlated with female pair-bonding behavior (Walum et al., 2012). This last study shows a direct relationship, in humans, between oxytocin and pair-bonding behavior.

The Importance of Context

Before describing the current research, it is important to note that both men and women have evolved psychological mechanisms associated with short-term and long-term mating but have faced somewhat different adaptive problems within these different mating contexts (Buss & Schmitt, 1993). In the current research the distinction between short-term 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 problem 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.

A Proposed Test of Two Hypotheses

According to the “Mr. Right” hypothesis of mate choice the frequency of female orgasm acts as an indicator that helps females evaluate males during short-term mating contexts as potential long-term mates. 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 of mate choice, female orgasm promotes female attachment to a male with whom she experiences orgasm, promoting long-term relationships. 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 this study, 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.

Prediction 1: Based on the mate-choice hypothesis, we expected that females, regardless of context, who role-played experiencing higher frequencies of orgasm would report greater relationship satisfaction.
Prediction 2: If the Mr. Right hypothesis of mate choice is correct, 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 3: If the long-term pair bonding hypothesis of mate choice is correct, we expected this relationship between female orgasm frequency and relationship satisfaction to be at least partially mediated by love for her partner.

Method

Participants and Design

Participants were 199 female undergraduates at Bowling Green State University. Participants completed the study online. Data from five participants who did not follow instructions or failed the manipulation check 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 175 females.

On average, participants were approximately 19 years old (M = 19.23, SD = 1.70). A majority of participants (80.3%) were White/Caucasian; 9.8% were Black/African American; 3.5% were Hispanic/Latina; 3.5% were Biracial/Multiracial; 1.2% were Asian, 1.2% identified their race/ethnicity as “Other,” and 6% were Native American. In terms of their current relationship status, 28% of participants were not dating anyone; 13.7% were casually dating someone; 51.7% were in a relationship; 28% of participants were not dating anyone; and 6% were Native American. In terms of their current relationship status, 28% of participants were not dating anyone; 13.7% were casually dating someone; 51.7% were in a serious, committed relationship; 29% were cohabiting/engaged/married; and, 34% listed their relationship status as “Other”. For analytic purposes, we dichotomized relationship status into the categories of “not involved in a serious relationship” (42%) and “involved in a serious relationship” (54.6%).

Participants were randomly assigned to one condition within a 2 (relationship context: short-term, long-term) × 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

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.”

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 et al., 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 summed to form the primary dependent variable of relationship satisfaction (α=.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 were summed to form a composite measure of expected relationship duration (α=.75). The item measuring likelihood of sexual infidelity was not included in the composite because it did not contribute to the composite’s internal consistency.

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 (see Preacher & Hayes, 2004). 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 (α=.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 measure of love for her partner (α = .85).

**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 (α = .91).

**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).

**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 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”).

**Demographics.** Next, participants completed a demographics questionnaire. This questionnaire assessed information such as age, sex, ethnicity, current relationship status, and sexual orientation.

**Results**

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

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). In both analyzes, all three covariates were found to not be statistically significant and were not reported.

**The Mate-Choice Hypothesis**

To test the predictions derived from the mate-choice hypothesis, the dependent variable of relationship satisfaction was subject to a 3 (orgasm frequency) × 2 (relationship context) ANOVA. A significant main effect of relationship context with female participants reporting greater satisfaction in the long-term context (M = 11.37, SD = 1.85) than in the short-term context (M = 8.88, SD = 2.58, d = 1.11), F(1, 140) = 52.01, p < .001, η² = .271. There was also a significant main effect of female orgasm frequency, F(2, 140) = 8.72, p < .001, η² = .111. A Tukey post-hoc test revealed that female participants role-playing almost always experiencing an orgasm (M = 11.10, SD = 2.17) reported greater relationship satisfaction than female participants role-playing occasionally experiencing an orgasm (M = 9.91, SD = 2.52, d = .69) and never experiencing an orgasm (M = 9.33, SD = 2.72, d = .72). There was no significant difference in relationship satisfaction between females role-playing occasionally and never experiencing an orgasm (d = .30). There was no significant interaction effect between relationship context and female orgasm frequency, F(2, 140) = 1.12, p = .329, η² = .016. (Figure 1)

The dependent variable of expected relationship duration was subject to a 3 (orgasm frequency) × 2 (relationship context) ANOVA. A significant main effect of relationship context with female participants reporting a longer expected relationship duration in the long-term context (M = 9.45, SD = 2.78) than in the short-term context (M = 6.59, SD = 2.52, d = 1.07), F(1, 139) = 42.81, p < .001, η² = .255. There was also a significant main effect of female orgasm frequency, F(2, 139) = 5.35, p = .006, η² = .071. A Tukey post-hoc test revealed that female participants role-playing almost always experiencing an orgasm (M = 8.94, SD = 3.04) reported a longer expected
relationship duration than female participants role-playing occasionally experiencing an orgasm \((M = 7.79, SD = 3.09, d = .38)\) and never experiencing an orgasm \((M = 7.29, SD = 2.64, d = .58)\). There was no significant difference in expected relationship duration between females role-playing occasionally and never experiencing an orgasm \((d = .17)\). There was no significant interaction effect between relationship context and female orgasm frequency, \(F(2, 139) = 1.03, p = .361, \eta^2 = .015\). (Figure 2)

“Mr. Right” Hypothesis

In Prediction 2 we postulated that the relationship between female orgasm frequency and the primary dependent variable of relationship satisfaction would be at least partially mediated by the participant’s perceptions of her male partner’s commitment. In Step 1 of the mediation model, the regression of orgasm frequency on relationship satisfaction, ignoring the mediator, was significant, \(b = .697, t(172) = 2.96, p = .004\). Step 2 showed that the regression of orgasm frequency on the mediator, perceived partner commitment, was not significant, \(b = .423, t(171) = 1.07, p = .287\). Step 3 of the mediation process showed that the mediator (perceived partner commitment), controlling for orgasm frequency, was a significant predictor of relationship satisfaction, \(b = .525, t(171) = 24.56, p < .001\). Step 4 of the analysis revealed that, controlling for the mediator (perceived partner commitment), orgasm frequency was still a significant predictor of relationship satisfaction, \(b = .475, t(171) = 4.25, p < .001\). A Sobel test was conducted and found no mediation in the model \((z = .81, p = .420)\). In contrast with Prediction 2, perceived partner care did not mediate the relationship between orgasm frequency and relationship satisfaction. (Figure 3)

In Prediction 2 we postulated that the relationship between female orgasm frequency and the secondary dependent variable of expected relationship duration would be at least partially mediated by the participants’ perceptions of her male partner’s commitment. In Step 1 of the mediation model, the regression of orgasm frequency on expected relationship duration, ignoring the mediator, was significant, \(b = .767, t(171) = 2.65, p = .009\). Step 2 showed that the regression of orgasm frequency on the mediator, perceived partner commitment, was not significant, \(b = .443, t(171) = 1.11, p = .268\). Step 3 of the mediation process showed that the mediator (perceived partner commitment), controlling for orgasm frequency, was a significant predictor of expected relationship duration, \(b = .494, t(170) = 12.19, p < .001\). Step 4 of the analysis revealed that, controlling for the mediator (perceived partner commitment), orgasm frequency was still a significant predictor of expected relationship duration, \(b = .548, t(170) = 2.57, p = .011\). A Sobel test was conducted and found no mediation in the model \((z = 1.11, p = .269)\). In contrast with Prediction 2, perceived partner care did not mediate the relationship between orgasm frequency and expected relationship duration. (Figure 4)
For both of the dependent variables, the female participants’ perception of their partner’s commitment did not mediate the relationship between orgasm frequency and relationship satisfaction/duration. This seems to indicate that the mate-choice function of female orgasm does not act through signaling the male’s overall care and commitment.

**Long-Term Pair Bonding Hypothesis**

In Prediction 3 we postulated that the relationship between female orgasm frequency and the primary dependent variable of relationship satisfaction would be at least partially mediated by the participant’s perceptions of her love for her partner. In Step 1 of the mediation model, the regression of orgasm
frequency on relationship satisfaction, ignoring the mediator, was significant, $b = .697$, $t(172) = 2.96$, $p = .004$. Step 2 showed that the regression of orgasm frequency on the mediator, lover for her partner, was also significant, $b = 1.68$, $t(171) = 4.27$, $p < .001$. Step 3 of the mediation process showed that the mediator (lover for her partner), controlling for orgasm frequency, was a significant predictor of relationship satisfaction, $b = .499$, $t(170) = 19.35$, $p < .001$. Step 4 of the analysis revealed that, controlling for the mediator (love for her partner), orgasm frequency was not a significant predictor of relationship satisfaction, $b = -.157$, $t(170) = -1.12$, $p = .265$. A Sobel test was conducted and found full mediation in the model ($z = 4.17$, $p < .001$). In line with Prediction 3, love for her partner fully mediated the relationship between orgasm frequency and relationship satisfaction. (Figure 5)

In Prediction 3 we postulated that in 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. In Step 1 of the mediation model, the regression of orgasm frequency on expected relationship duration, ignoring the mediator, was significant, $b = .767$, $t(171) = 2.65$, $p = .009$. Step 2 showed that the regression of orgasm frequency on the mediator, lover for her partner, was also significant, $b = 1.72$, $t(171) = 4.34$, $p < .001$. Step 3 of the mediation process showed that the mediator (lover for her partner), controlling for orgasm frequency, was a significant predictor of expected relationship duration, $b = .531$, $t(169) = 13.55$, $p < .001$. Step 4 of the analysis revealed that, controlling for the mediator (love for her partner), orgasm frequency was not a significant predictor of expected relationship duration.
significant predictor of expected relationship duration, $b = -0.139$, $t(169) = -0.65$, $p = 0.516$. A Sobel test was conducted and found full mediation in the model ($z = 4.13$, $p < .001$). In line with Prediction 3, love for her partner fully mediated the relationship between orgasm frequency and expected relationship duration. (Figure 6)

For both of the dependent variables, the female participants’ self-reported love for her partner fully mediated the relationship between orgasm frequency and relationship satisfaction/duration. This seems to indicate that the mate-choice function of female orgasm may act through promoting long-term pair bonding through female attachment.

**Discussion**

In this study, we tested predictions derived from the mate-choice hypothesis of 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 mate-choice hypothesis female orgasm functions to select mates for long-term relationships who are willing to commit and invest. This study found overall support for this hypothesis, as a female’s orgasm frequency was positively related to her relationship satisfaction and expectations for a longer relationship. As predicted, we found that a female experience more frequent orgasms in both short- and long-term relationships was related to greater relationship satisfaction for the female and an expectation of the relationship lasting longer.

According to the “Mr. Right” component of this 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 partner’s income or family income and females’ orgasm rate (Gallup et al., 2014) and in non-human primates a positive correlation between male status and female orgasm frequency (Troisi & Carosi, 1998). Based on this logic, we proposed that female orgasm as a mate-choice mechanism functions through signaling the male partner’s overall care and commitment to the relationship. However, this prediction was not supported and the female participants’ perception of her partner’s commitment did not mediate the relationship between orgasm frequency and the two outcome variables of relationship satisfaction and expected relationship duration.

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). Based on this logic, we predicted that female orgasm as a mate-choice mechanism functions through promoting pair bonding through female attachment. This prediction was supported and the female participants’ self-reported love for her partner fully mediated the relationship between orgasm frequency and both outcome variables of relationship satisfaction and expected relationship duration. In summary, this study found support for the mate-choice hypothesis of female orgasm and differential mediation indicates that this hypothesis operates through promoting long-term pair bonds rather than signaling male partner’s care and commitment.

**Evolved Function versus Benefit**

The predictions associated with the mate-choice (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.

**Methodological Considerations**

The methodology of this study was designed in order to test specific predictions from competing hypotheses, but the method is not without limitations. It is possible that the lack of significant results for the “Mr. Right” hypothesis 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 mate-choice (long-term pair bonding) hypothesis 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.

Additionally, the causal relationship between love for one’s partner, relationship satisfaction, and orgasm rate is unclear in this study. Participants were randomly assigned their orgasm rate via vignettes and then asked to self-report their love for their partner and relationship satisfaction. The researcher manipulating orgasm rate implies a causal relationship, but it is possible, even likely, that being more satisfied in a relationship also facilitates orgasm. Thus, when participants where asked to manipulate orgasm rate via vignettes and then asked to self-report their love for their partner, it may have assumed this was because they were more satisfied with the relationship and more in love with their partner. The direction of causation between these variables is likely circular and should not meaningfully change the primary conclusions of the current study. Regardless of causal direction, orgasm rate is related to relationship satisfaction, and this relationship is mediated by a female’s lover for her partner but not by her perceptions of her partners care and commitment.

**Conclusions**

Sexual functioning has great implications for both relationship and overall satisfaction (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 et al., 2013; Gallup et al., 2018).

In order to have a full evolutionary understanding of a psychological trait or behavior, it is necessary to understand the phenomenon on multiple levels: how it evolved, what is the adaptive function, what is the mechanism by which it operates, etc. (Tinbergen, 1963). In addition to asking ultimate questions about a trait, it is important to explore the proximate mechanism as well. Thus, the field of evolutionary psychology must adopt a range of empirical approaches to address these questions and find a convergence of evidence (Schmitt & Pilcher, 2004). There is interesting physiological research on female orgasm that provides insight to these proximate mechanisms (see Safron, 2016). The goal of the current study was to contribute to the body of research on the evolutionary function of female orgasm by utilizing a unique approach to attempt to parse the psychological mechanisms (i.e. does female orgasm increase relationship satisfaction via love for her partner or perceptions of her partner’s care?).

In closing, this study is, to the knowledge of the researchers, one of the first studies 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 potential 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.

**Declarations of interest**

none

**Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.
Note
1 The sperm selection hypothesis is a related adaptive explanation of female orgasm that asserts female orgasm functions to increase sperm retention and the probability of conception. The empirical support for this hypothesis largely comes from physiological research (see Fox, Wolff, & Baker, 1970; Levin, 1998). Due to the nature of the current study (using fictional relationships), the sperm selection hypothesis cannot be tested here, and thus, will not be discussed in as much detail. It is important to note that the sperm selection and mate-choice hypotheses are not mutually exclusive. Female orgasm may well function to select mates, promote pair bonding, and increase fertility with those selected partners.

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