



# Erectile Dysfunction and Sexual Coercion: The Role of Sperm Competition Risk

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Received: 18 May 2021 / Revised: 23 January 2022 / Accepted: 26 January 2022 / Published online: 1 July 2022  
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## Abstract

Erectile dysfunction (ED) has been shown to be associated with several negative aspects of intimate relationships. Our goal for the present research was to examine whether ED was associated with men's use of sexual coercion in their intimate relationships (which may include the use of physical coercion, psychological manipulation, or emotional manipulation to gain sexual access) and if perceived sperm competition risk (i.e., perceived risk of partner infidelity, which may place a man's sperm into competition with sperm from another man) played a role in this association. These associations were examined in Study 1 using self-reports provided by men ( $N=202$ ) who had a mean age of 30.48 years ( $SD=5.03$ ) and were recruited through Amazon's Mechanical Turk (MTurk). ED was found to have a large positive association with sexual coercion. However, men's self-reports did not provide support for sperm competition risk moderating the association between ED and sexual coercion, but an exploratory analysis revealed that sperm competition risk mediated this association. We attempted to replicate and extend these results in Study 2 by using partner-reports provided by women ( $N=151$ ) who had a mean age of 30.41 years ( $SD=4.77$ ) and were recruited through MTurk. Women's partner-reports provided support for sperm competition risk moderating the association between ED and sexual coercion. In addition, an exploratory analysis found that sperm competition risk also mediated the association between ED and sexual coercion, similar to Study 1. Discussion explores the implications of these results for understanding the role that sperm competition risk may play in the connection between ED and sexual coercion.

**Keywords** Erectile dysfunction · Sperm competition · Sexual coercion

## Introduction

Erectile dysfunction (ED) refers to the inability to maintain an erection sufficient for satisfactory sexual intercourse (NIH Consensus Development Panel on Impotence, 1993) and may have negative consequences for the psychological health and interpersonal relationships of men (e.g., Araujo et al., 1998; Feldman et al., 1994; Laumann et al., 1999; Swindle et al., 2004). There are various risk factors associated with ED. For example, age is an important risk factor for ED, with estimates of its prevalence ranging from 20 to 40% for men between the ages of 60 and 69 years (Lewis et al., 2010) and approximately 78% of men over the age of 75 years reporting at least some experience with ED (Saigal et al., 2006). A recent meta-analysis estimated the

global prevalence of ED to be between 13 and 71%, with prevalence rates varying across cultures, and increasing with age (Van Hemelrijck et al., 2019). However, it is important to note that ED is not limited to older men because 10% of men under the age of 40 years (Lewis et al., 2010) and 7% of men under the age of 29 years (Saigal et al., 2006) report experiencing ED. Other risk factors for ED include physical health problems such as heart disease, hypertension, diabetes, and obesity (e.g., Laumann et al., 2007; Nicolosi et al., 2003; Saigal et al., 2006). ED also tends to be comorbid with psychological health problems such as depression and anxiety (Althof, 2002) as well as an increased risk of dementia (Yang et al., 2015). Further, men who receive medical treatment for ED have been shown to report improvements in their confidence, self-esteem, and sexual satisfaction that provides preliminary support for the possibility that ED may play a causal role in some negative psychological outcomes for men (McCabe & Althof, 2014).

ED has been shown to have negative consequences for various aspects of men's romantic relationships including their level of satisfaction with those relationships (e.g., Corona et al.,

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2009). Romantic couples tend to report decreased sexual activity following the onset of ED, with both members of the couple wanting to find a solution for ED (McCabe & Matic, 2008). The negative consequences of ED extend to the female partners of men who experience ED because they tend to report relatively low levels of sexual desire and sexual functioning (e.g., Chevret et al., 2004; Fisher et al., 2005; Wagner et al., 2000). Further, men who received medical treatment for ED reported increased levels of relationship satisfaction compared to men who only received a placebo (O’Leary et al., 2006). Taken together, the existing research suggests that ED is associated with a variety of negative outcomes for men as well as their romantic partners.

There is some evidence suggesting a link between ED and the use of sexual coercion which is often defined as the use of physical force, psychological manipulation, or emotional manipulation to gain sexual access (e.g., Carvalho et al., 2013), but it should be noted that other studies have failed to provide support for this association (e.g., Dang & Gorzalka, 2015). One possible explanation for the association between ED and sexual coercion—if such an association exists—is that some men may engage in sexually coercive behavior in an attempt to manage their own feelings of frustration or inadequacy stemming from their experiences with ED. For example, men who experience ED may feel pressure to engage in sexual activity as soon as they experience any sort of sexual arousal in an effort to avoid performance failure. This desire to avoid ED symptoms by rushing these sexual encounters may be one of the reasons these men sometimes engage in coercive tactics with their partners. As it currently stands, the existing body of research does not provide a clear answer as to whether ED is associated with the use of sexually coercive behavior.

## Overview and Hypotheses

The present studies make use of data reported by Vance et al. (2022), who observed that ED was associated with men’s use of partner-directed behaviors such as violence and insults with these associations being mediated by feelings of suspicious jealousy. The goal of the present studies was to extend the work of Vance et al. (2022) by determining whether ED was associated with sexual coercion in intimate relationships. More specifically, we expected ED to be positively associated with the use of sexually coercive behavior in these relationships. The rationale for this prediction was that men who experience ED may engage in sexual coercion in an effort to manage their feelings of frustration or inadequacy (e.g., Carvalho et al., 2013). We were also interested in the possibility that the association between ED and sexual coercion may be particularly strong when men perceive themselves to be experiencing higher levels of sperm competition risk. That is, suspicions about past or future partner infidelity may exacerbate the tendency for men who experience ED to engage in sexually coercive behavior. This prediction is

consistent with the results of past studies showing that men are more likely to engage in partner-directed sexual coercion when they suspect that their partner has been unfaithful (e.g., McKibbin et al., 2011).

It is important to note that the present studies are unique in that they were intended to account for the role of both ED and sperm competition risk in men’s use of sexual coercive behavior. Study 1 focuses on men’s self-reported experience with ED, their perceptions of the degree to which their partner’s behavior places them at risk of sperm competition, and their self-reported use of sexual coercion in their current romantic relationship. Study 2 focuses on women’s perceptions of their partner’s ED, their self-reported behaviors that place their partners at risk of sperm competition, and their partner’s use of sexual coercion. Accounting for the experiences of both men and women is an important aspect of these studies because it has been shown that men may underreport the frequency of certain behaviors in their romantic relationships (e.g., Dobash et al., 1998).

## Study 1

The purpose of Study 1 was to investigate the associations between men’s self-reported experience with ED, their perceptions of the degree to which their partner’s behavior places them at risk of sperm competition, and their self-reported use of sexual coercion in their intimate relationships. We expected sperm competition risk to moderate the association between men’s experience with ED and their use of sexual coercion such that this association would be particularly strong when men perceived themselves to be at high risk of sperm competition. As with many studies assessing sensitive topics, there was certainly a risk that male participants in Study 1 may underreport their experience with ED or their use of sexual coercive behavior.

## Method

### Participants

The data reported in Study 1 were collected as part of a larger project concerning whether ED is associated with jealousy and partner-directed violence. Part of that larger project has been reported elsewhere (e.g., Study 1 of Vance et al., 2022), but the analyses reported in the current study were specifically conducted to test novel hypotheses developed for this research. Participants were 299 men recruited via Amazon’s Mechanical Turk (MTurk) who participated in exchange for financial compensation (\$2.00 USD). Participants were required to be heterosexual men between the ages of 18 and 45 years who were currently in a romantic relationship of at least 6 months duration. To assess sexual orientation, participants were asked “What is your sexual orientation?” and

were able to select between the following options: *heterosexual*, *homosexual*, *bisexual*, or *other*. We excluded data from 34 participants for failing to meet the requirements for participating in this study: Two participants were excluded for reporting a sexual orientation other than “heterosexual,” two participants were excluded for reporting they were not currently in a romantic relationship, 18 participants were excluded for reporting they were currently in a romantic relationship for less than 6 months, 11 participants were excluded for not completing the survey, and one participant was excluded for reporting they were over 45 years of age.

Curran (2016) emphasized the importance of detecting and removing careless and inattentive responders because failing to do so may lead to an array of problems. For example, Huang et al. (2015) found that relatively low proportions of careless responders were sufficient to produce spurious associations between variables. We used some of the strategies recommended by Curran to identify careless and inattentive responders which led us to exclude data from 63 additional participants: One participant was excluded for being a univariate outlier and 62 participants were excluded for completing the survey in less than 10 min, which suggested that they did not complete the survey with care (the average completion time was 30.96 min [SD=51.73 min] after excluding participants who completed the survey in less than 10 min). We also examined the data for multivariate outliers as assessed by Mahalanobis distance (De Maesschalck et al., 2000) and inconsistent responding as assessed by inter-item standard deviation (Marjanovic et al., 2015) but no additional participants were excluded for those reasons. The final sample consisted of 202 heterosexual men with a mean age of 30.48 years (SD=5.03) and a racial/ethnic composition as follows: 65.5% White, 12.8% Black, 6.4% Latino, 4.9% Asian, 7.4% Native American, 0.5% Middle Eastern, and 2.5% Multiracial. Participants reported involvement in a romantic relationship lasting an average of 39.43 months (SD=47.54).

## Measures

**Erectile Dysfunction** The International Index of Erectile Function (IIEF-5; Rosen et al., 1999) was used to assess erectile function over the past 6 months (5 items; e.g., “When you had erections with sexual stimulation, how often were your erections hard enough for penetration?” [ $\alpha=0.88$ ]). Participants were asked to respond to each question using a 5-point scale with specific anchors that differed across the items (e.g., 1 [*Almost never/never*] to 5 [*Almost always/always*]). Here and for all other measures used in the present studies, composite scores were created by calculating the average of the responses to the constituent items. Due to our interest in erectile dysfunction, we reverse-scored each of the IIEF-5 items so that higher scores for this measure indicated greater ED.

**Sperm Competition Risk** Men’s perceived risk of experiencing sperm competition (i.e., attributable to female partner infidelity) was assessed using six items ( $\alpha=0.84$ ) regarding their partner’s romantic involvement with others (two items; e.g., “As far as you know, has your current partner had sexual intercourse with someone other than you since you have been involved in a relationship together?”), the amount of time their partner spends with other men (two items; e.g., “As far as you know, how much time does your partner currently spend with her male friends?”), and their partner’s perceived attractiveness (two items; e.g., “Thinking about your partner at this moment in time, how physically attractive do other men think she is?”). Participants were asked to respond to each question using a 10-point scale with specific anchors that differed across the items (e.g., 0 [*Definitely no*] to 9 [*Definitely yes*]). This measure of sperm competition risk has not been used in previous research, but it closely resembles measures of sperm competition risk used in previous studies (e.g., Goetz et al., 2005; Pham & Shackelford, 2013).

**Sexual Coercion** The Sexual Coercion in Intimate Relationships Scale (Goetz & Shackelford, 2010) was used to assess men’s use of sexual coercion in their intimate relationships during the past month (34 items; e.g., “I pressured my partner to have sex with me against her will” [ $\alpha=0.99$ ]).<sup>1</sup> Participants were asked to respond to each item using a scale that ranged from 0 (*Act did not occur in the past month*) to 5 (*Act occurred 11 or more times in the past month*).

## Results

The means, SDs, and intercorrelations among the study variables are presented in Table 1. ED had a medium positive correlation with perceived sperm competition risk and a large positive correlation with sexual coercion. Additionally, perceived sperm competition risk had a large positive correlation with sexual coercion. We conducted a hierarchical moderated multiple regression analysis to determine whether perceived sperm competition risk moderated the association that ED had with sexual coercion. We entered the main effects of ED and perceived sperm competition risk on Step 1 with the interaction of ED  $\times$  perceived sperm competition risk entered on Step 2. The Variance Inflation Factor (VIF) values for this analysis were less than 1.27 which suggests that multicollinearity was not an issue (Darlington & Hayes, 2017).

<sup>1</sup> The internal consistency for the Sexual Coercion in Intimate Relationships Scale was high both for men’s self-reports in Study 1 and women’s partner-reports in Study 2. Although internal consistency estimates of this magnitude are a potential concern, it is important to note that other studies have observed similar internal consistency estimates for this instrument (e.g.,  $\alpha=0.96$  in Shackelford & Goetz, 2004;  $\alpha=0.95$  in Goetz & Shackelford, 2009).

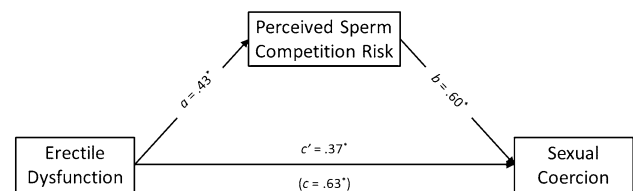
**Table 1** Study 1 (Men's Self-Reports): Intercorrelations and descriptive statistics

	1	2	3
1. Erectile dysfunction	–		
2. Perceived sperm competition risk	.43*	–	
3. Sexual coercion	.62*	.75*	–
Mean	2.16	4.58	1.63
SD	0.88	2.03	1.56
Range	1–5	0–9	0–5

\* $p < .001$  $n = 202$  men

Both ED ( $\beta = 0.39$ ,  $t = 8.37$ ,  $p < 0.001$ ,  $CI_{95\%} [0.30, 0.48]$ ) and perceived sperm competition risk ( $\beta = 0.59$ ,  $t = 13.22$ ,  $p < 0.001$ ,  $CI_{95\%} [0.50, 0.68]$ ) had unique positive associations with sexual coercion. However, the expected interaction of ED  $\times$  perceived sperm competition risk was not statistically significant ( $\beta = 0.08$ ,  $t = 1.48$ ,  $p = 0.141$ ,  $CI_{95\%} [-0.03, 0.18]$ ). These results were inconsistent with Hypothesis 1 such that the strength of the association between ED and sexual coercion did not vary as a function of perceived sperm competition risk.

Perceived sperm competition risk did not moderate the association between ED and sexual coercion as we expected, so we considered the possibility that it may mediate the association instead. Our rationale for this exploratory analysis was that ED may alter perceptions of sperm competition risk such that men with more frequent experience with ED may perceive greater risk of sperm competition. That is, we were interested in exploring whether more frequent experience with ED would lead to greater perceived sperm competition risk which, in turn, may contribute to more frequent use of sexual coercion. To examine this possibility, we conducted an exploratory mediation analysis using model four of the PROCESS macro developed by Hayes (2018) to determine whether perceived sperm competition risk mediated the relationship between ED and sexual coercion. Direct and indirect effects were examined using a bootstrap resampling process that was repeated 10,000 times to generate a 95% bootstrapped confidence interval (CI). All variables were standardized prior to analysis to aid with interpretation of the resulting coefficients. The results of this mediation analysis are presented in Fig. 1. This analysis revealed that ED had a large positive association with sexual coercion ( $c = 0.63$ ,  $SE = 0.06$ ,  $t = 11.20$ ,  $p < 0.001$ ,  $CI_{95\%} [0.52, 0.74]$ ) that remained significant—but was reduced in magnitude—when perceived sperm competition risk was included as a mediator ( $c' = 0.37$ ,  $SE = 0.05$ ,  $t = 8.22$ ,  $p < 0.001$ ,  $CI_{95\%} [0.28, 0.46]$ ). ED had a positive association with perceived sperm competition risk ( $a = 0.43$ ,  $SE = 0.07$ ,  $t = 6.67$ ,  $p < 0.001$ ,  $CI_{95\%} [0.31, 0.56]$ ) which, in turn, had a positive association with sexual coercion

**Fig. 1** Study 1 (Men's Self-Reports): Mediation analysis with perceived sperm competition risk mediating the association erectile dysfunction had with sexual coercion. \* $p < .001$ .

( $b = 0.60$ ,  $SE = 0.04$ ,  $t = 13.41$ ,  $p < 0.001$ ,  $CI_{95\%} [0.51, 0.68]$ ). ED had a positive indirect association with sexual coercion through perceived sperm competition risk ( $ab = 0.26$ ,  $SE = 0.04$ ,  $z = 5.96$ ,  $p < 0.001$ ,  $CI_{95\%} [0.19, 0.34]$ ).

## Discussion

The results of Study 1 revealed that ED had a large positive association with perceived sperm competition risk. However, perceived sperm competition risk did not moderate the association that ED had with sexual coercion as we had expected. An exploratory analysis showed that perceived sperm competition risk mediated the association that ED had with sexual coercion. This suggests the intriguing possibility that men who more frequently experience ED may perceive greater sperm competition risk which, in turn, may promote the use of sexually coercive behaviors. Previous research has documented an association between men's perceptions of their partner's infidelity and their use of sexually coercive behavior which suggests that men may sometimes employ sexual coercion as part of a broader anti-cuckoldry strategy (Goetz & Shackelford, 2009). This possibility is consistent with previous results showing that ED is associated with jealousy in some men (Cornwell & Laumann, 2011; Vance et al., 2022) and that men's feelings of sexual jealousy toward their partner facilitates various anti-cuckoldry and sperm competition-related behaviors (Buss et al., 1999; Maner & Shackelford, 2008).

Given that men presumably have first-hand knowledge of their own sexual experiences, we anticipated that men's self-reports would provide direct assessments of their own experience with ED and their perceptions of the degree to which their partner's behavior places them at risk of sperm competition. However, it is important to note that previous studies have investigated the possibility that men may underreport their symptoms of ED (e.g., Frost et al., 2012; Levine & Kloner, 2000). In addition, embarrassment has been found to be the primary reason men gave for not reporting ED to their urologist (Baldwin et al., 2003). Thus, the results of Study 1 should be considered with this limitation in mind.

## Study 2

The purpose of Study 2 was to replicate and extend the results of Study 1 by considering the perspectives of women. Collecting separate reports from both men and women concerning behaviors in romantic relationships may be helpful for gaining a more complete and nuanced understanding of the role that sperm competition risk may play in the association between ED and sexual coercion. For example, previous research documents that women provide more accurate reports of the frequency of violence in their intimate relationships, whereas men tend to underreport how often these events occur in their relationships (e.g., Dobash et al., 1998). As a result, studies investigating romantic relationships have sometimes attempted to mitigate biased self-reports by collecting data from both men and women (e.g., Goetz & Shackelford, 2009; Shackelford et al., 2002). We collected data from women in Study 2 to determine whether the associations we observed between ED, perceived sperm competition risk, and sexual coercion in Study 1 would emerge from their perspective.

## Method

### Participants

As in Study 1, the data reported in Study 2 were collected as part of a larger project concerning whether ED was associated with jealousy and partner-directed violence. Part of that larger project has been reported elsewhere (e.g., Study 2 of Vance et al., 2022). The analyses reported in the current study, however, were specifically conducted to test novel hypotheses for this research. Participants were 236 women recruited via MTurk who participated in exchange for financial compensation (\$2.00 USD). Participants were required to be heterosexual women between the ages of 18 and 45 years currently in a romantic relationship of at least 6 months duration. As in Study 1, we assessed sexual orientation by asking participants “What is your sexual orientation?” and allowing them to select between the following options: *heterosexual*, *homosexual*, *bisexual*, or *other*. We excluded data from 69 participants for failing to meet the requirements for participating in this study: Thirty-three participants were excluded for reporting a sexual orientation other than “heterosexual,” eight participants were excluded for a large amount of missing data, 26 participants were excluded for reporting they were currently in a romantic relationship for less than 6 months, one participant was excluded for reporting she was over 45 years of age, and one participant was excluded for reporting she was under 18 years of age.

As in Study 1, we used some of the strategies recommended by Curran (2016) to identify careless and inattentive responders which led to us excluding data from an additional 16 participants: One participant was excluded for being a

multivariate outlier and 15 participants were excluded for completing the survey in less than 10 min, which suggested that they did not complete the survey with care (the average completion time was 30.96 min [SD = 51.73 min] after excluding participants who completed the survey in less than 10 min). We also examined the data for univariate outliers and inconsistent responding as assessed by inter-item standard deviation but no additional participants were excluded for those reasons. The final sample consisted of 151 heterosexual women with a mean age of 30.41 years (SD = 4.77) and a racial/ethnic composition as follows: 80.3% White, 11.8% Black, 1.3% Latino, 2.0% Asian, 2.6% Native American, and 2.0% Multiracial. Participants reported involvement in a romantic relationship lasting an average of 50.52 months (SD = 49.47).

### Measures

**Erectile Dysfunction** A modified version of the IIEF-5 from Study 1 was used to assess the perceived ED of the male partner over the last 6 months ( $\alpha = 0.87$ ). The modifications involved directing participants to consider their male partner. For example, the item “When you had erections with sexual stimulation, how often were your erections hard enough for penetration?” was replaced with “When your partner had erections with sexual stimulation, how often were your partner’s erections hard enough for penetration?” As in Study 1, we reverse-scored each of the items for the IIEF-5 so that higher scores for this measure indicated greater ED.

**Sperm Competition Risk** Sperm competition risk was assessed with five items ( $\alpha = 0.82$ ) assessing women’s romantic involvement with others (one item; i.e., “Have you fallen in love with someone other than your current partner since you have been involved in a relationship with your current partner?”), the amount of time they spend with other men (two items; e.g., “How much time do you currently spend with your male friends?”), and their own attractiveness as perceived by other men (two items; e.g., “Thinking about yourself at this moment in time, how physically attractive do other men think you are?”). Participants were asked to respond to each question using a 10-point scale with specific anchors that differed across the items (e.g., 0 [Definitely no] to 9 [Definitely yes]).

**Sexual Coercion** A modified version of the Sexual Coercion in Intimate Relationships Scale (Goetz & Shackelford, 2010) was used to assess women’s reports of their partner’s use of sexual coercion during the past month (e.g., “My partner pressured me to have sex with him against my will” [ $\alpha = 0.99$ ]). Participants were asked to respond to each question using a 6-point scale with specific anchors (0 [act did not occur in the past month] to 5 [Act occurred 11 or more times in the past month]).

**Table 2** Study 2 (Women's Partner-Reports): Intercorrelations and descriptive statistics

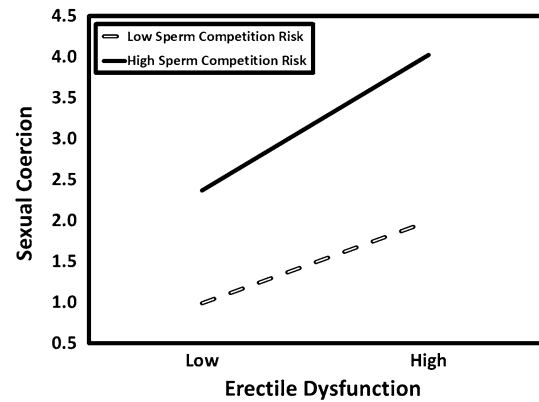
	1	2	3
1. Erectile dysfunction	–		
2. Sperm competition risk	.47*	–	
3. Sexual coercion	.70*	.78*	–
Mean	2.01	5.17	2.42
SD	0.83	2.10	1.52
Range	1–5	0–9	0–5

\*  $p < .001$  $n = 151$  women

## Results

The means, SDs, and intercorrelations among the study variables are presented in Table 2. ED had large positive correlations with sperm competition risk and sexual coercion. Additionally, sperm competition risk had a large positive correlation with sexual coercion. As in Study 1, we conducted a hierarchical moderated multiple regression analysis to determine whether sperm competition risk moderated the association that ED had with sexual coercion. We entered the main effects of ED and sperm competition risk on Step 1 with the interaction of ED  $\times$  sperm competition risk entered on Step 2. The VIF values for this analysis were less than 1.26 which suggests that multicollinearity was not an issue. This analysis was followed by simple slopes tests to probe the interaction of ED  $\times$  sperm competition risk. These simple slopes tests were conducted using values one SD above and below their respective means (e.g., low sperm competition risk was represented by a value that was one SD below the mean for sperm competition risk, and high sperm competition risk was represented by a value that was one SD above the mean for sperm competition risk).

Both ED ( $\beta = 0.44$ ,  $t = 9.33$ ,  $p < 0.001$ ,  $CI_{95\%} [0.35, 0.53]$ ) and sperm competition risk ( $\beta = 0.56$ ,  $t = 12.20$ ,  $p < 0.001$ ,  $CI_{95\%} [0.47, 0.66]$ ) were positively associated with sexual coercion. In addition, the expected interaction of ED  $\times$  sperm competition risk emerged from this analysis ( $\beta = 0.11$ ,  $t = 2.01$ ,  $p = 0.047$ ,  $CI_{95\%} [0.00, 0.24]$ ). The predicted values for this interaction are depicted in Fig. 2. Simple slope tests revealed that the association between ED and sexual coercion was significant for women who placed their partner at low sperm competition risk ( $\beta = 0.33$ ,  $t = 4.62$ ,  $p < 0.001$ ,  $CI_{95\%} [0.23, 0.56]$ ) but this association was particularly strong for women who placed their partner at high sperm competition risk ( $\beta = 0.54$ ,  $t = 7.62$ ,  $p < 0.001$ ,  $CI_{95\%} [0.48, 0.82]$ ). Additional simple slope tests revealed that the association between sperm competition risk and sexual coercion was significant for women who reported that their partner experienced low levels of ED ( $\beta = 0.46$ ,  $t = 6.25$ ,  $p < 0.001$ ,  $CI_{95\%} [0.15, 0.29]$ ) but this association was particularly strong for women who reported that their partner experienced high levels

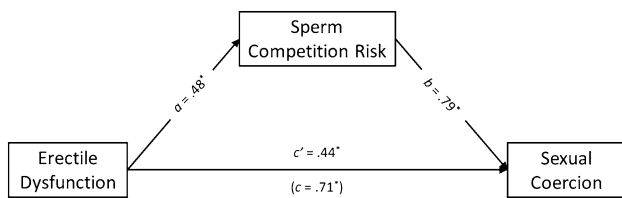
**Fig. 2** Study 2 (Women's Partner-Reports): Predicted values for sexual coercion illustrating the interaction of ED and sperm competition risk at values that are 1 SD above and below their respective means

of ED ( $\beta = 0.67$ ,  $t = 9.84$ ,  $p < 0.001$ ,  $CI_{95\%} [0.26, 0.38]$ ). Taken together, these results show that women reported experiencing the highest levels of sexual coercion when their male partners were experiencing ED in conjunction with high levels of sperm competition risk.

As in Study 1, we also conducted an exploratory mediation analysis to determine whether sperm competition risk mediated the relationship between ED and sexual coercion. The results of this mediation analysis are presented in Fig. 3. ED had a large positive association with sexual coercion ( $c = 0.71$ ,  $SE = 0.06$ ,  $t = 12.04$ ,  $p < 0.001$ ,  $CI_{95\%} [0.60, 0.83]$ ) that was reduced in magnitude—but was still significant—when sperm competition risk was included as a mediator ( $c' = 0.44$ ,  $SE = 0.05$ ,  $t = 9.23$ ,  $p < 0.001$ ,  $CI_{95\%} [0.35, 0.53]$ ). ED had a positive association with sperm competition risk ( $a = 0.48$ ,  $SE = 0.07$ ,  $t = 6.5327$ ,  $p < 0.001$ ,  $CI_{95\%} [0.34, 0.63]$ ) which, in turn, had a positive association with sexual coercion ( $b = 0.79$ ,  $SE = 0.05$ ,  $t = 12.19$ ,  $p < 0.001$ ,  $CI_{95\%} [0.48, 0.66]$ ). ED had a positive indirect association with sexual coercion through sperm competition risk ( $ab = 0.27$ ,  $SE = 0.05$ ,  $z = 5.74$ ,  $p < 0.001$ ,  $CI_{95\%} [0.19, 0.36]$ ).

## Discussion

The results of Study 2 were consistent with our hypotheses. That is, ED had a large positive association with sexual coercion that was especially strong when sperm competition risk was high. This pattern suggests that women may be at particularly high risk for experiencing sexual coercion when their partner is experiencing ED and is suspicious about the possibility of past or future infidelity. The significant results of the moderation analysis that emerged in Study 2—which were not significant when examining the reports of men in Study 1—highlight the importance of considering the perspectives of both men and women when investigating



**Fig. 3** Study 2 (Women’s Partner-Reports): Mediation analysis with sperm competition risk mediating the association erectile dysfunction had with sexual coercion. \* $p < .001$ .

behaviors in heterosexual romantic relationships. Contrasting the reports provided by men and women may be especially useful when investigating sensitive aspects of intimate relationships, such as physical violence or sexual coercion, about which men may be reluctant to provide honest accounts of their behavior (e.g., Dobash et al., 1998; Shackelford et al., 2002). These contrasts between the reports provided by men and women could also be useful to consider in clinical contexts (e.g., relationship counseling). It is also important to note that the results of the exploratory mediation analysis in Study 2 were similar to the results of Study 1 such that ED had an indirect association with sexual coercion through perceived sperm competition risk. As a consequence, it remains somewhat unclear whether sperm competition risk is better conceptualized as moderating or mediating the association that ED has with sexual coercion.

## General Discussion

The results of the present studies revealed that ED had a large positive association with sexual coercion across both studies. That is, men who experienced more intense issues with ED tended to engage in more sexually coercive behaviors according to both the self-reports of men and the partner-reports provided by women. This pattern suggests that ED may serve as a potential risk factor for sexually coercive behaviors. One explanation for this association is that men may use sexually coercive tactics to mitigate the perceived loss of sexual access to their partner that results from their experiences with ED. In essence, men may be attempting to use these coercive tactics to gain sexual access to their partners in order to compensate for sexual opportunities that were lost due to their ED. Of course, there are also alternative explanations for these results that should be considered. For example, men may feel emasculated as a result of their experience with ED and may resort to the use of sexual coercion in a misguided attempt to restore their sense of masculinity (Carvalho et al., 2013).

The present results may help to resolve the previous inconsistencies in the literature due to the association between ED and the use of sexual coercion emerging in some studies (e.g., Carvalho et al., 2013) but not in other studies (e.g., Dang & Gorzalka,

2015). One potential explanation for the strength of the association between ED and sexual coercion that emerged from the present studies is that we employed the Sexual Coercion in Intimate Relationships Scale which encompasses a relatively broad range of coercive tactics that men may use to solicit sex from their female partners (e.g., “I hinted that I would give my partner gifts or other benefits if she had sex with me,” “I threatened to pursue a long-term relationship with another woman if my partner did not have sex with me”). This broader conceptualization of sexual coercion may be beneficial for gaining a better understanding of the use of sexual coercion in long-term romantic relationships. In contrast, the Sexual Experiences Survey (Koss & Oros, 1982)—which has been used in some of the previous studies investigating the potential connection between ED and sexual coercion (e.g., Dang & Gorzalka, 2015)—focuses on the explicit use of force to sexually coerce one’s partner (e.g., “Been in a situation where you obtained sexual acts with a woman such as anal or oral intercourse when she didn’t want to by using threats or physical force?”). Future studies concerning the connections between ED and sexually coercive behaviors within the context of long-term romantic relationships may benefit from employing a broader conceptualization of sexual coercion that extends beyond the use of physical force.

A novel feature of the present studies is that we considered the role that sperm competition risk played in the association that ED had with sexual coercion. We expected sperm competition risk to moderate this association such that ED would have a particularly strong association with sexual coercion when men were at greater risk of sperm competition. However, we found inconsistent support for this prediction because sperm competition risk moderated the association between ED and sexual coercion in Study 2 (which relied on the reports provided by women) but not in Study 1 (which relied on the reports provided by men). The pattern that emerged from Study 2 showed that women reported their male partners using the highest levels of sexually coercive behavior when the man was experiencing more severe ED symptoms and at greater sperm competition risk. That is, men who both suffer from ED and have partners who are engaging in behaviors that may elicit concerns regarding potential infidelity (e.g., spending a lot of time around other men) may be especially likely to employ behaviors such as sexual coercion in an effort to mitigate their actual (or perceived) risk of sperm competition. This pattern is consistent with the basic expectations of sperm competition theory (Baker & Bellis, 1989; Parker, 1970). One potential explanation for the inconsistent results across our studies is that women may be more willing than men to provide honest accounts of the sexually coercive behaviors that occur in their relationships (e.g., Dobash et al., 1998; Shackelford et al., 2005). It would be beneficial for future studies to consider the possibility that sperm competition risk may moderate the association between ED and sexual coercion in larger and more diverse samples using both the self-reports of men and the partner-reports provided by women.

We also conducted exploratory mediational analyses for both studies. The goal of these analyses was to consider whether sperm competition risk mediated—rather than moderated—the association that ED had with sexual coercion. Consistent with this possibility, we found that ED had a positive indirect association with sexual coercion through sperm competition risk in both studies. That is, the association between ED and sexual coercion was mediated by sperm competition risk when using the self-reports provided by men and the partner-reports provided by women. This pattern suggests that more frequent experience with ED may alter the perceptions of men such that they believe they are at greater risk of sperm competition which, in turn, may contribute to their use of sexually coercive tactics. However, it is important to note that these were exploratory analyses so it would be beneficial for future studies to attempt to replicate these patterns.

### Limitations and Future Directions

Despite the novel findings identified in the current research, there are a number of limitations that should be considered as research in this area moves forward and expands on these findings. The first limitation is that the analyses performed for the current research were conducted using samples that have been used for analysis in other research (Vance et al., 2022). Drawing numerous distinct conclusions using the same samples of participants may be problematic, especially if these samples are peculiar in some way, or are not representative of the target populations. Relying on these samples for multiple sets of analyses increases the likelihood that sampling error will influence the results of the analyses. Future research should attempt to replicate and extend the results of the present studies using new samples.

The second limitation is that our samples were only modest in size. Although our samples were large enough to conduct appropriately powered statistical analyses, it would be beneficial for future studies to replicate and extend the present findings using even larger and more diverse samples of participants. For example, it would be informative for future studies to include a more diverse age range of participants because this would allow researchers to examine whether the association between ED and sexual coercion differs across the life span.

The third limitation is that our results were based on independent reports secured from men and women, rather than linked reports of men and their romantic partners. Although there are advantages to securing independent reports of relationship behaviors from men and women, there are also advantages to securing dyadic data which would allow researchers to simultaneously consider the perspectives of men and women who are involved in the same relationship. This is particularly important because men and women

sometimes differ in their perceptions of certain aspects of their romantic relationships. The current studies are capable of comparing the reports of men and women about their separate romantic relationships, but future studies that used dyadic data would allow for these comparisons to be made within the same relationships.

The fourth limitation is that we relied exclusively on self-report instruments (Study 1) or partner-report instruments (Study 2) which allows for the possibility that our results may have been influenced to some extent by participants engaging in socially desirable responding. For example, men may have been reluctant to report their experiences with ED or their use of sexually coercive behaviors due to the feelings of shame, guilt, or embarrassment that may accompany the acknowledgment of these experiences and behaviors. In addition, it is also possible that the responses provided by participants may have been distorted by memory biases, limited insights into their own behaviors, or inaccurate perceptions of their partner's behavior.

The fifth limitation is that the participants in both Studies 1 and 2 were relatively young. This is an important issue because ED is more likely to occur in older men even though it is certainly not limited to them (e.g., Lewis et al., 2010; Saigal et al., 2006; Van Hemelrijck et al., 2019). The relatively young ages for the participants in these studies is the most likely explanation for the low levels of ED that were reported. It would be beneficial for future studies to replicate these results using older samples where the rates of ED would likely be elevated and would avoid any potential concerns regarding restriction of range for ED in the present studies.

The final limitation is that the instrument used to measure sperm competition risk was developed for these studies. Although this instrument closely resembles instruments that have been used to measure sperm competition risk in previous studies (e.g., Goetz et al., 2005; Pham & Shackelford, 2013), it is not identical to those instruments. As a result, it would be useful for future studies to replicate the present results using other strategies for capturing sperm competition risk. For example, previous studies have sometimes used the percentage of time a couple has spent apart since their last copulation as a proxy for sperm competition risk (e.g., Shackelford et al., 2002).

### Conclusion

The results of the present studies show that ED has a large positive association with sexual coercion such that men who experienced more intense issues with ED tended to engage in more sexually coercive behaviors according to both the self-reports of men and the partner-reports provided by women. We expected sperm competition risk to moderate the association between ED and sexual coercion but we found inconsistent support for this prediction because sperm competition risk moderated the association between ED and sexual



coercion in Study 2 (which relied on partner-reports provided by women) but not in Study 1 (which relied on self-reports provided by men). However, exploratory mediational analyses revealed that ED had a positive indirect association with sexual coercion through sperm competition risk in both studies. Taken together, these results suggest that sperm competition risk may play a role in the association between ED and sexual coercion, but the exact role remains somewhat unclear.

**Funding** The authors have not disclosed any funding.

## Declarations

**Conflict of interest** The authors have not disclosed any competing interests.

**Ethical Approval** This study was approved by the Oakland University IRB.

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