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Sexual Assertiveness Mediates the Associations Between Partner Facilitative Responses and Sexual Outcomes in Women With Provoked Vestibulodynia

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Provoked vestibulodynia (PVD) is a recurrent idiopathic vulvo-vaginal pain associated with negative sexual and psychological consequences. Facilitative partner responses to pain are currently receiving empirical attention because they are positively associated with women's sexual outcomes. However, the mechanisms through which facilitative responses to pain are associated with these outcomes have not been examined. One potential mechanism is sexual assertiveness, which has been found to be associated with better sexual function and satisfaction in women with PVD. The present study examined whether women's sexual assertiveness mediated the association between women's perception of facilitative partner responses and women's sexual function and satisfaction. Women ($N = 140$) with PVD symptomatology completed self-reported questionnaires evaluating their perception of their partners' facilitative responses, and their own sexual assertiveness, sexual function, and sexual satisfaction. Dependent measures were sexual function measured by the Female Sexual Function Index and sexual satisfaction assessed by the Global Measure of Sexual Satisfaction Scale. Results indicated that women's higher sexual assertiveness mediated the association between their greater perceived facilitative partner responses and their improved sexual function and satisfaction. Findings suggest a potential mechanism through which partner responses may be associated with women's sexual outcomes.

INTRODUCTION

With a prevalence of 7% to 8% in general population-based samples, vulvodynia, an idiopathic vulvar pain condition, is characterized by pain in the vulvar region in the absence of relevant physical findings (Harlow et al., 2014). Provoked vestibulodynia (PVD) is the most common subtype of vulvodynia (Bornstein et al., 2016; Harlow et al., 2014) and is defined as a recurrent burning pain specific to the vulvar vestibule, which is provoked by pressure in both sexual (e.g., intercourse) and nonsexual contexts (e.g., tampon insertion). The etiology of PVD is multifactorial; it involves a complex interaction between biological, cognitive, behavioral, emotional, and interpersonal dimensions (Bergeron, Rosen, & Morin, 2011). Many biological factors are associated with pain modulation, including central sensitization (Micheletti, Radici, & Lynch, 2014), pelvic-floor muscle reactivity (Reissing, Brown, Lord, Binik, & Khalifé, 2005), and genetic susceptibility to heightened inflammatory responses (Gerber, Bongiovanni, Ledger, & Witkin, 2002). A number of psychological factors such as catastrophizing, hypervigilance, self-efficacy, attachment, and avoidant behaviors have also been found to be associated with pain and sexual outcomes (Bergeron et al., 2011; Desrochers, Bergeron, Khalifé, Dupuis, & Jodoin, 2009; Leclerc et al., 2015). Although biological and psychological factors have been the focus of the majority of studies in PVD, recent research has underscored the important role of interpersonal factors, such as partner responses to pain, in modulating pain severity, interference with sexual function and sexual satisfaction, as well as depression (Rosen, Bergeron, Leclerc, Lambert, & Steben, 2010; Rosen et al., 2014a; Rosen et al., 2014b). However, little is known about the mechanisms underlying the association between partner responses to pain and the sexual experience of women with PVD. The current study addressed this gap by examining a mediation model of the association between partner responses to pain and women's sexual outcomes.

PVD impairs many aspects of sexual health and functioning. Controlled studies have shown that affected women report significantly more negative attitudes toward their sexuality, lower levels of desire and arousal, problems with orgasm, decreased frequency of sexual activities, as well as decreased sexual satisfaction (Desrochers et al., 2009; Farmer & Meston, 2007; Meana, Binik, Khalife, & Cohen, 1997). Given that the pain is often provoked during partnered sexual activity, it is possible that male partners also suffer consequences related to women's pain. Recent controlled studies have shown that male partners of women with PVD report increased rates of psychological distress, more erectile difficulties, decreased sexual satisfaction, and poorer communication about sexuality compared to men partnered with women without PVD (Jodoin et al., 2008; Pazmany, Bergeron, Verhaeghe, Van Oudenhove, & Enzlin, 2014; Smith & Pukall, 2014).

A growing body of research has focused on the role of dyadic variables and partner responses to pain in PVD (Rosen, Rancourt, Bergeron, & Corsini-Munt, 2014). According to Fordyce's operant model (1976), the partner, who is the primary witness to women's pain, may unknowingly respond in a reinforcing manner that can contribute to maintaining pain and increasing disability (Rosen et al., 2010). Evidence from the chronic pain literature (Cano, Johansen, Leonard, & Hanawalt, 2005; Romano et al., 1995) has supported this model, as has research conducted with samples of women with PVD (e.g., Rosen, Bergeron, Lambert, & Steben, 2013; Rosen et al., 2010).

The three most commonly studied partner responses to pain in the context of PVD are solicitous, negative, and facilitative. Solicitous responses are reactions of sympathy, attention, and support, such as a partner suggesting to stop engaging in all sexual activity because of the pain.

Negative responses are reactions including critical remarks or demonstrations of hostility. Facilitative responses refer to demonstrations of encouragement, affection, and positive attitudes. For example, a facilitative partner would express pleasure that the woman is engaging in any sexual activity. It has been theorized that because of the fear that nonpenetrative activities will still lead to painful intercourse, some affected couples tend to avoid all sexual activity, including penetrative and nonpenetrative activities (Rosen et al., 2014b). The extensive avoidance of pain-related activities can lead to hypervigilance and catastrophic thinking, factors that orient women's attention toward the pain and are positively associated with women's pain and disability (Rosen et al., 2013; Payne, Binik, Amsel, & Khalifé, 2005). Researchers have suggested that solicitous and negative responses promote this avoidance, whereas facilitative responses promote an active, approach-oriented coping, such as shifting to less or nonpainful sexual activities rather than cessation of all sexual activity (Rosen, Bergeron, Glowacka, Delisle, & Baxter, 2012). Cross-sectional studies have demonstrated that less solicitous and negative, and more facilitative partner responses are associated with lower levels of pain and sexual dysfunction in women with PVD (Desrosiers et al., 2008; Rosen et al., 2012).

Furthermore, the communal coping model posits that pain catastrophizing, a negative cognitive appraisal, may serve as a way for the patient with pain to solicit empathic responses or maximize assistance and proximity. Moreover, responses to pain from others may lead to the development and maintenance of the patient's pain catastrophizing (Sullivan et al., 2001). Among women with PVD, it has been demonstrated that pain catastrophizing mediates the associations between higher perceived solicitous partner responses, greater levels of pain, and couples' lower sexual satisfaction (Rosen et al., 2013). Much prior research has emphasized detrimental partner responses (e.g., Desrosiers et al., 2008; Rosen et al., 2010), but gaining a better understanding of adaptive processes is vital in order to help couples to cope optimally with PVD. Specifically, Rosen and colleagues (2012) have shown that facilitative partner responses are positively correlated with women's sexual satisfaction in both cross-sectional and daily diary studies (Rosen, Muise, Bergeron, Delisle, & Baxter, 2015). Additionally, a recent daily diary study demonstrated that on days when women perceived more facilitative responses, they reported better sexual function (desire, arousal, orgasm, frequency of sexual activities) compared to days when facilitative responses were lower (Rosen et al., 2014b). These results suggest that partners' facilitative responses to pain are linked to women's better sexual outcomes. However, the processes by which facilitative responses are related to women's PVD experience have not been examined.

A variable linked to the dyadic aspects of PVD (Leclerc et al., 2015) and positively associated with women's sexual outcomes – sexual function and sexual satisfaction – is sexual assertiveness (Hurlbert, 1991). Sexual assertiveness refers to the degree to which a person is able to openly communicate his or her thoughts, choices, and feelings about sexuality. Sexual assertiveness is considered to be an essential skill for the development of a healthy sexuality (Morokoff et al., 1997). Furthermore, being sexually assertive involves going beyond sexual disclosure and openly communicating sexual preferences, and includes initiating behaviors linked to sexual needs. This variable is positively associated with sexual satisfaction in general population samples (Ménard & Offman, 2009). In the context of PVD, higher levels of sexual assertiveness are associated with women's better sexual function and satisfaction (Leclerc et al., 2015).

Thus, facilitative responses and women's sexual assertiveness seem to be two key variables regarding the modulation of sexual outcomes among women with PVD. Additionally, it has been suggested that the positive association between facilitative responses and women's sexuality is

not simply attributable to behaviors that promote nonpainful sexual activities, but that facilitative responses to pain may also foster closeness and intimacy in the relationship, factors that are known to improve overall sexual function and satisfaction (Althof et al., 2005; Rosen et al., 2014b). In the same way, sharing sexual ideas, thoughts, and preferences involves attitudes which can promote sexual communication. According to the biopsychosocial model of pain communication (Hadjistavropoulos et al., 2011), the pain-related disability may result from partner-reinforcing behaviors *in addition* to a broader social context that involves an interaction between both interpersonal and intraindividual variables, such as behaviors, perceptions, emotions, and cognitions. Thus, in the context of PVD, it is possible that a woman who perceives her partner as more facilitative in response to her pain may be encouraged to communicate more with him about her sexual preferences and choices, in turn contributing to a better sexual adaptation. In other words, the beneficial effects of facilitative partner responses on the sexuality of women with PVD could be partially explained by the degree to which women sexually assert themselves.

Aims

The objective of the present study was to examine whether women's sexual assertiveness mediated the association between facilitative partner responses to pain and women's sexual function and sexual satisfaction. Consistent with theorized and empirical associations of partner responses to pain occurring during sexual intercourse and women's sexual assertiveness in sexual situations, it was hypothesized that higher facilitative partner responses would be associated with greater sexual function and sexual satisfaction to the extent that women reported greater sexual assertiveness.

METHOD

Participants

Women reporting pain during sexual intercourse were referred to the study by collaborating gynecologists and other health professionals (63%); through advertisements in newspapers, Internet websites, universities, and clinics in a large North American city (31%); and from past studies conducted in the authors' research laboratory (6%). Inclusion criteria were the following: (i) moderate level of pain intensity during intercourse which is (a) subjectively distressing; (b) occurs on 75% of intercourse attempts; and (c) has lasted for at least 6 months; (ii) pain limited to intercourse or other activities involving pressure to the vestibule (e.g., tampon insertion); and (iii) cohabiting and/or in a committed relationship with a partner for at least six months; and (iv) sexually active (including penetrative and nonpenetrative sexual activities, caressing, and masturbation) within the last four weeks. Exclusion criteria included: (i) unprovoked vulvar pain; and (ii) presence of one of the following assessed via self-report: (a) major medical and/or psychiatric illness; (b) active infection; (c) deep dyspareunia; (d) vaginismus (involuntary tightness of the pelvic floor during attempted penetration, as defined in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-4*; American Psychiatric Association, 2000); (e) pregnancy; and (f) age less than 18 years old. Eligibility criteria were designed to recruit a homogeneous sample of women experiencing pain symptoms consistent with PVD. When women were recruited by a gynecolo-

gist, these criteria were verified in person during examination and via a semistructured screening interview administered by a research assistant. When they were recruited through advertisements, these criteria were verified over the telephone via the same semistructured screening interview, but no gynecologic examination was performed. It has been shown that women with a PVD diagnosis confirmed via a gynecologic examination were not significantly different from those with PVD-like symptoms who did not receive a formal diagnosis in terms of pain intensity, sexual function, sexual satisfaction, and sexual assertiveness (Leclerc et al., 2015). Furthermore, it has been demonstrated that self-report survey responses about genital symptoms can predict vulvodynia diagnosis with good accuracy (Reed, Haefner, Harlow, Gorenflo, & Sen, 2006). Among the 242 potentially eligible women, 15 were excluded because of vaginismus. Of the 227 women with PVD-like symptoms, 19 refused to participate and 21 did not return their questionnaires. Among the 187 women who returned their questionnaires, nine were removed because they were not in a relationship for at least six months, 13 did not report an average moderate level of pain during intercourse (at least four) on a numerical rating scale (measuring pain from 0–10), and eight had more than 30% of their questionnaire data missing. Among the remaining 157 participants, 17 were not sexually active within the last four weeks. Final analyses were conducted with a final sample of 140 women. Sexually inactive women were not different from the sexually active women included in the analyses ($N = 140$) in terms of relationship status, duration of pain, education, household income, and sexual assertiveness. Included women were significantly older, $t(60) = -4.77, p = .001$, had been in a relationship for a longer period, $t(114) = -5.07, p = .001$, had been experiencing less pain during the last six months $t(28) = 2.08, p = .05$, and reported better sexual satisfaction $t(18) = -2.02, p = .05$.

Measures

Demographics

Sociodemographic questions were included in the self-report questionnaires, and women reported on general demographics including age, cultural background, and education level. They also reported on the relationship duration, the couple's relationship status (married, cohabiting, or committed but not living together), shared annual income, and the duration of their pain.

Partner Responses to Pain

Women completed the facilitative subscale of the Spouse Response Inventory (SRI; Schwartz, Jensen, & Romano, 2005) to assess perceived facilitative partner responses to pain. This scale has shown good validity and reliability. This six-item measure was previously adapted for use with a population of women suffering from PVD (Rosen et al., 2012). Confirmatory factor analysis indicated that the adapted items maintained the structure of the original measure. Women indicated facilitative partner responses to pain on a scale ranging from 1 (*never*) to 6 (*very frequently*). Higher scores indicate a greater frequency of facilitative partner responses and scores range from 6 to 36. In the current sample, Cronbach's alpha was .88.

Sexual Assertiveness

Women's ability to assert themselves in sexual situations was assessed using the 25-item Hurlbert Index of Sexual Assertiveness (HISA; Hurlbert, 1991). They were asked to rate how strongly they agreed with each of 25 statements on a 5-point Likert scale ranging from 1 (*none of the time*) to 5 (*all of the time*). The summation of all items provides a global score of sexual assertiveness ranging from 0 to 100, where higher scores represent greater sexual assertiveness. Reliability and validity have been well demonstrated (Apt & Hurlbert, 1992; Hurlbert, 1991; Pierce & Hurlbert, 1999). In this sample, the Cronbach's alpha was .91.

Main Outcome Measures

Women's Sexual Function

Women's sexual function was assessed using the Female Sexual Function Index (FSFI) (Rosen et al., 2000). This scale includes 19 items, which have been designed to assess six domains of sexual function: sexual desire, subjective arousal, lubrication, orgasm, sexual satisfaction, and pain/discomfort. Higher scores indicate healthier sexual functioning. Several studies have shown the excellent reliability and validity of this self-report questionnaire (Meston, 2003; Rosen et al., 2000; Ter Kuile, Brauer, & Laan, 2006; Wiegel, Meston, & Rosen, 2005). Additionally, the psychometric properties of this measure have been specifically validated in a sample of women with vulvodynia (Masheb, Lozano-Blanco, Kohorn, Minkin, & Kerns, 2004). In this sample, the Cronbach's alpha was .96.

Women's Sexual Satisfaction

Women's sexual satisfaction was assessed using The Global Measure of Sexual Satisfaction (GMSEX; Lawrance & Byers, 1995, 1998). Participants were asked to rate their sexual relationship based on the following adjective scales: good–bad, pleasant–unpleasant, positive–negative, satisfying–unsatisfying, and valuable–worthless. For each pair of adjectives, the ratings were given according to a 7-point Likert scale ranging from 1 (*bad, unpleasant, etc.*) to 7 (*good, pleasant, etc.*). Global scores range between 5 and 35, where a higher score indicates greater satisfaction. The GMSEX has demonstrated good reliability and validity (Byers & Macneil, 2006; Lawrance & Byers, 1995, 1998). In the current sample, the Cronbach's alpha was .92.

Procedure

Eligible women were mailed a package containing a consent form to complete and return, consent information to keep, a questionnaire booklet consisting of basic sociodemographic questions and standardized questionnaires including the measures described above, and a prestamped envelope for returning the materials. They were asked to complete the questionnaires without discussing their responses with their partner. A research assistant contacted them by phone every two weeks

after receiving the package, to a maximum of six telephone follow-ups to help ensure completion and return of the questionnaires. Women who returned their package received \$25.00 as compensation for their participation. The present study was approved by our university health center's institutional review board and was part of a larger study of couples with PVD, of which some results have been published previously (Awada, Bergeron, Steben, Hainault, & McDuff, 2014; Leclerc et al., 2015; Rosen et al., 2012; Rosen et al., 2013; Rosen et al., 2010).

Analyses

Pearson product-moment correlations were conducted to examine the bivariate relationships between all study variables and to identify potential covariates. Mediation analyses were tested separately for each dependent variable and conducted using the procedures established by Preacher and Hayes (2004, 2008). The bootstrap test implemented by Preacher and Hayes is a nonparametric resampling procedure that does not assume the normality of the sampling distribution. This method demonstrates greater power while maintaining control over the possibility of Type I error. The current study ran this procedure with 20,000 samples to construct bias corrected and accelerated (BCa) confidence intervals around the regression coefficients. A confidence interval that does not include zero is considered significantly different from zero and represents a significant indirect effect (Preacher & Hayes, 2008). All statistical analyses were conducted using SPSS version 21 (SPSS Inc., Chicago, IL, USA).

RESULTS

Demographics

Table 1 shows the descriptive statistics for the sociodemographic, independent, mediator, and dependent variables in this sample. All the women who took part in the study were in mixed-sex relationships.

Intercorrelations among the independent (facilitative responses), mediator (sexual assertiveness), and dependent variables (sexual function and satisfaction) are presented in Table 2. All variables were significantly correlated with each other. To determine whether there was a need to include relevant covariates in subsequent analyses, correlations between demographic characteristics and the outcome variables were examined. Women's age was significantly correlated with their sexual function ($r = .17, p = .03$) and their sexual satisfaction ($r = .18, p = .02$). Pain duration was significantly correlated with their sexual satisfaction ($r = 0.19, p = .02$) and relationship length with their sexual function ($r = .16, p = .04$). Thus, subsequent analyses controlled for women's age, pain duration, and relationship length.

Mediation of Facilitative Responses and Sexual Function by Sexual Assertiveness

Controlling for age, pain duration, and relationship length, the indirect effect of sexual assertiveness on the association between facilitative partner responses and women's sexual function was

TABLE 1
Descriptive Statistics of the Sample ($N = 140$)

	M (range) or n	SD or %
Characteristics		
Age (years)	32.20 (18–64)	± 11.86
Education (years)	16.00 (10–25)	± 2.84
Current status ($N = 140$)		
Cohabiting	81	58.0
Married	33	23.5
Not living together	26	18.5
Duration of relationship (years)	7.99 (0.5–44)	± 9.03
Duration of pain (years)	6.55 (0.5–43)	± 7.14
Cultural background ($N = 140$)		
English Canadian	118	84.28
French Canadian	11	7.86
Other	11	7.86
Religion ($N = 140$)		
Catholic	119	85.00
Other	11	7.86
No religion	10	7.14
Couple's annual income ($N = 129$)		
More than \$60,000	50	38.75
Less than \$60,000	79	61.25
Independent variable		
Facilitative responses (SRI)	4.86 (1.83–6)	± 1.32
Mediator		
Sexual assertiveness (HISA)	63.70 (12.64–100)	± 16.16
Dependant variables		
Sexual function (FSFI)	24.23 (4.60–35)	± 6.44
Sexual satisfaction (GMSEX)	25.92 (9–35)	± 6.69

Note. SRI = Spouse Responses Inventory; HISA = Hurlbert Index of Sexual Assertiveness Questionnaire; FSFI = Female Sexual Function Index; GMSEX = Global Measure of Sexual Satisfaction.

significant, with a point estimate of .15 and a 95% BCa bootstrap confidence interval of .07 to .25 (Figure 1). The association between facilitative partner responses and women's sexual function after controlling for the mediator was no longer significant, indicating full mediation. This model explained 19% of the variance attributable to women's sexual function, $F(5, 134) = 6.62$, $p < .001$.

Mediation of Facilitative Responses and Sexual Satisfaction by Sexual Assertiveness

Controlling for age, pain duration, and relationship length, the indirect effect of sexual assertiveness on the association between facilitative partner responses and women's sexual satisfaction was significant, with a point estimate of .20 and a 95% BCa bootstrap confidence interval of .11 to .31 (Figure 2). The association between facilitative responses and sexual satisfaction, before

TABLE 2
 Bivariate Correlations Between Partner Facilitative Responses and Women’s Sexual Assertiveness, Sexual Satisfaction, and Sexual Function

	<i>Facilitative responses (SRI)</i>	<i>Sexual assertiveness (HISA)</i>	<i>Sexual satisfaction (GMSEX)</i>	<i>Sexual function (FSFI)</i>
Facilitative responses (SRI)	—	0.41**	0.37**	0.18*
Sexual assertiveness (HISA)		—	0.59**	0.45**
Sexual satisfaction (GMSEX)			—	0.55**
Sexual function (FSFI)				—

Notes. SRI = Spouse Responses Inventory; HISA = Hurlbert Index of Sexual Assertiveness Questionnaire; FSFI = Female Sexual Function Index; GMSEX = Global Measure of Sexual Satisfaction.

* $p < .05$.

** $p < .01$.

and after controlling for the mediator, remained significant, indicating partial mediation. This model explained 39% of the variance attributable to women’s sexual satisfaction, $F(5, 134) = 18.74, p < .001$.

DISCUSSION

The present study examined a potential mechanism through which facilitative partner responses are associated with sexual outcomes of women with PVD. Consistent with our hypotheses, women’s higher sexual assertiveness mediated the associations between their greater perceived facilitative partner responses to pain and their higher levels of sexual function and satisfaction.

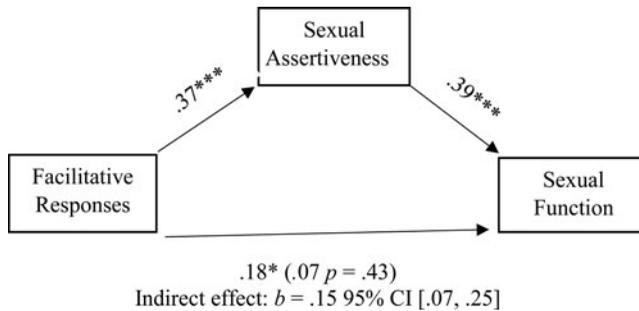


FIGURE 1 Path coefficients (standardized regression weights) for the mediation model of the relation between partner facilitative responses and sexual functioning. The value outside the parentheses represents the total effect of the partner responses on women’s sexual functioning prior to including the mediator; the value inside the parentheses represents the direct effect after the mediator was included. * $p < .05$. *** $p < .001$.

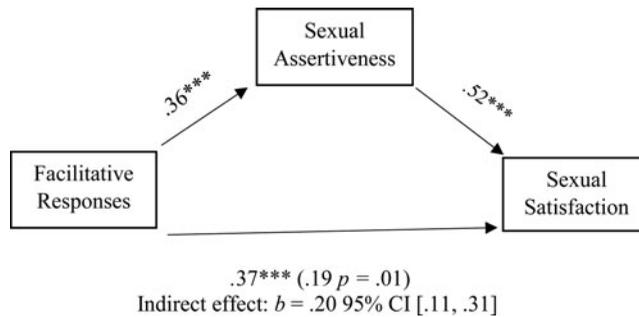


FIGURE 2 Path coefficients (standardized regression weights) for the mediation model of the relation between partner facilitative responses and sexual satisfaction. The value outside the parentheses represents the total effect of the partner responses on women's sexual functioning prior to including the mediator; the value inside the parentheses represents the direct effect after the mediator was included. *** $p < .001$.

This finding supports the biopsychosocial model of pain communication (Hadjistavropoulos et al., 2011), which proposes that the interplay of interpersonal and intraindividual factors is important when considering the social context of pain.

Women's perceptions of facilitative partner responses were positively associated with their sexual assertiveness. This finding indicates that the degree to which a woman perceives that her partner is focused on approach-oriented coping behaviors and demonstrates affection during sexual activity could promote her communication about sexual choices and preferences in sexual interactions during which she experiences pain. In chronic pain populations, partners' facilitative responses to pain were associated with decreased avoidant behaviors, which were subsequently associated with better adaptation to the pain problem (Schwartz et al., 2005). Given the sexual context of pain among women with PVD, partners' facilitative responses may contribute to decreased sexual avoidance, and thus create a context that favors sexual communication about both partners' shared sexuality. Further, according to the communal coping model, pain catastrophizing may serve as a way to solicit support from the social context of the patient, and partner responses can reinforce those behaviors (Sullivan et al., 2001). Paradoxically, demonstrations of sympathy are associated with pain catastrophic thinking (Rosen et al., 2013). It is possible that, in contrast to solicitous responses, a proactive, facilitative approach to pain *coupled* with women's sexual assertiveness may create a context in which pain catastrophizing is not reinforced, potentially leading to more positive sexual outcomes (Rosen et al., 2013). Similarly, it has been suggested that facilitative responses to PVD pain may promote the woman's perception that in addition to being supportive, her partner is also motivated to be involved in diminishing her pain (Rosen et al., 2010). Thus, the woman may feel more inclined to openly discuss both her sexuality and her pain. This openness to discussing sexual preferences and difficulties could lead to productive problem-solving strategies and allow for an optimal adjustment of her sexuality in the context of pain (Leclerc et al., 2015).

We found that sexual assertiveness mediated the association between women's perceived facilitative partner responses and women's sexual function. The perception by the woman that her partner is motivated to find strategies regarding the adaptation of their sexuality to the pain may give rise to a more harmonious and secure climate for her to discuss

sexual needs. This communication might facilitate the experience of desire and arousal—two components of sexual function. According to Basson's (2000) model of female sexual response, the relational context is a determining factor in women's experience of sexual desire.

Sexual assertiveness partially mediated the association between women's perceived facilitative partner responses and women's sexual satisfaction. The demonstration of affection by the partner during sexual activity could improve the degree to which the woman can share her sexual preferences or limits, but also her thoughts and emotions linked to her sexuality and her pain. Bois and colleagues (Bois et al., 2015; Bois, Bergeron, Rosen, McDuff, & Gregoire, 2013) have highlighted the link between couples' sexual intimacy and the sexual satisfaction of women with PVD. Given that sexual intimacy involves the degree to which members of the couple are open, empathic, and sensitive to their partner, during or after sexual activities, it is possible that facilitative partner responses to pain lead to greater sexual communication by the woman and create an environment conducive to greater levels of intimacy, which may explain the positive association with women's sexual satisfaction.

The demonstration that facilitative partner responses to pain are positively associated with women sexually asserting themselves underscores the importance of taking into account the interdependence of partners' and women's behaviors. The results contribute to the theoretical understanding of the dyadic factors necessary to improve the sexual health of women with PVD (Rosen et al., 2014a, 2014b). In addition, the operant model has been criticized because it seems to simplify the process by which the partner may influence the patient's experience of pain while conceptualizing the partner's behavior as the only reinforcing agent (Cano & Williams, 2010; Newton-John, 2002). By proposing a model including an intraindividual variable, the present study contributes to refine the behavioral model by considering the woman as an active agent between partner responses and her PVD-associated sexual outcomes. Therefore, results corroborate the communication model of pain (Hadjistavropoulos et al., 2011), which postulates the importance of examining interpersonal factors linked with intraindividual factors to take into account more complex processes involved in the social context of pain.

However, other intraindividual and dyadic factors may play a role in the models proposed in the current study. Among PVD samples, women's relationship satisfaction was positively associated with their perception of facilitative partner responses as well as with their sexual satisfaction (Rosen et al., 2015). Given that relationship satisfaction was also found to moderate the association between perceived facilitative partner responses and depression in women with PVD (Rosen et al., 2014a), it is possible that this variable represents another mechanism through which facilitative responses may foster adaptive coping. Furthermore, it is possible that the dyadic process operating between facilitative partner responses and women's sexual assertiveness promotes a better climate for sexual communication between both members of the couple. Increased dyadic perception of sexual communication is associated with both partners' greater sexual function and satisfaction among PVD couples (Rancourt, Rosen, Bergeron, & Nealis, 2016). Thus, relationship satisfaction and sexual communication represent interpersonal factors that could be examined as additional potential mechanisms underlying the association between facilitative responses and sexual outcomes in women with PVD.

The present study is limited by its cross-sectional design and correlational analyses, and therefore causal relationships cannot be inferred. Additionally, only the perception of the woman was assessed to measure partner responses. However, women's perceived facilitative responses and partners' self-reported facilitative responses are positively correlated (Rosen et al., 2015). Nevertheless, since relationship satisfaction is correlated with women's perception of facilitative partner responses (Rosen et al., 2014a; Rosen et al., 2015) it is possible that this variable may have an influence on women's perception of their partners' responses. Other intraindividual factors such as awareness of responses, motivation to respond, and emotions related to the responses may influence women's perception of partner responses (Stone, Bachrach, Jobe, Kurtzman, & Cain, 2000) and have not been measured in the current study. Further studies should take into account those variables.

Also, given that not all participants received a PVD diagnosis, conclusions can only be generalized to women with PVD-like symptoms in heterosexual relationships. Future research should assess both women's and partner's experience of partner responses and examine, using a longitudinal design, the combined effect of facilitative responses and sexual assertiveness on women's pain and sexual outcomes of both members of the couple.

Despite these limitations, results of the present study have important clinical implications. First, this study confirms previously established empirical findings that facilitative partner responses optimize the sexual health of women with PVD symptoms (Rosen et al., 2012; Rosen et al., 2014a, 2014b). This highlights the potential importance of including the partner in therapeutic interventions. Indeed, preliminary results have indicated that integrating the partner in a cognitive-behavioral intervention for women with PVD resulted in women's decreased pain during intercourse and increased sexual satisfaction for both members of the couple (Corsini-Munt, Bergeron, Rosen, Mayrand, & Delisle, 2014). However, male partners may be less likely to participate in therapy given that they are typically more reluctant than women toward therapeutic consultation (Mahalik, Good, & Englar-Carlson, 2003), and not all women suffering from PVD are in partnered relationships. The findings from the current study that a woman's own sexual assertiveness mediates the association between partner responding to pain and women's sexual outcomes presents a solution for couples where the partner may choose not to participate in therapy. In these cases, psychoeducation about the role of relationship factors in the experience of pain and associated sexual difficulties, as well as targeting ways to increase women's sexual assertiveness, may prove beneficial (Brotto, Basson, Carlson, & Zhu, 2013; Livingston, Testa, & VanZile-Tamsen, 2007). Finally, the current findings suggest that the degree to which a woman sexually asserts herself is associated with more favorable sexual outcomes. Given the previously identified detrimental role of avoidance in pain intensity for women with PVD (Desrochers et al., 2009), a focus on sexual assertiveness for women who are not in a relationship may help them to feel more comfortable to disclose their pain and hence lead to better coping strategies.

The present study identified a potential mechanism through which facilitative responses were associated with women's sexual outcomes. Sexual assertiveness is a mediator of the relation between (a) facilitative partner responses to pain; and (b) sexual function and satisfaction of women with PVD. Findings underscore the importance of taking into account the interdependence between partners' and women's attitudes and behaviors in order to improve women's PVD-related sexual impairments.

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