

ORIGINAL RESEARCH—PAIN

Harmful or Helpful: Perceived Solicitous and Facilitative Partner Responses Are Differentially Associated with Pain and Sexual Satisfaction in Women with Provoked Vestibulodynia

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ABSTRACT

Introduction. Provoked vestibulodynia (PVD) is a highly prevalent vulvovaginal pain condition that negatively affects women's emotional, sexual, and relationship well-being. Recent studies have investigated the role of interpersonal variables, including partner responses.

Aim. We examined whether solicitous and facilitative partner responses were differentially associated with vulvovaginal pain and sexual satisfaction in women with PVD by examining each predictor while controlling for the other.

Methods. One hundred twenty-one women (M age = 30.60, SD = 10.53) with PVD or self-reported symptoms of PVD completed the solicitous subscale of the spouse response scale of the Multidimensional Pain Inventory, and the facilitative subscale of the Spouse Response Inventory. Participants also completed measures of pain, sexual function, sexual satisfaction, trait anxiety, and avoidance of pain and sexual behaviors (referred to as "avoidance").

Main Outcome Measures. Dependent measures were the (i) Pain Rating Index of the McGill Pain Questionnaire with reference to pain during vaginal intercourse and (ii) Global Measure of Sexual Satisfaction Scale.

Results. Controlling for trait anxiety and avoidance, higher solicitous partner responses were associated with higher vulvovaginal pain intensity (β = 0.20, P = 0.03), and higher facilitative partner responses were associated with lower pain intensity (β = -0.20, P = 0.04). Controlling for sexual function, trait anxiety, and avoidance, higher facilitative partner responses were associated with higher sexual satisfaction (β = 0.15, P = 0.05).

Conclusions. Findings suggest that facilitative partner responses may aid in alleviating vulvovaginal pain and improving sexual satisfaction, whereas solicitous partner responses may contribute to greater pain. **Rosen NO, Bergeron S, Glowacka M, Delisle I, and Baxter ML. Harmful or helpful: Perceived solicitous and facilitative partner responses are differentially associated with pain and sexual satisfaction in women with provoked vestibulodynia. J Sex Med 2012;9:2351–2360.**

Key Words. Provoked Vestibulodynia; Pain; Sexual Satisfaction; Partner Responses; Vulvodynia

Introduction

The International Society for the Study of Vulvovaginal Disease classifies vulvodynia into two symptom presentations: localized vulvar pain, which involves a portion of the vulva, and generalized vulvar pain, which involves the entire vulva. Both types are characterized by a burning

pain, for which there are no relevant physical findings [1]. The most common subtype of localized vulvodynia, with a prevalence of 12% in the general population [2], is provoked vestibulodynia (PVD). Women with PVD experience chronic, recurrent vulvovaginal pain that is specific to the vestibule and which is triggered, in both sexual and nonsexual contexts, by touching the vestibule [1].

Women with PVD are more likely to report sexual impairments including lower desire, arousal, and frequency of orgasm and intercourse, as well as heightened anxiety, depression, fear of pain, hypervigilance, and catastrophizing, compared to women without PVD [3–9]. A number of risk factors for PVD have recently been identified, suggesting that both peripheral and central mechanisms play a role in the development and maintenance of PVD (for a summary, see [10]). Yet, there remain many unanswered questions with regard to the etiology of this multifactorial condition, particularly with respect to psychosocial and interpersonal factors.

Psychosocial factors, including interpersonal variables, are known to increase the risk for developing chronic pain conditions [11–15]. Recent empirical evidence suggests that expressions of pain to significant others may be driven by interpersonal goals, such as obtaining support or intimacy, or to avoid painful activities [16–18]. With regard to interpersonal factors in women with PVD, there appear to be no differences in self-reported dyadic adjustment compared to women without PVD and no association between dyadic adjustment and pain in women with PVD [4,6,9,19,20]. Still, these women report more negative effect in sexual situations with their partners compared to women without PVD [21]. Recently, studies have identified key relational variables in couples where the woman has PVD. For example, one study found that male partners' negative attributions about PVD pain were associated with poorer sexual satisfaction, dyadic adjustment, and greater psychological distress [22]. Interpersonal variables are especially important in a PVD context because male partners may trigger pain during sexual activities, and they also witness the pain experienced by women. Male partners may also suffer negative repercussions, including lower intercourse frequency and sexual satisfaction [22,23].

Partner responses to pain are the interpersonal factor that has possibly received the most empirical attention in the chronic pain literature. Operant learning theory asserts that partners may reinforce and maintain a person's pain experience [24]. Research in chronic pain [13,14,25] and PVD [20,23] supports this claim. Prior studies have emphasized the detrimental impact of solicitous partner responses, defined as partner reactions of sympathy, attention, and support. For example, in the context of PVD, a partner may ask if he can do anything to help or suggest they stop engaging in the sexual activity. In women with PVD, higher

solicitous partner responses—assessed from the perspective of both women and partners—were associated with higher vulvovaginal pain intensity [20,23]. It may be that partner solicitous responses reinforce a person's avoidance of painful activities, encourage passivity, and increase the likelihood that they will behave similarly in the future [14,26,27]. Moreover, solicitous responses may cue the person to attend more to their pain, and trigger or maintain catastrophizing about their pain, subsequently contributing to a heightened pain experience [28,29]. From a cognitive-behavioral perspective, solicitous responses may also promote the interpretation that engaging in any kind of sexual activity may cause physical harm, and thus reduce the likelihood of engaging in both penetrative and nonpenetrative activities. In sum, in women with PVD, solicitous responses may trigger or reinforce psychological (e.g., catastrophizing) and behavioral (e.g., avoidance) factors that are known to be associated with increased vulvovaginal pain during intercourse and sexual impairment [30].

Few studies have examined how adaptive partner responses might improve the functioning of individuals with pain. Facilitative responses refer to partner reactions that encourage a person's efforts at adaptive coping with pain [31]. For example, with respect to PVD, a partner may express happiness that the woman is engaging in sexual activity. Both the operant and cognitive-behavioral models imply that partner responses may also positively influence pain and sexual outcomes through the same mechanisms of reinforcement. In contrast to solicitous responses, facilitative responses presumably decrease avoidance of painful activities and/or negative cognitive appraisals (e.g., catastrophizing, pain self-efficacy) and distressing emotions (e.g., anxiety) surrounding painful sexual interactions. Further, in PVD, facilitative responses may help women direct their attention away from the pain and toward the more pleasurable aspects of sexual interactions. Consequently, facilitative responses may reduce the impact of these negative psychosocial factors, which are known to be associated with greater pain during intercourse. Currently, there is no empirically based information about how facilitative partner responses may decrease pain and improve sexual outcomes in women with PVD.

Although one might expect the outcomes of pain and sexual impairment to be related in PVD, evidence suggests that they may in fact be distinct and independent phenomena. Indeed a recent study of women with PVD showed a lack of

significant correlation between pain intensity during intercourse and overall sexual function, as well as pain and sexual satisfaction [20]. Partner responses may therefore show differing patterns of association with these two possibly unrelated yet critical outcomes. Sexual impairment may involve disruptions in sexual functioning and/or decreased sexual satisfaction. Although positively correlated, sexual satisfaction can be differentiated from sexual functioning in that it focuses on the interpersonal aspect of sexual activities, whereas sexual functioning focuses on the intrapersonal aspects of the sexual response cycle [32]. Although sexual function across treatment groups for women with PVD has significantly improved in some studies, it typically remained above clinical thresholds, regardless of the type of intervention [33]. Changes in the more subjective measures, such as sexual satisfaction, are therefore emerging as important outcome variables and key targets for intervention.

Sexual satisfaction is lower in women with vulvodynia compared to women without vulvodynia [34,35]. In terms of partner responses, prior PVD studies found no significant relationship between partner responses and women's global sexual functioning [20,23]; however, higher solicitous partner responses were associated with greater sexual satisfaction [20]. Rosen et al. [20] suggested that higher solicitous partner responses could be interpreted as a greater partner sensitivity and understanding of the pain experienced by women during sexual activity, resulting in greater sexual satisfaction. Indeed, they found that greater dyadic adjustment mediated the association between higher solicitousness and greater sexual satisfaction [30].

In sum, prior research has suggested that higher solicitous partner responses are associated with higher pain and higher sexual satisfaction in women with PVD. This finding begs the question of how the partner should respond in order to minimize pain, but maximize sexual satisfaction in women with PVD. The current study aimed to examine whether facilitative partner responses were associated with better outcomes both for pain and sexual satisfaction because these responses also tapped into partner sensitivity toward women's pain experience. Specifically, women are likely to perceive both solicitous and facilitative responses as positive and supportive, which may in turn, promote an interpersonal environment more conducive to mutually satisfying sexual interactions. Thus, we expected that facilitative and solicitous responses would be associated with lower and

higher vulvovaginal pain, respectively, as described previously, however both would be associated with higher sexual satisfaction.

Aims

The goal of the present study was to examine whether solicitous and facilitative responses to pain in women with PVD were differentially associated with women's vulvovaginal pain intensity and sexual satisfaction. This study is the first to examine solicitous and facilitative partner responses simultaneously, which allows an examination of each predictor while controlling for the other. We expected that greater perceived partner solicitousness would be associated with higher levels of pain and sexual satisfaction, and greater perceived partner facilitative responses would be associated with lower levels of pain, but higher sexual satisfaction.

Methods

Participants

Women were recruited at regularly scheduled clinical appointments to the study coinvestigator gynecologists or other health professionals (e.g., psychologists) and through advertisements in newspapers and Internet websites in two large Canadian cities (referred to as "city one" and "city two"). The sample included 47% recruited at visits to health professionals, 50% recruited through advertisements, 2% recruited via participation in another PVD study, and 1% by word of mouth. Forty-four percent of participants were recruited in city one and 56% were recruited in city two. Participants were screened for eligibility using a semi-structured interview. Eighty-one percent of participants were diagnosed by a clinician and 19% were diagnosed by self-report. In order to ensure a homogenous sample of participants with PVD, the inclusion criteria were the following: (i) pain during intercourse which was subjectively distressing, occurs(ed) on 75% of intercourse attempts in the last 6 months, and had lasted for at least 6 months; (ii) pain located in the vulvovaginal area (i.e., at the entrance of the vagina); (iii) pain limited to intercourse and other activities involving pressure to the vestibule (e.g., bicycle); and (iv) in a committed romantic relationship for at least 6 months. Exclusion criteria were: (i) vulvar pain not clearly linked to intercourse or pressure applied to the vestibule; and (ii) presence of one of

the following: active infection previously diagnosed by a physician or self-reported infection, vaginismus, pregnancy, and age less than 18 or greater than 45 years (i.e., to exclude peri- and postmenopausal women due to hormonal influences that may affect pain during intercourse). Of the 142 heterosexual women who met eligibility criteria and agreed to participate, 8 women had missing data representing more than 10% of a measure, 10 women from city one reported not engaging in sexual activities in the preceding 4 weeks, and 3 women from city two reported not engaging in penetrative activities in the past 6 months, resulting in a final sample size of 121 (85%) women.

Measures

Solicitous Partner Responses

Perceived solicitous partner responses were measured with the significant other response scale, a subscale of the West Haven-Yale Multidimensional Pain Inventory [36]. This scale assesses the perceived partner responses to pain including solicitous responses (six items) and was previously adapted to the current population of women with PVD [20]. Participants indicated the frequency of solicitous partner responses to the woman's pain during or after intercourse, on a scale ranging from 1 (*never*) to 7 (*very frequently*). An example adapted item included "suggested we stop engaging in current sexual activity." The questionnaire's reliability and validity have been well established [36], as has the current adapted version [20]. Higher scores indicate a greater frequency of partner responses. In line with prior research [20,30], two items were deleted to improve the internal consistency of the scales. Although amenable to adaptation, these items were not representative of the typical solicitous behaviors of partners from a clinical standpoint (e.g., "suggests we turn on the TV"), and from a statistical standpoint, they did not load onto the solicitous subscale. Scores could thus range from 4 to 28. In the present sample, Cronbach's alpha was 0.74.

Facilitative Partner Responses

Perceived facilitative responses were assessed with the facilitative subscale of the Spouse Response Inventory (SRI) [31]. This scale assesses the perceived partner responses to patient behaviors including facilitative responses (six items) and was adapted to the current population of women

with PVD. Women and partners indicated the frequency of facilitative partner responses to the woman's pain during or after intercourse, on a scale ranging from 1 (*never*) to 6 (*very frequently*). An example of an adapted item included "tells me that I am pleasuring him." Higher scores indicate a greater frequency of partner responses. Scores can range from 6 to 36. The SRI has demonstrated good validity and reliability [31]. In the present sample, Cronbach's alpha was 0.87.

Anxiety

Higher rates of trait anxiety are found in women with PVD and this anxiety has been associated with greater pain during intercourse as well as sexual impairment [8,37]. Prior chronic pain research has also established associations among pain intensity, disability, partner responses, and anxiety [12,38,39]. We therefore included trait anxiety as a covariate in our analyses in order to assess the unique contribution of partner responses to pain. Trait anxiety symptoms were assessed with the trait subscale of the State-Trait Anxiety Inventory (STAI) [40] which has shown good reliability and validity previously, and in chronic pain populations. The trait subscale of the STAI consists of 20 items with single item scores ranging from 1 (*not at all*) to 4 (*very much so*). A total score is derived by reverse coding positive statements and then adding all items. A higher score (possible scores range from 20 to 80) indicates more anxiety.

Avoidance of Pain and Sexual Behaviors (Referred to as "Avoidance")

Avoidance of pain-inducing behaviors has been consistently linked to greater pain and disability in chronic pain populations, including PVD [41]. Thus, the frequency with which participants engaged in sexual and nonsexual behaviors that are relevant to their vulvovaginal pain, in other words their degree of avoidance, may influence their pain and sexual satisfaction and need to be controlled for in the current analyses. No validated measure currently exists to assess women's avoidance of vulvovaginal pain and sexual behaviors. A questionnaire was therefore developed for this study and consisted of 25 items. Participants were asked to indicate how many times (e.g., 0, 1, 2, 3, etc.) they engaged in a variety of behaviors during the past 4 weeks. Higher scores indicate lower avoidance. The list of behaviors was first constructed by the study coauthors who have over 20 years of combined research and clinical experience with

PVD. Item revisions were made based on feedback from additional health professionals who work in the field. Example items included “I engaged in vaginal intercourse,” “I talked about my PVD to someone (e.g., partner, friend, health professional),” “I engaged in self-stimulation (masturbation) alone,” and “I hugged/kissed my partner.” Seven items were deleted because of high correlations with a remaining item indicating redundancy in items (e.g., “I talked about how I feel about PVD to someone” was deleted and “I talked about my PVD with someone” was kept). Two items were subsequently deleted due to very low frequencies (e.g., “I did my sex therapy exercises”) and to improve the internal consistency of the scale. The final scale consisted of 16 items and the Cronbach’s alpha was 0.73.

Sexual Functioning

Women’s sexual functioning was measured with the Female Sexual Function Index (FSFI) [32]. Prior research has established a positive association between sexual function and sexual satisfaction, although the two constructs are distinct [42]. We included sexual function as a covariate when sexual satisfaction was the outcome variable in order to assess the unique contribution of partner responses to sexual satisfaction. The FSFI consists of 19 items assessing five dimensions of global sexual functioning: desire, arousal, lubrication, orgasm, satisfaction, and pain. The sexual satisfaction subscale was removed from the total score to avoid overlap with our outcome measure of sexual satisfaction. The FSFI has demonstrated excellent psychometric properties [43]. Some items were reverse scored so that lower scores indicate greater dysfunction across all items and for the total score. Total scores in this sample ranged from 1 to 29.

Main Outcome Measures

Vulvovaginal Pain

Women’s vulvovaginal pain was assessed with the Pain Rating Index of the McGill Pain Questionnaire [44] with reference to their vulvovaginal pain during intercourse in the last 6 months. This index provides a checklist of 77 adjectives that are grouped into 20 categories and listed in increasing pain quality and intensity. Respondents are instructed to choose no more than one adjective per category, and they do not have to choose an adjective in every category. The resulting total score provides a global multidimensional measure

of pain and ranged from 1 to 66. Higher scores indicate greater pain quality and intensity.

Sexual Satisfaction

Women’s sexual satisfaction was assessed with the Global Measure of Sexual Satisfaction scale, which has good psychometric properties [42]. This scale consists of five items to which participants respond on a seven-point Likert scale. Higher scores indicate greater satisfaction and total scores can range from 5 to 35.

Procedure

Participants in city one completed paper-and-pen study materials which they returned by postal mail, whereas participants in city two completed the same materials in-person and online. All participants completed consent forms, a socio-demographic questionnaire, and standardized questionnaires assessing partner responses, trait anxiety, avoidance, pain, sexual function, and sexual satisfaction. City one participants were contacted every 2 weeks after receiving the questionnaires, up to a maximum of six telephone follow-ups, as a reminder to return their questionnaires. As compensation, city one participants were offered a 30-minute telephone psychological consultation focusing on PVD, or they received the same information in written form as was provided verbally in the telephone consultation. City two participants received financial compensation (\$20.00) for their participation as well as written information about PVD. The present study was approved by the university and each of the two health centers’ institutional review boards.

Results

Sample Characteristics

Table 1 presents the descriptive statistics for the sociodemographic, independent, and dependent variables in this sample. City two participants ($M = 30.67$, $SD = 5.98$) reported significantly higher facilitative partner responses compared to city one participants ($M = 28.04$, $SD = 6.75$, $t[124] = -2.29$, $P = 0.02$) and higher trait anxiety ($M = 45.98$, $SD = 11.33$) compared to city one participants ($M = 40.98$, $SD = 6.75$, $t[127] = -2.54$, $P = 0.01$). Participants did not differ on any of the other study variables by city.

Zero-Order Correlations

Higher scores on the facilitative responses scale was associated with having less education

Table 1 Descriptive statistics of the sample

	<i>M</i> or <i>N</i>	<i>SD</i> or %
Characteristic		
Age (years)	30.60	10.53
Duration of pain (months)	65.06	68.52
Education level (years)	15.81	2.66
Marital status		
Cohabiting	76	58.90
Married	34	26.40
Committed but not cohabiting	19	14.70
Couple's annual income (<i>N</i> = 121)		
\$0–19,999	19	14.70
\$20,000–39,999	21	16.30
\$40,000–59,999	24	18.60
>\$60,000	61	47.40
Independent variables		
Sollicitous responses	16.05 (4–28)	5.11
Facilitative responses	29.23 (6–36)	6.52
Dependent variables		
Sexual satisfaction	23.46 (5–35)	7.12
Vulvovaginal pain	28.62 (1–66)	13.29
Covariates		
Sexual function	16.22 (1–29)	6.49
Trait anxiety	43.19 (20–80)	11.36
Avoidance	4.77 (1–12)	1.27

Sollicitous = Multidimensional Pain Inventory (sollicitous subscale); facilitative = Spouse Response Inventory (facilitative subscale); Sexual satisfaction = Global Measure of Sexual Satisfaction; vulvovaginal pain = McGill Pain Questionnaire; sexual function = Female Sexual Function Index; trait anxiety = State-Trait Anxiety Inventory (trait subscale); avoidance = log transformed scores on the Vulvovaginal Pain and Sexual Behaviors Questionnaire

($r = -0.22$, $P = 0.02$). Greater vulvar pain intensity was associated with having a lower income ($r = -0.19$, $P = 0.04$) and greater pain duration ($r = 0.18$, $P = 0.05$), whereas greater sexual satisfaction was related to shorter pain duration ($r = 0.18$, $P = 0.04$). Greater trait anxiety was related to having a lower income ($r = -0.29$, $P < 0.01$). Finally, greater avoidance was associated with having a lower income ($r = -0.24$, $P < 0.01$), less education ($r = -0.18$, $P = 0.05$), and a younger age ($r = -0.32$, $P < 0.01$). No sociodemographic variables were controlled for in the analyses because all correlations with outcome variables were less than 0.30, the generally accepted standard for inclusion of a covariate.

Table 2 Correlations between partner responses, vulvovaginal pain intensity, sexual satisfaction, and covariates (*N* = 121)

	Facilitative	Avoidance	Trait anxiety	Sexual function	Sexual satisfaction	Vulvovaginal pain
Sollicitous	0.38**	0.10	0.08	0.06	0.18*	0.20*
Facilitative	—	0.27**	-0.01	0.11	0.25**	-0.01
Avoidance	—	—	-0.13	0.28**	0.25**	0.16
Trait anxiety	—	—	—	-0.13	-0.24**	0.28**
Sexual function	—	—	—	—	0.60**	-0.10
Sexual satisfaction	—	—	—	—	—	-0.16

** $P < 0.01$; * $P < 0.05$

Sollicitous = Multidimensional Pain Inventory—sollicitous subscale; facilitative = Spouse Response Inventory—facilitative subscale; trait anxiety = State-Trait Anxiety Inventory—trait subscale; sexual function = Female Sexual Function Index; sexual satisfaction = Global Measure of Sexual Satisfaction; avoidance = log transformed scores on the Vulvovaginal Pain and Sexual Behaviors Questionnaire

Table 3 Results of hierarchical regression analyses for partner responses predicting women's pain intensity

	<i>B</i>	<i>SE B</i>	β
Step 1			
Trait anxiety	0.36	0.10	0.30**
Avoidance	2.29	1.00	0.20*
Step 2			
Trait anxiety	0.35	0.10	0.30**
Avoidance	2.68	1.03	0.23*
Sollicitous	0.51	0.24	0.20*
Facilitative	-0.42	0.20	-0.20*

** $P < 0.01$; * $P < 0.05$

Note. $R^2 = 0.12$ for step 1; $\Delta R^2 = 0.05$ for step 2

Sollicitous = Multidimensional Pain Inventory—sollicitous subscale; facilitative = Spouse Response Inventory—facilitative subscale; trait anxiety = State-Trait Anxiety Inventory—trait subscale; avoidance = log transformed scores on the Vulvovaginal Pain and Sexual Behaviors Questionnaire

Table 2 presents the intercorrelations between the study variables. Higher vulvovaginal pain intensity was associated with higher trait anxiety and sollicitous partner responses. Higher sexual satisfaction was associated with higher sexual function, lower avoidance, lower trait anxiety, as well as higher sollicitous and facilitative responses. Higher sexual function was associated with lower avoidance. Lower avoidance was also related to higher facilitative responses. Finally, sollicitous and facilitative partner responses were positively correlated.

Partner Responses as Predictors of Pain Intensity

Hierarchical regression analyses were conducted to examine the relative contributions of partner sollicitous and facilitative responses to vulvovaginal pain intensity in women with a diagnosis of or self-reported symptoms of PVD (Table 3). The covariate avoidance was log transformed to account for outliers and to ensure that the variable was normally distributed. In support of our hypothesis, after controlling for trait anxiety and avoidance, higher sollicitous partner responses were significantly associated with higher vulvovaginal pain intensity ($\beta = 0.20$, $P = 0.03$), and

higher facilitative partner responses were significantly associated with lower vulvovaginal pain intensity ($\beta = -0.20$, $P = 0.04$). The overall model for partner responses predicting pain was significant ($F[4,117] = 5.74$, $P < 0.001$) and accounted for 16% of the variance in pain intensity, with 5% accounted for by partner responses.

Partner Responses as Predictors of Sexual Satisfaction

Hierarchical regression analyses were conducted to examine the relative contributions of partner solicitous and facilitative responses to women's sexual satisfaction (Table 4). Controlling for sexual function, trait anxiety, and avoidance, higher facilitative partner responses were associated with higher sexual satisfaction ($\beta = 0.15$, $P = 0.05$). The overall model for partner responses predicting sexual satisfaction was significant ($F[5,116] = 17.42$, $P < 0.001$) and accounted for 43% of the variance in sexual satisfaction, with 5% of the variance accounted for by partner responses. Solicitous partner responses were not significantly associated with sexual satisfaction ($\beta = 0.11$, $P = 0.15$).

Discussion

The purpose of this study was to examine whether solicitous and facilitative partner responses to pain in women with PVD were differentially associated with women's vulvovaginal pain intensity and sexual satisfaction. This study is the first to examine solicitous and facilitative partner responses simultaneously. Because our predictors are positively correlated, we included them as

simultaneous predictors in analyses, so that, statistically, results for facilitative partner responses represent the part of facilitative that does not overlap with solicitous, and results for solicitous partner responses represent the part of solicitous that do not overlap with facilitative. In support of our hypotheses, after controlling for trait anxiety and avoidance, higher solicitous partner responses and lower facilitative partner responses were associated with higher vulvovaginal pain intensity in women with PVD. Further, after controlling for sexual function, trait anxiety, and avoidance, higher facilitative responses were associated with higher sexual satisfaction. We did not find support for our hypothesis regarding the association between solicitous partner responses and sexual satisfaction.

The finding that higher solicitousness was associated with higher vulvovaginal pain intensity is consistent with findings from the chronic pain literature [11,26,39] and also with prior studies examining partner responses to PVD pain [20,23]. In line with Fordyce's [24] operant learning model and cognitive-behavioral theory, this result suggests that partners may reinforce and perpetuate avoidant behaviors in the person with pain, as well as negative cognitive appraisals of the pain such as catastrophizing, leading to greater pain. In the current study, solicitous responses were not associated with our measure of women's avoidance of pain and sexual behaviors. Theoretically, solicitousness should favor greater avoidance [14]; however, the complex interrelations between partner responses, such as solicitousness, and behavioral responses, such as avoidance, have yet to be elucidated empirically. In the context of PVD, partner solicitous responses may increase pain by encouraging avoidance of penetrative as well as nonpenetrative sexual activities; the latter is possibly a result of women's fear that nonpenetrative activities will still lead to painful intercourse. Although clinically it is not encouraged that women keep engaging in painful sexual intercourse, extensive avoidance of nonpenetrative sexual activities may have consequences beyond increased pain, leading to relationship difficulties such as lower feelings of intimacy, feelings of invalidation and inadequacy in both partners, and communication problems. Solicitous responses may also exacerbate vulvovaginal pain by heightening cognitive-affective factors such as catastrophizing, anxiety and hypervigilance, or by generating new cognitions that the pain is uncontrollable or intolerable, which may lead to further

Table 4 Results of hierarchical regression analyses for partner responses predicting women's sexual satisfaction

	<i>B</i>	<i>SE B</i>	β
Step 1			
Sexual function	0.62	0.08	0.55**
Trait anxiety	-0.10	0.05	-0.15*
Avoidance	0.49	0.48	0.08
Step 2			
Sexual function	0.60	0.08	0.54**
Trait anxiety	-0.11	0.05	-0.17*
Avoidance	0.18	0.49	0.03
Solicitous	0.16	0.11	0.11
Facilitative	0.17	0.09	0.15†

** $P < 0.01$; * $P < 0.05$; † $P = 0.055$

Note. $R^2 = 0.38$ for step 1; $\Delta R^2 = 0.05$ for step 2

Solicitous = Multidimensional Pain Inventory—solicitous subscale; facilitative = Spouse Response Inventory—facilitative subscale; trait anxiety = State-Trait Anxiety Inventory—trait subscale; sexual function = Female Sexual Function Index; sexual satisfaction = Global Measure of Sexual Satisfaction; avoidance = log transformed scores on the Vulvovaginal Pain and Sexual Behaviors Questionnaire

avoidance. These intraindividual psychological factors are themselves associated with increased pain during intercourse [3,7,41]. A recent study supported this assertion, finding that catastrophizing mediated the association between solicitous partner responses and greater vulvovaginal pain in women with PVD [30].

In contrast to solicitous responses, the current study found that facilitative partner responses were associated with lower vulvovaginal pain in women with PVD. This finding is consistent with studies in other chronic pain populations [25,31,45] and is a contribution to the PVD literature. These differential associations will clarify and assist clinicians and patients in understanding what kind of partner responses may be detrimental to women's pain experience and what type of responses may improve her functioning. Moreover, the differential association of solicitous and facilitative responses with vulvovaginal pain is interesting given the positive correlation between the two types of partner responses and reflects their conceptual overlap. Indeed, both types of partner responses are likely viewed by women as their partner being supportive. However, as noted, solicitous responses are typically associated with avoidance and heightened negative cognitive-affective reactions, whereas facilitative responses encourage the person in pain to cope in an adaptive, non-avoidant way. Promoting adaptive coping may in turn generate positive cognitions that the pain is controllable, tolerable, and that sexual activities can still be pleasurable, leading to reduced pain. In the context of PVD, the adaptive coping reinforced by facilitative responses may include focusing on non-painful sexual activities, expressing affection and pleasure during or after sexual activity, and focusing on other outcomes of sexual activity such as intimacy and closeness with one's partner [20,30]. Future studies should investigate the mechanisms by which facilitative responses may decrease pain.

Higher facilitative partner responses were also associated with greater sexual satisfaction in this sample of women with PVD. Contrary to our hypothesis, solicitousness was not associated with sexual satisfaction, which was inconsistent with results of prior studies [20,30]. Importantly, this study examined the influence of solicitous and facilitative partner responses while controlling for the other. The findings suggest that facilitative responding may be a more robust predictor of sexual satisfaction, although solicitousness still contributed to the variance accounted for by the model. Supporting and encouraging women's

efforts at adaptive coping with vulvovaginal pain during intercourse may foster feelings of self-efficacy, which may in turn allow a woman to focus on the pleasurable aspects of sex, thereby increasing her sexual satisfaction. Additionally, facilitative responses may reflect or promote emotional closeness and intimacy in the relationship, thereby creating a more positive interpersonal context for sexually satisfying interactions. Finally, facilitative responses may encourage focusing on pleasurable nonpenetrative activities, which are themselves likely to be more sexually satisfying because they are presumably less or non-painful.

The current study sample included women with PVD who were in stable, heterosexual relationships, which may not be representative of the general population of women with PVD. Future studies should include a more heterogeneous sample (e.g., homosexual couples, younger couples, or those in newer relationships) to improve the generalizability of the findings. Additionally, the study selection criteria corresponded to a diagnosis of PVD; however, a small portion of the participants were not diagnosed through a gynecological examination. In this case, their diagnosis was self-reported. Symptom self-report in women with PVD has been found to be significantly related to receiving a diagnosis of PVD from a physician [46]. In addition, partner responses accounted for a relatively small, but significant, amount of the variance in pain and sexual satisfaction. Still, targeting partner responses in clinical interventions may have additional benefits that reach beyond moderating these specific responses, such as improving communication and intimacy in the relationship, further bolstering the effects on pain and sexual satisfaction. Future research should seek to examine additional interpersonal predictors that may prove more robust, such as the degree of emotional self-disclosure and validation in couple communications [47]. Finally, this study was cross-sectional and no causal conclusions can be drawn. There may be other possible directions of the relationship between pain and partner responses. For example, it may be that women with more intense pain garner more solicitousness from their partners. The temporal order to these associations should be tested using study designs that can examine causality. Further, there is some evidence to suggest that partner responses may change over time [48,49] indicating that longitudinal and experimental studies, such as observational and experience processing methods, are warranted. These limitations notwithstanding, the

present study underscores the crucial role of partner variables in the pain and sexual sequelae of PVD.

Conclusions

Consistent with earlier research, our results support the important role of relationship factors in the experience of pain [27,50] and sexual satisfaction in PVD [51]. Higher solicitous partner responses were associated with higher vulvovaginal pain, whereas higher facilitative partner responses were associated with lower vulvovaginal pain and higher sexual satisfaction. These results are encouraging for couples grappling with PVD. The findings indicate a type of responding that may be viewed as supportive and sensitive to the woman's pain experience, while potentially aiding in alleviating the pain and improving sexual satisfaction. These results may guide interventions for couples where the woman has PVD, by providing information concerning what types of partner responses to promote.

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