

## ORIGINAL RESEARCH

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# Acceptance of Vulvovaginal Pain in Women with Provoked Vestibulodynia and Their Partners: Associations with Pain, Psychological, and Sexual Adjustment

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### ABSTRACT

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**Introduction.** Provoked vestibulodynia (PVD) is a common vulvovaginal pain condition associated with negative psychological and sexual consequences for affected women and their sexual partners. Greater pain acceptance has been found to be associated with better functional and psychological outcomes in individuals with chronic pain, and acceptance-based strategies are being increasingly incorporated into treatment protocols. The present study is a novel investigation of pain acceptance in PVD couples.

**Aim.** The aim was to examine the associations between acceptance of vulvovaginal pain and women's pain during intercourse, as well as the psychological and sexual adjustment of both women with PVD and their partners.

**Methods.** Sixty-one couples ( $M_{age}$  for women = 27.95 years,  $SD = 5.87$ ;  $M_{age}$  for men = 30.48 years,  $SD = 6.70$ ) in which the woman was diagnosed with PVD completed the Chronic Pain Acceptance Questionnaire, in reference to women's vulvovaginal pain. Women also rated their pain during intercourse, and couples completed measures of anxiety, depression, sexual function, and sexual satisfaction.

**Main Outcome Measures.** Dependent measures were (i) women's self-reported pain during intercourse on a numerical rating scale; (ii) State-Trait Anxiety Inventory trait subscale; (iii) Beck Depression Inventory-II; (iv) Derogatis Interview for Sexual Functioning; and (v) Global Measure of Sexual Satisfaction Scale.

**Results.** Women's greater pain acceptance was associated with their lower self-reported pain during intercourse, controlling for partner's pain acceptance. Greater pain acceptance among women was associated with their own lower anxiety and depression, greater sexual functioning, as well as their own and their partner's greater sexual satisfaction, controlling for the partner's pain acceptance. Additionally, greater pain acceptance among male partners was associated with their own lower depression.

**Conclusions.** Findings suggest that psychological interventions for PVD should target increasing couples' vulvovaginal pain acceptance in order to improve women's pain and the sexual and psychological functioning of both members of the couple. **Boerner KE and Rosen NO. Acceptance of vulvovaginal pain in women with provoked vestibulodynia and their partners: Associations with pain, psychological, and sexual adjustment. J Sex Med \*\*;\*\*,\*\*:\*\*\_\*\*.**

**Key Words.** Provoked Vestibulodynia; Vulvodynia; Genital Pain; Pain Acceptance; Couples; Anxiety; Depression; Sexual Functioning; Sexual Satisfaction

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### Introduction

Vulvodynia, or chronic vulvar pain, is characterized by pain in the vulvar region in the absence of relevant physical findings [1]. With a

prevalence of 8–12%, provoked vestibulodynia (PVD) is the most common subtype of vulvodynia [2]. PVD is defined as acute recurrent pain in the vulvar vestibule, which can be provoked by sexual (e.g., intercourse) or nonsexual (e.g., tampon

insertion, gynecological exam) contact. Although the etiology of PVD has not been fully established, a number of factors have been found to be associated with pain modulation, including genetic susceptibility to heightened inflammatory responses [3], increased muscular tension and reactivity in the pelvic floor [4], central sensitization [5], and psychosocial factors such as hypervigilance, catastrophizing, avoidance behaviors, and self-efficacy [6,7]. Recent research has underscored the role of interpersonal factors, such as intimacy and partner responses to the pain, in the maintenance and/or exacerbation of pain and associated impairments in women with PVD and their partners [8,9].

Like many chronic pain conditions, some of the most substantial effects are not the experience of the pain itself, but the impact the pain has on quality of life and functioning. Having PVD has been related to psychological distress including heightened anxiety and depression compared with women without this condition [10]. Women with PVD also report significant impairments in their sexual functioning, such as lower levels of desire and arousal, problems with orgasm, and decreased frequency of sexual activity, as well as decreased sexual satisfaction [10,11]. Additionally, recent controlled studies have shown that male partners of women with PVD also suffer the consequences of his partner's pain, with partners reporting increased rates of psychological distress, increased prevalence of sexual difficulties (e.g., erectile dysfunction), and decreased sexual satisfaction [12,13].

Impacts of pain on functioning may be influenced by the manner in which an individual's beliefs or interpretations about the pain (e.g., is the pain threatening?) guide their responses to a pain condition [14]. In accordance with the Fear-Avoidance model of chronic pain, fear of pain leads to attempts to control, manage, change, or reduce the pain, typically by avoiding situations that may cause further pain [15,16]. In the case of PVD, attempts to control pain may involve avoidance of all sexual activities out of fear that it may lead to painful intercourse [6]. Contrary to the intention of this strategy, avoidance may actually result in increased attention directed toward the pain, with pain-related fear and hypervigilance being reinforced by this behavior, resulting in greater pain and associated impairments [17]. Focusing efforts on changing or avoiding pain may prevent an individual from fully engaging in the activities and relationships that are important to them, leading

to a decrease in functioning and psychological adjustment [18].

In contrast, acceptance of chronic pain refers to (i) an openness to experiencing pain sensations and giving up futile attempts to control pain (pain willingness), and (ii) the pursuit of a satisfying life despite having chronic pain (activity engagement) [19]. Acceptance represents a counterintuitive reaction to pain, which is generally understood to signal the presence of potential tissue damage that requires immediate attention and removal of the pain-inducing stimulus. However, in the context of chronic pain, where pain may continue in the absence of disease or injury, acceptance-based thoughts promote the individual's continued functioning in their environment and engagement in activities that are in line with their personal values, acknowledging that efforts to change or reduce pain may not be helpful in this circumstance [20]. Such acceptance requires a degree of psychological flexibility in integrating and acknowledging the sensory, emotional, and cognitive influences that are present when a person experiences pain but without allowing them to disrupt engagement in valued activities [21]. Greater patient-reported acceptance of chronic pain has been associated with lower pain, disability, and psychological distress [22], as well as greater pain-related catastrophizing [23] in various chronic pain populations.

To our knowledge, the construct of pain acceptance has yet to be applied to PVD and the unique domains of functioning (e.g., sexual functioning and satisfaction) that it impacts. There has been an examination of the related construct of mindfulness in women with PVD, which refers to the practice of combining moment-to-moment awareness with a nonjudgmental acceptance and observation of the physical sensations, emotions, and thoughts that arise [24]. A mindfulness meditation program has been found to have beneficial effects in women with PVD, including reductions in pain catastrophizing, sex-related distress, and improved pain self-efficacy [25]. Mindfulness and acceptance may provide an important complement to existing treatments for PVD. Although cognitive-behavioral and medical interventions have been found to significantly reduce women's pain and psychosexual impairments, some elements of pain and sexual consequences typically persist following treatment for many affected women and their partners [26,27]. Furthermore, over 80% of women with PVD continue to have intercourse on a regular basis, suggesting that

they are motivated to persist with sexual activities in spite of the pain [27,28]. Thus, acceptance may prove to be an important construct for improving women's psychological and sexual well-being in the presence of continued pain, as well as possibly decreasing the pain itself.

Pain researchers are increasingly acknowledging the importance of examining the social context of chronic pain, though prior studies on pain acceptance have failed to take into account both the patient and partner's perspective [30,31]. The interpersonal context of PVD is especially salient because of the partner's role in triggering the pain from intercourse, and the fact that he is typically present during the pain to observe her emotional and behavioral responses, and has his own reactions to the pain. In PVD, the couples' relationship, the partner's own psychosocial functioning, and male partners' self-reported responses to the pain have all been linked to women's outcomes such as her pain, sexual functioning, and depression [7,27,32,33]. Furthermore, the partners' own thoughts and behaviors in response to the woman's vulvovaginal pain are associated with women's pain experience and may reinforce pain-related cognitive-affective reactions and behaviors in both the woman and her partner [8,32,34]. In the present study, partner's pain acceptance was conceptualized as the degree to which a male partner experiences a willingness for his female partner to experience pain, as well as the extent to which the male partner has relinquished attempts to control or avoid the pain. Note that partner pain acceptance does not refer to the male partner's belief that pain is an inevitable or acceptable outcome in the pursuit of his own sexual pleasure, rather, it reflects a shift in attention and energy away from attempts to control the pain and toward achieving realistic and valued life (and sexual) goals. Partner acceptance would be demonstrated by endorsement of pain-accepting cognitions and limited interference of the pain with respect to male partners' ability to engage in valued (i.e., sexual) activities. Given this interdependent relationship between the cognitions, affect, and functioning of women with PVD and their partners, couple therapy is frequently proposed as a treatment option [35]. Before integrating acceptance-based practices into individual or couple therapy for women with PVD and their partners, it is essential that research examines the role of acceptance of pain from the perspective of both women and partners, and its associations with

women's pain and the psychological and sexual functioning of both members of the couple.

## Aims

The objective of the present study was to examine the associations between women's and partner's acceptance of vulvovaginal pain and women's pain, as well as the psychological and sexual adjustment of women with PVD and their partners. Prior studies in other chronic pain populations have found greater pain acceptance to be associated with lower pain and disability as well as better psychological adjustment [22]. Additionally, research has found that male partners both impact and are impacted by their female partner's PVD-related pain [36]. Therefore, we expected that women's and partner's greater acceptance of vulvovaginal pain would be associated with women's lower pain, as well as lower anxiety and depression and higher sexual functioning and satisfaction for both partners.

## Methods

### Participants

Women were screened for eligibility via a telephone interview and gynecological examination and needed to meet the following criteria to participate: (i) the woman was experiencing pain during intercourse that had lasted at least 6 months and occurred on 75% of intercourse attempts; (ii) the pain was limited to activities that involved pressure to the vestibule; (iii) the woman had a diagnosis of PVD from one of our collaborating physicians using the standardized form of the "cotton swab test," which involves randomized palpation of the 3-, 6-, and 9-o'clock positions of the vulvar vestibule with a dry cotton swab while the woman provides pain ratings at each location [26]; and (iv) the couple had been cohabitating and/or been in a committed relationship for at least 6 months. Exclusion criteria were presence of one of the following: active yeast infection, current pregnancy, age of <18 years for women and partners, age of >45 years for women (i.e., to exclude women who may be peri- or postmenopausal due to hormonal influences that may impact their genital pain), or vaginismus (as defined by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text Revision* [37]). Eligible women were asked to confirm their male partner's

participation. All couples in the current study were in cross-sex relationships.

## Measures

### Demographics

Participants completed an investigator-created demographics questionnaire where they reported on their own general demographic variables including age, cultural background, and education level, and women reported on demographic variables regarding the couple including relationship duration and shared income, as well as reporting on the duration of their pain.

### Chronic Pain Acceptance

Acceptance of vulvovaginal pain was measured with the Chronic Pain Acceptance Questionnaire—Revised (CPAQ-R [38]). This 20-item questionnaire asks participants to rate each statement on a seven-point Likert scale from 0 (*never true*) to 6 (*always true*). The scale assesses two dimensions: Activity Engagement (measuring the extent to which the individual continues to pursue life activities in spite of the presence of a pain condition) and Pain Willingness (measuring the extent to which the individual reports an openness to experiencing pain sensations and recognizes that avoidance and attempting to control the pain are maladaptive forms of coping). Total scores range from 0 to 120, with higher scores indicating greater levels of pain acceptance. A recent systematic review of measures of acceptance of chronic pain indicated that, based on psychometric properties, there is the most support for use of the CPAQ-R to measure chronic pain acceptance, as compared with other questionnaires [39]. In the present study, the instructions for the CPAQ-R were adapted to instruct participants to refer to their own (or their partner's) vulvovaginal pain while completing the questionnaire, rather than any other pains they may experience. An example of an item for partners included "I am getting on with the business of living no matter what my partner's level of pain is" and an example item for women included "I lead a full life even though I have chronic pain." Cronbach's alpha for the present sample was 0.86 for women's pain acceptance and 0.88 for partners.

### Main Outcome Measures

#### Pain During Intercourse

Women's self-reported pain during intercourse was measured with a numerical rating scale

ranging from *no pain at all* to *worst pain ever*. This is the most recommended instrument for the measurement of clinical pain intensity [40] and has been shown to positively correlate with other pain intensity measures in previous research involving women with PVD [6]. Note that the majority of the sample ( $n = 47, 72.3\%$ ) responded to this question on a scale of 0–10, and the remaining sample ( $n = 18, 27.7\%$ ) responded to this question on a scale of 1–10. Scores reported on the scale of 1–10 were rescaled to the metric of 0–10 before the present analysis were conducted.

### Anxiety

Both members of the couple completed the well-validated trait subscale of the State-Trait Anxiety Inventory [41], which consists of 20 items rating anxiety on a four-point Likert scale of 1 (*almost never*) to 4 (*almost always*). Higher scores indicate greater anxiety, and total scores can range from 20 to 80. Internal consistency was high in the present sample, with Cronbach's alpha of 0.91 for women and 0.94 for partners.

### Depression

Both members of the couple completed the well-validated Beck Depression Inventory II (BDI-II [42]), which is a 21-item self-report measure that examines the presence of typical symptoms of depression over the previous 2 weeks. Higher scores indicate greater depression, and total scores can range from 0 to 63. Cronbach's alpha for the BDI-II in this sample was 0.92 for women and 0.89 for partners.

### Sexual Function

Both members of the couple completed the Derogatis Interview for Sexual Functioning—Self-Report (DISF-SR [43]). The DISF-SR is comprised of 26 gender-keyed items that assess five domains of sexual functioning (Sexual Cognition/Fantasy, Sexual Arousal, Sexual Behavior/Experience, Orgasm, and Sexual Drive/Relationship). Possible scores for overall sexual functioning range from 0 to 160 for women and from 0 to 168 for men, with higher scores indicating greater sexual functioning. Scores for women and men were standardized to be on the same metric for the present analyses. Cronbach's alpha for the present study was 0.86 for women and 0.82 for partners. Note that of those couples who completed this questionnaire ( $n = 53$ ) data were only used for couples who reported

currently engaging in intercourse with penetration attempts ( $n = 46$ ).

### Sexual Satisfaction

Global satisfaction with their sexual relationship was measured in both members of the couple using the Global Measure of Sexual Satisfaction scale, a subscale of the Interpersonal Exchange Model of Sexual Satisfaction Questionnaire [44]. Participants are asked to rate their sexual relationship on five seven-point scales, with the anchors comprised of pairs of bipolar descriptors (e.g., good-bad, satisfying-unsatisfying). Possible scores range from 5 to 35, with higher scores indicating greater sexual satisfaction. This measure has been found to be valid for use in populations of women with PVD and their partners [9,13,45], and internal consistency was high in the present study, with Cronbach's alpha of 0.92 for women and 0.89 for partners.

### Procedure

Data for the present analyses were taken from questionnaires completed by women and partners as part of two larger studies [27,29,46]: study 1 was cross-sectional ( $n = 30$  couples; 49.2%) and study 2 ( $n = 31$  couples; 51.7%) was a treatment study for PVD. Data from study 2 were taken from the pretreatment baseline questionnaires. The diagnostic protocol for PVD and eligibility criteria, described previously, was consistent across these studies. For both studies, women and their partners met with a research assistant, where they provided informed consent. Couples then completed a series of questionnaires (i.e., at baseline for the treatment studies), each on a separate computer, and were instructed not to communicate with each other while completing the questionnaires. Women provided ratings of pain intensity during intercourse. Both women and their partners completed measures of vulvovaginal pain acceptance, anxiety, depression, and sexual functioning and satisfaction, in addition to measures not pertinent to the present study. All participants completed all measures described above, except for the measure of sexual function, which was added after study recruitment had already commenced, and as such only a subset of the sample completed this measure ( $n = 53$  couples). In appreciation of their participation in research, couples received compensation that was commensurate with the requirements of the larger studies that they were taking part in. Each

individual study was approved by the institution's research ethics board.

### Analyses

Mean imputation was used for missing data in cases where less than 10% of data from a questionnaire was missing. Differences between the two studies that couples participated in and differences between men and women were assessed using  $t$ -tests for continuous variables,  $\chi^2$  analyses for categorical variables, and Fisher's exact test when the assumption of expected frequencies for  $\chi^2$  analyses was violated. Correlations assessed the presence of significant covariates (i.e., demographics) to be controlled for in subsequent analyses. A hierarchical regression analysis was conducted to examine the relative contributions of women's acceptance of her vulvovaginal pain and partners' acceptance of her vulvovaginal pain on women's self-reported pain during intercourse. Analyses examining associations between women's and partners' acceptance and couples' sexual and psychological well-being were guided by the Actor-Partner Interdependence Model (APIM) [47]. The APIM has been applied in research involving romantic couples, both in healthy couples and couples where one partner has a chronic condition, such as PVD [27,48]. Specifically, multilevel modeling was used to account for the nonindependence in the data [49]. Individual data (level 1) were nested within couple dyads (level 2) to create a two-level model with between-person analyses at the first level and between-dyad analyses at the second level. All statistical analyses were conducted using SPSS version 21 (SPSS Inc., Chicago, IL, USA).

## Results

### Demographics

Couples were recruited using the following methods: 59% ( $n = 36$ ) of couples were recruited from community posters/advertisements, 19.7% ( $n = 12$ ) from referrals from health care providers, 19.7% ( $n = 12$ ) from past participants of studies conducted in our research laboratory, and 1.6% ( $n = 1$ ) through word of mouth. Demographic characteristics of the 122 study participants (61 couples) and mean scores for all study variables are presented in Table 1. There were no differences between the participants of the two studies on any of the primary study variables, with the exception of depression: women in the cross-sectional study ( $M = 17.45$ ,  $SD = 11.47$ ) reported greater depres-

**Table 1** Descriptive statistics of the sample

	Women (n = 61)		Partners (n = 61)	
	M (range) or n	SD or %	M (range) or n	SD or %
<b>Characteristics</b>				
Age (years)	27.95 (19–43)	5.87	30.48 (22–52)	6.70
Cultural background				
English-Canadian	39	63.9%	42	68.9%
French-Canadian	12	19.7%	7	11.5%
Other	10	16.4%	12	19.7%
Education duration (years)	16.92 (12–27)	2.64	16.70 (11–31)	3.49
Couple annual income				
\$0–19,999	8	13.1%	—	—
\$20,000–39,999	12	19.7%	—	—
\$40,000–59,999	9	14.8%	—	—
>\$60,000	32	52.5%	—	—
Duration of pain (years)	6.32 (0.5–26)	4.80	—	—
Duration of relationship (years)	5.92 (0.5–20)	4.36	—	—
Current status				
Not living together	4	6.6%	—	—
Cohabiting, not married	33	54.1%	—	—
Married	24	39.3%	—	—
<b>Independent variable</b>				
Pain acceptance (CPAQ-R)	68.32 (27–99)	16.60	58.22 (15–96)	18.96
<b>Dependent variables</b>				
Pain intensity (NRS)	6.64 (2–10)*	1.73	—	—
Anxiety (STAI-T)	44.98 (25–66)	10.51	37.20 (20–68)	11.49
Depression (BDI-II)	14.15 (0–41)	10.27	7.40 (0–38)	7.25
Sexual functioning (DISF-SR) <sup>†</sup>	61.80 (25–101) <sup>†</sup>	17.15	93.07 (50–133) <sup>†</sup>	18.60
Sexual satisfaction (GMSEX)	20.52 (5–35)	7.67	22.27 (9–35) <sup>‡</sup>	7.63

\*Re-scaled scores presented so that all responses were on a 0–10 scale

<sup>†</sup>Note that range of possible scores for DISF-SR is 0–160 for women and 0–168 for men

<sup>‡</sup>n = 46 for this questionnaire

<sup>§</sup>n = 60 for this questionnaire

BDI-II = Beck Depression Inventory second edition; CPAQ-R = Chronic Pain Acceptance Questionnaire—Revised; DISF-SR = Derogatis Interview of Sexual Functioning—Self-Report; GMSEX = Global Measure of Sexual Satisfaction; M = mean; NRS = Pain intensity during intercourse as measured on a 0–10 numerical rating scale; SD = standard deviation; STAI-T = State Trait Anxiety Inventory Trait Subscale.

sive symptoms compared with those entering the treatment study ( $M = 10.96$ ,  $SD = 7.91$ ),  $t(51.3) = 2.56$ ,  $P = 0.01$ . As such, study type was included as a covariate for the analyses examining depression. Women in the cross-sectional study also reported a shorter pain duration ( $M = 5.0$  years,  $SD = 3.86$ ) than women in the treatment study ( $M = 7.61$  years,  $SD = 5.31$ ),  $t(59) = -2.20$ ,  $P = 0.03$ , and there was a greater proportion of both women ( $F = 16.15$ ,  $P < 0.01$ ) and men ( $F = 13.6$ ,  $P < 0.01$ ) in the cross-sectional study who were English-Canadian than participants in the treatment study, where a greater proportion of participants were French-Canadian.<sup>1</sup> There were no other differences in demographics between the studies. Paired-sample  $t$ -tests revealed that women had significantly higher scores on the CPAQ-R than their partners ( $t(60) = 3.51$ ,  $P < 0.01$ ). Additionally, consistent with previous research [50],

<sup>1</sup>Of note, for all other study outcomes (pain intensity, anxiety, sexual functioning, and sexual satisfaction), the pattern of results remained the same when controlling for study type (i.e., the significance of all effects held).

women in the present sample were significantly more anxious ( $t(60) = 4.53$ ,  $P < 0.01$ ) and depressed ( $t(64) = 4.48$ ,  $P < 0.01$ ) and reported lower sexual functioning ( $t(45) = -8.10$ ,  $P < 0.01$ ) than their partners. There was no significant difference in sexual satisfaction between women and their partners ( $t(59) = -1.75$ ,  $P = 0.09$ ).

### Correlations

Preliminary analysis examined the correlations between demographic characteristics and the outcome variables to determine whether there was a need to control for these variables in subsequent analyses. Partner's older age ( $r = -0.41$ ,  $P < 0.01$ ) and women's older age ( $r = -0.52$ ,  $P < 0.01$ ) was significantly correlated with lower sexual functioning in women. Women's older age was also significantly correlated with her partner's lower sexual satisfaction ( $r = -0.31$ ,  $P = 0.02$ ). Longer relationship duration ( $r = -0.54$ ,  $P < 0.01$ ) and pain duration ( $r = -0.31$ ,  $P = 0.04$ ) was associated with lower sexual functioning in women. Therefore, age, relationship, and pain duration were included as

**Table 2** Correlations between pain acceptance and dependent variables

	Woman's pain acceptance (CPAQ-R)	Partner's pain acceptance (CPAQ-R)
Partner's pain acceptance (CPAQ-R)	0.21	—
Woman's pain during intercourse (NRS)	-0.48*	-0.17
Woman's anxiety (STAI-T)	-0.38*	0.05
Partner's anxiety (STAI-T)	0.03	-0.20
Woman's depression (BDI-II)	-0.47*	0.00
Partner's depression (BDI-II)	0.13	-0.20
Woman's sexual functioning (DISF-SR)	0.28	0.16
Partner's sexual functioning (DISF-SR)	0.15	0.25
Woman's sexual satisfaction (GMSEX)	0.35*	0.03
Partner's sexual satisfaction (GMSEX)	0.22	0.04

\* $P < 0.01$ 

BDI-II = Beck Depression Inventory second edition; CPAQ-R = Chronic Pain Acceptance Questionnaire—Revised; DISF-SR = Derogatis Interview of Sexual Functioning—Self-Report; GMSEX = Global Measure of Sexual Satisfaction; NRS = pain intensity during intercourse as measured on a 0–10 numerical rating scale; STAI-T = State Trait Anxiety Inventory Trait Subscale.

covariates in analyses involving sexual functioning. Additionally, participant age was included as a covariate in analyses of sexual satisfaction.

Table 2 provides correlations between women's and partner's pain acceptance and all outcome variables. With regard to intercorrelations between outcome variables, women's pain intensity was associated with women's symptoms of depression ( $r = 0.33$ ,  $P = 0.01$ ) and anxiety ( $r = 0.31$ ,  $P = 0.02$ ). Both women's and partner's depressive symptoms was associated with their own anxiety ( $r = 0.75$ ,  $P < 0.01$  and  $r = 0.79$ ,  $P < 0.01$ , respectively), and anxiety in women was associated with anxiety in her partner ( $r = 0.26$ ,  $P = 0.05$ ). Women's sexual satisfaction was related to her partner's sexual satisfaction ( $r = 0.55$ ,  $P < 0.01$ ), her own sexual functioning ( $r = 0.42$ ,  $P < 0.01$ ), her own anxiety ( $r = -0.27$ ,  $P = 0.04$ ), and her own depression ( $r = -0.28$ ,  $P = 0.03$ ).

#### Associations Between Vulvovaginal Pain Acceptance and Women's Pain During Intercourse

A hierarchical regression analysis was conducted to examine the relative contribution of women's and partner's acceptance of women's vulvovaginal pain on women's self-reported pain during intercourse (Table 3). Over and above the effect of partner's level of acceptance, women's greater pain acceptance was associated with lower levels of self-reported pain during intercourse ( $\beta = -0.47$ ,  $t(58) = -4.00$ ,  $P < 0.01$ ). The model was significant ( $F(2,58) = 9.03$ ,  $P < 0.01$ ) and accounted for 24% of the variance in women's pain intensity during intercourse, with 21% of the variance specifically accounted for by women's vulvovaginal pain acceptance.

#### Associations Between Vulvovaginal Pain Acceptance and Psychological and Sexual Well-Being

Table 4 indicates the actor and partner effects for each outcome, and Figure 1 visually depicts a summary of the significant actor and partner effects for all outcomes. Significant "actor effects" refer to the effect of an individual's own pain acceptance on their own outcomes while controlling for the impact of their partner's pain acceptance. Significant "partner effects" refer to the effect of an individual's pain acceptance on a partner's outcome, controlling for the impact of their partner's pain acceptance.

With regard to psychological distress variables, a significant actor effect for women was observed for the association between vulvovaginal pain acceptance and anxiety, indicating that greater pain acceptance in women was related to fewer symptoms of anxiety in women. For depression, there was a significant actor effect for women, indicating that greater pain acceptance in women was related to her lower depressive symptoms. There was also a significant actor effect for men,

**Table 3** Results of hierarchical regression analysis for chronic pain acceptance predicting women's pain intensity

	Women's self-reported pain during intercourse		
	<i>b</i>	Standard error	$\beta$
Step 1			
Partner's CPAQ-R	-0.01	0.01	-0.17
Step 2			
Partner's CPAQ-R	-0.00	0.01	-0.07
Women's CPAQ-R	-0.03	0.01	-0.47*

\* $P < 0.001$ 

CPAQ-R = Chronic Pain Acceptance Questionnaire—Revised.

**Table 4** Actor-Partner Interdependence Model with vulvovaginal pain acceptance as independent variable and anxiety, depression, sexual functioning, and sexual satisfaction as dependent variables

	Vulvovaginal pain acceptance				
	<i>b</i>	Standard Error	df	<i>t</i>	<i>P</i>
<b>Anxiety</b>					
Actor-by-gender	-0.13	0.12	92.45	-1.11	0.27
Partner-by-gender	0.02	0.12	88.62	0.19	0.85
<b>Actor effects</b>					
<b>Women</b>	<b>-0.26</b>	<b>0.08</b>	<b>58</b>	<b>-3.32</b>	<b>&lt;0.01</b>
Men	-0.13	0.08	58	-1.64	0.11
<b>Partner effects</b>					
Women	0.07	0.07	58	1.07	0.29
Men	0.05	0.09	58	0.57	0.57
<b>Depression*</b>					
<b>Actor-by-gender</b>	<b>-0.20</b>	<b>0.09</b>	<b>93</b>	<b>-2.29</b>	<b>0.02</b>
Partner-by-gender	-0.03	0.08	99.85	-0.41	0.68
<b>Actor effects</b>					
<b>Women</b>	<b>-0.31</b>	<b>0.07</b>	<b>56.62</b>	<b>-4.49</b>	<b>&lt;0.01</b>
<b>Men</b>	<b>-0.11</b>	<b>0.05</b>	<b>57.06</b>	<b>-2.25</b>	<b>0.03</b>
<b>Partner effects</b>					
Women	0.04	0.06	57.25	0.64	0.53
Men	0.07	0.06	56.54	1.30	0.20
<b>Sexual functioning†</b>					
Actor-by-gender	0.01	0.01	77.20	0.93	0.35
Partner-by-gender	-0.01	0.01	70.45	-0.65	0.52
<b>Actor effects</b>					
<b>Women</b>	<b>0.02</b>	<b>0.01</b>	<b>39.31</b>	<b>2.13</b>	<b>0.04</b>
Men	0.01	0.01	41.09	0.72	0.47
<b>Partner effects</b>					
Women	0.00	0.01	40.02	0.33	0.74
Men	0.01	0.01	39.91	1.03	0.31
<b>Sexual satisfaction‡</b>					
<b>Actor-by-gender</b>	<b>0.20</b>	<b>0.08</b>	<b>80.68</b>	<b>2.42</b>	<b>0.02</b>
Partner-by-gender	-0.16	0.08	80.77	-1.90	0.06
<b>Actor effects</b>					
<b>Women</b>	<b>0.18</b>	<b>0.06</b>	<b>56.33</b>	<b>3.12</b>	<b>&lt;0.01</b>
Men	-0.02	0.05	56.69	-0.33	0.74
<b>Partner effects</b>					
Women	-0.04	0.05	56.76	-0.73	0.47
<b>Men</b>	<b>0.12</b>	<b>0.06</b>	<b>56.59</b>	<b>2.00</b>	<b>0.05</b>

\*Analyses of depression were conducted controlling for study type (cross-sectional or treatment)  
 †Analyses of sexual functioning were conducted controlling for participant age, relationship duration, and pain duration  
 ‡Analyses of sexual satisfaction were conducted controlling for participant age  
 Significant effects are bolded. Unstandardized beta (*b*) presented in the first column. Anxiety = State-Trait Anxiety Inventory Trait Subscale; Depression = Beck Depression Inventory second edition; sexual functioning = Derogatis Interview of Sexual Functioning—Self-Report; Sexual satisfaction = Global Measure of Sexual Satisfaction.

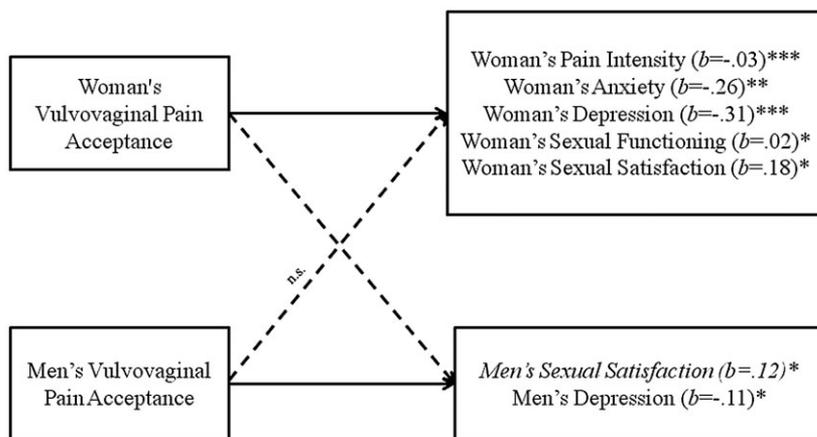
indicating that greater pain acceptance in men was related to their own lower symptoms of depression. There was no effect of women or men's vulvovaginal pain acceptance on their partner's anxiety or depression.

For sexual functioning, there was a significant actor effect for women, indicating that women's higher acceptance of their vulvovaginal pain was related to their own higher sexual functioning, controlling for age, relationship duration, and pain duration. There was no effect of women or men's vulvovaginal pain acceptance on their partner's sexual functioning, and no effect of men's vulvovaginal pain acceptance on his own sexual functioning.

There was a significant actor effect for women on sexual satisfaction, indicating that higher vulvovaginal pain acceptance was related to higher sexual satisfaction in women, controlling for age. There was also a significant partner effect for men on sexual satisfaction, indicating that women's higher vulvovaginal pain acceptance was related to higher sexual satisfaction in men, controlling for age. There was no effect of men's vulvovaginal pain acceptance on their own or their partner's sexual satisfaction.

**Discussion**

The present study examined the associations between women's and partner's acceptance of women's vulvovaginal pain and women's pain during intercourse as well as the psychological and sexual well-being of women with PVD and their partners. In support of our hypotheses, women's greater acceptance of her own vulvovaginal pain condition was associated with her lower pain, anxiety and depression, and higher sexual func-



**Figure 1** Summary of actor and partner effects of vulvovaginal pain acceptance on pain, psychological and sexual outcomes.

Note: Only significant effects are depicted in the figure. Solid lines/roman font indicate actor effects and dashed lines/italic font indicate partner effects. \**P* ≤ 0.05; \*\**P* < 0.01; \*\*\**P* < 0.001

tioning and sexual satisfaction. Women's greater pain acceptance was also associated with her male partner's higher sexual satisfaction. Men's greater pain acceptance was associated with his own lower depressive symptoms. Findings are in line with studies examining the positive influence of acceptance of pain in other chronic pain populations [22,23] and support the importance of considering the social context of pain by including the perspective of both members of affected couples in chronic pain research [31,51].

Higher pain acceptance in women was related to lower self-reported pain during intercourse, above and beyond the partner's level of acceptance. In research with other chronic pain populations, greater pain acceptance has also been observed to be associated with lower pain intensity [52,53]. In PVD, acceptance of pain may increase women's motivation to engage in partnered sexual activity and cope adaptively with her pain, which may result in attention being directed away from the pain and toward the more pleasurable aspects of the experience, resulting in less pain. Additionally, increased acceptance may reduce women's avoidance and catastrophizing about pain [52], both factors that are known to increase pain intensity in women with PVD [6]. Decreased catastrophizing may in turn reduce the negative physiological reactions that occur in the presence of heightened anxiety (e.g., decreased lubrication and increased pelvic floor muscle tension), thus facilitating a less painful experience of intercourse [52]. Continued engagement in less or nonpainful sexual activities and decreased catastrophizing may explain the negative correlation between acceptance of pain and intensity of pain experienced during intercourse in women with PVD. It is likely that this relationship is bidirectional to some degree in that women with greater pain severity may experience more impairment in functioning than women with lower levels of pain, making it more difficult to engage in pain-accepting cognitions and behaviors.

Similar to the negative association found between pain acceptance and psychological distress in other chronic pain populations [18], greater pain acceptance in women with PVD was related to their own lower symptoms of anxiety and depression, controlling for partner's level of pain acceptance. Men's greater pain acceptance was also associated with their own lower depressive symptoms, which represents a particularly novel finding as no previous literature has examined the role of pain acceptance in partners of individuals with chronic pain, although they are

known to experience psychosocial consequences of the pain. Acceptance of chronic pain promotes continued engagement in life activities that are in line with one's personal values, which reduces the frequency of behaviors (e.g., isolation, avoidance) that perpetuate psychological distress in many individuals with chronic pain [14]. In PVD, greater acceptance of vulvovaginal pain may reflect the positive value a woman places on the importance of the sexual relationship. Perceiving the sexual relationship as valuable may increase an individual's motivation to engage in sexual activities with her partner, leading to enhanced feelings of intimacy and connectedness and reducing her own anxiety and depression [55]. Indeed, recent models of female sexual response have suggested that sexual motivation is influenced by both sexual (e.g., arousal) and nonsexual (e.g., intimacy) outcomes and that the nonsexual factors may be especially important for women with sexual difficulties [55]. Future research is needed to explore whether sexual motivations in women with PVD are driven by a desire for intimacy versus feelings of responsibility or guilt (or both), and whether pain acceptance plays a role in framing such motivations.

Acceptance of chronic pain may also entail the acceptance of catastrophic cognitions and attributions as a facet of the pain experience; therefore, changes in acceptance may mediate the impact of catastrophizing on anxiety and depression [52,56]. Previous research in chronic pain populations has provided empirical evidence for the link between reduced catastrophizing and reduced psychological distress, beyond the effects of functional impairment [57]. When catastrophic thoughts emerge, an individual may choose to acknowledge but not engage with that thought and may continue to engage and be present during all kinds of sexual activities because they are motivated by how much they value their sexual relationship. Continued engagement in valued activities may interrupt rumination and avoidance and provides evidence to the individual against the feelings of helplessness or guilt that characterizes many catastrophic thoughts and maintains anxiety and depression [22].

Women's higher acceptance of their pain was also related to their own higher sexual functioning, controlling for the partner's level of pain acceptance. Furthermore, higher pain acceptance in women was associated with her own and her partner's higher sexual satisfaction. Women with lower acceptance of pain may be more inhibited during sexual activity and/or hypervigilant of the pain or the impact of their pain on their partner's sexual

experience, thus interfering with their own sexual functioning [27]. Conversely, women's greater levels of acceptance of their vulvovaginal pain may reflect their belief that sexual activity is an important and valued aspect of the relationship, which may lead them to try and adapt the sexual relationship to account for the pain in the interest of continuing to pursue valued activities. This adaptive response reflects the construct of psychological flexibility that plays an important role in pain acceptance and subsequent functioning [21]. Such flexibility may allow for an expansion of the couple's sexual repertoire to sexual activities that are focused on pleasure and intimacy, rather than avoiding out of fear of pain, thus creating a more positive interpersonal context for sexual interactions and leading to enhanced overall sexual functioning in women and greater satisfaction in both members of the couple. Additionally, though not examined in the present study, the concept of sexual autonomy may be an important factor in understanding women's vulvovaginal pain acceptance, in that having a sense of control and agency over one's own sexuality may facilitate the conscious letting go of attempts to change or modify the pain, and thus improving sexual functioning.

Greater pain acceptance may allow women to be more present (i.e., mindful) during sexual activities and to focus on her own and her partner's pleasurable sensations or other positive benefits of sexual activity, such as intimacy. Prior research has found that participation in a mindfulness-based treatment program for women with PVD was associated with enhancements in sexual well-being [25]. Theoretically, the mindful process of accepting the presence of an intervening negative stimulus (e.g., pain, catastrophizing thoughts) allows for a richer experience of the present moment, allowing women to be attentive to the cultivation of intimacy with their partner and other pleasurable aspects of the sexual experience [58]. Such positive experiences may also reinforce women's motivation for engaging in sexual activity to pursue positive outcomes in the relationship (i.e., approach goals), resulting in their improved sexual functioning and greater overall sexual satisfaction for both partners. In community samples and recently in women with PVD, greater approach goals for sexual activity have been associated with greater sexual satisfaction [59,60]. In women with PVD, holding stronger approach goals may encourage women to initiate or be more receptive to less- or non-painful sexual activities, which are presumably more sexually satisfying than painful intercourse.

The results of the present study have implications for considering treatment approaches for women and couples struggling with PVD who may have devalued their sexual relationship because of the pain, or who want to continue to include intercourse in their sexual activities. Acceptance-based treatments, which have been described as a "third generation cognitive-behavioural approach," have been shown to reduce depression, disability, and pain-related anxiety in several studies across different types of chronic pain conditions [61,62]. Furthermore, cognitive-behavioral therapy for PVD has been effective in reducing women's pain and there is preliminary evidence that it may improve couples' sexual functioning and psychological adjustment [26,27]. Given that some pain persists for many women, even those who respond well to psychological treatment [26], acceptance-based strategies may be a useful advent to improve women's sexual and psychological well-being, and partner's sexual satisfaction. Psychological treatments could incorporate increasing acceptance-oriented cognitions of pain, identifying personal values (e.g., investing in their sexual relationship with their partner), and encouraging continued engagement in valued life activities (e.g., nonpainful sexual activities). The relationships observed in the present study between the woman's pain acceptance and her partner's sexual satisfaction, as well as between partner's pain acceptance and his own symptoms of depression, provide empirical support for the inclusion of partners in acceptance-based treatments for PVD.

The primary limitation of the present study is the use of a cross-sectional design. Future longitudinal research should examine the role of vulvovaginal pain acceptance in PVD, and whether acceptance changes over time and with psychological intervention. As the present analyses were correlational, no comment can be made on the causal direction of the relationships. It is possible that lower pain during intercourse, lower depression or anxiety, and greater sexual functioning and satisfaction may lead to greater acceptance of chronic pain. However, previous longitudinal studies with other chronic pain samples have found pain acceptance to be a significant predictor of positive affect and social, physical, and emotional functioning over time beyond the effect of pain intensity, lending some support for the hypothesis that pain acceptance enhances psychological functioning [18,63]. It is also possible that for some women, higher levels of pain acceptance may be related to prior treatments or experiences with nonvulvovaginal pain.

The specific measure of acceptance employed in the present study (the CPAQ-R) is a widely used and validated measure in chronic pain samples [64,65]. However, this measure has limitations in that it focuses to a greater extent on the cognitive and behavioral aspects of acceptance. Perhaps the experience of women with PVD and their partners could be more comprehensively assessed by also including measures that are better able to capture the sensory and affective components of the experience (e.g., measures of mindfulness). Additionally, it is possible that the phrasing of the questions on the CPAQ-R referring to nonspecific life activities may not have adequately captured the specific interference with sexual activities that are experienced by couples with PVD. Therefore, pain acceptance in the context of the sexual activities that are typically disrupted by PVD may actually have been underreported. Further research is needed to understand the experience and perspectives of men who have developed accepting attitudes toward their female partner's pain and how this is interpreted by their female partner. Finally, the present sample of participants included only heterosexual couples, the majority of whom were highly educated and of a high socioeconomic status. As such, the results may not be generalizable to all couples where the woman has PVD. There were also significant differences in pain duration, culture, and depression between the two studies that provided data for the present analysis. Although the pattern of results remained the same when study type was controlled for, there may have been additional differences between the two groups that were not considered in the present study.

### Conclusions

The present study examined the role of pain acceptance in PVD, which is unique from other chronic pain conditions given the inherently interpersonal context (i.e., sexual activity) in which the pain is typically experienced, and the different outcomes (e.g., sexual functioning and satisfaction) used to measure the impact of pain on functioning. The field of chronic pain research has increasingly acknowledged the social context of pain and how partner variables may influence functioning in the context of various chronic pain conditions [29]. Previous research in other chronic pain populations has supported the important role of acceptance in patient pain and disability [18,22] but has not taken the partner's perspective and outcomes into account. The results of this study highlight

the important role of pain acceptance on pain, psychological, and sexual outcomes in couples with PVD, which has implications for the use of acceptance-based treatment approaches in this population. For couples with PVD, an acceptance-based approach to living with recurrent pain, which promotes continued engagement in valued activities (i.e., sexual but not necessarily painful behaviors), may facilitate a richer experience of the intimacy and pleasurable aspects of their sexual relationships, resulting in lower pain, anxiety, and sexual dysfunction for the woman, as well as higher sexual satisfaction and less depressive symptoms for both members of the couple.

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