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Self-Efficacy Mediates the Attachment-Pain Association in Couples with Provoked Vestibulodynia: A Prospective Study

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ABSTRACT

Introduction: Attachment influences the way individuals anticipate, react, and seek support when faced with chronic pain. Although cross-sectional research indicates that attachment insecurity and pain self-efficacy are associated with pain intensity in chronic pain populations, little is known about their long-term effects on pain, and about the directionality of associations between these constructs. Furthermore, whereas attachment is a relational concept, few studies on genito-pelvic pain have espoused a couples' perspective.

Aim: Using a prospective dyadic design, the present study aimed to examine the directionality of the associations among attachment dimensions, pain self-efficacy, and pain intensity in couples coping with provoked vestibulodynia (PVD). A second aim was to test whether pain self-efficacy mediated the attachment-pain association.

Methods: 213 couples coping with PVD completed self-report questionnaires at baseline (T1) and at a 2-year follow-up (T2).

Main Outcome Measure: (1) Experiences in Close Relationships — Revised; (2) Painful Intercourse Self-Efficacy Scale; and (3) 10-point Numerical Rating Scale for pain intensity.

Results: Autoregressive cross-lagged models revealed that women's greater attachment anxiety and avoidance at T1 predicted their greater pain intensity at T2. Women's greater attachment anxiety at T1 predicted their poorer pain self-efficacy at T2, and poorer pain self-efficacy in women at T1 predicted their higher pain intensity at T2. A mediation model showed that women's lower pain self-efficacy at T2 fully mediated the association between women's higher attachment anxiety at T1 and their higher pain intensity at T2. Partners' attachment dimensions did not predict their own or women's pain self-efficacy nor pain intensity.

Clinical Implications: Results suggest that greater attachment anxiety may contribute to women with PVD's lower confidence that they can manage their pain, which leads to long-term persistent pain. This study highlights the importance of assessing attachment and pain self-efficacy in women with genito-pelvic pain and to consider interventions targeting these variables, as they have far-reaching consequences.

Strength & Limitations: The use of longitudinal and dyadic data inform interpersonal processes and the long-term implications of attachment and pain self-efficacy in PVD. The use of self-report measures may introduce a social desirability and recall bias.

Conclusion: This prospective dyadic study adds to a body of literature on PVD and chronic pain by empirically supporting theoretical models on attachment, pain self-efficacy, and persistent pain, and supports the role of psychosocial factors in the adjustment to PVD. **Charbonneau-Lefebvre V, Vaillancourt-Morel M-P, Brassard A, et al. Self-Efficacy Mediates the Attachment-Pain Association in Couples with Provoked Vestibulodynia: A Prospective Study. J Sex Med 2019;XX:XXX–XXX.**

Key Words: Vulvodynia; Provoked Vestibulodynia; Pain Self-Efficacy; Chronic Pain; Attachment

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INTRODUCTION

Vulvodynia is an idiopathic chronic pain condition affecting women of all ages.[1] Provoked vestibulodynia (PVD) is thought to be the most frequent cause of vulvodynia and is known to affect approximately 7−12% of women in the general population.[1,2] PVD is characterized by pressure-provoked pain and by sensations of cutting or burning located at the entrance of the vulvar vestibule.[3] Given that the valued activity with which this pain interferes is sexuality, women and their partners both suffer negative consequences, including lower sexual function and satisfaction, and higher psychological distress.[4,5] Proximal interpersonal factors, such as negative and solicitous partner responses and partner catastrophizing, are associated with worse PVD symptomatology.[6,7] One distal interpersonal factor that has received less attention is attachment, known to play a role in the adjustment of individuals with chronic pain (ICPs).

Attachment develops throughout childhood, based on the stability and security of the infant-caregiver relationship, and influences needs, behaviors, and cognitions, particularly within intimate relationships in adulthood.[8] It is characterized by 2 dimensions: attachment-related anxiety (negative representation of the self, fear of abandonment, and excessive proximity needs) and attachment-related avoidance (negative representation of others, discomfort with emotional intimacy, and excessive self-reliance).[9,10] Attachment theory provides an interesting framework for understanding adjustment to chronic pain, and consequently to PVD, whereby representations of self as worthy of care and loveable despite pain and representations of others as sources of support may impact pain-coping strategies and outcomes.[11,12] Furthermore, attachment generally influences couples' relationship and sexual adjustment, where more secure couples tend to be more stable, more satisfied in their relationship, and better fitted to offer support to their partner when they are experiencing distress.[13,14]

Cross-sectional studies to date have yielded inconsistent findings in the associations between attachment and pain in both ICPs and their partners, with some showing links between chronic pain intensity and attachment-related anxiety and avoidance in ICPs,[15] and others showing no associations.[16−18] As for partners' attachment dimensions, 1 study found that spouses' attachment anxiety was associated with the ICPs' pain intensity,[19] whereas another study reported no association between caregivers' attachment and pain intensity in ICPs.[18] In the context of PVD, only 2 cross-sectional studies have examined the associations between attachment and pain intensity. Granot et al[20] showed that women with PVD had higher levels of attachment avoidance than controls, which was associated with greater pain intensity. Conversely, Leclerc et al[21] reported that attachment-related anxiety and avoidance in women with PVD was not associated with pain intensity.

The Attachment Diathesis Model of Chronic Pain[11] suggests that attachment is associated with a number of psychological variables (eg, appraisal, coping, and support seeking) that may influence chronic pain outcomes (eg, pain intensity, disability, and psychological wellbeing), and that the presence of such mediators would explain the discrepancies found in the literature examining the attachment−pain association. One of the potential psychological variables that could mediate the relationship between attachment and pain intensity is pain self-efficacy, which is the confidence that one is capable of coping in a way that can reduce pain.[22] Pain self-efficacy is considered a target process variable in nonmedical treatments of chronic pain due to its positive and long-term association with pain intensity, and it is also one of the strongest psychological predictors of disability in ICPs.[23−26] Pain self-efficacy is also a predictor of pain intensity and post-treatment pain intensity following cognitive-behavioral therapy in women with PVD.[27−29] Although few studies espoused a dyadic perspective in studying pain self-efficacy, 1 study involving 191 individuals with congestive heart failure and their romantic partners found that partners' confidence in their significant other's ability to manage their heart disease predicted a 4-year survival rate,[30] suggesting that partners' self-efficacy might also influence adjustment to chronic conditions beyond the effect of one's own self-efficacy. To our knowledge, only 1 study examined pain self-efficacy in couples coping with PVD using a dyadic perspective. Findings indicated that partners' self-efficacy was significantly correlated with women's pain intensity.[31] As suggested by the Interpersonal Emotion Regulation Model of Women's Sexual Dysfunction,[32] interpersonal processes, including attachment, play a significant role in the adjustment to PVD, as both partners are affected by and contribute to the pain condition.

In fact, attachment dimensions are known to influence the way one copes in the face of threat, such as in the context of chronic pain and, therefore, PVD.[33,34] It is thought that individuals with greater attachment anxiety have a negative representation of oneself and perceive themselves as being unworthy of love and unable to cope effectively with life stressors.[8] In contrast, individuals with greater attachment avoidance have a negative representation of others, seek less social support, and tend to be self-reliant in the face of threat. These attachment dimensions may influence how ICPs perceive their abilities to cope effectively with chronic pain, where anxiously attached individuals may have lower pain self-efficacy than avoidant or securely attached individuals.[17]

To our knowledge, only 1 cross-sectional study examined the association between attachment and pain self-efficacy in ICPs, and revealed that both attachment anxiety and avoidance were associated with lower pain self-efficacy.[17] This study also showed that attachment avoidance moderated the relationship between pain self-efficacy and pain intensity. Furthermore, in their critical review of studies linking adult attachment with chronic pain, Meredith et al[11] pointed out that the long-term implications of insecure attachment (ie, anxiety and/or avoidance) on chronic

Table 1. Sociodemographic characteristics of the sample (N = 213 couples)

	Women		Partner	
Characteristics	*M* or %	*SD* or *n*	*M* or %	*SD* or *n*
Age (years)	31.92	11.07	34.80	11.83
Cultural background				
French Canadian	87.79	187	73.24	156
English Canadian	3.76	8	6.57	14
Other	7.99	17	5.64	12
Education (years)	16.20	3.08	15.50	3.45
Couple annual income (CAD$)				
$0–19,999	7.98	17	—	—
$20,000–39,999	13.62	29	—	—
$40,000–59,999	21.12	45	—	—
>$60,000	51.64	110	—	—
Relationship duration (years)	7.47	7.91	—	—
Current relationship status				
Married	24.41	52	—	—
Cohabitating, not married	60.09	128	—	—
Not living together	14.08	30	—	—
Pain duration (years)	5.79	6.26	—	—

pain outcomes is yet unknown. Conceptual models posit that attachment and pain self-efficacy are predictors of pain intensity, but this has been strongly criticized as no longitudinal studies have examined the direction of these associations.[11,22] In fact, some authors suggest that chronic pain could increase attachment insecurity due to patients' fear of being rejected, whereas a cross-sectional study showed that attachment anxiety partially mediated the relationship between pain affect and emotional distress.[35] Moreover, although some authors highlight the importance of including romantic partners in studies linking attachment to chronic pain,[12] few studies have done so, with none involving a prospective design.[19,21,36]

The current study goes beyond previous investigations concerning the links among attachment, pain self-efficacy, and pain intensity by (a) examining the directionality of associations among attachment, pain self-efficacy, and pain intensity using a 2-year prospective design, (b) considering both partners' attachment and pain self-efficacy, and (c) testing the mediational role of pain self-efficacy in the association between attachment and pain. We hypothesized that both partners' lower pain self-efficacy would mediate the associations between their greater attachment insecurity (ie, greater attachment anxiety and/or avoidance) and women's greater pain intensity. The same directionality of the associations was expected for partner effects.

METHODS

Participants

Participants were 213 women and their male partners recruited during medical visits to gynecologists or other health professionals, and through newspaper and online advertisements. The present study was part of a larger longitudinal investigation from which results pertaining to different variables were published previously.[27,37] Interested women were screened in person or over the telephone for eligibility. If recruited through a medical clinic, women received a formal PVD diagnosis using the cotton-swab test, and if recruited over the telephone, women were screened for PVD-like symptomatology, which is a robust method in diagnosing PVD.[38] Inclusion criteria were: (1) subjectively distressing vulvovaginal pain occurring in at least 75% of intercourse attempts and lasting for at least 6 months, (2) pain solely triggered during activities exerting pressure to the vulvar vestibule (eg, intercourse and tampon insertion), (3) if recruited through a gynecologist or a general practitioner, moderate to severe pain located at the entrance of the vagina, in at least one of the determined vestibular locations during the cotton swab test, and (4) married or cohabitating with a romantic partner for at least 6 months. Exclusion criteria were: (1) lack of clear evidence that vulvar pain is linked to intercourse or pressure applied to the vulvar vestibule, (2) presence of 1 of the following: major medical or psychiatric illness, active infection, deep dyspareunia, diagnosed vaginismus, dermatologic lesion, or pregnancy, and (3) participants under 18 years of age. Finally, because this study focused on romantic relationship variables, only women in the same relationship at baseline and follow-up were included.

Procedure

Participants gave their written informed consent and received the questionnaires either during their visit to their physician or by mail if recruited through advertisement. Couples were asked to complete the questionnaires individually and to return them by mail. 2 years later, couples were invited to participate in a follow-up (T2) following the same instructions as the prior

Table 2. Means, SD, and correlations for attachment dimensions, pain self-efficacy, and pain intensity for women and their partners at T1 and T2

	M (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13
1. W anxiety T1	2.45 (1.00)	—												
2. W anxiety T2	2.46 (0.98)	.62**	—											
3. W avoidance T1	2.43 (0.88)	.44**	.30**	—										
4. W avoidance T2	2.49 (0.91)	.31**	.49**	.69**	—									
5. P anxiety T1	2.28 (0.84)	.28**	.12	.37**	.31**	—								
6. P anxiety T2	2.41 (0.92)	.21*	.26**	.38**	.37**	.70**	—							
7. P avoidance T1	2.33 (0.70)	.21**	.11	.33**	.23**	.48**	.42**	—						
8. P avoidance T2	2.53 (0.82)	.14	.34**	.22**	.30**	.30**	.54**	.53**	—					
9. W self-efficacy T1	61.05 (15.68)	−.18*	−.20**	−.20*	−.14*	−.14	−.08	−.08	−.05	—				
10. W self-efficacy T2	70.69 (18.78)	−.30**	−.32**	−.23**	−.36**	−.16	−.17*	.02	−.04	.43**	—			
11. P self-efficacy T1	57.21 (16.02)	−.21**	−.12	−.19*	−.16*	−.18*	−.09	−.14	−.12	.37**	.34**	—		
12. P self-efficacy T2	66.94 (19.41)	−.16*	−.24**	−.13	−.26**	−.14	−.21**	−.16	−.20**	.34**	.65**	.47**	—	
13. W pain intensity T1	7.11 (1.73)	.01	.10	−.13	−.04	.02	−.03	.02	.03	−.40**	−.20**	−.21**	−.13	—
14. W pain intensity T2	4.29 (2.61)	.28**	.18**	.16*	.23**	.15	.07	−.03	−.03	−.26**	−.66**	−.19*	−.46**	.19**

*$P < .05$. **$P < .01$.
P = partners; W = women.

participation. As compensation, women who completed all questionnaires at baseline (T1) were offered a telephone consultation with a clinical sexologist focusing on general information about PVD and its treatment, and were given a list of PVD specialists in their geographic area. At T2, women and their partners were each offered a $25 financial compensation. This study was approved by the University of Montreal's Institutional Review Board.

MEASURES

Attachment

Attachment anxiety and avoidance for both partners were measured using the Experiences in Close Relationships—Revised.[39] The attachment anxiety subscale includes 18 items such as "I worry about being abandoned" and the attachment avoidance subscale comprises 18 items such as "I prefer not to show a partner how I feel deep down." Participants rate their general feeling regarding their current relationship on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), with higher scores indicating greater attachment anxiety or avoidance. This instrument has shown good psychometric properties, with alpha coefficients over .90 and test-retest correlations ranging between .50 and .75.[40] In the current sample, Cronbach's alphas were .89 for attachment anxiety and .86 for attachment avoidance in women at T1 and were, respectively, .89 and .88 at T2. For partners, Cronbach's alphas were .86 for attachment anxiety and .82 for attachment avoidance at T1 and .88 and .87, respectively, at T2.

Pain intensity

Women were asked to estimate their average vulvovaginal pain over the last 6 months using a horizontal Numerical Rating Scale ranging from 0 (no pain) to 10 (worst pain ever).[41] This type of scale correlates significantly with other pain intensity measures and its validity is well-documented.[42] Numerical Rating Scales are frequently used in assessing vulvovaginal pain[43,44] and other general chronic pain conditions.[17,41]

Pain Self-Efficacy

The Painful Intercourse Self-Efficacy Scale was used to assess women and partners' sense of self-efficacy in coping with pain during sexual intercourse. This scale is adapted from the Arthritis Self-Efficacy Scale,[45] which is frequently used in the field of chronic pain. Participants indicate, on a 10-point scale ranging from very uncertain (10) to very certain (100), their perceived ability to engage in sexual activity or to achieve specific outcomes in pain management. In the present study, Cronbach's alphas for women's pain self-efficacy were .91 at T1 and .95 at T2, and partner's pain self-efficacy Cronbach's alphas were .92 at T1 and .96 at T2.

Statistical Analyses

Descriptive and correlational analyses were computed using the SPSS version 24.0 (SPSS, Chicago, IL, USA) to describe sample characteristics and associations between study variables. Paired sample *t*-tests were used to examine mean differences between women and partners' study variables at T1 and T2, and between T1 and T2.

Autoregressive cross-lagged (ARCL) models were computed using *Mplus* version 8.0[46] to examine the direction of associations between study variables. These models test for the autoregressive effects (ie, the effect of 1 variable on itself at a later time point) and the cross-lagged effects (ie, the effect of 1 variable on another at a later time point). These models were run using path analysis following the Actor-Partner Interdependence Model,[47] which allows for the examination of the effect of one's

Table 3. Autoregressive cross-lagged model between women and partners' attachment dimensions and women's pain intensity

Effect	Coefficient (SE)	Standardized
Autoregressive effects		
W Anxiety T1 → W Anxiety T2	**0.59 (0.06)*** **	**.61**
W Avoidance T1 → W Avoidance T2	**0.71 (0.06)*** **	**.69**
P Anxiety T1 → P Anxiety T2	**0.74 (0.07)*** **	**.69**
P Avoidance T1 → P Avoidance T2	**0.58 (0.08)*** **	**.50**
Pain intensity T1 → Pain intensity T2	**0.31 (0.11)** **	**.20**
Cross-lagged effects		
Pain intensity T1 → W Anxiety T2	0.04 (0.04)	.07
Pain intensity T1 → W Avoidance T2	0.02 (0.03)	.04
Pain intensity T1 → P Anxiety T2	−0.01 (0.03)	−.02
Pain intensity T1 → P Avoidance T2	0.01 (0.03)	.03
W Anxiety T1 → Pain intensity T2	**0.49 (0.21)***	**.19**
W Avoidance T1 → Pain intensity T2	**0.50 (0.24)***	**.17**
P Anxiety T1 → Pain intensity T2	0.35 (0.27)	.11
P Avoidance T1 → Pain intensity T2	−0.62 (0.39)	−.17

Significant effects are bold-faced.
*$P < .05$. **$P < .01$. ***$P < .001$.
P = partners; W = women.

independent variable on one's own outcome variables (actor effect), but also one's independent variable on the partner's outcome variables (partner effect) while controlling for the interdependence of the variables between members of the couple.

Then, based on these results, a mediation model was tested using *Mplus* to examine if the associations between women and partners' attachment and pain intensity were mediated by women and partners' pain self-efficacy. The effects on T2 mediators and outcomes were examined while controlling for the same variable at T1. To determine the significance of indirect effects through the mediator, 95% CIs around the estimates were computed using 5,000 bootstrapping samples.

Based on most recommended guidelines, overall model fits were tested using several fit indices: the chi-square value, the comparative fit index (CFI), the root—mean-square error of approximation (RMSEA), and the standardized root-mean-square residual (SRMR). Indicators of good fit are a nonsignificant chi-square value, a CFI value of .90 or higher, an RMSEA and an SRMR values below .08.[48–50] In all models, covariances between variables were added based on inspection of modification indexes until model fit indices were satisfactory. All analyses in *Mplus* were computed using the maximum likelihood parameter estimates with SEs and chi-square test statistics that are robust to non-normality (MLR) and missing data were treated using full information maximum likelihood.[46]

RESULTS

Sample Characteristics

Of the 486 women who met eligibility criteria, 353 completed the questionnaires at baseline (T1). At follow-up (T2), 302 of the baseline women agreed to participate, and 274 women returned their questionnaires, for a retention rate of 77.6%. Of those, 213 were still in a relationship with the same partner as at T1. Main reasons for not participating in follow-up were the impossibility to contact participants ($n = 24$) and a lack of interest in participating ($n = 15$). Therefore, the final sample included 213 women and their partners. Independent samples *t*-tests revealed no significant differences between participants included in the present study and those that were excluded (ie, withdrew at follow-up or were not with the same partner) on women and partners' age, education, couple's annual income, duration of the relationship, pain duration, pain intensity, and pain self-efficacy. Of the 213 women, 52.6% ($n = 112$) received a PVD diagnosis by a medical practitioner and 47.4% ($n = 101$) met PVD criteria based on the telephone screening. Women who had been diagnosed by a medical practitioner were significantly younger, 29.77 years vs 34.28, $t(210) = 2.96$, $P = .004$, as were their partners, 32.74 years vs 36.98, $t(181) = 2.44$, $P = .016$. There were no other significant differences on T1 sociodemographic variables and on women and their partners' study variables at T1 and T2. Sociodemographic characteristics of the sample are presented in Table 1.

Description of Study Variables

Means and SDs for women and partners' attachment dimensions, pain self-efficacy, and women's pain intensity at T1 and T2 are presented in Table 2. Paired sample *t*-tests between T1 and T2 indicated that pain intensity significantly decreased between T1 and T2, $t(200) = 13.92$, $P < .001$. No significant differences in attachment dimensions were found between T1 and T2 for women and their partners, with the exception of partners' attachment avoidance, which significantly increased between T1 and T2, $t(146) = -2.40$, $P = .018$. A significant

Table 4. Autoregressive cross-lagged model between women and partners' attachment dimensions and pain self-efficacy

Effect	Coefficient (SE)	Standardized
Autoregressive effects		
W Anxiety T1 → W Anxiety T2	**0.59 (0.06)*** **	**.61**
W Avoidance T1 → W Avoidance T2	**0.71 (0.06)*** **	**.68**
P Anxiety T1 → P Anxiety T2	**0.74 (0.06)*** **	**.69**
P Avoidance T1 → P Avoidance T2	**0.58 (0.08)*** **	**.51**
W Self-efficacy T1 → W Self-efficacy T2	**0.37 (0.07)*** **	**.32**
P Self-efficacy T1 → P Self-efficacy T2	**0.53 (0.08)*** **	**.43**
Cross-lagged effects		
W Self-efficacy T1 → W Anxiety T2	−0.01 (0.00)	−.11
W Self-efficacy T1 → W Avoidance T2	0.002 (0.00)	.04
W Self-efficacy T1 → P Anxiety T2	0.000 (0.00)	−.01
W Self-efficacy T1 → P Avoidance T2	0.002 (0.00)	.04
P Self-efficacy T1 → W Anxiety T2	0.003 (0.00)	.04
P Self-efficacy T1 → W Avoidance T2	−0.002 (0.00)	−.04
P Self-efficacy T1 → P Anxiety T2	0.004 (0.00)	.07
P Self-efficacy T1 → P Avoidance T2	−0.002 (0.00)	−.04
W Anxiety T1 → W Self-efficacy T2	**−4.50 (1.22) *** **	**−.24**
W Avoidance T1 → W Self-efficacy T2	−2.17 (1.50)	−.10
P Anxiety T1 → W Self-efficacy T2	−1.29 (1.65)	−.06
P Avoidance T1 → W Self-efficacy T2	4.53 (2.55)	.17
W Anxiety T1 → P Self-efficacy T2	−0.03 (1.37)	−.01
W Avoidance T1 → P Self-efficacy T2	−0.83 (1.72)	−.04
P Anxiety T1 → P Self-efficacy T2	−0.55 (1.94)	−.02
P Avoidance T1 → P Self-efficacy T2	−1.75 (2.76)	−.06

The effect of women's age on self-efficacy was controlled for in this model. Significant effects are bold-faced.
***$P < .001$.
P = partners; W = women.

increase in pain self-efficacy was found between T1 and T2 for both women, $t(198) = -7.79$, $P < .001$, and their partners, $t(175) = -6.67$, $P < .001$. Paired sample t-tests between women and their partners showed that women reported greater pain self-efficacy than their partners at T1 and T2, T1: $t(183) = 2.43$, $P = .016$; T2: $t(172) = 3.34$, $P = .001$. The attachment dimensions at T1 and T2 did not significantly differ between women and their partners.

Zero-Order Correlations

Correlational analyses were conducted between potential confounding variables and study outcomes. Women and partners' age, length of relationship, sexual intercourse frequency, and couples' income were not significantly correlated with women's pain intensity at T2. Women who had received medical treatment between T1 and T2, including medication, did not significantly differ from those who had not on pain self-efficacy and pain intensity at T2. Women's pain duration was significantly but poorly correlated with pain intensity at T2 ($r = .15$, $P = .033$) and with women ($r = -.15$, $P = .032$) and partners' ($r = -.18$, $P = .016$) pain self-efficacy at T2. Women's pain self-efficacy at T2 was significantly correlated with their own age ($r = -.22$, $P = .002$), their partner's age ($r = -.27$, $P = .001$), and with relationship duration ($r = -.18$, $P = .011$), whereas partners' pain self-efficacy at T2 was significantly correlated with their own age ($r = -.17$, $P = .031$). Women and partners' age were considered as potential control variables due to their significant association with pain self-efficacy at a correlation >0.20. However, considering the strong correlation between women and partners' age ($r = .92$, $P < .001$), only women's age was controlled for in models, including self-efficacy as an outcome variable. Correlations between study variables are reported in Table 2.

Autoregressive Cross-Lagged Model Between Attachment Dimensions and Pain Intensity

An ARCL model was computed to examine whether attachment anxiety and avoidance in both partners at T1 predicted women's pain intensity at T2, or whether pain intensity at T1 predicted attachment dimensions of both partners at T2. Results reported in Table 3 indicated significant autoregressive paths between T1 and T2 for all variables, indicating that a variable at T1 significantly predicted the level of the same variable at T2. Cross-lagged effects revealed that greater attachment anxiety and avoidance in women at T1 significantly predicted their greater pain intensity at T2. This model fit the data well, with satisfactory fit indices: chi-squared (12) = 13.93, $P = .305$; RMSEA = .03, 90% CI .00−.08; CFI = .99; and SRMR = .02.

Table 5. Autoregressive cross-lagged model between women and partners' pain self-efficacy and women's pain intensity

Effect	Coefficient (SE)	Standardized
Autoregressive effects		
W Self-efficacy T1 → W Self-efficacy T2	**0.48 (0.09)*** **	**.41**
P Self-efficacy T1 → P Self-efficacy T2	**0.58 (0.08)*** **	**.48**
Pain intensity T1 → Pain intensity T2	0.15 (0.12)	.10
Cross-lagged effects		
W Self-efficacy T1 → Pain intensity T2	**−0.03 (0.01)****	**−.18**
P Self-efficacy T1 → Pain intensity T2	−0.02 (0.01)	−.11
Pain intensity T1 → W Self-efficacy T2	−0.37 (0.84)	−.04
Pain intensity T1 → P Self-efficacy T2	0.14 (0.75)	.01

The effect of women's age on self-efficacy was controlled for in this model. Significant effects are bold-faced.
**$P < .01$. ***$P < .001$.
P = partners; W = women.

Autoregressive Cross-Lagged Model Between Attachment Dimensions and Pain Self-Efficacy

An ARCL model was computed to examine the directionality of associations between attachment dimensions and pain self-efficacy for both partners. Results reported in Table 4 indicated significant autoregressive paths between T1 and T2 for all variables and indicated a significant cross-lagged effect of women's attachment anxiety at T1 on women's pain self-efficacy at T2, indicating that women's greater attachment anxiety significantly predicted their lower pain self-efficacy. The fit indices for this model are satisfactory: chi-squared (13) = 16.11, $P = .243$; RMSEA = .03, 90% CI .00−.08; CFI = .99; and SRMR = .02.

Autoregressive Cross-Lagged Model Between Pain Self-Efficacy and Pain Intensity

A third ARCL model was computed to examine whether pain self-efficacy predicted pain intensity or vice-versa. Results presented in Table 5 indicated significant autoregressive paths between T1 and T2 for women and their partners' pain self-efficacy, but not for pain intensity. Cross-lagged effects showed that women's greater pain self-efficacy at T1 significantly predicted their lower pain intensity at T2. This model fit the data well, with satisfactory fit indices: chi-squared (4) = 5.02, $P = .285$; RMSEA = .04, 90% CI .00−.11; CFI = .99; and SRMR = .04.

Mediation of Attachment Dimensions and Pain Intensity by Pain Self-Efficacy

Results of the previous ARCL models provided sufficient support to pursue analysis with pain self-efficacy as a mediator of the associations between attachment dimensions and pain intensity. Results of the mediation model are presented in Figure 1 and the fit indices of this model are satisfactory: chi-squared (5) = 4.86, $P = .434$; RMSEA = .00, 90% CI .00−.09; CFI = 1.00; and SRMR = .02. Bootstrapping analyses indicated that the indirect effect of

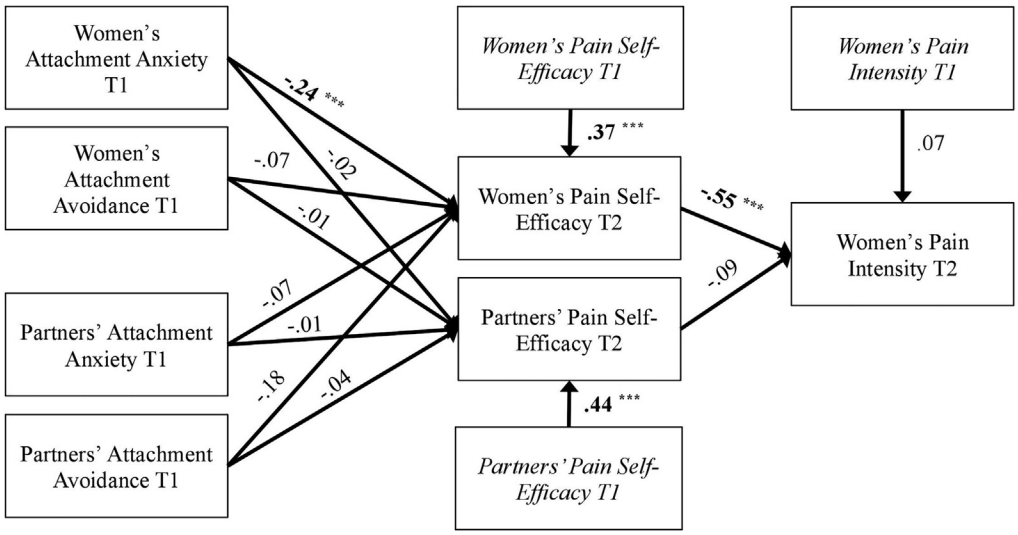

Figure 1. Mediation of women and partners' attachment and pain intensity by pain self-efficacy. Italic text represents same variables at baseline (T1) that were controlled for in the model. Direct links between attachment dimensions and pain intensity at 2-year follow-up (T2) were nonsignificant and are not represented in the figure. The effect of women's age on self-efficacy was controlled for in this model. Regression coefficients are standardized scores. Significant effects are bold-faced. ***$P < .001$.

women's attachment anxiety at T1 on their pain intensity at T2 through women's pain self-efficacy at T2 was significant, $b = .35$, 95% bootstrap CI .09−.60. Therefore, women's greater attachment anxiety at T1 predicted their lower pain self-efficacy at T2, which, in turn, predicted their greater pain intensity at T2. The overall model explained 29.9% of variance in women's pain self-efficacy at T2, 22.0% of partners' pain-self-efficacy at T2, and 44.4% of women's pain intensity at T2.

DISCUSSION

This work contributes to a growing body of research examining the effects of attachment and pain-self efficacy on PVD and extends it by incorporating dyadic and longitudinal perspectives. In line with what was found in previous community-based studies of women with PVD,[51] our results showed a decrease in pain intensity over 2 years. An increase in pain self-efficacy was also found in both women and their partners, and may be partially explained by the fact that some women sought treatment between the 2 time points. Results indicated that both attachment dimensions prospectively predicted pain intensity and that attachment anxiety predicted pain self-efficacy in women with PVD. Attachment anxiety also predicted pain intensity through its effect on pain self-efficacy.

A first model examined the directionality of associations between attachment and women's pain. Findings showed that women's attachment anxiety and avoidance, but not partners' attachment dimensions, predicted pain intensity at the 2-year follow-up. This result supports theoretical frameworks suggesting that attachment dimensions in ICPs act as predictors of pain intensity.[11] Attachment avoidance is associated with compulsive self-reliance, poorer social coping, thought suppression, and deactivation strategies, such as denial of emotions and attachment needs.[15,52] These coping strategies serve to conceal a vulnerable side of the self that may be hurt by an unreliable and untrustworthy partner (negative model of others). In the context of PVD, avoidant women may under-report pain and avoid potentially painful sexual experiences. They may over-rely on themselves to solve their pain problem, not seeking help from their partner, and comply with undesired sexual intercourse to fulfill "relational obligations," which could further exacerbate the pain experience.[15,53] Conversely, women reporting greater attachment anxiety are found to experience hyperactivated responses to stress, greater catastrophizing, hypervigilance, and fear of pain, all of which could lead to greater pain intensity in the context of PVD.[16,54] Anxiously attached women have a negative view of themselves and may experience greater fears that their partner will leave because of their deficient sexuality, which could lead to greater emotional distress, hypervigilance to signs of rejection, pain catastrophizing, and to sexual compliance, all of which may contribute to increased pain intensity.[15,53,55]

A second model focused on the relationship between attachment dimensions and pain self-efficacy. Only women's attachment anxiety was associated with their own lower pain self-efficacy, suggesting that women who are high in attachment anxiety have lower confidence that they can act in ways to reduce their vulvovaginal pain. This supports the Attachment Diathesis Model of Chronic Pain,[11] which suggests that anxiously attached ICPs live with the appraisal that they may not be equipped to manage the threat that is chronic pain. The current result is in line with those of a cross-sectional study by Meredith et al[17] showing that lower pain self-efficacy was predicted by greater attachment anxiety in ICPs, but also by greater attachment avoidance, which was not the case in the present study. As avoidantly attached individuals tend to be more self-reliant,[9,10] they may be just as inclined to feel confident that they can take charge of their chronic pain problem as securely attached individuals. Furthermore, it may be that in the context of PVD, the intra-individual nature of pain self-efficacy is more related to women's negative representations of themselves (ie, attachment anxiety) as being sexually defective or unable to cope with pain, as compared to attachment avoidance, which carry the belief that one cannot rely on another for support. Also, anxiously attached women tend to rely on sexuality to seek proximity and to foster intimacy with their romantic partners.[56] Suffering from PVD may limit these women's ability to create such a connection with their partner and may lead them to believe that they are not capable of overcoming their chronic sexual difficulty in a way that could lead to a satisfying sex life, which could contribute to lower pain self-efficacy.

A third model examined the directionality of associations between pain self-efficacy and pain intensity. It was found that women's pain self-efficacy predicted their pain intensity over the course of 2 years. ICPs with a greater sense of self-efficacy are more likely to mobilize resources and to persist in their effort to alleviate pain, which makes pain-self efficacy one of the most robust predictors of pain intensity.[22,57] A poorer sense of agency over pain may increase pain-related distress, leading to aversive physiological arousal, and, therefore, increasing pain sensations.[58]

Finally, we examined whether women's pain self-efficacy acted as a mediator of the association between women's attachment and pain. Results indicated that women's pain self-efficacy fully mediated this relationship, suggesting that women's attachment anxiety affects pain intensity through their lower sexual pain self-efficacy. This is, to our knowledge, the first study to examine self-efficacy as a mediator of the attachment and pain association. There has been much criticism about the lack of longitudinal data in this area, and although a directionality between current variables had been proposed,[11,17,28] no study had verified these assumptions. Findings of the present study support the expected directionality that had been previously hypothesized.

Although other partner and relationship variables are found to be associated with pain in PVD, partners' attachment did not predict either women's pain self-efficacy or pain intensity over time. Another study showed that male partners' attachment was not associated with experimentally induced pain intensity in their female partners,[59] however, in patients with lung cancer, romantic partners' avoidance was found to be associated with greater patient

pain intensity.[19] However, this was the first study to examine long-term implications of partners' attachment on couples' adjustment to PVD, and although partners' attachment failed to predict women's pain self-efficacy and pain intensity over time, significant correlations were found between partner variables and women's outcomes in a cross-sectional manner. As posited by the Interpersonal Emotion Regulation Model of Women's Sexual Dysfunction,[32] these cross-sectional association results suggest that interpersonal processes play a role in couples' adjustment of chronic genito-pelvic pain, but more research is needed to examine this effect across time. As for pain self-efficacy, a study involving PVD couples showed that partners' pain self-efficacy was significantly associated to women's pain intensity,[7] which was also the case in the present study. Partners' confidence in the fact that the pain is manageable might be reassuring and help women to better regulate pain-related distress, which could reduce pain intensity.[30,58] Although partners' pain self-efficacy was correlated with women's pain intensity in the present study, it failed to predict pain intensity while controlling for women's pain self-efficacy. The effect of women's pain self-efficacy might overshadow that of partners' due to the strong correlations between both partners' self-efficacy, hence a highly shared variance. The strong intra-individual nature of pain self-efficacy and pain intensity may have led to greater associations among women's attachment, pain self-efficacy, and pain, outweighing partners' potential impact on these outcomes. In addition, controlling for stability in a longitudinal autoregressive model attenuates considerably the effect sizes of other predictors, which may have affected the significance of certain partner effects.[60]

This study sheds light on the associations among attachment, pain self-efficacy, and pain intensity in PVD couples, and holds a number of strengths. First, the prospective design allowed us to go beyond previous research by considering the long-term implications of attachment and pain self-efficacy on pain intensity, and by examining the directionality of these associations. Moreover, the dyadic nature of the data contributed to a better understanding of relational processes underlying chronic pain conditions, whereby attachment may affect pain intensity through its effect on pain self-efficacy only in women with PVD, and not in their romantic partners. However, results must be interpreted in the context of this study's limitations. The use of self-reported measures may have introduced social desirability and recall biases. Additionally, the sample comprised exclusively long-term relationship couples who had remained together over the 2-year period. Findings may not be applicable to single women with PVD, and may also be specific to couples who stay together despite the pain. Additionally, sex has been found to play a role in the associations between attachment and pain self-efficacy.[17] Therefore, results must be interpreted carefully, as they apply only to women with PVD. Although the use of autoregressive cross-lagged models partially resolves this issue, the use of 2 time points for a 3-variable mediation analysis is a limitation of this study. It would have been preferable to use 3 time points to fully support the directionality findings. Finally, as the current study was focused on the prospective associations among attachment, pain self-efficacy, and pain intensity in couples, we did not address other potentially relevant variables (eg, catastrophizing, emotion regulation, and coping strategies) and how they may influence pain outcomes over time.

Clinically, findings showing that women with PVD's attachment anxiety and pain self-efficacy have long-term implications for their pain intensity highlight the importance of assessing attachment in this population. Cognitive-behavioral therapy may be effective in increasing pain self-efficacy, which in turn may help to reduce pain intensity.[57] Moreover, Kowal et al[61] advocated for the utility of treatments targeting attachment representations, such as emotion-focused therapy, for couples coping with chronic illness, as this type of therapy has been proven to be effective in reducing attachment insecurity and increasing support seeking.[62,63] In conclusion, future studies should integrate other concepts associated with attachment and pain self-efficacy, such as catastrophizing, support seeking, and coping strategies, in order to improve our understanding of psychological and relational factors in PVD. Future studies on PVD should also consider using prospective and dyadic study designs as they may better capture interpersonal processes influencing sexuality across time and between partners.

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