# Chronic Overlapping Pain Conditions and Central Sensitization in Individuals with Chronic Pelvic Pain: The Role of Positive and Negative Affect

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## Introduction

Chronic pelvic pain (CPP) is pain located in the abdomino-pelvic region that persists for 6 months or more and leads to significant functional and psychosocial impairment. CPP has a complex etiology and a high degree of co-prevalence with other pain conditions, referred to as chronic overlapping pain conditions (COPCs). Evidence suggests that central sensitization (CS) contributes to these conditions; however, the factors influencing the relationship between COPCs and CS have received limited attention. Although previous work has examined variables that impact the development/maintenance of CPP, the contributions of psychological risk and resilience factors have not been investigated.

## Objectives

The aim of this study was to examine whether positive (PA) and negative affect (NA) moderate the relationship between COPCs and CS in individuals with CPP

## Methods

**Participants**

- N=197 individuals with CPP
- Mean age= 36 years (*SD*= 11.2)
- Participants predominantly identified as female (78%) and white (79%)
- Mean pelvic pain duration = 7.8 years (range=3 months to 45 years)

**Procedure**

1. Data collected through Qualtrics and REDCap surveys
2. Initial screening conducted prior to completing measures: participants had to be ≥18 years of age, residing in the United States, and report experiencing pelvic pain for ≥3 months

**Measures**

1. Self-report medical history form to document number of COPCs reported from the following: 1) vulvodynia, 2) irritable bowel syndrome, 3) temporomandibular disorder, 4) chronic fatigue syndrome, 5) interstitial cystitis/painful bladder syndrome, 6) fibromyalgia, 7) endometriosis, 8) chronic tension-type headache, 9) chronic migraine headache, and 10) chronic low back pain
    - Summary score obtained by summing the number of COPCs endorsed

## Methods (Continued)

2. Central Sensitization Inventory (CSI): assesses presence of central nervous system pain mechanisms and the frequency of 25 health symptoms (e.g., "My muscles feel stiff and achy" related to CS or CS syndromes
    - Items rated 0 (never) to 4 (always)
    - Total possible score = 100, with higher scores indicating greater CS
3. Positive and Negative Affect Schedule (PANAS): measures positive and negative affect using a 20-item scale
    - 10 positively-valenced and 10 negatively-valenced items
    - Rated on a 5-point scale: 1 (very slightly or not at all) to 5 (extremely)
    - Higher scores indicate greater PA or NA, respectively

**Data Analysis**

- All analyses were performed using SPSS 27 and significance level was set at $p \leq 0.05$ (2-tailed)
- Descriptive statistics were used to characterize the sample
- Bivariate correlations were conducted to examine the relationship between key variables
- Moderation analyses were conducted using the Hayes PROCESS macro to examine whether positive and/or negative affect moderated the relationship between COPCs and CS

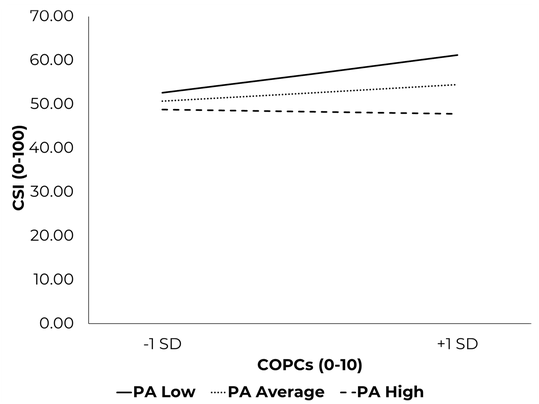
## Results: Bivariate Correlations

| Table 1. Bivariate Correlations | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. CSI | - | | | | | | | | | | | |
| 2. COPCs | .28## | - | | | | | | | | | | |
| 3. Sex | .04 | .25## | - | | | | | | | | | |
| 4. Age | .01 | -.001 | -.08 | - | | | | | | | | |
| 5. Race | -.08 | -.16* | -.03 | -.10 | - | | | | | | | |
| 6. Ethnicity | -.13 | .03 | -.02 | .06 | -.14 | - | | | | | | |
| 7. Marital Status | .11 | -.12 | -.15* | -.20## | .10 | -.12 | - | | | | | |
| 8. Education | -.10 | .29## | .17* | .06 | -.02 | -.07 | -.16* | - | | | | |
| 9. Income | -.08 | .14* | .04 | .05 | -.10 | -.07 | .32## | -.24## | - | | | |
| 10. Pelvic Pain Duration | .23## | .36## | .28## | .18* | -.16* | .06 | -.12 | .17* | .11 | - | | |
| 11. PA | -.30## | -.20## | -.08 | .05 | .10 | -.11 | -.11 | .01 | .16* | -.18* | - | |
| 12. NA | .66## | .14 | .02 | -.09 | .07 | -.10 | .12 | -.10 | -.20## | .15* | -.27## | - |

## Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

- Greater CS was associated with a greater number of COPCs ($p<0.01$)
- Higher PA was related to lower CS ($p<0.01$) and fewer COPCs ($p<0.05$), while greater NA was associated with more CS ($p<0.01$).

## Results: Moderation Analyses




- After controlling for pelvic pain duration, the overall model for CS with PA as a moderator significantly accounted for 17% of the variance in CS ($p < .001$)
- There was a significant COPCs X PA interaction (($\Delta R^2 = 0.02$, $p < 0.05$)
- A greater number of COPCs was associated with higher CS, but only among individuals with low levels of PA ($p = 0.003$), but not among those with average ($p = 0.16$) or high ($p = 0.77$) levels of PA
- No significant moderation effects were observed for NA ($p=0.13$)

## Discussion

- Taken together, among individuals with chronic pelvic pain, lower positive affect has an adverse effect on central sensitization in those reporting a greater number of chronic overlapping pain conditions
- Individuals with chronic pelvic pain, especially those experiencing multiple chronic pain conditions, may benefit from interventions aimed at increasing positive affect
- Future research should further examine the role of protective factors, compared to vulnerability factors, that may contribute to mechanisms underlying chronic pelvic pain. This can inform/improve ways to better tailor treatment approaches for this population

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