The relationship between pain catastrophizing and experimental pain sensitivity across the menstrual cycle
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Introduction
- Pain catastrophizing is a maladaptive coping strategy associated with enhanced pain. The menstrual cycle is also known to influence pain, with increased pain sensitivity generally experienced during the luteal phase compared to the follicular phase. Participants attended 3 laboratory visits. During Visit 1, participants were instructed how to monitor their menstrual cycle and completed the Pain Catastrophizing Scale (PCS) with traditional instructions to assess trait-like pain catastrophizing (T-Catas). Visits 2 & 3 were pain testing sessions conducted during follicular and luteal phases. During each testing session, pain sensitivity was assessed from the nociceptive flexion reflex (NFR) threshold, electrocutaneous pain threshold and tolerance, and MPQ sensory and affective ratings of electrocutaneous stimuli. Moreover, situation-specific catastrophizing (SS-Catas) was assessed at each testing session by asking participants to fill out the PCS while thinking back on their catastrophic cognitions during the electrocutaneous stimulations. This study assessed whether pain catastrophizing and the pain catastrophizing-pain sensitivity relationship can be menstrual phase dependent.

Objective
- To assess T-Catas and SS-Catas predict pain sensitivity (pain threshold, pain tolerance, McGill pain sensory/affective pain ratings) across the menstrual cycle
- Determine if relationships between catastrophizing and pain sensitivity measures vary depending on the menstrual cycle

Participants
- 41 Healthy Female Participants
- Participant Characteristics: White, non-Hispanic (71%); married (71%); employed full-time (56%); yrs of education = 15 (SD = 1.79); average age = 31 yrs (SD = 8.96); average menstrual cycle length = 29 days (SD = 3.28); average length of luteal phase = 18 days (SD = 3.48)
- Exclusion Criteria:
  - < 18 yrs of age
  - Failure to regularly cycle within 2 months of study inclusion
  - Use of hormone preparations within past 6 months
  - Pregnant within past 6 months
  - Menopausal or post-menopausal
  - Current acute illness
  - Cardiovascular, neurological, circulatory and/or hearing problems
  - Chronic pain condition (e.g., back pain)
  - Recent use of anxiolytic and/or antihypertensive medication
  - Recent psychosocial stressors

Experimental Procedure
- Measurement of Subjective Pain
  - Pain Catastrophizing Scale
    - 13 item self-report measure for use in clinical and non-clinical samples; used for persons with and without pain
    - Subscales:
      - Ruminations: (e.g., I can’t stop thinking about the pain)
      - Magnification: (e.g., I worry that the pain will get worse)
      - Helplessness: (e.g., There’s nothing I can do)
    - Internal consistency: alphas for PCS total and subscales range from .66 to .87
    - Pre-test PCS Instructions: “Please indicate the degree to which you had these thoughts and feelings when you were experiencing pain.”
    - Post-test PCS Instructions: “Thinking back to your experience during the electric stimulations, please indicate the degree to which you had these thoughts and feelings.”

- NFR recording electrodes - left biceps femoris muscle
- Stimulating electrodes - over left sural nerve

Pain Outcomes Defined
- Pain Outcome Variable | Definition
  - Pain Tolerance | Stimulus level (in mA) that participant rated as 100 or 50 mA maximum
  - NFR Threshold | Stimulus level (in mA) required to reliably elicit NFR
  - McGill Sensory Pain | Questionnaire used to assess sensory aspect of pain experience (e.g., throbbing, burning)
  - McGill Affective Pain | Questionnaire used to assess affective aspect of pain experience (e.g., fearful, distressful)

Results
- SS-Catastrophizing was associated with higher affective pain (p<.001). This relationship did not vary by menstrual phase.
- SS-Catastrophizing was associated with higher sensory pain (p<.001) and the relationship was stronger during follicular phase (p<.001).

Conclusions
- Results indicate T-Catas is a better predictor of pain sensitivity (threshold and tolerance), whereas SS-Catas is a better predictor of retrospective pain evaluations (sensory and affective ratings).
- Results also indicated SS-Catas may exacerbate pain during the luteal phase by augmenting the sensory component of pain.
- These results suggest that SS-Catas may predict the increase in women’s reports of pain during the luteal phase.