Sensation Seeking and Stoicism Mediate the Relationship Between Sex and Pain Tolerance
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Introduction
There has been substantial support for sex differences in pain. Notably, females tend to exhibit increased pain perception, higher pain ratings to experimental stimuli, and have a higher prevalence of chronic pain than males. One study observed sex differences in pressure pain threshold found that sensation seeking (SS) and stoicism accounted for the difference. In an effort to replicate and expand this work, this study measured SS from the Sensation Seeking Scale and stoicism (from the Pain Attitudes Scale) in a sample of 94 (52% male) healthy, pain-free participants, whose pain was tested from multiple stimulus modalities (e.g., heat, cold, ischemic, electrotactile).

Objective
To examine mediations of the relationship between sex and pain sensitivity across multiple stimulus modalities in a healthy population.

Participants
- Healthy Participants: N = 94
  - Participant Characteristics: Male (52%), White, non-Hispanic (33%), Native-American (81%), single (69%), heterosexual (63%), employed (63%), average age = 30.37 years (SD = 13.9).
- Exclusion Criteria
  - Current use of anxiolytic, antidepressant, and/or antihypertensive medication
  - Chronic pain condition (e.g., back pain)
  - NFR Threshold assessed by sending electrical stimulations to the left ankle over the sural nerve

Procedure
- Two testing sessions were completed:
  - Testing session and test order were counterbalanced
  - Informed consent obtained at beginning of first testing session
- Testing day 1:
  - Procedure:
    - Sensitivity and stimulating electrode applied
    - NFR Threshold assessed by sending electrical stimulations to the left ankle over the sural nerve
    - Ischemic threshold/tolerance assessed by infusing a blood pressure cuff around non-dominant bicep
    - Heat pain threshold/tolerance assessed by heating up thermal probe on volar surface of left forearm
    - Cold pain threshold/tolerance assessed by placing hand in a circulating, temperature controlled water bath
- Testing day 2:
  - Stimulating electrode applied
  - Electric Pain Sensitivity Assessment
  - Thermal Stimulus (Heat): Stimulation of a participant’s left forearm
  - Cold Pressor Test

Pain Attitudes Questionnaire
- 24-item questionnaire administered during second testing session
  - Participant indicated a rating of 1-5 for each item: a rating of 1 indicating they strongly disagree with the statement, a rating of 5 indicating they strongly agree with the statement
  - Scored into 5 subscales, 3 of which measure stoic attitudes: Stoic Fortitude (showing courage in facing pain), Stoic Concealment (hiding pain from others), and Stoic Superiority (enduring pain)
  - Higher scores = stronger attitudes of pain-related stoicism

Electric Pain Sensitivity Assessment
- Sensitivity and stimulating electrode applied
- NFR Threshold assessed by sending electrical stimulations to the left ankle over the sural nerve
- Ischemic threshold/tolerance assessed by infusing a blood pressure cuff around non-dominant bicep
- Heat pain threshold/tolerance assessed by heating up thermal probe on volar surface of left forearm
- Cold pain threshold/tolerance assessed by placing hand in a circulating, temperature controlled water bath

Pain Tolerance
- Cold Pain Threshold/Tolerance
  - Non-dominant hand placed in 6°C water (Cold pressor)
  - Hand kept in water until participant reached tolerance
  - Pain was rated continuously using a Visual Analog Scale (VAS)
  - Cold Pain Tolerance: Tolerance was defined as the time (in seconds) when participant reported measure pain
  - Cold Pain Tolerance: Tolerance was defined as the time (in seconds) when participant rated pain as moderate/tolerable (rating = 100)

- Heat Pain Threshold/Tolerance
  - Thermal probe is attached to volar surface of participant’s left forearm
  - Probe temperature starts at 32°C and increases at a rate of 0.5°C per second until participant indicates heat is painful (average of 4 trials)
  - Heat Pain Temperature: Thermal probe is attached to volar surface of participant’s left forearm
  - Probe temperature starts at 32°C and increases at a rate of 0.5°C per second until participant indicates heat is intolerable (average of 4 trials)

Sensation Seeking Scale
- Sensation seeking (SS) assessed using a self-report measure through the Sensation Seeking Scale (SSS)
  - SS was significant mediator of the relationship between sex and pain outcomes
  - Findings lend support for stoicism and sensation seeking as mediators for sex differences in pain, specifically pain tolerance; however, no evidence was found for mediation of the relationship between sex and ischemic pain tolerance
  - These findings may have important implications for treatment seeking in males: because males are more likely to report higher levels of sensation seeking and stoicism, they may be less likely to seek treatment for pain experienced while engaging in more risky behaviors
  - This may inflate sex differences in the precedence rates of chronic pain, where females tend to have higher rates
  - Data collection is ongoing, therefore additional relationships may emerge

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