Stoicism is associated with experimental measures of pain perception, but not spinal nociception

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Introduction
Evidence suggests that stoic attitudes may be related to the experience of pain. In this study, we examined the relationship between pain-related stoicism and experimental pain sensitivity in 25 healthy, pain-free men and women. Pain sensitivity was assessed over two testing sessions from electrocutaneous pain threshold/tolerance, heat pain threshold/tolerance, ischemic pain threshold/tolerance, cold pain threshold/tolerance, pressure pain threshold, and nociceptive flexion reflex (NFR) threshold (a physiological measure of spinal nociception). Three stoicism subscales (fortitude, concealment, superiority) were assessed from the revised Pain Attitudes Questionnaire that was administered during the second testing session.

Objectives
- To examine the relationship between stoicism and pain sensitivity across multiple stimulus modalities in a healthy population.

Participants
- Healthy Participants: N = 25
  - Participant Characteristics: Male (60%), Native American (44%), White, non-Hispanic (40%), single (44%), employed (72%). Average age = 33.8 years (SD = 12.11)

Exclusion Criteria
- Cardiovascular, neurological, circulatory problems
- Chronic pain condition (e.g. back pain)
- Current use of anxiolytic, antidepressant, and/or antihypertensive medication
- < 18 years of age
- Ethical approval obtained at beginning of first testing session
- Informed consent obtained at beginning of first testing session
- Testing session and test order were counterbalanced
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- Participants indicated a rating of 1 (strongly disagree) to 5 (strongly agree) with the statement, a rating of 5 indicating they strongly agree with the statement.

Procedure
- Two testing sessions were completed.
- Testing session and test order were counterbalanced.
- Informed consent obtained at beginning of first testing session.
- During physiology testing session:
  - Sensors and stimulating electrodes applied
  - NFR Threshold assessed by sending electrical stimulations to the left ankle over the sural nerve
  - During sensitivity testing session:
    - Sensing stimulus applied
    - Electrocutaneous pain threshold assessed by sending electrical stimulations to the left ankle over the sural nerve
    - Ischemic threshold/tolerance assessed by inflating a blood pressure cuff around non-dominant bicep
    - Heat pain threshold/tolerance assessed by heating up thermal probe on volar surface of left forearm

Pain Attitudes Questionnaire
- Pain Attitudes Questionnaire revised (PAQ-R): Self-report measure assessing attitudes of stoicism and cautiousness
- 34-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 (tending to hide pain from others), and Stoic Superiority (enduring pain)
- Higher scores = stronger attitudes of pain-related stoicism

Electric Pain Sensitivity Assessment
- Electrocutaneous pain threshold: Tested by applying an electrical stimulus to the left ankle over the sural nerve
- Ischemic pain threshold: Tested by inflating a blood pressure cuff around the non-dominant bicep
- Heat pain threshold: Tested by heating up a thermal probe on the volar surface of the left forearm

Heat Pain Threshold/Tolerance
- Heat Pain Threshold: 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 (5 trials)
- Higher scores = stronger attitudes of pain-related stoicism

Conclusion
- Our results suggest that higher levels of pain-related stoicism are associated with elevated pain tolerance and reduced pain perception.
- The relationship between stoicism and pain does not appear to be mediated by descending modulation of spinal nociception as assessed by NFR, suggesting that stoicism-related pain reduction may occur through supraspinal mechanisms.
- Data collection is ongoing; therefore, additional relationships may emerge.

Stoic Concealment and Heat Pain Tolerance
- Significant association of stoic concealment and heat pain tolerance
(p=0.01)

Stoic Superiority and Electric Pain Tolerance
- Significant association of stoic superiority and electric pain tolerance
(p=0.05)

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