Introduction
Past research has shown an influence of self-reported levels of stoicism on pain outcomes. Specifically, those who report higher levels of stoicism are similar to those who report low levels of stoicism in spinal nociceptive input (e.g. nociceptive flexion reflex; NFR) but differ in the report of pain sensation (e.g., pain threshold, pain tolerance). However, it is unclear if a relationship exists between transmission of stoicism and self-reported stoicism or pain outcomes. The current study utilized a semi-structured interview to assess attitudes about pain and history of painful experiences. One item that specifically inquired about what parents taught participants about pain was coded for the presence or absence of a stoic attitude. The relationship between this variable and self-reported stoicism (measured from footprint, concealment, and superiority subscales of the Pain Attitudes fortitude, PAG) and pain outcomes (heat and electrocutaneous pain thresholds/tolerances).

Objective
To examine differences in pain outcomes based on parental modeling of stoic beliefs and self-reported attitudes about pain.

Participants
- Healthy Participants: N = 97
  - Participant Characteristics: Male (51.6%), Native American (31.6%), White, non-Hispanic (35.8%), single (68.4%).
  - Average age = 30.22 years (SD = 13.39)
- Exclusion Criteria
  - Cardiovascular, neurological, circulatory problems
  - Ischemic threshold/tolerance assessed by inflating a blood pressure cuff around non-dominant bicep
  - Pain threshold: Stimulus intensity (in mA) that participant rated as maximum tolerable (=100) on the VAS, or 50 mA maximum

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 electrode applied
  - NFR Threshold assessed by sending electrical stimulations to the left ankle over the sural nerve
  - Nociceptive Flexion Reflex (NFR): A spinal nociceptor-mediated protective withdrawal reflex elicited by All Fiber activation
  - Isochrnic Pain Sensitivity Assessment
  - Electric Pain Sensitivity Assessment

Pain Attitudes Questionnaire
- Pain Attitudes Questionnaire revised (PAQ-R): Self-report measure assessing attitudes of stoicism and cautionfulness
- 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 face of pain), Stoic Concealment (concealing pain from others), and Stoic Superiority (enduring pain)
- Higher scores = stronger attitudes of pain-related stoicism

Ischemic Pain Sensitivity Assessment
- Procedure:
  - 2 minutes of hand exercises at 50% maximum grip strength
  - Arm lowered and blood pressure cuff left inflated until participant reached tolerance
  - Pain was rated continuously
- Ischemic Pain Threshold: Time (in seconds) when participant first indicated ischemic pain as being painful (≥20) on the VAS
- Ischemic Pain Tolerance: Time (in seconds) when participant rated ischemic pain as maximum tolerable (=100) on the VAS, or 150 seconds maximum

Electric Pain Sensitivity Assessment
- Biceps femoris EMG sensors
- Visual Analog Scale (VAS): Participant indicated a rating of 1 (least tolerable) to 100 (most tolerable) on the VAS following each stimulation

Visual Analog Scale (VAS): "How much pain do you feel right now?"

Semi-Structured Pain Interview
- The interview is comprised of several open-ended questions that ask about participants’ experiences with pain. The current investigation focused on a single question: "What did your parents (or elders) teach you about pain?"
- Responses were dichotomically coded into several categories that corresponded to pain coping strategies noted in the literature (e.g., avoidance, seeking treatment, stoicism, behavioral coping, cognitive coping).
- The current study focused on membership to the stoicism category.

Results: Correlations
- * indicates significance at the alpha of .05 level; ** indicates significance at the .01 level; variables were transformed as necessary to adjust for significance

Conclusions
- Parental modeling of stoicism lead to differences in pain sensitivity, for electric tolerance, such that those participants whose parents communicated that showing pain was undesirable were more likely to have higher tolerances for electric stimulations.
- Higher levels of self-reported stoicism levels were related to increasing endurance of heat and electric pain

Funding Source: This work was funded by an award (R01MD007807) from the National Institute On Minority Health and Health Disparities of the National Institutes of Health. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.