**Introduction**

Heart rate variability is a measure of autonomic control over the heart, and high resting parasympathetically mediated heart rate variability measures have been shown to be associated with reduced pain. But, it is unclear whether the relationship between heart rate variability and pain varies across menstrual phases (mid-follicular, ovulatory, and late-luteal).

**Objective**

- **Examine whether heart rate variability was associated with measures of experimental pain sensitivity (electrocutaneous pain threshold/tolerance, ischemic pain threshold/tolerance, physiological pain responses), (i.e., NFR, ischemia pain threshold/tolerance), subjective sensory and affective pain and suprathreshold pain), during the mid-follicular, ovulatory, and late-luteal phases of the menstrual cycle.**

**Participants**

- **Healthy Female Participants:** N = 53
  - Participant Characteristics: White, non-Hispanic (71%), married (73%), employed full-time (55%), yrs of education = 15 (SD = 1.79), average age = 31.60 yrs (SD = 8.09), average menstrual cycle length = 29 days. (SD = 3.28)

**Exclusion Criteria:**

- <18 yrs of age
- Failure to regulate cycle within 2 months of study inclusion
- Use of hormones within past 6 months
- Menopausal or post-menopausal
- Cardiovascular (e.g., heart arrhythmia), neurological, circulatory problems
- Irregular heart beat observed during data processing
- Chronic pain condition (e.g., back pain)
- Recent use of analgesic medication
- Use of hormone preparations within past 6 months
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**Experimental Procedure**

- Informed Consent
- Participants were asked to attend 3 laboratory testing sessions during the mid-follicular, ovulatory, and late-luteal phases (testing order counterbalanced)
- Menstrual phases and ovulation were verified using daily diaries, leveling hormone surge tests, and salivary levels of estradiol and progesterone.

- **During each testing session:**
  - Participants sat quietly to record heart rate variability (Baseline-HRV)
  - NFR Threshold Assessment and Pain Threshold Assessment
  - Menstrual phases and ovulation were verified using daily diaries, leveling hormone surge tests, and salivary levels of estradiol and progesterone.
  - Heart rate variability was recorded again (Posttest-HRV)

- Diffuse noxious inhibitory control was assessed (data not presented)

**Results: Heart Rate Variability and Menstrual Phases**

- Results indicated that Posttest-HRV was negatively correlated with NFR Threshold and suprathreshold ratings, but menstrual phase did not moderate these relationships.

**Conclusions**

- Given that Posttest-HRV was measured after NFR threshold, it is likely that persons with a higher NFR thresholds (those who received higher intensity stimulations and thus rated the stimulations as more painful) had reduced parasympathetic activation and increased sympathetic activation which led to lower HRV.

- Together, these data suggest that HRV has little relation to experimental pain sensitivity across phases of the menstrual cycle.