Is sensation seeking related to central sensitization and endogenous inhibition of pain?

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Introduction
Sensation seeking, the personality trait associated with interest in new experiences, risk taking, and disinhibition, has been shown in prior research to be related to lower pain sensitivity (i.e., higher pain threshold and tolerance). However, less is known about the relationship between sensation seeking and mechanisms of nociception (Conditioned Pain Modulation, CPM) and central sensitization (e.g., temporal summation of the nociceptive flexion reflex, TS-NFR). It is important that these relationships are understood, as this could explain the mechanisms for individual differences in pain sensitivity and, perhaps, pain risk.

Objectives
To examine the relationship between sensation seeking and heat pain sensitivity, inhibition of heat pain, and central sensitization of heat.

Methods: Conditioned Pain Modulation (CPM)

Phase
Conditioned Pain Modulation (CPM)

Stimulating electrodes over sural nerve

EMG electrodes over the femurs

Pre
5 electric stimulations

2 min break

5 electric stimulations with hand in cold water (10 °C)

3 min break

Post
5 electric stimulations

Methods: Sensation Seeking Scale

Sensation Seeking Scale (SSS): 40-item self-report questionnaire administered during second session, using forced-choice format, where participants indicated agree or disagree to statements regarding trait sensation seeking.

Methods: 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 (average of 4 trials)

Heat Pain 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 intolerable

Patient Characteristics:

Healthy Participants (n=192)

Participant Characteristics:

• Male (52.6%), White, non-Hispanic (49%), Native American (43.8%), Single (74.2%), Heterosexual (94.9%), 25 years of age (30.9%), Ethnicity (70.7%), Average Age = 28.21 years

Methods: NFR/Temporal Summation of Pain

Methods: Heat Pain Threshold/Tolerance

Methods: NFR/Temporal Summation of Pain

Patients at risk for chronic pain include those with low levels of sensation seeking.

Conclusions

These results suggest that, while those who endorse higher levels of sensation seeking have similar pain thresholds to those with lower levels of sensation seeking, they tend to be able to endure more pain. This difference in pain tolerance does not appear to be due to differences in endogenous pain inhibition or central sensitization.

Although all participants recruited for the current study were healthy, pain-free individuals, the results may have important implications for development of chronic pain.

Past research has shown that those who experience chronic pain are inclined towards lower levels of sensation seeking.

The relationship between sensation seeking and pain tolerance may suggest that an inability to endure pain serves as a mechanism of chronic pain development in those with low levels sensation seeking. Future longitudinal investigations should examine sensation seeking together with pain tolerance as a factor in the development of chronic pain.

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