Emotional Modulation of Nociceptive Reactions: Do Borderline Personality Traits Play a Role?

Jennifer L. Russell, M.A., Amy E. Williams, M.A., Klanci M. McCabe, M.A., & Jamie L. Rhudy, PhD

Department of Psychology, The University of Tulsa, 600 South College Ave, Tulsa, OK 74104

Introduction

Recent research by our laboratory has demonstrated that affect modulates pain and nociception. Nociceptive reactions (pain, heat, cold, and mechanical) are modulated by emotional state. Borderline personality disorder (BPD) is characterized by impulsivity (e.g., short-term behavior), affective instability, interpersonal difficulties, suicidal tendencies, and dissociation. Affective instability and impulsivity have been positively correlated with low pain ratings and higher pain thresholds. However, it is unclear how characteristics of BPD may contribute to the BP-hypothalamus relationship. One possible pathway by which BPD traits could lead to hypogastric pain is via emotion. Indeed, the nociceptive flexion reflex (NFR) is a spinal reflex that is used as a measure of nociceptive flexion and/or attenuating defensive facilitation of nociception.

Objective

The present study examined whether affective instability and impulsivity (as measured by the Personality Assessment Inventory (PAI)) moderate the emotional modulation of nociceptive reactions.

Method

Participants

23 Healthy Students
• Characteristics: 9 Men, 14 Women; White non-Hispanic (57%), single (96%), and unemployed (52%), average age = 22 yrs (SD=5.93)
• Exclusion Criteria: < 18 years of age, current or past illness, cardiovascular, neurological, and/or circulatory problems, recent use of analgesics, antidepressants, anti-anxiety, or anti-hypertensive medication, recent psychological trauma, specific phobia of snakes or spiders, Raynaud’s disease

Procedure

Picture-Viewing: Emotion Induction

The International Affective Picture System (IAPS; Center for the Study of Emotion and Attention, 1999)

Nociceptive Flexion Reflex (NFR) Magnitude

Skin Conductance Response (SCR)

Heart Rate Acceleration

Measurement of Subjective Pain

Nociceptive Reactions and Affective Instability

Emotion Induction: Manipulation Checks

Sensors attached to palmar and plantar surfaces of index and middle finger

SCR defined as maximum increase in HR in 1-5 s post-stimulation window

Noxious stimulations to sural nerve

Elaborated STS (E-STS) recorded from left and right electrodes

Baseline recording for 1 sec preceding noise onset

Impulsivity defined as maximum increase in E-STS in 1-4 s post-stimulation window

Heart Rate Acceleration

Data Analysis

Conclusions

• Emotional modulation of nociceptive reactions was assessed, standardized within-individual, and analyzed. Data were collapsed across picture duration.

• Analyses: Repeated Measures ANCOVA for each nociceptive reaction (subjective pain, NFR magnitude, skin conductance response, and heart rate acceleration) were conducted with picture content as a within-subjects variable. Affective instability and impulsivity were entered as covariates in separate analyses to test the Covariate x Picture Content interaction.

Nociceptive Reactions and Impulsivity

Impulsivity did not moderate the emotional modulation of nociceptive reactions.

Nociceptive Reactions and Affective Instability

Effective instability did not moderate emotional modulation of nociceptive reactions.

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