Sex Differences in Emotional Modulation of Pain and Nociception

Jennifer L. DeVentre, BS, Emily J. Bartley, MS, Mary C. Chandler, BA, Kara L. Kerr, Amy E. Williams, MA, Klanci M. McCabe, MA, Jennifer L. Russell, MA & Jamie L. Rhudy, PhD
Department of Psychology, The University of Tulsa, 800 South Tucker Drive, Tulsa, OK 74104

Introduction
Relative to men, women report more experimental pain and experience more severe clinical pain. Though the mechanisms underlying these sex differences are likely to be manifold, sex differences in emotional modulation of pain may contribute. Research has shown that differences exist in the experience and processing of emotion. For example, women experience more fear in situations judged to be threatening. Given that emotional processes can modulate pain (negative emotions enhance pain and positive emotions inhibit pain), sex differences in emotion could contribute to sex differences in pain.

Objective
The current study sought to examine whether men and women differ in emotional processes: emotionally-charged pictures, painful electrocutaneous stimulations, and emotional modulation of pain—specifically, how varying levels of emotional stimulation may modulate perception of pain and other physiological and nociceptive processes.

Participating
120 Healthy Participants
• 48 Men, 32 Women, White non-Hispanic (76%)

Procedure
Participants watched series of emotionally-charged pictures while receiving painful stimulations to the ankle.
• After each painful stimulation, participants rated pain intensity and NFR magnitude recorded.
• Picture-evoked and pain-evoked HR and SC changes were recorded.

Skin Conductance Response (SCR)
• Skin Conductance Response (SCR): average SC in the 1-6 s post-shock interval minus average SC in 1 s pre-shock interval
• Heart Rate Response (HR): average HR in the 1-6 s post-shock interval minus average HR in 1 s pre-shock interval

Results: Pain-Evoked SCR & HR
• Largest responses to unpleasant and pleasant pictures (relative to neutral)
• Men had greater SC responses to the pictures
• Women had greater picture-evoked HR acceleration to the pictures of death, adventure, and neutral.
• Men had greater HR responses to erotic pictures ($p < .05$)

Results: Picture-Evoked SCR & HR
• Picture content modulated SCR.
• Larger responses to unpleasant and pleasant pictures (relative to neutral)
• Men had greater SC responses to the pictures

Results: Valence Ratings
• Sex differences exist in subjective pleasure ratings of pictures ($p < .05$)
• No significant differences in arousal ratings were found between the sexes

Conclusions
• These differences do not result in differential NFR responding.