Affective Modulation of Blink Reflexes Following Painful Trigeminal Nerve Stimulation
Amy E. Williams, M.A., & Jamie L. Rhudy, PhD
Department of Psychology, The University of Tulsa, 600 South College Ave, Tulsa, OK 74104

Introduction
Trigeminal nerve stimulation elicited by a custom concentric electrode has been shown to elicit eyeblink reflexes that are abolished by local anesthetics, suggesting nociceptive specificity. Numerous studies have shown that startle eyeblink is modulated by emotional processes, but it is unknown whether nociceptive blink reflexes (NBR) also show affective modulation. The present study examined the impact of emotion on NBR elicited by painful trigeminal nerve stimulation from a custom concentric electrode that selectively activates primary nociceptors.

Objective
• To determine if nociceptive blink reflexes (NBRs) elicited by painful trigeminal nerve stimulation are modulated by emotion.

Participants
• 36 Healthy Students
• Characteristics: 12 Men, 24 Women; White non-Hispanic (78%), single (84%), and employed (67%); average age = 21.22 yrs (SD=2.27)

Exclusion Criteria:
• < 18 years of age
• Current acute illness
• Cardiovascular, neurological, and/or circulatory problems
• Recent use of anesthetics, antidepressant, anxiolytic, or anxiolytic medication
• Recent psychological trauma
• Specific phobia of snakes or spiders
• Chronic pain condition
• Raynaud's disease

Procedure

Measurement of Subjective Pain
• Concentration: eliciting a trade-off between pain and another value
• NBR recording electrodes

Results: Pain Ratings
• Pain Ratings: main effect of picture content was significant (F[2,66] = 20.62, p < .001, \( \eta^2 = .39 \))
• Pain ratings were higher during unpleasant compared to neutral pictures (p < .001, \( \eta^2 = .80 \)).
• Pain ratings were lower during pleasant compared to neutral pictures (p = .01, \( \eta^2 = .15 \)).
• Linear trend explained the greatest variance (p < .001, \( \eta^2 = .51 \)).

Results: Nociceptive Blink Reflex (NBR)

Emotion-Induction: Manipulation Checks
• NBR: main effect of picture content was significant (F[2,66] = 3.37, p = .04, \( \eta^2 = .20 \))
• Quadratic trend explained the greatest variance (p < .001, \( \eta^2 = .74 \)).

Data Analysis
• NBR and pain ratings were converted to z scores and averaged across similar picture valence.
• Repeated measures ANOVA with picture content as the within subjects variable.
• Polynomial trend analyses were conducted to determine the amount of variance explained by linear and quadratic trends.

Conclusions
• Pictures effectively modulated affective valence and arousal.
• Unpleasant (attack) pictures led to facilitation of subjective pain compared to neutral, and pleasant (erotic) pictures led to inhibition of subjective pain compared to neutral.
• Unpleasant pictures led to facilitation of NBR compared to pleasant pictures.
• Emotion modulated pain and NBRs in response to painful trigeminal nerve stimulation.
• Future research may utilize this paradigm to study modulation of head pain in clinical populations (e.g., headache disorders, craniofacial disorders).