

Introduction

Advanced age is associated with increased pain, and because pain is influenced by regulatory factors that inhibit or enhance incoming pain signals, pain experienced by older adults may stem from a dysfunction of pain regulatory mechanisms. Unfortunately, there is little well-controlled research addressing this issue.

Our laboratory has developed procedures to reliably test the regulation of pain by emotional processes. To do so, emotionally-charged pictures are presented while painful electrocutaneous stimuli are delivered to the ankle to elicit pain and pain-related physiological responses.

Objective

The present study was designed to determine if there are differences in emotional modulation of pain across age groups

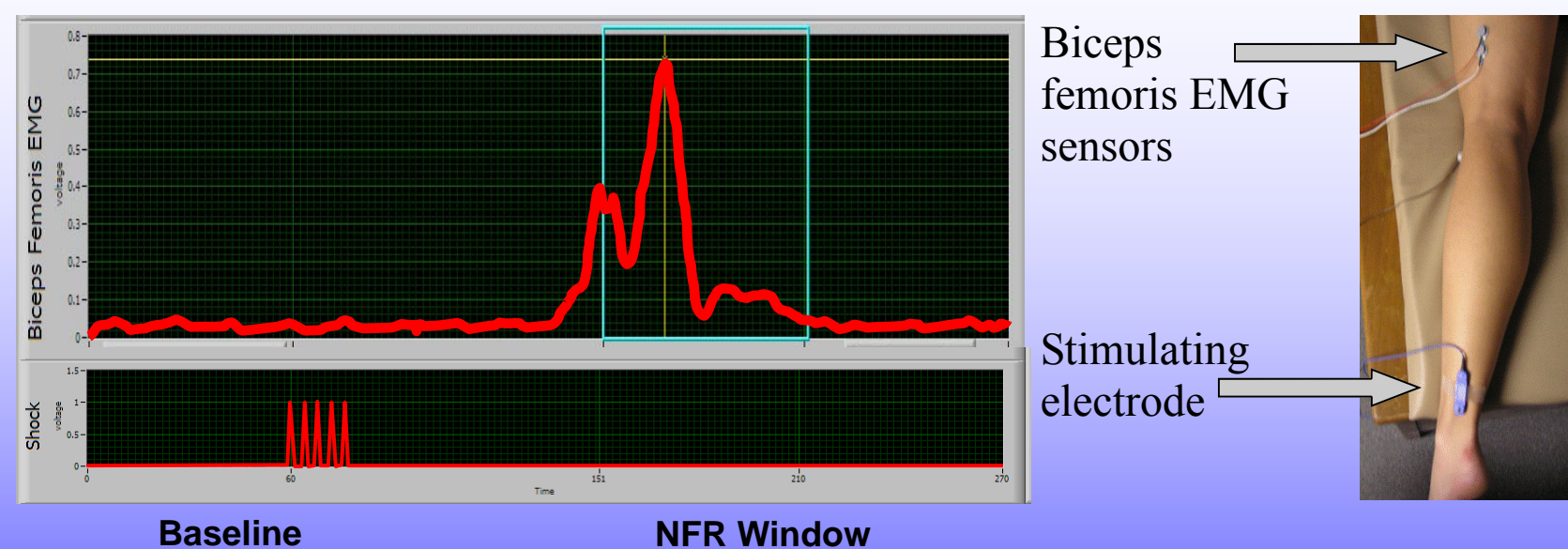
Participants

114 Total Participants Divided into 3 Groups

- Low age group (n = 45): mean = 21 yrs, range = (18-25)
66.7% female, 80% White, 82.2% single, 80% employed
- Medium age group (n = 35): mean = 32 yrs, range = (26-42)
42.9% female, 57.1% white, 57.1% single, 77.1% employed
- High age group (n = 34): mean = 54 yrs, range = (43-83);
61.8% female, 94.1% white, 26.5% single, 70.6% employed

Exclusion Criteria: less than 18 years of age; current acute illness; cardiovascular, neurological, and/or circulatory problems; recent use of analgesic, antidepressant, anxiolytic, or antihypertensive medication; recent psychological trauma; specific phobia of snakes or spiders (due to picture-viewing); chronic pain condition; Raynaud's disease

Nociceptive Flexion Reflex (NFR) Magnitude

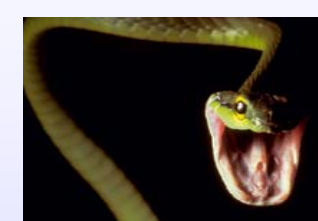


NFR is a spinally-mediated protective withdrawal reflex elicited by Aδ fiber activation, and NFR magnitude correlates with pain ratings
 NFR magnitude = mean of biceps femoris EMG in 90-150 ms post-stimulus interval minus mean of 60 ms pre-stimulus interval, divided by the pooled standard deviation (Cohen's d value)

Picture-Viewing: Emotion Induction

The International Affective Picture System
 (IAPS; Center for the Study of Emotion and Attention, 2006)

Unpleasant



Attack



Mutilation



Death/Grieving

Neutral



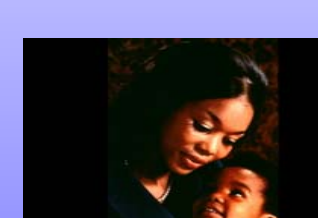
Pleasant



Erotica



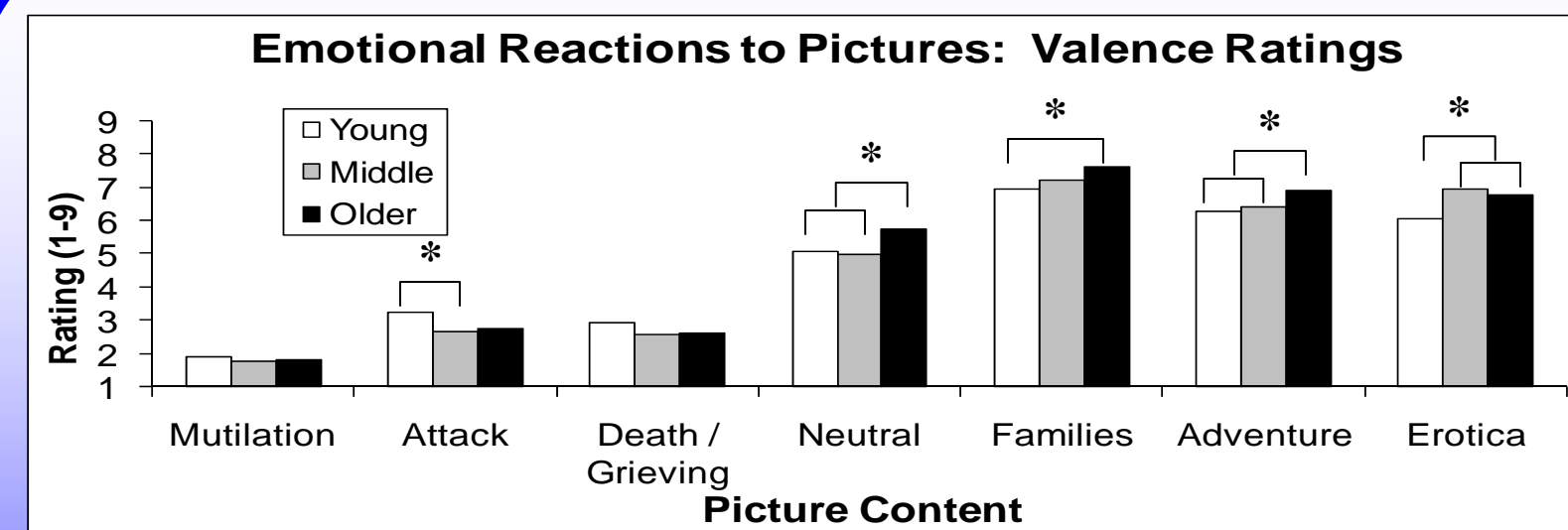
Adventure



Family

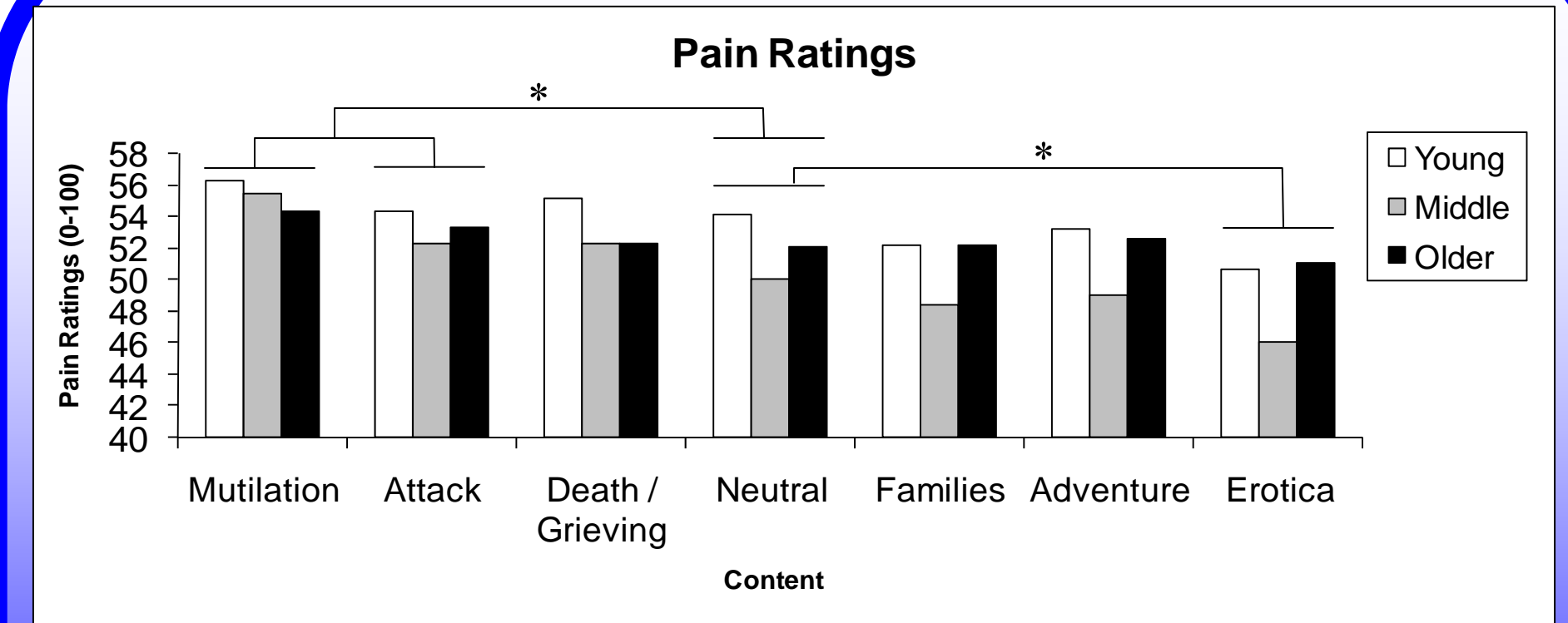
- 108 pictures were presented in pseudorandom order
 - 36 pictures per valence (unpleasant, neutral, pleasant)
 - Pictures present for 6 s (12-22 s ITIs)
- Noxious stimuli delivered to sural nerve
 - Intensity = 1.2 x NFR threshold
 - Delivered 3-5 s following picture onset during 1/3 of pictures (balanced across valence and block) and 16 inter-picture intervals

Results: Emotional Reaction to Pictures



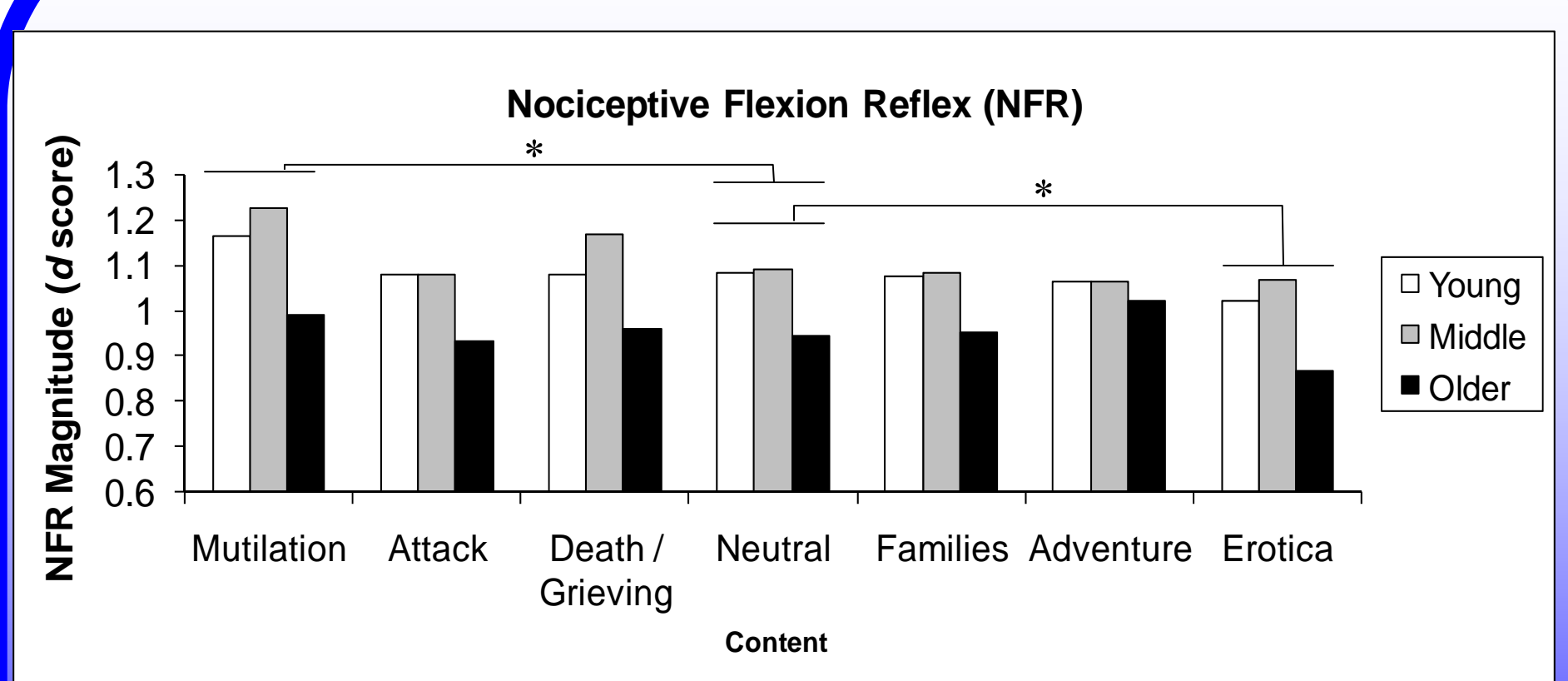
- **Main effect of picture content ($p < .001$):** mutilation, attack, and death/loss pictures were rated as unpleasant, and erotica, adventure, and families were rated as pleasant.
- **Interaction of Age x Content $p < .001$:** generally, younger participants rated pleasant contents as less pleasurable than older adults

Results: Pain Ratings



- **Main effect of picture content ($p < .001$):** mutilation and attack pictures led to pain facilitation, erotica led to the best pain inhibition
- **No Age x Content Interaction ($p = .18$):** despite the appearance of mean differences, there were no age-related differences in this pattern of modulation

Results: Nociceptive Flexion Reflex (NFR)



- **Main effect of picture content ($p < .001$):** mutilation pictures led to pain facilitation, erotica led to the best pain inhibition.
- **No Age x Content Interaction ($p < .41$):** despite the appearance of mean differences, there were no age-related differences in this pattern of modulation

Conclusions

- Picture content manipulated emotion as expected
- Older participants rated pleasant content as more pleasurable than younger participants
- Age did not influence emotional regulation of pain
- This suggests that age-related changes in pain are not likely to be mediated by changes in the way emotion alters pain

