

Drop-Outs in Experimental Pain Research: Are There Differences in Psychophysiological Emotional Processing?

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Introduction

Drop-outs are a potential threat to the validity of experimental pain research. Indeed, the possibility of important differences between those who complete the study and those who do not could present a selection bias in available data. For example, group differences in emotional processing could confound the interpretation of pain outcomes, because emotion is known to modulate pain and nociceptive processes. The present study examined the differences between drop-outs and completers from a study describing the relationship between emotion and nociceptive processing. Group differences in emotional processing were assessed by corrugator EMG, SCR, initial HR deceleration, HR acceleration, and startle

Objective

To determine if there are differences in emotional processing between individuals who drop out of a pain study and those who do not

Participants

- **95 Completers and 26 Drop-Outs**
- **Completer Characteristics:** Female (57%), White non-Hispanic (72%), single (61%), employed (75%), average age = 33 yrs ($SD=13.39$)
- **Drop-out Characteristics:** Female (69%); White non-Hispanic (50%), single (50%), employed (73%), average age = 34 yrs ($SD=13.92$)
- **No significant differences for demographics between groups ($ps > .1$)**
- **Exclusion Criteria:**
 - < 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

Procedure

- 5.5 hour study examining relationships among startle modulation, pain sensitivity, and pain modulation
- Phases included **Emotional Modulation of Startle**, during which participants viewed pictures with different valences (unpleasant, neutral, pleasant) while receiving loud bursts of white noise over headphones
- After the startle phase, participants went through a **Pain Sensitivity Testing** phase and an **Emotional Modulation of Pain** phase
- Analyses examined physiological emotional reactions during startle modulation phase for those who completed the study and those who dropped out during subsequent pain testing phases

Picture-Viewing: Emotion Induction

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



Unpleasant

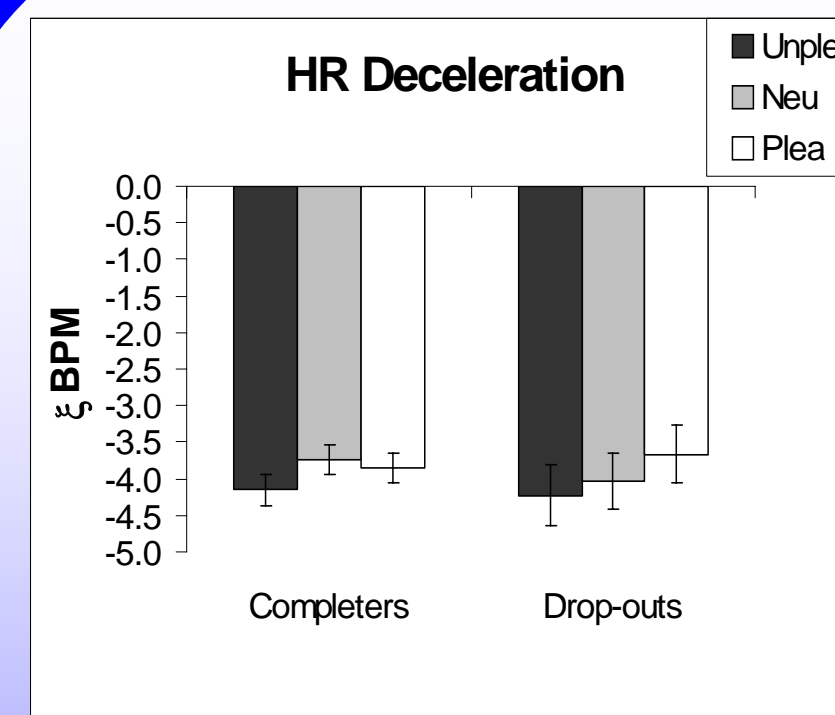
Neutral

Pleasant

54 pictures presented in pseudorandom order

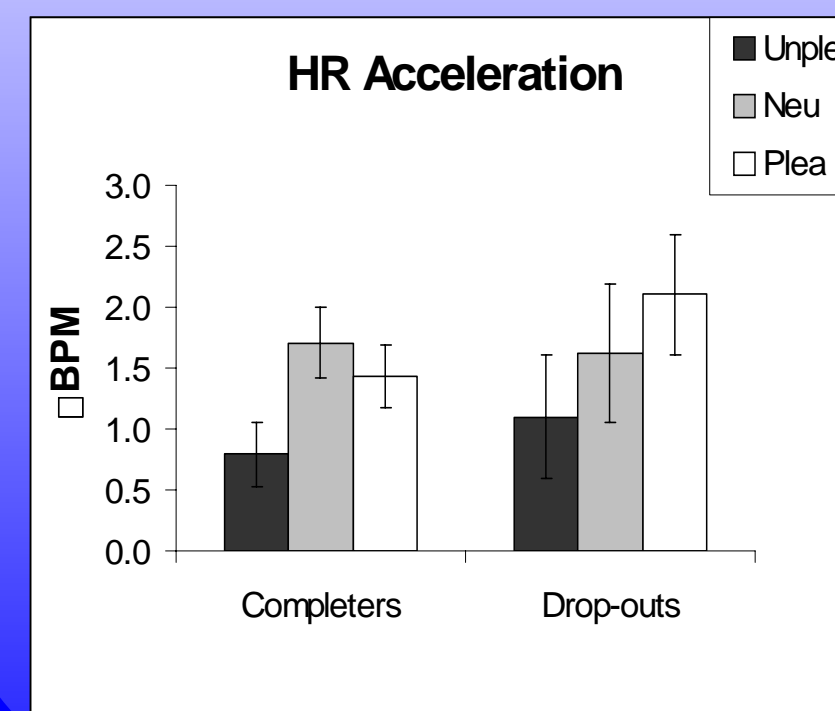
- 18 pictures per valence
- Pictures presented for 6 s (12-22 s ITI)

Results: Heart Rate (HR)



HR Deceleration

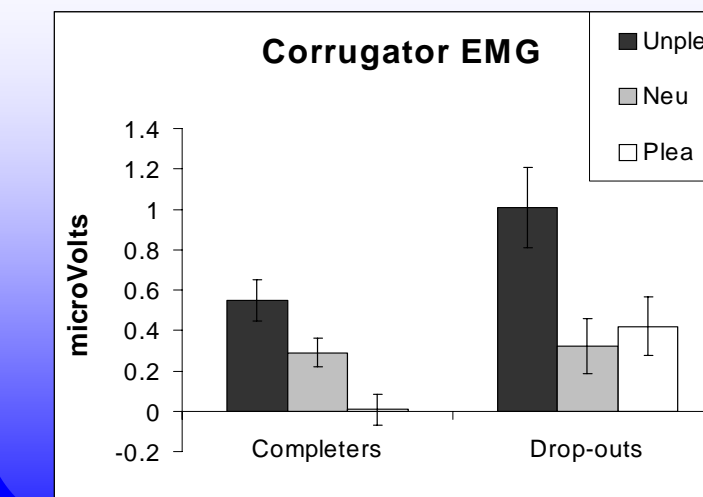
- Picture Valence main effect: $F(2,118)=4.35, p=.02, \eta^2=.07$
 - Linear trend: $p=.005, \eta^2=.06$
- Picture Valence x Group interaction: $F(2,118)=1.097, p=.34, \eta^2=.02$
- No main effect of Group: $F(1,119)=.92, p=.39, \eta^2<.001$



HR Acceleration

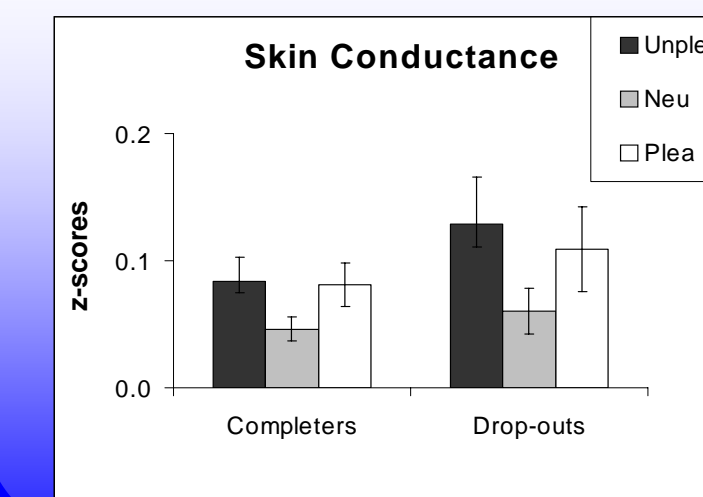
- Picture Valence main effect: $F(2,118)=5.33, p=.006, \eta^2=.08$
 - Linear trend: $p=.002, \eta^2=.07$
- Picture Valence x Group interaction: $F(2,118)=1.207, p=.30, \eta^2=.02$
- No main effect of Group: $F(1,119)=.34, p=.56, \eta^2=.003$

Results: Corrugator EMG



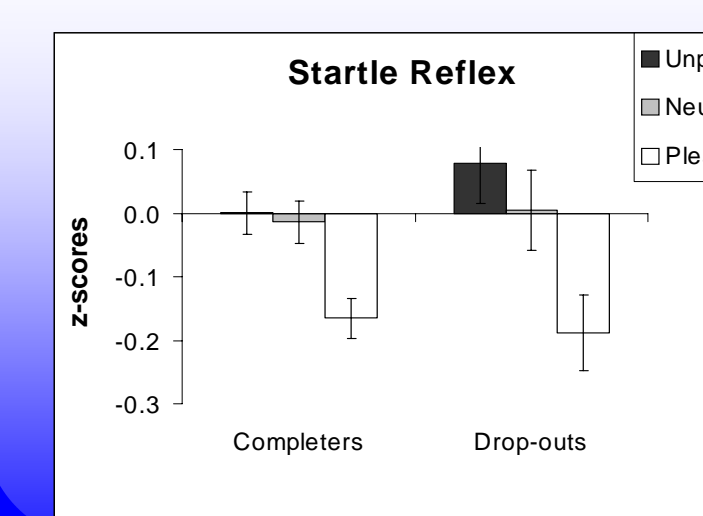
- Picture Valence main effect: $F(2,117)=18.38, p<.001, \eta^2=.24$
 - Linear trend: $p<.001, \eta^2=.21$
- Picture Valence x Group interaction: $F(2,117)=3.61, p=.03, \eta^2=.06$
 - Group differences for unpleasant and pleasant

Results: Skin Conductance Response (SCR)



- Picture Valence main effect: $F(2,116)=6.44, p=.002, \eta^2=.10$
 - Quadratic trend: $p<.001, \eta^2=.10$
- Picture Valence x Group interaction: $F(2,117)=.47, p=.63, \eta^2=.008$
- No main effect of Group: $F(1,117)=.92, p=.34, \eta^2=.008$

Results: Acoustic Startle Reflex (ASR)



- Picture Valence main effect: $F(2,118)=6.44, p<.001, \eta^2=.14$
 - Linear trend: $p<.001, \eta^2=.13$
- Picture Valence x Group interaction: $F(2,118)=3.61, p=.03, \eta^2=.06$
- No main effect of Group: $F(1,119)=.46, p=.50, \eta^2=.004$

Conclusions

- There were no significant differences in emotional processing between drop-outs and completers on measures of SCR, HR, and ASR
- However, corrugator EMG did show significant differences between groups, with drop-outs showing greater corrugator activity in response to unpleasant and pleasant pictures
- While the differences between groups for corrugator EMG should be studied further, these differences may reflect a greater tendency to experience displeasure and/or to communicate displeasure through facial affect
- These minor group differences are not likely to affect the validity of experimental pain research