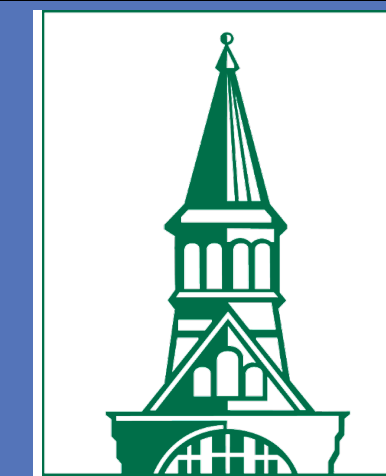


Use of a Mobile Application to Capture Post-Traumatic Symptoms and Subsequent Psychiatric Diagnoses

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Background

- Approximately 23-31% of adults exposed to a traumatic event will meet the criteria for a psychiatric diagnosis within 12 months.
- Trauma exposure is associated with increased risk of developing psychiatric health problems, most commonly post-traumatic stress disorder (PTSD) and depression.
- Symptoms of re-experiencing, avoidance, and sleep disturbances are common reactions to trauma and are associated with development of PTSD and depression.
- Despite the high incidence of PTSD, the initial presentation and development of these symptoms is still not well understood.
- PTSD is more prevalent in those with increased peritraumatic pain and chronic pain, thought to be due to nociceptive pathways interaction with psychological processes.
- We hypothesize that more frequent pain will be associated with elevated re-experiencing of the trauma, symptoms of hyper arousal, and impaired sleep in the first 30 days after a traumatic event.

Participants

Recruited from a Level 1 trauma center Emergency Department for treatment related to a traumatic injury.

- Inclusion criterion :
 - Directly experienced a trauma that met criterion A for a diagnosis of PTSD according to DSM 5
 - Had access to a smartphone
- Participants were representative of Northern New England
 - Majority self-identified as white (84.6%),
 - Average age of M = 27.56, SD = 13.16 years
 - Median income of \$20,000 to \$30,000.

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Methods

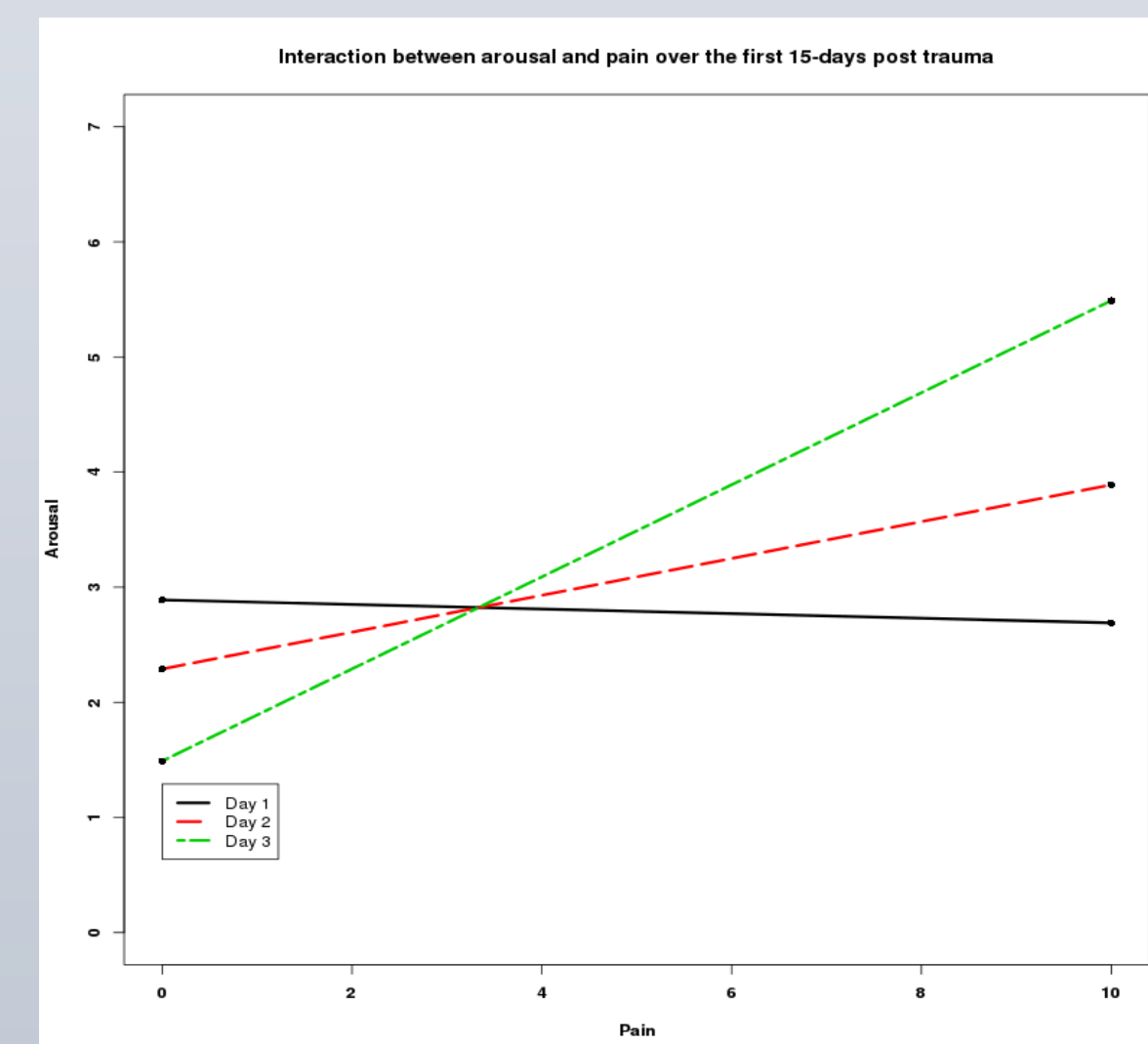
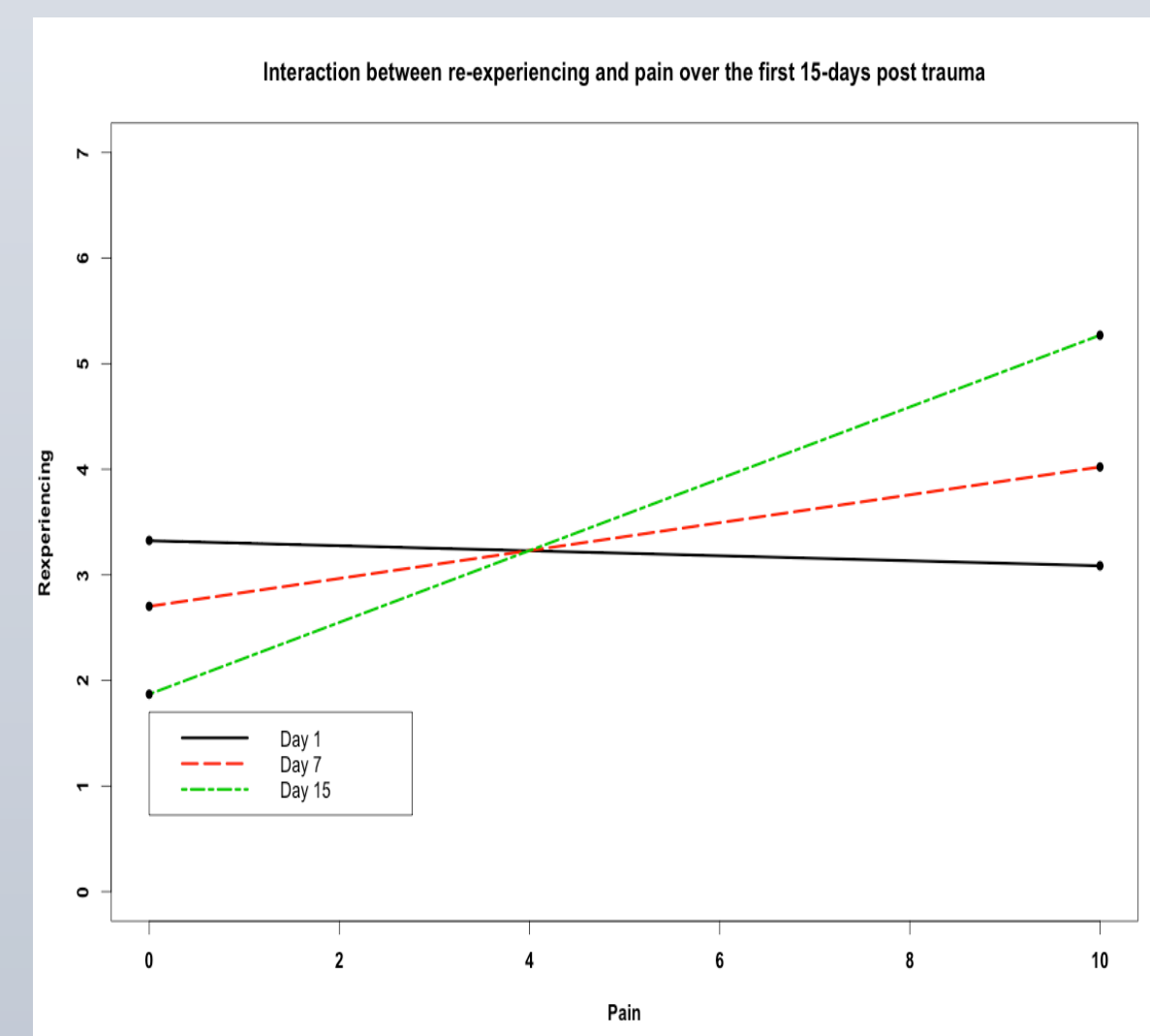
Measures:

- PTSD Checklist-5 (PCL; Blevins, Weathers, Davis, Witte, & Domino, 2015): The PCL is a 20-item self-report measure that assesses PTSD symptoms experienced over the last month according to DSM 5 criteria.
- Patient Health Questionnaire-8 (PHQ-8; Kroenke, Spitzer, & Williams, 2001): The PHQ-8 is an 8-item self-report measure that assesses depression symptoms experienced over the past two weeks.

Mobile Assessment Questions: A brief survey of PTSD symptoms was developed for the mobile device. Questions were adapted from the PCL. For the present study, questions assessing re-experiencing symptoms, symptoms of heightened arousal, and pain.

Procedures: Participants were approached in the hospital and completed a baseline assessment. Participants were contacted via telephone within M = 4.81 (SD = 2.83) days of their enrollment with instruction to download and install the mobile application. Participants received a local notification to complete a survey on their mobile device each day for 30 days post initial assessment. Follow-up interviews were conducted via telephone one month after the time of the initial phone interview.

Outcome	Effect	Coefficient	SE	t-value	95% CI
Re-experiencing	Intercept	3.43	0.46	7.42**	2.49 to 4.38
	Time	-0.10	0.05	-2.15*	-2.04 to -0.01
	Pain	-0.05	0.11	-0.48	-0.27 to 0.17
Arousal	Intercept	2.99	0.45	6.64**	2.09 to 3.89
	Time	-0.06	0.05	-1.23	-0.17 to 0.04
	Pain	-0.02	0.10	-0.022	-0.23 to 0.18
	Time * Pain	0.03	0.01	2.37*	0.01 to 0.06



Results

- The primary hypotheses were assessed with lagged multilevel model (MLM). Due to the increase in missing data after the first 15 days of assessments, the present study focused on the first 15 days of assessment.
- A lagged model was used such that pain on day t served as the predictor of symptoms on $t+1$. This allows for an evaluation of the extent that pain is associated with symptoms on the next day.
- The results suggested that the relation between re-experiencing and pain symptoms was moderated across time. That is, the relation between pain and re-experiencing become more strongly positively related over time such that increased pain was associated with increased re-experiencing at the end of the 15 day period.
- These findings were also observed for arousal symptoms.

Discussion

- Daily mobile application symptom responses demonstrated a relationship between pain scores and thoughts of re-experiencing the trauma such that a higher pain score correlated with subsequent increased re-experiencing on the following day.
- This relationship between pain and re-experiencing is weakest in the first seven days post-trauma, but then strengthens the further from the time of trauma up to day fifteen. The same was true for symptoms of arousal.
- While the physiologic connection of pain and emotions is not well understood, there is some evidence that there are shared underlying mechanisms and neurobiological pathways for chronic pain and emotions.
- The emergence of this relationship between pain and re-experiencing over time may demonstrate a biological change post-trauma in how a person experiences pain, strengthening its relation to emotions.
- Further research is needed to better identify how pain can be used to help screen for those at risk of developing PTSD for possible early intervention.