Anxiety and Trauma Relate Differentially to Physiological Arousal to Conditioned Fear and Inhibition Cues

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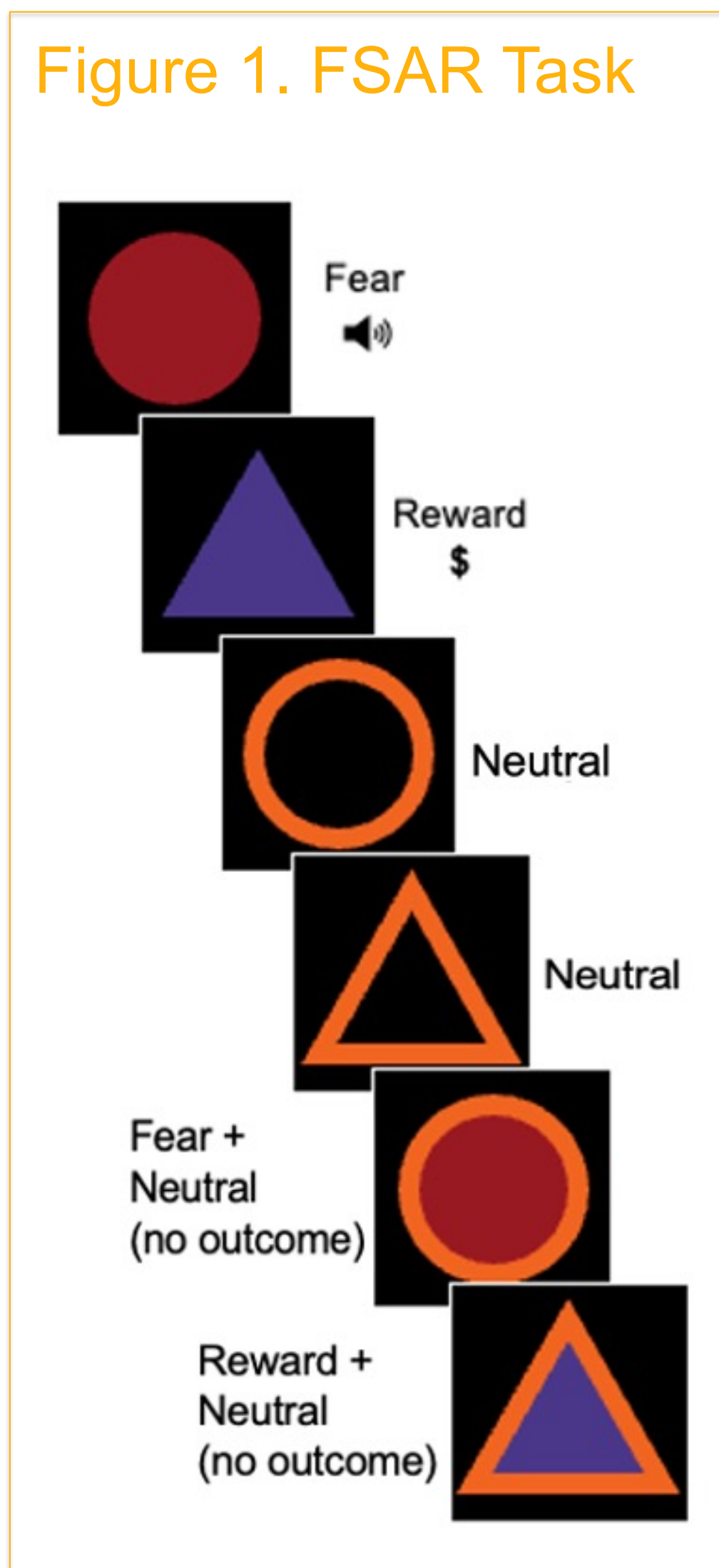Translational Affective Neuroscience Lab

INTRODUCTION

- Anxiety and posttraumatic stress disorder (PTSD) are theorized to share pathophysiology of aberrant fear responding.

- Yet, it remains unclear if these two disorders are similar in ability to discriminate fear from safety.

- In PTSD, numerous studies have demonstrated that individuals show deficiencies in ability to distinguish fear from safety[1,2].

- Comparatively, less work has examined ability to distinguish fear from safety in anxiety disordered individuals with mixed findings. For example, at least one study demonstrates that the ability to distinguish between fear and safety is intact in those with anxiety disorders[3], while other work indicates this ability is compromised[4].

- Here, we examine trauma load and anxiety symptoms within a healthy sample as they relate to conditioned fear and inhibition cues.

METHODS

- Sample included $N = 82$ healthy undergraduate participants, consisting predominately of white (59.8%) and female (57.3%) identifying individuals. The average age was 19.05 (SD: 1.29).

- Participants completed a fear, reward, and neutral conditioning task: colored geometric shapes (conditioned stimuli; CS) were paired with an unconditioned stimulus (US), either a white noise burst (Fear) or $0.25 (Reward) or no outcome (Neutral). On critical trials, Neutral cues were co-presented with Fear or Reward for inhibition trials (Fear+Neutral; Reward+Neutral). Forty trials were administered with jittered durations: CS cues were presented for 3-5 seconds.

- Continuous electrodermal activity was recorded on the non-dominant hand (high-pass filtered) using a >0.03 µS cut-off for skin conductance response (SCR) detection. Visual inspection rejected artifacts, retaining $N = 48$ for analysis.

- All participants completed the self-reported Beck Anxiety Inventory (BAI), which includes 21-items measuring cognitive, affective, and somatic intensity of state anxiety over the past 7 days. Scores range 0-63, where greater scores indicate higher intensity of anxious symptoms. The average score in this sample was 29.42 ($SD = 15.81$).

- All participants also completed the Life Events Checklist (LEC), which is a commonly used self-report measure of trauma history. A total LEC severity score was calculated where higher scores indicate greater trauma load. Scores ranged 0-7, with the mean this sample of 2.98 ($SD = 1.52$).

Figure 1. FSAR Task

Fear

Reward $

Neutral

Neutral

Fear + Neutral (no outcome)

Reward + Neutral (no outcome)

RESULTS

- Greater anxiety is related to greater SCR amplitude to fear ($r = 0.49$, $p < 0.001$).

- These effects remain significant when controlling for trauma load ($r (35) = 0.42$, $p = 0.009$).

- Greater trauma load is <u>not</u> related to SCR amplitude to fear ($p = 0.259$).

- Conversely, trauma load is related to SCR amplitude to inhibition trials. Such that greater trauma load is related to greater SCR amplitude to Fear + Neutral ($r(27) = 0.38$, $p = 0.042$), and to Reward + Neutral ($r(25) = 0.39$, $p = 0.045$).

- These effects remain significant when controlling for anxiety ($p = 0.045$ and $p = 0.044$, respectively).

- Anxiety is <u>not</u> related to SCR Amplitude to Fear + Neutral or Reward + Neutral cues (p's > 0.07)

Greater Anxiety is Related to Greater SCR Amplitude to Fear Cues

Greater Trauma Load is Related to Greater SCR Amplitude to Fear + Netural Cues

Greater Trauma Load is Related to Greater SCR Amplitude to Reward + Netural Cues
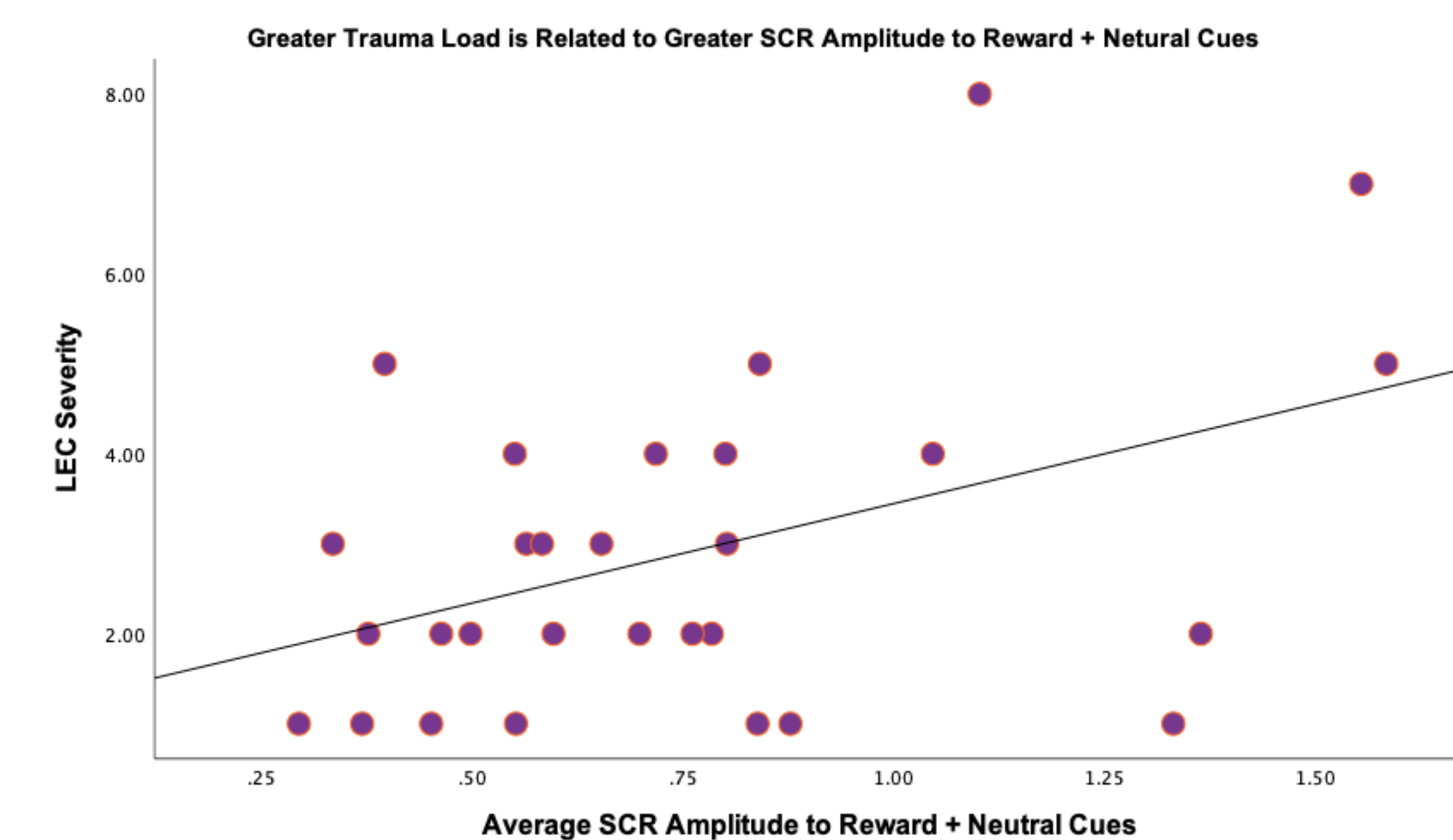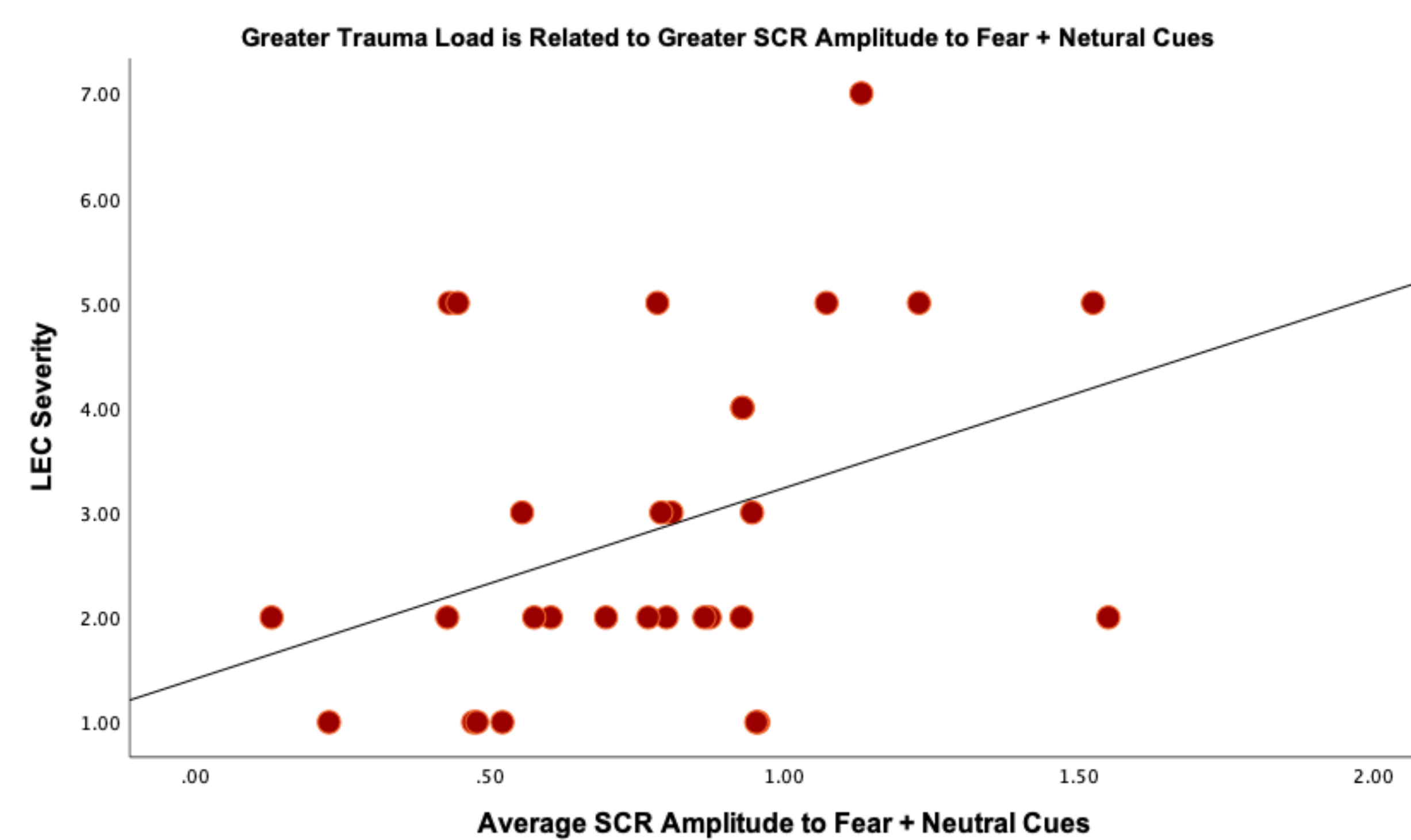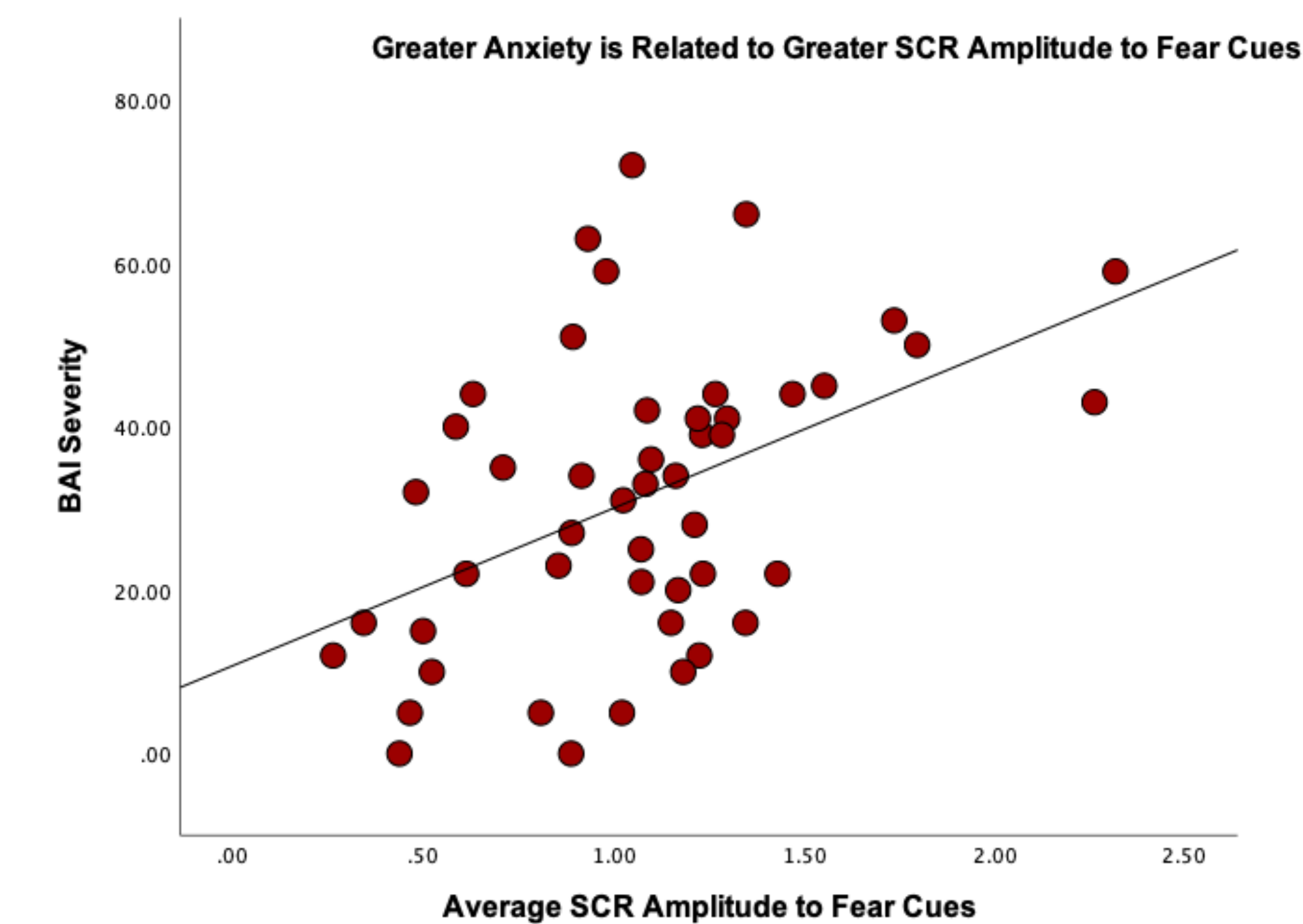
CONCLUSIONS

- Anxiety is related to high response to fear. Conversely, trauma load is related to high response to inhibition trials (Fear + Neutral, Reward + Neutral). These are distinct effects and hold when controlling for the other contributing factor (e.g., controlling for trauma load when examining effect of anxiety).

- These findings support prior work showing that anxiety is related to the dissociation of fear from safety[3], while trauma may reverse that effect[5].

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