

Threat Reactivity as a Potential Risk Factor for Posttraumatic Stress Symptoms and Substance Use

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Exposure to a potentially traumatic event (PTE) is incredibly common among U.S. adults, with approximately 90% reporting traumatic event exposure in their lifetime, and many reporting exposure to multiple PTEs (Kilpatrick et al., 2013). Trauma exposure can lead to an array of negative physical and mental health symptoms associated with stress-related conditions such as posttraumatic stress disorder. Our “Traumatic Stress Risk Factors and Daily Symptoms” study aims to examine underlying risk factors for posttraumatic stress symptoms (PTSS), specifically threat reactivity and negative reinforcement sensitivity. These risk factors will be assessed in relation to PTSS severity and maintenance over time among a trauma-exposed sample. Normal functioning of our body’s threat response system is imperative for ongoing survival, and PTSS has been shown to alter the way our body reacts to external threatening stimuli (Lobo et al., 2011). A blunted neural response to threatening stimuli has been shown in chronic and severe PTSS, while a hypersensitive neural response has been shown in people with moderate PTSS (D’Andrea et al., 2013). Further research on these risk factors will provide a better framework to understand the conditions that result in altered threat responding in PTSS and how this connects to other forms of psychopathology such as substance use disorders (McCauley et al., 2012) and suicidality (Albanese et al., 2021).

Eligibility requirements for participants (n=100, aged 18-65) include a history of trauma exposure and some PTSS, including at least avoidance or traumatic intrusions. We will first administer a clinical interview to screen participants for eligibility and symptom severity. Following screening, we will schedule participants for an in-person laboratory appointment in which they will complete a non-invasive electroencephalogram (EEG) procedure while engaging in a series of computerized tasks designed to examine threat reactivity and sensitivity to negative reinforcement. To measure threat reactivity,

participants will complete a picture-viewing task where they are presented with pleasant, neutral, and threatening images. Either a circle or a square will then flash onto the screen, and the participant must quickly and accurately press a button indicating which shape appeared. This task reflects threat reactivity and the ability to maintain attention on a goal-directed task in the context of a threat compared to the pleasant and neutral conditions. I hypothesize that participants who struggle to maintain attention during this task will experience more severe PTSS and report greater substance use. If participants have trouble maintaining attention, then they will have significantly greater brain activity, approximately 400-1000 milliseconds after viewing the stimulus. Participants will complete self-report measures of drug and alcohol use as well as alcohol use motives to assess engagement in substance use and potentially problematic substance use motives (e.g., drinking to cope and conform).

We will then invite participants to complete a two-week ecological momentary assessment (EMA) period where they will complete a brief survey four times a day for two weeks. The EMA period provides an opportunity to evaluate daily fluctuations in anxiety, mood, sleep patterns, and PTSS in the participant’s typical environment in real time (Shiffman, Stone, & Hufford, 2008). It also provides a chance to test how neurobehavioral mechanisms assessed in the lab predict changes in PTSS and substance use patterns in a real-world setting. The EMA period can provide rationale as to how and when PTSS and substance use co-occur (Lane, Waters, & Black, 2019). We will invite all participants to complete a follow up appointment three months later, which will include another clinical interview to observe the maintenance of their PTSS.

The present work may contribute to the development of targeted interventions to normalize threat responses among those with PTSS. It will also allow us to gain more

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knowledge about the comorbidity of PTSS and substance abuse. We look forward to collecting data on this study over the next few years and will be actively recruiting participants in the near future.

Statement of Research Advisor

The Research and Interventions for Stress-related Conditions (RISC) lab in the Department of Psychological Sciences aims to better understand neurobehavioral mechanisms underlying vulnerability for posttraumatic stress disorder (PTSD), suicide, and other anxiety and stress-related disorders. Dorothy's research expands these areas in important ways by investigating one possible vulnerability factor for PTSD symptomology. Dorothy's impressive contributions highlight the outstanding undergraduate scholarship conducted in the RSIC lab.

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Authors Biography



Dorothy E. Dreelin is a senior pursuing a B.A. degree in Psychology at Auburn University. She has been heavily involved in research at Auburn University since she began managing the Research and Interventions for Stress-related Conditions (RISC) lab in May of 2021. This upcoming fall, she will be applying to Clinical

Psychology Ph.D. programs with the intention of starting her Ph.D. in August of 2023. For her Ph.D. and future research, she intends to study risk and protective factors that overlap with both substance abuse and posttraumatic stress disorder.



Brian J. Albanese is an Assistant Professor in the Department of Psychological Science and Director of the Research and Interventions for Stress-related Conditions (RISC) lab at Auburn University. He received his B.S. in Psychology from the University of Connecticut and Ph.D. in Clinical Psychology

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