**Example Abstract: Symposium**

**Title:** Taking the lab into the clinic: Incorporating biomarkers into PTSD treatment research

**Abstract Body:**

Rumination contributes to the maintenance and onset of depression and anxiety, acts as a final common pathway for multiple vulnerabilities, and is identified as a transdiagnostic mechanism (Nolen-Hoeksema & Watkins, 2011). Thus, understanding and targeting it is a potential way to improve the effectiveness and efficacy of psychotherapy. This talk reviews the application of cognitive science principles to understanding rumination and its translation to innovations in CBT (Watkins, 2015), providing proof-of-principle of how psychological science can enhance interventions (Holmes et al., 2014).

Cognitive science research using a range of lab-based experimental paradigms and manipulations has explored what underlies pathological rumination, suggesting (a) rumination can be usefully conceived as a mental habit (Watkins & Nolen-Hoeksema; 2014; Hertel, 2004) with particular patterns of selective information processing implicated in its development and maintenance (e.g., Koster et al., 2011; Hertel et al., 2011; Watkins et al., 2012); (b) the consequences of repetitive thinking about negative content depend upon the thinking style adopted, with an abstract, decontextualized thinking style, characteristic of rumination (Watkins et al., 2015), causally implicated in increased negative emotional reactivity and impaired problem solving, relative to concrete and contextualised processing (Watkins, 2008).

This cognitive science informed Rumination-focused CBT (RFCBT), which explicitly uses functional analysis to target rumination-as-habit, and uses exercises and experiments to shift thinking style, instead of challenging thought content. In clinical trials, RFCBT is efficacious for difficult-to-treat residual depression (Watkins et al., 2010), outperforms standard CBT in treating major depression (Hvennegard et al., submitted) and prevents anxiety and depression in high risk young adults via an e-technology variant (Topper et al., submitted).

**Learning Objectives:**

1. Presented an overview and critical evaluation of rumination, its role as a transdiagnostic process and a final common pathway in psychopathology
2. Presented data & evidence from cognitive science experiments that indicate potential underlying cognitive mechanisms underpinning rumination
3. Described key therapeutic principles and data on innovative CBT treatment approaches for rumination, summarizing key recent clinical trials

Individual Abstracts

**Title:** *Predicting Dropout from Prolonged Exposure Therapy (Before it Happens): Developing a Five-Minute Prospective Psychophysiological Tool*

**Author:**

* Peter Tuerk

**Keywords:**

1. Stress
2. Psychophysiology
3. Prolonged Exposure

**Abstract Body:**

Background: The majority of combat veterans who *complete* Prolonged Exposure (PE) therapy for PTSD experience large symptom reductions on post-treatment self-report and interview measures. Yet, treatment dropout for veterans usually centers around 30 to 35%. Those who dropout of PE show no symptom reduction and continue to use mental health services at high levels. The well-established, replicable, and large effect sizes for PE completers suggests prioritization of research aimed at understanding, predicting, and lowering dropout. To date, researchers have identified few consistent or strong predictors of PE dropout based on demographic, symptom-, or trauma-related constructs. More recently, biological and psychophysiological measures are emerging as replicable predictors of PE treatment response and may have significant value for predicting PE dropout. Thus, we investigated an already established electrodermal activity (EDA) audio-tone task (Orr et al.,1995; Shalev et al., 1992) which has been previously associated with PTSD pathology and treatment outcomes, as a potential predictor of dropout in PE.

Methods: 40 treatment seeking veterans of the recent wars were administered the audio-tone task prior to beginning PE treatment. The task consisted of fifteen aversive, randomly spaced consecutive 100-decibel (dB), 1000-hertz (Hz), 500-millisecond (ms) tones, with 0-ms rise and fall times delivered concurrently with EDA monitoring. Exploratory hypotheses were generated regarding EDA responses and slope of habituation curve over the 3 to 5 minute task as prospective predictors of dichotomous dropout.  Two-sample z tests for proportion were used to explore hypotheses, adjusting for multiple comparisons.

Results: Treatment completers demonstrated expected typical reductions in PTSD symptoms on the CAPS (F=165.38, *p* d = 2.41). Shape of habituation curve on the audio tone task emerged as a strong predictor of PE dropout (z = 2.81, *p* = 0.0049, *adj. p* = 0.019), such that 91% of subjects demonstrating a quadratic habituation slope at baseline dropped out of treatment, compared to at a 41% dropout rate of those who did not. Non-statistically significant signals were evidenced for low EDA reactivity and secondary EDA arousal after initial habituation.

Conclusion: If the findings presented here are replicable, it may be likely that the reported effect is related to heterogeneous or divergent explanations for different subsets of patients. Regardless, this audio tone paradigm is promising to proactively identify individuals who are at a high risk of dropout in clinical settings, to oversample or select for increased dropout in order to help power dropout-related clinical trials with dichotomous outcomes, or to generate hypotheses regarding the mechanisms or dynamics of PTSD and PE therapy.

**Title:** *Changes in skin conductance during 60 vs 90-minute prolonged exposure therapy sessions*

**Author:**

* Carmen P. Mclean

**Keywords**

1. Psychophysiology
2. Prolonged Exposure
3. Translational Research

**Abstract Body**

Prolonged exposure (PE) is an efficacious treatment for PTSD, but its 90-minute session format is a barrier to implementation in settings which use a 60-minute session framework. Although reducing PE sessions from 90 to 60 minutes would remove a major implementation barrier, it is unclear whether shorter session duration would limit reductions in extinction-related arousal, which are associated with treatment outcomes. To address this question, the current study compared changes in skin conductance responses (SCR) during 60 versus 90-minute PE sessions. Participants were treatment-seeking, mixed-trauma patients diagnosed with primary PTSD (n=10) who were enrolled in an ongoing randomized controlled trial comparing the efficacy of 60-minute versus 90-minute sessions of PE. Electrodes measuring SCR were applied to the palmar surface of the non-dominant hand of each participant throughout the course of each therapy session during treatment, following an initial 5-minute baseline period before each session started.  Based on previous research, we hypothesized that SCR during imaginal exposure (repeatedly revisiting the trauma memory) would decrease over the course of treatment and that the amount of reduction would be similar for 60-minute (15-20 minutes of imaginal exposure) and 90-minute (30-45 minutes of imaginal exposure) sessions. Results showed significant reductions in SCR during imaginal exposure over time for both conditions (*B* = -1.03, *t*(9.62) = -3.25, *p* = .009), indicating a between-session decrease in psychophysiological arousal with repeated exposure. There were no significant differences in SCR between the 60 vs. 90-minute sessions (*p* = .21), suggesting that PE sessions of shorter duration are equally effective in reducing physiological arousal to trauma-related cues. Currently, there are 6 participants undergoing the study procedures, with an estimated additional 4 participants slated to complete the study procedures by August of 2016. Analyses will be updated to reflect this larger sample (n=20; 10 participants in each PE duration group) by September of 2016. Recording SCR during treatment provides an additional tool for researchers and clinicians to measure objective reductions in arousal to trauma memories beyond relying on patients’ subjective self-report of their distress levels. Equivalent reduction in physiological arousal across the two durations of PE session informs our understanding of the mechanisms underlying PE efficacy and has important implications for the dissemination of implementation of PE.

**Title:** *Changes in Salivary Cortisol During Psychotherapy for Posttraumatic Stress Disorder*

**Author:**

* Sheila A. M. Rauch

**Keywords**

1. Stress
2. Stress
3. Veterans

**Abstract Body**

Background: Convergent evidence suggests that the hypothalamic-pituitary adrenal (HPA) axis is disrupted in PTSD and that HPA axis normalization may be associated with symptom improvement. Thus, the current study was designed to test the association between HPA axis reactivity and treatment response in psychotherapy for PTSD.

Methods: Thirty returning veterans with DSM-IV-TR PTSD were randomly assigned to receive 10 sessions of Prolonged Exposure Therapy or Present Centered Therapy as part of a previously published RCT (2007-2012). Treatment groups were collapsed for the current analyses.  Salivary cortisol was collected three times during three therapy sessions. Cortisol reactivity was calculated by area under the curve. Hierarchical linear modeling was used to measure longitudinal change in salivary cortisol nested within patients, and to test the effects of treatment responder status at both levels.

Results: Session number was significant in the final model, indicating linear increases in cortisol output across sessions (β=1.06, p=.02). In addition, responder status significantly predicted slope of cortisol reactivity across sessions (β=1.35, p=.04). Specifically, compared to high responders, low responders exhibited a 1.35 (ug/ml) average increase in cortisol reactivity between sessions. Responder status accounted for 6% of the previously unexplained variance in cortisol reactivity.

Conclusions: As compared to high treatment responders, low treatment responders showed greater increases in salivary cortisol output over the course of treatment. These results indicate that increases in HPA axis reactivity over the course of psychotherapy may be associated with worse treatment response. Future work is needed to investigate how modulation of HPA axis reactivity may be targeted in order to optimize PTSD treatment outcomes.

Trial Registration: ClinicalTrials.gov Identifier: NCT00475241 URL:https://www.clinicaltrials.gov/ct2/show/NCT00475241?term=Rauch&rank=12

**Title:** *Identification of biomarkers of PTSD risk and resilience from virtual reality-based exposure therapies*

**Author:**

* Seth Norrholm

**Keywords**

1. Trauma
2. Technology/Mobile Health
3. Psychophysiology

**Abstract Body**

Posttraumatic stress disorder (PTSD) symptoms can result in functional impairment among active duty service members (SMs) and combat Veterans. The variability in outcomes (e.g., risk vs. resilience) may be related to underlying neurobiological alterations that can be readily indexed through psychophysiological and neuroendocrine mechanisms. For example, previous work has shown that individuals with PTSD tend to have exaggerated startle responses, altered cortisol responsivity, and elevated basal catecholamine levels. There are now emerging data regarding neurobiological consequences of exposure to trauma-related stimuli. In the current set of studies, we assessed whether psychophysiological and neuroendocrine responses to a virtual reality-based combat environment impact the relationship between PTSD symptom clusters and elements of functioning. In one study, clinically healthy SMs, within 2 months after deployment to Iraq or Afghanistan, completed self-report measures, viewed virtual-reality (VR) combat sequences, and had sequential blood draws. Norepinephrine responses to VR combat exposure moderated the relationship between avoidance symptoms and scales of functioning. Among those with high levels of avoidance, norepinephrine change was inversely associated with functional status, whereas a positive correlation was observed for those with low levels of avoidance. In an additional study, acoustic startle and cortisol responses to virtual combat scenarios in Iraq and Afghanistan Veterans predicted outcomes to virtual reality-based exposure therapy. Our findings represent a novel use of a virtual environment to display combat-related stimuli to SMs and Veterans to elucidate neurobiological mechanisms that underlie exposure treatment response and outcome.