

Bayesian estimation of the drift-diffusion model (HDDM, Wiecki 2013).

Results: Results indicate that individuals with OCD accumulated significantly less evidence during easy value-based choices ($t(51) = 5.4$, $p < 0.001$), which is consistent with reduced fidelity of value-based decision making in OCD reported by prior studies (Pushkarskaya 2015, 2017). Evidence accumulation did not differ between OCD and HC during perceptual judgements. Preliminary results link these behavioral differences to reduced connectivity in STN-related circuits.

Conclusions: Our novel results indicate that difficulties with value-based decision in OCD maybe linked to altered evidence accumulation during easy value-based judgments; disfunction of the STN circuits may contribute to difficulties with value-based decision making in OCD.

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Keywords: STN, Decision Making, OCD, Drift Diffusion Modelling

Odor Modulates the Temporal Dynamics of Fear Memory Consolidation

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Background: Systems consolidation (SC) theory proposes that recent, contextually rich memories are stored in the hippocampus (HPC). As these memories become remote, they are believed to rely more heavily on cortical structures within the prefrontal cortex, where they lose much of their contextual detail and become schematized. Odor is a particularly evocative cue for intense remote memory recall and despite these memories being remote, they are highly contextual. In instances such as post-traumatic stress disorder (PTSD), intense remote memory recall can occur years after trauma, which seemingly contradicts SC. We hypothesized that odor may shift the organization of fearful memories such that when paired with an odor during encoding, the de-contextualization process is delayed, and retrieval may still rely on the HPC, where memories are imbued with contextually rich information, even at remote time points.

Methods: We tagged odor- and non-odor associated fear memories in 47 male c57BL/6 mice and assessed recall and c-Fos expression in the dorsal CA1 (dCA1) and prelimbic cortex (PL) 1 d or 21 d later.

Results: In support of SC, our statistical analyses revealed that recent memories were more dCA1-dependent whereas remote memories were more PL-dependent. However, we also found that odor influenced this temporal dynamic biasing the memory system from the PL to the dCA1 when odor cues were present.

Conclusions: A better understanding of how memories are layered, comprised of contextual information, at the level of the engram localized to specific brain regions may provide therapeutic insight into the convergence of emotional processing and PTSD symptomatology.

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Keywords: PTSD & Anxiety, Emotional Memory, Odor Processing, DREADDs

Optimizing the Effects of Theta-Burst Stimulation (TBS)

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Background: Theta burst stimulation (TBS) is a form of transcranial magnetic stimulation (TMS) with comparable efficacy to standard TMS for depression treatment. It consists of a burst of 3 pulses at 50Hz, repeated every 200ms. Intermittent TBS (iTBS) with an inter-train interval (ITI) of 8s has been shown to facilitate motor evoked potentials (MEPs), while continuous TBS (cTBS), given continuously for 40s, reduces MEPs. Huang et al. (2010) built a theoretical model to characterize the opposing plasticity effects of cTBS and iTBS.

Methods: We modified the Huang model to systematically investigate the effect of ITI on motor cortical response to TBS. To test this new model, we recruited healthy adults, each undergoing 6 sessions of motor cortex TBS, with a different ITI in each session: 0(cTBS), 2, 5, 8(iTBS), 11, and 14s. MEPs were measured at baseline, immediately post-TBS, and after 15, 20, 25, 30, 45, and 60min.

Results: The theoretical model predicted that an ITI of 1.63s would result in a maximal change in MEP of +19.4mV, occurring 5min post-TBS. Compared to standard iTBS, ITIs of 11 and 14s would be less excitatory while 2 and 5s would be more excitatory. The effects of the modified ITI conditions (ITI=2, 5, 14s) on MEP differed significantly from cTBS and iTBS, in agreement with the model; the difference is most significant at the immediate and 25min post-TBS time point ($p < 0.05$).

Conclusions: This study investigates the effects of the ITI parameter of TBS on cortical response. Optimizing temporal parameters could potentially enhance the neuromodulatory effect of TBS.

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Keywords: Transcranial Magnetic Stimulation (TMS), Theta Burst Stimulation (TBS), Motor Evoked Potential (MEP), Computational Modeling, Neuroplasticity

PTSD Symptoms and Attachment Styles in World Trade Center Responders and Survivors: A Symptom Approach

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Background: Genetic epidemiologic studies suggest that attachment style may moderate genetic vulnerability to developing posttraumatic stress disorder (PTSD). Living with PTSD symptoms is, in turn, associated with interpersonal

difficulties, which often contribute to the chronicity of this disorder and negatively affect treatment outcomes. In the current study, we employed a novel 'symptomics' approach to identifying how individual PTSD symptoms related to attachment styles in World Trade Center (WTC) responders and survivors with PTSD participating in an ongoing trial of two web-based psychotherapies.

Methods: Data were analyzed from 86 treatment-seeking WTC responders and survivors with full or subthreshold PTSD. WTC-related PTSD symptoms were assessed using the PTSD Checklist for DSM-5 and attachment style using the Relationship Questionnaire (RQ). Relative importance analyses were conducted to compute the relative importance of each DSM-5 PTSD symptom in predicting attachment styles.

Results: Lower physical reactivity to trauma reminders (relative variance explained [RVE]=17.0%) and sleep difficulties (15.1%) were most strongly related to a secure attachment style; greater feelings of isolation from others (15.1%) and physical reactivity to trauma (13.4%) to a fearful/avoidant style; greater concentration difficulties (13.9%) and feelings of isolation from others (11.2%) to an anxious/preoccupied style; and greater hypervigilance (21.9%) and avoidance of trauma-related thoughts/feelings (11.1%) to an avoidant/dismissive style.

Conclusions: Individual PTSD symptoms were differentially associated with attachment styles in treatment-seeking WTC responders and survivors. A 'symptomics' approach to elucidating how PTSD symptoms contribute to attachment styles may help inform the personalization of PTSD treatments to address interpersonal difficulties in trauma survivors.

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Keywords: PTSD, Symptomics, Attachment Style, World Trade Center responders

Pain in the Immediate Aftermath of Sexual Assault and its Relationship to Physical Trauma During Assault

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Background: During the 20th century, it was recognized that re-experiencing, hyperarousal, and avoidance symptoms frequently develop in traumatic stress survivors and are unrelated to tissue trauma. Increasing evidence indicates that pain is another such stress-related disorder.

Methods: Adult women sexual assault (SA) survivors (n=706) presenting for care within 72 hours of assault were enrolled. The location and severity (0-10 numeric scale) of pain in each body region were assessed at presentation, one-week, and six-weeks. At one-week follow-up, pain during the week prior to SA was also assessed. Pain ≥ 4 was defined as moderate/severe, clinically significant new or worsening pain (CSNWP) in a body region was defined as pain ≥ 2 -points greater than reported pre-assault.

Results: Moderate/severe pain was present in 500/701 (71%), 418/687 (61%), and 257/619 (42%) of SA survivors at presentation, one week, and six weeks, respectively. CSNWP in one or more body regions was present in 622/699 (89%), 595/697 (85%), and 409/627 (65%) at presentation, one week, and six weeks, respectively. The most common regions of CSNWP at six weeks were the neck (29%), lower back (28%), and head and face (25%). CSNWP in ≥ 3 regions was present one week and six weeks after SA in 418 (62%) and 232 (38%), respectively. Among women conscious throughout SA (n=419), only 366/1252(29%) and 205/769(27%) of regions with pain were areas in which trauma was reported by history or identified by physical exam, respectively.

Conclusions: Pain after SA is a posttraumatic stress disorder.

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Keywords: Sexual Assault, Acute Pain, Chronic Pain, Trauma

Patterns of Altered Resting State Functional Connectivity in Klinefelter's Syndrome (47, XXY)

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Background: Structural neuroimaging studies in Klinefelter's Syndrome (KS) have revealed a reproducible pattern of anatomical alterations centered on parietal and temporal cortices. However, potential differences in functional brain architecture in KS are not known.

Methods: We conducted resting state functional magnetic resonance imaging on a cohort of individuals with KS (N = 51, ages 7-25y, mean age 17.1) and karyotypically normal male controls (N = 67, ages 7-24y, mean age 16.5). We used a data-driven approach to calculate voxel-wise whole-brain connectivity and determine group differences in this metric throughout the brain. Areas of significant group difference were then treated as seeds to identify the regions to which they showed altered functional connectivity (FC) in participants with XXY syndrome relative to XY controls.

Results: The KS group showed significantly increased global connectivity in the right cerebellum. Abnormal cerebellar global connectivity in XXY syndrome was driven by aberrant increase in connectivity between the cerebellum and a distributed set of cortical regions including bilateral dorsolateral prefrontal