analyses with the 11 functional brain connections (extracted as Fisher's z-transformed correlations between regions) as predictors and each of the 13 neurocognitive factor scores separately.
Results: Consistent with our hypothesis, one predictor materialized as significant (R = .187, R2 = .035, F = 5.55, p = .020) for the Total Sample. Largely, positive connectivity between Right Inferior Frontal Gyrus and the PCC (seed) was associated with increased aggression in the Total Sample of all participants (β = .187, t = 2.36, p = .020). One predictor materialized as significant in Individuals the 2W group, (R = .719, R2 = .518, F = 8.58, p = .019). In general, greater negative (anticorrelated) connectivity between the Left Lateral Occipital Cortex (β = -.719, t = -2.93, p = .019) and the PCC (seed) and was associated with greater aggression at 2W, but no predictors emerged at 1M or 3M. Individuals in the 6M group showed one significant predictor (R = .675, R2 = .455, F = 16.71, p = .001). Specifically, greater positive connectivity between the Right Lateral Occipital Cortex (β = .675, t = 4.09, p = .001) and PCC (seed) was associated with greater aggression at 6M. No associations were evident at 12M.
Conclusions: Overall, these findings suggest functional connectivity between the posterior hub of the DMN and cortical regions within the occipital cortex was predictive of higher aggression in individuals with mTBI. However, the direction of this connectivity differed at 2W versus 6M, suggesting a complex process of recovery that may contribute differentially to aggression in patients with mTBI. As these regions are involved in self-consciousness and visual perception, this may point toward future avenues for aiding in functional recovery of emotional dysregulation in patients with persistent post-concussion syndrome.

Categories: Concussion/Mild TBI (Adult)
Keyword 1: neuroimaging: functional connectivity
Keyword 2: aggression
Keyword 3: traumatic brain injury
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47 Predicting Impulsivity Across Multiple Stages of Time-Since-Injury in mild TBI using Resting State Functional Connectivity

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Objective: Mild traumatic brain injury (mTBI) remains one of the most silent recurrent head injuries reported in the United States. mTBI accounts for nearly 75 percent of all traumatic brain injuries in the American population. Brain injury is often associated with impulsivity, but the association between resting state functional connectivity (rsFC) and impulsivity at multiple stages since time-since-injury (TSI) is unclear. We hypothesized that rsFC within the default mode network (DMN) would predict impulsivity across multiples stages of recovery in mild TBI.
Participants and Methods: Participants healthy controls (HC: n=35 total [15 male, 20 female], age M=24.40, SD=5.95; mTBI: n=121 total [43 male; 78 female], age M=24.76, SD=7.48). Participants completed a cross-sectional study design at various post-injury time points ranging from (2W, 1M,3M,6M,12M). Participants a neuroimaging session and behavioral tasks including a psychomotor vigilance task. Impulsivity was assessed as a combination of false starts and impulsive responses on behavioral tasks. The neuroimaging session included a rsFC scan. To predict impulsivity from brain connectivity, we conducted a series of stepwise linear regression analyses with the 11 functional brain connections (extracted as Fisher's z-transformed correlations between regions) as predictors and each of the 13 neurocognitive factor scores separately. We focus here on the outcomes for the impulsivity factor.
Results: Results showed greater positive connectivity between the and Right Frontal Pole and the anterior cingulate cortex (ACC; seed) (β = .158, t = 1.98, p = .049) which was associated with greater impulsivity. Individuals in the 2W group demonstrated one significant predictor (R = .632, R2 = .399, F = 5.32, p = .050). Largely, there was greater positive connectivity between the Right Frontal Pole and the ACC (seed) and (β = .632, t = 2.31, p = .050) which was associated with higher impulsivity at the 2W time-since-injury. No predictors emerged for the 1M, 3M, or 6M conditions. However, individuals in the 12M group demonstrated two significant predictor connections (R = .497, R2 = .247, F =

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5.73, p = .007). Overall, a linear combination of greater negative (anticorrelated) connectivity between the Right Frontal Pole and the mPFC (seed) (β = -.576, t = -3.53, p = .002) and greater positive connectivity between the Paracingulate Cortex (seed) and the Left Lateral Prefrontal Cortex (β = .368, t = 2.14, p = .039) was also associated with greater impulsivity in individuals with mTBI at 12M.
Conclusions: These findings suggest functional connectivity between the anterior node of the DMN and prefrontal cortex regions involved in behavioral control was predictive of higher impulsivity in individuals with mTBI at 2W and 12M post injury, but not at other time frames. Interestingly, these connections differed at the two time points. Acutely, greater impulsivity was associated with greater connectivity among regions involved in error detection, exploration, and emotion. At one year, the connections involve regions associated with error monitoring and inhibitory processes. This may reflect compensatory strategy development during recovery.

Categories: Concussion/Mild TBI (Adult)
Keyword 1: brain injury
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48 Elevated Postconcussive Symptoms are Associated with Increased Anterior Cerebral Blood Flow and Not Cortical Thickness in Veterans with a History of Remote mTBI

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Objective: Veterans with a history of mild traumatic brain injury (mTBI) often endorse enduring postconcussive symptoms (PCS) including cognitive and neuropsychiatric complaints. However, although several studies have shown associations between these complaints and brain structure and cerebrovascular function, few studies have examined relationships between structural and functional brain alterations and PCS in the context of remote mTBI. We therefore examined whether PCS were associated with cortical thickness and cerebral blood flow (CBF) in a well-characterized sample of Veterans with a history of mTBI.
Participants and Methods: 116 Veterans underwent structural neuroimaging and a clinical interview to obtain detailed TBI history and injury-related information. Participants also completed the following self-report measures: the Neurobehavioral Symptom Inventory (NSI) for ratings of cognitive, emotional, somatic-sensory, and vestibular symptoms, and the Posttraumatic Stress Disorder (PTSD) Checklist for PTSD symptom severity. Regional brain thickness was indexed using FreeSurfer-derived cortical parcellations of frontal and temporal regions of interest (ROIs) including the superior frontal gyrus (SFG), middle frontal gyrus (MFG), inferior frontal gyrus (IFG), orbitofrontal cortex (OFC), anterior cingulate cortex (ACC), medial temporal lobe (MTL), and lateral temporal lobe (LTL). A subset of Veterans (n=50) also underwent multi-phase pseudo-continuous arterial spin labeling (MPPCASL) to obtain resting CBF. T1-weighted structural and MPPCASL scans were co-registered and CBF estimates were extracted from the 7 bilateral parcellations of ROIs. To assess the relationship between NSI total and subscale scores and ROI thickness and CBF, multiple regression analyses were conducted adjusting for age, sex, and PTSD symptom severity. False Discovery Rate was used to correct for multiple comparisons.
Results: NSI total and subscale scores were not associated with cortical thickness of any ROI. However, higher NSI scores were associated with increased ROI CBF of the SFG (q=.014) and MFG CBF (q=.014). With respect to symptom subscales, higher affective subscale scores were associated with increased SFG (q=.001), MFG (q=.001), IFG (q=.039), ACC (q=.026), and LTL CBF (q=.026); higher cognitive subscale scores were associated with increased SFG (q=.014) and MFG CBF (q=.032); and higher vestibular subscale scores

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