

Intrinsic Functional Connectivity Patterns in Comorbid PTSD and Alcohol Use Disorder vs. Alcohol Use Disorder

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Introduction: Co-occurring posttraumatic stress disorder (PTSD) and alcohol use disorder (AUD) is highly prevalent and associated with worse psychiatric health, prognosis and social outcomes than either disorder alone. Despite this, the neurobiology of this comorbidity remains understudied. We investigated group differences in intrinsic functional connectivity (IFC) between those with PTSD&AUD and AUD-alone.

Methods: In this study, 17 individuals with PTSD&AUD and 25 individuals with AUD-only underwent resting-state functional magnetic resonance imaging (fMRI). This data was preprocessed and post-processed (using fMRIPrep and XCP-D, respectively) to correct for artifacts and improve signal-to-noise ratio. Differences in IFC between PTSD&AUD and AUD-alone was evaluated using 430 node ROI-to-ROI matrices derived from XCP-D. Second-level analyses used a GLM model which included age, sex, medication use, and drinking history as covariates.

Results: A significant group difference was found in the right Default_PFCdPFCm_8 seed (Default Mode Network B (DMN); MVPA $P_{FDR} = 0.049$). In the PTSD&AUD group, *reduced connectivity* was observed with Default_PFCdPFCm_8 seed and regions in the dorsal attention A (3/10 connections), limbic B (2/10), salience-ventral, temporal parietal, cerebellar, and default B/C networks. In contrast, *increased connectivity* was seen with regions in the default A (10/30), somato-motor A/B (12/30), executive control A/C (CEN) (4/30), salience/ventral attention (2/30), the dorsal attentional B networks and the left ventral pallidum, when compared to AUD.

Discussions and Conclusions: These findings suggest that individuals with PTSD&AUD show altered IFC compared to AUD. This pattern of between-group differences may reflect difficulties in regulating internal states and external attention, which could help explain the greater emotional and cognitive challenges observed clinically in individuals with PTSD&AUD compared to those with AUD alone.

Implications for Practice or Policy: Understanding the neurobiology of a comorbidity frequently seen in the alcohol and other drug clinic will offer insight to improve treatment.

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