**TITLE:** Amplitude of low-frequency oscillations in schizophrenia and relationship to insight

**AUTHORS:** Nadia Quyyum, Sarah Clark, Aral Ahmadi

**FACULTY SPONSOR:** Dr. Jessica Turner, Associate Professor, Department of Psychology

**Introduction:** Recent studies suggest that patients with schizophrenia often have impaired insight into their illness due to brain abnormalities. There is also evidence that patients with schizophrenia exhibit differences in low-frequency oscillations (LFOs) in particular regions of the brain. We investigated the amplitude of low-frequency fluctuations (ALFF) in relation to insight in schizophrenia.

**Method:** Resting state MRI scans were obtained from 89 people with schizophrenia (SZ) and 91 healthy controls (HC) from the Mind Research Network, New Mexico. Patients were classified as low insight ($N = 24$) or high insight ($N = 65$) based on the Positive And Negative Symptom Scale (PANSS) insight item. We calculated ALFF in slow-4 (0.027-0.073 Hz) and slow-5 (0.01-0.027 Hz) frequency bands. Voxelwise ANCOVAs were conducted between SZ and HC and high and low insight groups, using age, gender, and positive and negative symptoms as covariates.

**Results:** SZ had higher ALFF in the inferior frontal gyrus, medial frontal gyrus, and insula in both frequency bands, and the anterior cingulate at slow-4. Low insight patients had higher ALFF in the insula, inferior parietal lobe, superior frontal gyrus, middle temporal gyrus, and precentral gyrus in both frequency bands. Low insight patients also had higher LFO in the cerebellum, anterior cingulate, inferior frontal gyrus, inferior temporal gyrus, and caudate at slow-5, and the fusiform gyrus, postcentral gyrus, and middle frontal gyrus at slow-4. Contrasts were corrected at the family wise level. There were no regions in which HC or high insight groups had higher ALFF.

**Conclusion:** This is the first ALFF study on insight. Consistent with previous literature, people with schizophrenia had higher LFO in frontal regions than healthy controls. Patients with low insight had higher LFO in different frontal, parietal, and temporal regions and the thalamus. These areas may be involved in self-reflective processing and have been implicated in previous studies regarding insight. Higher LFO may indicate a compensatory mechanism for those with low insight.

**Keywords:** LFO, ALFF, insight, schizophrenia