**Investigating the fractional occupancy of brain states during an emotionally salient video in psychosis using hidden Markov modelling – preregistration**

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Schizophrenia is a disorder that affects multiple domains (thought, perception, emotion). Emotional disturbances encompass negative symptoms such as flat affect and anhedonia,  alongside deficits in emotional expression, perception and recognition. Tapping into emotional processing with robust ecologically valid stimuli holds promise for characterising brain network dynamics and individual differences in psychosis.

In this study we acquired fMRI data of 80 invited participants (40 with transdiagnostic psychosis) who viewed emotional videos. We will utilise a hidden Markov model (HMM) to identify underlying brain states driven by the stimuli. We will then quantify how much time is spent in each brain state (fractional occupancy (FO)). We will link these brain states and their transitions to emotional properties of the movie. We will further validate these brain states and networks with brain maps obtained through the metanalytical open access Neurosynth database. We will compare the FO of the different brain states for our experimental vs control groups using Bayesian t-tests. We hypothesise that there will be a significant difference in the fractional occupancy of different brain states between the two groups.

The negative symptoms of schizophrenia, characterised by impaired emotional processing, form the majority of burden of disease but remain poorly understood with no effective treatments. Studying differences in occupied brain states during an ecologically valid emotional stimulus offers novel insights into the disease. These findings will shed light on new targets for ongoing investigation and treatment formulation.