

amygdala or salience network functional connectivity during rest, nor from healthy controls.

Conclusions: Anxious depression was associated with increased amygdala reactivity to emotional faces relative to non-anxious depression, suggesting that anxious depression is associated with specific neurobiological correlates. Anxious depression was not associated with differences in amygdala or salience network functional connectivity during rest, suggesting that anxious depression is specifically associated with stronger responses to external stimuli.

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Keywords: Depression, Anxiety, Amygdala, Brain Imaging, fMRI

Neural Correlates of Heart Rate-Subjective Stress Coherence

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Background: We previously demonstrated in 1,065 participants from the MIDUS-2 study (www.midus.wisc.edu) that individuals whose heart rate was more strongly associated with their self-reported stress (i.e., stronger heart rate-subjective stress coherence) had lower anxious and depressive symptoms and levels of pro-inflammatory markers (Sommerfeldt et al., 2019).

Methods: Extending this work, we assessed neural correlates of heart rate-subjective stress coherence during a functional neuroimaging emotional picture viewing task in a subset of 60 participants. Psychophysiological Interaction (PPI) analysis, using a seed region of the dorsal anterior insula, compared the connectivity from that seed region and each voxel during emotional images compared to neutral images, such that a positive PPI would indicate a larger functional coupling for emotional versus neutral images between the seed and voxel of interest. This PPI magnitude was then related to heart rate-subjective stress coherence. We hypothesized that coherence would relate to functional connectivity between the insula and anterior cingulate cortices.

Results: We instead found that functional connectivity between the right dorsal anterior insula and right primary motor and primary sensory cortices was positively associated with individual differences in heart rate-subjective stress coherence: participants with stronger heart rate-subjective stress coherence had greater PPI (cluster-based $p < .05$).

Conclusions: In light of recent evidence implicating motor cortex in top-down control of the sympathetic nervous system (Dum et al., 2016), our results underscore the importance of exploring this pathway in future studies of individual differences in heart rate-subjective stress coherence.

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Keywords: Depression, Anxiety, Wellbeing, Neuroimaging, Functional Neuroimaging, Stress

Neural Correlates of Irritability and Suicidality in Adult Outpatients With Major Depressive Disorder: Findings From the EMBARC Study

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Background: Irritability is an important yet understudied symptom domain in adult patients with major depressive disorder (MDD). Across multiple clinical trials and psychiatric illnesses, we have found that irritability is associated with suicidality and changes in irritability predicts subsequent suicidality, both independent of depressive symptoms.

Methods: Participants of Establishing Moderators and Biosignatures of Antidepressant Response for Clinical Care for Depression (EMBARC) study, randomized to sertraline or placebo, were included ($n=296$). Functional magnetic resonance imaging was used to compute resting state functional connectivity (FC) after parcellating cortical and subcortical regions in 121 parcels ($n=7260$ FC pairs). Machine learning approaches were used to identify shared and unique neural circuits associated with irritability and suicidality.

Results: In EMBARC study, irritability was highly associated with ($r = 0.73$) suicidality. Using an elastic net approach, we identified 76 and 54 FC pairs to be associated with irritability and suicidality respectively. Striatum emerged as the key hub as it was included in over a third of FC pairs associated with suicidality and irritability. A network comprising nodes in limbic (LN), salience (SN), and default mode (DMN) networks was associated with both suicidality and irritability. Unique to irritability, we found that lower connectivity of LN with executive control network, dorsal attention network, and visual network were associated with higher severity of irritability. Unique to suicidality, we found that lower connectivity of hippocampus with default mode network was associated with higher severity of suicidality.

Conclusions: Distinct neural circuits underlie the shared versus components of irritability and suicidality.

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Keywords: Irritability, Suicidal Ideation, Elastic Net, Major Depressive Disorder (MDD), Resting State Functional Connectivity