

## Volume 7, Number 9, September 2022

A brief summary of the articles appearing in this issue of *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*.

### Examining Functional Brain Connectivity and Networks

Functional connectivity (FC) in emotion- and reward-related brain networks is altered in individuals with mood disorders, but less is known about differences between high- and low-risk youth. In this longitudinal study, **Fischer et al.** (pages 855–866) identified patterns of FC in emotion and reward networks that differentiated psychiatrically healthy youths at low or high familial risk for mood disorder. FC differences were also identified that distinguished subsequent resilience versus conversion to psychopathology among the high-risk youths. Further, risk status moderated the relationship between family dynamics and limbic FC. These findings provide insight into the neural underpinnings of mood disorder risk and resilience.

FC in stress-sensitive brain networks, which undergo critical maturation during adolescence, is altered by exposure to both chronic and acute stressors. However, how trauma impacts these networks during stress in adolescents remains unclear. Using functional magnetic resonance imaging with an acute stress task, **Corr et al.** (pages 867–875) found that FC increased between default mode network (DMN) and central executive network regions and decreased between the salience network (SN) and the DMN and central executive network. Adolescents with exposure to multiple forms of victimization showed reduced FC during stress between the DMN and SN. These findings highlight the FC brain changes that may occur during periods of acute stress in adolescence and the influence of a history of victimization on these functional networks.

Activity in the SN and DMN is altered in autism spectrum disorder (ASD), but the relationship between these networks in ASD is not well understood. Using resting-state functional magnetic resonance imaging data, **Chen et al.** (pages 876–884) identified increased FC between the medial prefrontal cortex (DMN) and insula (SN) in individuals with ASD relative to a healthy comparison group. This medial prefrontal cortex–insula coupling was stronger and more stable in the ASD group and was associated with reduced social responsiveness. These findings suggest that atypical configurations between functional brain networks may contribute to ASD-associated behaviors.

Thalamic FC alterations are consistently reported in schizophrenia, including hypoconnectivity with prefrontal limbic cortices and hyperconnectivity with sensorimotor areas. These patterns may be evoked by altered neurotransmission. Here, **Avram et al.** (pages 885–894) report that, compared with placebo, d-amphetamine, LSD (lysergic acid diethylamide), and MDMA (3,4-methylenedioxymethamphetamine) increased thalamic FC with sensorimotor cortices in healthy volunteers, while changes in thalamic FC with the SN differed by substance. These findings indicate that drugs known to induce

distinct changes in neurotransmission elicit phenomena similar to those observed in patients with schizophrenia.

Smoking behavior during the first day of a quit attempt is a significant predictor of successful abstinence, yet little is known about the neurobiology of early tobacco abstinence. Here, **Yip et al.** (pages 895–904) assessed the effects of smoking status and state (deprived vs. satiated) on whole-brain FC. The authors identified differences between smokers and nonsmokers in subcortical-cerebellar and corticocerebellar networks that were largely dependent on smoking state. FC within the SN and frontoparietal network was also decreased among smokers relative to nonsmokers. These data provide insight into the effects of smoking state on functional brain connectivity.

### Neurobiology of Suicidality in Late Life

People with suicidal thoughts are at particularly high risk of engaging in suicidal actions, yet the underlying neural mechanisms remain poorly understood. In this study of patients with late-life depression, **Shao et al.** (pages 905–915) found reduced gray matter volume in DMN and lateral prefrontal regions of patients with suicidality compared with nonsuicidal patients. Alterations in ventrolateral prefrontal cortex–caudate FC were related to suicidal thoughts and actions. Use of the neural features in machine learning models improved classification of nonsuicidal versus suicidal individuals. These findings advance our knowledge of the neurobiological mechanisms of suicidality in late-life depression.

### Amygdala, Anxiety, and ASD

Structural differences in the amygdala have been linked to the presence of anxiety in children with ASD, but evidence has been limited and discrepant. Here, **Yarger et al.** (pages 916–924) found no association between anxiety symptoms and amygdala volumes in a large sample of children with ASD. Further, the presence of anxiety did not differentiate between groups of children with anxiety and autism, autism and no anxiety, and no anxiety or autism. Age, sex, and autism severity did not moderate associations between amygdala volumes and anxiety symptoms. These findings highlight the complexity of identifying associations between biological and clinical measures and the importance of factors such as large sample sizes and the careful selection of assessment methods.

### Alcohol Use Disorder and Social Behaviors

Alcohol use disorder is associated with deficits in social cognition, but its impact on specific social behaviors is unknown. In this study of prosocial decision making, **Jangard et al.** (pages 925–934) report that individuals with alcohol use disorder showed reductions in prosocial behaviors such as altruism and fairness compared with healthy individuals. These

reductions were confined to first-person interactions and were associated with decision time, attention, and moral attitudes biased towards selfish options. These findings provide insight into the individual differences in social behaviors that may be trait-related factors of alcohol use disorder.

### **Structural Connectome in PTSD**

Posttraumatic stress disorder (PTSD) is associated with structural brain changes, but whether there are coordinated

patterns of structural differences across affected cortical regions is unclear. Analyzing data from a large cohort, **Sun et al.** (pages 935–948) found that participants with PTSD had lower structural covariance than trauma-exposed control participants in networks composed of regions having the greatest PTSD-related structural atrophy. These structural covariance differences were modulated by comorbid depression, sex, and age. Together, these findings advance our understanding of the effects of PTSD on brain structure.