

in FAA may be associated with aberrant stress regulation and neuropsychiatric symptom severity during adolescence.

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Keywords: Cortisol, Cognitive Disorganization, Frontal EEG Asymmetry, Psychosocial Stress, Adolescence

Neuroimaging Defined Psychosis Spectrum Phenotypes in the General Population

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Background: Machine learning techniques are increasingly used to identify neuroimaging patterns for the diagnosis and prognosis in schizophrenia. We have previously shown that multivariate patterns of brain structural data (biosignatures) can successfully classify individuals at clinical high risk (CHR) for psychosis into those with good or poor prognosis. As the specificity of these findings is currently unknown, we applied this biosignature to a representative epidemiological sample.

Methods: A multivariate brain structural pattern (biosignature) classified 116 CHR individuals (mean [SD] age, 24.0 [5.1] years; 58 [50.0%] female) in those with poor and good prognosis. We applied this model without any in-between retraining on 594 independent healthy subjects (mean [SD] age, 52.2 [17.8] years; 305 [51.3%] female) and compared the emerging groups in terms of core cognitive and emotional processes.

Results: The model identified a cognitively efficient and cognitively inefficient group among the healthy individuals. The cognitively inefficient group (mean [SD] age, 55.8 [17.1] years; 48.1% female) had lower general intellectual ability ($T = 2.85$, $P = 0.005$) and lower performance in working memory ($T = 1.96$, $P = 0.05$), emotion recognition and regulation ($T = 2.37$, $P = 0.02$), and processing speed ($T = -3.86$, $P < 0.001$) compared to the cognitively efficient group (mean [SD] age, 47.4 [17.5] years; 55.7% female).

Conclusions: These results suggest that biosignatures relevant to poor outcome psychosis are not disease specific. However, they identify a substantial subset of the general population showing cognitive inefficiency that resembles the profile of cognitive abnormalities seen in clinical samples.

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Keywords: Multivariate Classification, MR Structural Imaging, Cognitive Vulnerability

Neuroimaging Resilience to Trauma in World Trade Center Rescue and Recovery Workers

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Background: Resilience, or the phenomenon of successful adaptation following significant trauma exposure, is a complex, multidimensional process. Here, we investigate the neural correlates of resilient outcomes across multiple domains, in a well-characterized cohort of World Trade Center (WTC) rescue and recovery workers.

Methods: Resilience was defined as residual scores from a regression of individual trauma history (weighted linear combination of childhood, adulthood, and WTC-related trauma exposures) against current psychopathology (clinician-rated PTSD and self-reported depression symptoms) and psychosocial functioning (symptom-related disruption of social/family life), using data from a discovery sample of $N=375$ WTC rescue and recovery workers. A priori functional imaging (fMRI) metrics from tasks probing emotion regulation, reward responsivity, and social cognition (current $N=36$) were then combined with other sociodemographic and cognitive measures in leave-one-(subject)-out cross-validated regularized (elastic net) multiple regression models, to determine if they were robustly related to resilience in this population.

Results: Resilience to WTC-related PTSD was positively predicted by being a traditional (emergency services) responder, premorbid IQ, cognitive function, and emotion regulation-related BOLD signal in the rostral anterior cingulate cortex ($\beta=4.28, 0.97, 1.03, 0.67$, respectively), and negatively predicted by female gender ($\beta=1.46$). Resilience to depression was positively predicted by traditional responder status and perceived social support ($\beta=0.88, 1.38$). Resilience to psychosocial disruption was positively predicted by traditional responder status, perceived social support, and social cognition-related BOLD signal in the ventromedial prefrontal cortex and superior frontal gyrus ($\beta=0.75, 0.57, 0.49, 0.20$, respectively).

Conclusions: These interim results (target $N=105$) highlight the importance of in-depth clinical phenotyping and consideration of multiple outcome domains when assessing neural mechanisms underlying human resilience.

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Keywords: Resilience, Resilience Factors, Trauma, Post-Traumatic Stress Disorder (PTSD), Functional Magnetic Resonance Imaging (fMRI)

Neuromelanin-Sensitive MRI as an Index of Norepinephrine System Integrity in Healthy Aging, Mild Cognitive Impairment, and Alzheimer's Disease

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Background: Pathology of noradrenergic neurons of the locus coeruleus (LC) is implicated in the onset of Alzheimer's disease (AD). Recent studies have suggested that a novel MRI method, neuromelanin-sensitive MRI (NM-MRI), could index the integrity of the LC in some neurodegenerative conditions.

Methods: Sixty-six cognitively normal older participants (CN), 23 participants with mild cognitive impairment (MCI), and 15 AD participants underwent a cognitive assessment including