Results: Greater widespread SA predicted better cognitive performance; this pattern was shared across groups. Greater CT among frontal regions (lateral orbitofrontal cortex, lOFC; precentral gyrus; paracentral lobule) and lateral occipital areas predicted better cognitive performance in CHR-P. In contrast, no associations were present among controls within these regions, except for the lOFC where decreased CT related to better performance.
Conclusions: Overall, results highlight the importance of decomposing volume into CT and SA, and how variation in cognition may be supported by shared and group-specific regional characteristics. Disrupted neurodevelopmental processes (e.g. accelerated cortical thinning) may adversely impact cognitive functioning in early stages of psychosis. Future studies of CHR-P should investigate how longitudinal changes in CT and SA are related with changes in cognition.
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Keywords: Clinical High-Risk States for Psychosis, Neurocognition, Cortical Surface Area, Cortical Thickness

P587. Altered Intracerebellar White Matter Fibers in Psychotic Disorders

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Background: Growing evidence implicates cerebellar circuit abnormalities in psychosis. Previous studies using diffusion magnetic resonance imaging (dMRI) have reported alterations in major white matter tracts connecting the cerebellum to other brain regions. However, less is known about the microstructural integrity of local circuits within the cerebellum.
Methods: We investigated the integrity of intracerebellar white matter tracts, as measured by fractional anisotropy (FA), in 112 participants [41 schizophrenia (SZ), 35 psychotic bipolar disorder (BD), 36 healthy control (HC)]. From dMRI scans with 80 gradient directions (b=900s/mm2) and seven b=0s/mm2 scans, we computed 2-tensor whole-brain tractography and parcellated the output using an anatomically curated fiber clustering white matter atlas (Zhang et al., NeuroImage 2018). Cerebellar clusters were appended into two larger tracts defined by an expert neuroanatomist: (1) the mossy, climbing, and Purkinje axons (MCPA), characterized by fibers located in the white matter core of the cerebellum, and (2) the intracortical cerebellar fibers (ICCF), consisting of fibers in the cerebellar cortex.
Results: There was no main effect of diagnosis on mean FA of bilateral MCPA or ICCF in ANCOVA analyses controlling for age, sex, handedness, duration of illness, and chlorpromazine equivalent antipsychotic dose. Among patients, the total PANSS score was significantly associated with mean FA in bilateral MCPA (ß=2.67 x 10-4, p=0.002), but not ICCF (ß=8.64 x 10-5, p=0.332) in regression analyses adjusted for the same covariates.
Conclusions: These findings suggest that alterations in the white matter core of the cerebellum, consisting of mossy, climbing, and Purkinje axons, may be associated with psychosis severity.
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Keywords: Schizophrenia, Psychotic Bipolar Disorder, Cerebellum, Diffusion Magnetic Resonance Imaging (dMRI), White Matter Integrity

P588. Exploring the Neural Correlates of Sense of Agency Deficits in Psychosis: A DTI Study

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Background: Patients with psychosis (PSY) are hypothesized to have a reduced ability to distinguish internally versus externally generated sensations, which may relate to delusions and hallucinations. It has been suggested that corollary discharge (CD), an internal copy of a motor command, and fractional anisotropy (FA) may be compromised in PSY compared to healthy controls (HC).
Methods: 26 PSY and 17 HC participants performed a transsaccadic detection paradigm in a functional MRI scan session, with 20 PSY and 17 HC completing diffusion tensor imaging (DTI). Psychometric functions were derived based on behavioral responses. Symptoms were measured using the PANSS and Sense of Agency Scale (SOAS).
Results: PSY displayed significantly greater perceptual thresholds than HCs (p=.038), suggesting that PSY have greater difficulty utilizing CD. There is a significant positive relationship between threshold and PANSS positive symptoms scores in PSY (rs=.387, p=.05), and an inverse relationship between threshold and SOAS across both groups. PSY displayed a significant inverse relationship (p<.05, FWE corrected), and HCs displayed a trending inverse relationship, between thresholds and FA in the cingulum, inferior fronto-occipital and superior longitudinal fasciculi, anterior thalamic radiation, and corticospinal tracts. Whole-brain FA was not significantly different between PSY and HC.
Conclusions: These findings indicate that impaired CD and SOAS may be tied to more altered white matter, partially replicating previous work evaluating transsaccadic perception in individuals with psychosis. Further tractography analysis of associated DTI data will allow us to investigate the specific pathway implicated in the CD of saccadic eye movements.

Supported By: R01
Keywords: Diffusion Tensor Imaging (DTI), Psychosis Disorders, Corollary Discharge, Sense of Agency

P589. Psychotic Features Impact Perception Rather Than Learning

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Background: The nascent field of computational psychiatry has used the framework of Bayesian inference to explain psychosis and aberrant perceptions like hallucinations. Recent studies have proposed that psychosis is characterized by an abnormal relative weight of priors over sensory likelihood, but their conclusions are sometimes conflicting.
Methods: We propose to gain insight by disentangling the weights of the prior and the sensory likelihood (rather than using a relative weight) and disentangling the learning of priors from their use in a perceptual decision. Unlike previous studies, we can do so by combining a dedicated pair of categorization tasks (with and without learning of priors) and a computational model. We explored inter-individual differences in psychiatric features (psychotic, anxious, autistic) and both model-free and model-based analyses of behavior.
Results: Subjects' perception (n=244) was generally shaped by priors (be they learned or not) and sensory likelihood (p values$<$ 0.001). However, subjects with more severe psychotic features exhibited a reduced weight of the sensory likelihood in their decision, both when priors are learned or explicitly given (multiple linear regression of the psychometric features on the logistic weights of likelihood: -0.24 and -0.17, p values: 0.002 and 0.03). A computational analysis of learning dynamics showed that this reduced weight of the sensory likelihood did not alter the learning of priors and was specific to the decision stage (weight of psychotic features on the prior/likelihood balance in decision = 0.25, p value: 0.002).
Conclusions: Those results are consistent with previous studies and enable new interpretations to previously conflicting studies on psychosis.
Supported By: Fondation pour la Recherche Médicale
Keywords: Bayesian Observer Model, Psychosis-Proneness, Categorical Perception

P590. Predicting General Psychopathology With Multimodal Speech and Language Features

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Background: Computational advances and developments in automated speech and language analysis allow for the exploration of automated prediction of symptom expression and clinical phenotypes. In this study, we used multimodal speech and language features to predict general dimensions of psychopathology across a cross-diagnostic sample.
Methods: Language samples were obtained from adults with psychotic disorders (PD, n=48), other non-psychotic psychiatric disorders (OD, n=88) and healthy volunteers (HV, n=37). Speech features were generated corresponding to parts of speech, sentiment, network characteristics, and general features like word count and sentence length. Clinically, participants were assessed across multiple domains of psychopathology, including with the Basic Symptom Inventory (BSI). A preliminary evaluation of the BSI suggested a single dimension for psychopathology severity, which we predicted using LASSO regression models. Ongoing analyses examine whether speech features can predict clustering among participants based on BSI and clinical ratings.
Results: A correlation analysis showed moderate relationships between general psychopathology and sentiment (arousal, valence, dominance, absolute r=0.37-0.49, p$<$0.001) and weak correlation with parts of speech (i.e., adjectives, particles, and pronouns, r=0.20-0.21, p$<$0.05). We were able to predict general psychopathology with moderate success (R2=0.33). Key computational features predominantly included parts of speech features (i.e., proportion of interjections, particles, and pronouns) and graph features (i.e., clustering coefficients, graph density, and average shortest path length), as well as sentiment and sentence length.
Conclusions: Automatically extracted speech and language features were modestly predictive of general psychopathology as measured by the BSI. Parts of speech and graph network properties were especially promising in the prediction of psychopathology severity.
Keywords: Natural Language Processing (NLP), Schizophrenia Spectrum Disorders, General Psychopathology

P591. Modeling Cross-Diagnostic Speech Disturbance With Semantic and Structural Speech Graphs

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Background: Computational modeling of speech disturbance generates promising biomarkers for several areas of psychopathology, including psychotic and mood disorders. Here, we evaluate an alternative method of examining speech graphs by quantifying semantic role relationships— i.e., who is doing what to whom.
Methods: Free speech samples were gathered from individuals with schizophrenia spectrum disorders, other non-psychotic disorders, and healthy volunteers (n=37 per group). Participants were matched on word count to reduce the moderating effect of speech quantity. Semantic relationships were identified via automated semantic role labeling. Structural (nodes: words; edges: sequential relationships) and semantic graphs (nodes: arguments + predicates; edges: action/predication relationships) were generated. Network features were