putamen and left hippocampus, right putamen and right caudate nucleus, left superior frontal and right inferior orbitofrontal regions, as well as long-range connections between left and right occipital cortex and left cingulate gyrus, left supramarginal gyrus and right temporal pole. Two negative correlations between the SVM decision scores for ROP and measures of the RAVLT were significant (delayed recall: r=-0.3, Bonferroni –adjusted p<.04; recall after interference: r=-0.3, Bonferroni-adjusted p<.02).
Discussion: The classification performance was driven by a rsFC pattern including areas involved in memory processing, such as hippocampus and cingulate gyrus (Allen et al., 2007) as well as regions related to language processing, such as the supra marginal gyrus (Li et al., 2009). The negative correlation of rsFC-based decision scores with RAVLT measures shows that patients whose verbal learning and memory is more severely impaired exhibit a more distinctive rsFC pattern than patients with less impaired verbal memory.

T138. ACOUSTIC PATTERNS IN SCHIZOPHRENIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background: Individuals with schizophrenia are characterized as presenting atypical voice patterns: poverty of speech, increased pauses, distinctive pitch (mean and variability). Voice atypicalities may play a role in the social impairment experienced by patients, and could constitute a window into motor, cognitive, emotional and social components of the disorder. Indeed, they have already been generally associated with negative symptoms. However, the state of the evidence for atypical voice patterns and their relation to clinical features is uncertain. Studies using clinical rating scales indicate that voice alterations are severe across many voice properties. In contrast, quantitative acoustic studies seem to have found less robust and more variable results limited to specific features. We therefore systematically reviewed the literature quantifying acoustic patterns in schizophrenia, and performed a meta-analysis of the evidence. We aimed at identifying evidence for acoustic markers of schizophrenia and its clinical features, needs for further research and barriers to collective advancements on these issues.
Methods: We adopted the "PRISMA Statement" guidelines for transparent reporting of a systematic review. The literature search was conducted on Pubmed and Google Scholar (details and pre-registration at https://goo.gl/H1yDpm). Study selection was conducted according to the following inclusion criteria: (a) empirical study, (b) quantification of acoustic features in the vocal production of participants with schizophrenia, (c) sample including at least two individuals with schizophrenia, (d) inclusion of a comparison group, or an assessment of variation in acoustic features in relation to severity of clinical features. We identified 54 studies as eligible for inclusion and contacted all authors to obtain missing estimates and individual-level data, where possible. 34 studies availed enough information to be included in a meta-analysis. The meta-analysis consisted of mixed effects regression models, one per each relevant acoustic feature.
Results: Of the 37 authors contacted, 59% responded and 5% provided at least some of the requested data. Chief reasons of denials were: i) data loss (n = 8), ii) effort required (n = 5), iii) ethical concerns with data sharing (n = 1). On the results available we found significant meta-analytic effects of schizophrenia in percentage of spoken time (n = 6, d = -1.16, 95% CIs: -2.06 -0.27) and proportion of pauses (n = 5, d = 0.56, 95% CIs: 0.15 0.96). After controlling for influential studies, we found significant differences also in pitch mean (n = 5, d = 0.40, 95% CIs: 0.12 0.68) and pitch variability (n = 6, d = -0.46, 95% CIs: -0.70 -0.23). No effects were found for pause duration (n = 7), speech rate (n = 9), speech duration (n = 5) and pitch intensity (n = 5). We found evidence for publication bias for studies investigating pause duration and pitch variability.
Key concerns on the meta-analysis are: i) small sample sizes, ii) heterogeneity of task and acoustic processing methods, iii) lack of demographic and clinical individual-level data necessary to control for confounds (e.g. medication and relation to clinical features).
Discussion: We found clear effects of increased pause behavior in schizophrenia and less clear effects of pitch. However, the magnitude of these abnormalities is limited and contrast with the large effect sizes reported by studies using clinical rating scales. Future research should focus on larger sample sizes, systematic assessment of multiple acoustic features and multiple speech tasks, standardized acoustic processing methods, and individual level data available. More reflection is needed on how to make data sharing possible within privacy and ethical constraints.

T139. ELECTRORETINOGRAM ABNOMALIES IN SCHIZOPHRENIA PATIENTS WITH VISUAL HALLUCINATIONS

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Background: Retinal dysfunctions have been integrated in cognitive models of visual hallucinations in several pathologies such as Parkinsonian syndromes or eye diseases. Besides, structural abnormalities of the retinal ganglion cells are documented in schizophrenia and have been associated to visual hallucinations (VH) in neurological disorders. We aim to study functional abnormalities of retinal ganglion cells in schizophrenia patients with VH.
Methods: We measured the activity of retinal ganglion cells using electroretinogram according to ISCEV criteria. We compared the amplitude and implicit time of the P50 and the N95 waves of the pattern electroretinogram in schizophrenia patients with VH (VH group, n = 7), Auditory Hallucinations or no hallucination (AH/NH group, n = 8) and controls (n = 30).
Results: Preliminary findings show a significant increase of the N95 implicit time in the HV group compared with controls (p = .05). No difference was found between the HV and HA/NH groups but a gradient appeared to emerge between the 3 groups.
Discussion: Functional impairment of the retinal ganglion cells appears to be more pronounced in schizophrenia patients with HV. The increase of N95 implicit time may be interpreted as a dysfunction of retinal ganglion celles rather than a cell loss. These preliminary results need to be confirmed with a larger sample.

T140. RESTING STATE NETWORKS ALTERATION IN SCHIZOPHRENIA

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Background: While functional MRI and PET studies have shown altered task-related brain activity in schizophrenia, recent studies suggest that such differences might also be found in the resting state (RS). Here we used ICA based analysis to investigate RS fMRI data to compare connectivity of 11 well known networks (Auditory, Cerebellum, DMN, Exectutive Control, Fronto-parietal 1, Fronto-parietal 2, Salience, Sensorimotor, Visual1, Visual2, Visual3 network) between patients with schizophrenia and healthy controls suggesting deficits in related neuropsychological functions.
Methods: We obtained RS fMRI series (3T, 3x3x3mm resolution, 45 slices, TR 2.55s, 210 volumes) in 25 schizophrenia patients (mean age 30a±7.3), on stable antipsychotic medication and 25 matched healthy controls (30.3a±8.6). Subjects were asked to lie in the scanner keeping eyes closed with no further specific instructions. Data were pre-processed; we applied

FSL MELODIC (pICA) yielding IC, we used FIX to auto-classify ICA components which represent artifacts and an automated routine to select for each subject the component matching the anatomical definition of resting state networks. SPM12 was used for second level analysis, we used two sample t-test to compare networks functional connectivity between groups. We then analysed the power spectrum density (PSD) for the extracted networks, estimating the power of the signal at different frequencies.
Results: Our method reliably identified all networks in every control and patients. We found significant differences in the anatomical pattern of areas. Patients showed decreased functional connectivity in comparison to healthy controls in portions of Cerebellum, DMN, Executive Control, Fronto-parietal1 and sensorimotor networks; in addition patients showed increased functional connectivity in comparison to healthy controls in portions of DMN network. Finally, PSD was found altered in patients with Schizophrenia when compared to healthy controls in Fronto-parietal1, Sensorimotor, visual1and visual2 networks.
Discussion: Well known resting state networks were reliable identified from RS fMRI in Schizophrenia patients. The differences in anatomical distribution point to possible alterations in functional connectivity in Schizophrenia, which suggests disruption in Cerebellum, DMN, Executive control, Fronto-parietal and sensorimotor activity. The comparison of the PSD suggests changes in Fronto-parietal1, Sensorimotor and in addition visual1, visual2 networks.

T141. CHARACTERIZATION OF HEMODYNAMIC ALTERATIONS IN SCHIZOPHRENIA AND BIPOLAR DISORDER AND THEIR EFFECT ON RESTING-STATE FUNCTIONAL CONNECTIVITY

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Background: Schizophrenia (SZ) and bipolar disorder (BP) have both common and distinct clinical symptomatology. Their neural bases have been explored using functional connectivity between brain regions using resting-state functional magnetic resonance imaging (rs-fMRI). However, fMRI is an indirect measure of neural activity and is modeled as a convolution of the hemodynamic response function (HRF) and latent neural activity. The HRF varies across both individuals and different brain regions within an individual. Consequently, it is plausible for two brain regions to appear synchronized in the BOLD space while being desynchronized in latent neural space and vice versa.
Methods: In order to address this issue, we estimated voxel-specific HRFs by deconvolving rs-fMRI time series obtained from SZ (N=19), BP (N=35) and matched healthy individuals (N=34). The shape of the HRF was significantly different between the three groups in many regions previously implicated in SZ and BP. Specifically, we found voxels within the mediodorsal, habenular and central lateral nuclei of the thalamus to have HRFs with aberrations in all three of its shape parameters: time to peak, response height and full width half max. Therefore, we defined this region as the seed, estimated seed-based functional connectivity maps in all three groups and characterized pairwise differences between them. Further, we performed a 2-way ANOVA and estimated regions exhibiting an interaction between the group and deconvolution factors.
Results: We found voxels within the mediodorsal, habenular and central lateral nuclei of the thalamus to have HRFs with aberrations in all three of its shape parameters: time to peak, response height and full width half max. Results indicated that functional connectivity differences between the groups are inferred significantly differently with raw BOLD and deconvolved latent neural time series. Since the variability of the HRF could be driven by both neural and non-neural factors, we feel that it is preferable to estimate functional connectivity using deconvolved data.
Discussion: Neurochemicals such as GABA, glutamate, serotonin and nitric oxide have a role in controlling neurosignaling pathways underlying neurovascular coupling and hence the HRF. Previously documented alterations of these neurochemicals in SZ and BP could, at least in part, explain the significant differences in HRF shapes observed between the groups. Functional connectivity group differences obtained from raw BOLD data must be interpreted cautiously in the light of systematic HRF differences between groups.

T142. PARIETAL CONNECTIVITY IN SCHIZOPHRENIA AND PSYCHOTIC BIPOLAR DISORDER: A COMBINED STRUCTURAL AND DYNAMIC FUNCTIONAL CONNECTIVITY STUDY

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Background: The role of parietal lobe in psychotic disorders is poorly understood. In independent previous studies, we have observed that (1) the severity of disorganization is associated with reduced cerebral blood flow to bilateral parietal angular gyrus in patients with schizophrenia (2) disorganization is more pronounced in patients who have morphological abnormalities in left parietal supramarginal gyrus (3) the global connectivity of right parietal supramarginal region is reduced in schizophrenia compared to bipolar disorder with psychosis. We aimed to delineate the nature of parietal dysconnectivity in the 2 major psychotic disorders and to study the relationship between the syndrome of disorganization and structural and functional connectivity of the parietal lobe with rest of the brain. We also related parietal connectivity to the global assessment of functional status (GAF scores) and processing speed scores among patients with schizophrenia.
Methods: We recruited 16 subjects with psychotic bipolar disorder and 34 subjects with established schizophrenia, age- and sex- matched with 32 healthy controls. Both patient groups were medicated, and were in a clinically stable state. Diffusion Tensor Imaging (DTI) and resting state fMRI data were obtained using a 3T MRI scanner. Using 90 regions as defined in the AAL atlas, deterministic tractography was performed (FSL v5.0 and TrackVis). For each of the 90*90 connections, fractional anisotropy weighted by number of streamlines, and normalised by average fiber length was used as the index of structural connectivity. 90*90 functional connectivity values were also obtained for each subject using the fMRI data (SPM8 and DPARSFA). Dynamic connectivity (variance) was estimated using a sliding window approach (13 bins; 240 time points; TR=2.5s). The primary variable of interest across the 2 imaging modalities was the graph metric of weighted average degree from all parietal lobe nodes in the AAL atlas with all other nodes of the brain. Using ANOVA, we compared the degree of parietal connectivity among the 3 groups of subjects. Three multiple regression analyses were conducted to assess relationships between parietal connectivity (degree of right and left structural and dynamic functional connectivity) and severity of disorganisation, processing speed (digit symbol substitution test -DSST) and GAF scores.
Results: The 3 groups differed significantly on the degree of left parietal structural connectivity (F=6.5, p=0.002, HC>BIP=SCZ) and on the degree of left (F=6.4, p=0.003; BIP=HC>SCZ) as well as right parietal (F=5.2, p=0.008; BIP=SCZ>HC) dynamic functional connectivity. Parietal dysconnectivity predicted the severity of disorganisation (model F=4.1, p=0.01) in SCZ. Disorganization was particularly associated with reduced left parietal structural (β=-0.45, p=0.02) and dynamic connectivity (β=0.40, p=0.04) but not with the right parietal dysconnectivity. DSST scores were associated with reduced left parietal structural connectivity (β=0.44, p=0.04). GAF was increased in patients with higher right parietal dynamic functional connectivity (β=0.38, p=0.04).
Discussion: Both structural and dynamic functional parietal dysconnectivity are seen in the 2 major psychotic disorders - schizophrenia and bipolar