disorder. Left-right asymmetry in parietal dysconnectivity is notable, especially among patients with schizophrenia. Parietal dysconnectivity plays a role in the processing speed as well as global functioning deficits in schizophrenia. Taken together, these findings suggest that the degree of connectivity of parietal lobe could be an important determinant of symptom burden, specific cognitive deficits as well as functional capacity in psychotic disorders.

T143. NOT A NUISANCE ANY MORE: GLOBAL FMRI SIGNAL AT REST, PROCESSING SPEED AND SYMPTOM SEVERITY IN SCHIZOPHRENIA

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Background: Before data from resting-state functional magnetic resonance imaging (rs-fMRI) is analyzed, the global signal (GS) - average blood-oxygen level dependent (BOLD) signal across all voxels in the brain - is normally removed through global signal regression (GSR). This convention arose in order to control for changes in brain activity that are usually of no interest but may be caused by non-neuronal factors, including changes in respiratory rate, arterial CO2 levels or cardiac pulsation. However, recent studies have indicated that GS may systematically vary between patients with schizophrenia and healthy controls. In addition to testing this notion, we also studied if the dynamic variance of global signal across time carried any meaningful information that relates to overall symptom severity and information processing speed in patients with schizophrenia.
Methods: Data was collected from 39 in a clinically stable, medicated early stage of schizophrenia (median duration of illness= 6.5 years), and 34 sex, age and parental socioeconomic-status matched healthy controls over a 10-minute period of eyes-open rest at TR=2.5s (3T Philips Achieva, 240 time points, dual-echo, gradient-echo EPI). Scores were obtained from the Signs and Symptoms of Psychotic Illness (SSPI) scale and the Digit Symbol Substitution Test (DSST). Rs-fMRI time-series data were motion-corrected (using 6 parameters), slice-time corrected, reoriented with structural images, band-pass filtered (0.01–0.1 Hz), scrubbed using ArtRepair for framewise displacement and transformed to MNI space. SPM8 and the advanced version of the Data Processing Assistant for resting-state fMRI (DPARSFA) were used for this purpose. GS mean was computed from all grey matter voxels using a template mask in MNI space, using grand mean scaling to a base of 1000, averaged across all time-points. The variance of GS across time (dynamic GS variance) was computed from the entire 10-minutes of acquisition (240 time points).
Results: Independent-sample t-tests used to compare GS mean between controls (mean[sd] = 3135.1[1244.4]) and the SCZ group (mean[sd] = 3207.8[1191.7]) yielded no significant results [t(71) = -0.14, p = .89]. The temporal variance of GS did not differ between controls (mean[sd] = 113.05[59.41]) and the SCZ group (mean[sd] = 118.02[57.93]) [t(71) = -0.36, p = .72]. In the SCZ group there was a significant correlation between the total SSPI score reflecting overall illness severity (□ = -.322, $p < 0.05$) and the mean GS. This relationship was especially pronounced for the syndrome of Reality Distortion (rho = -.344, $p < 0.05$) and Disorganization (rho = -.303, p = 0.065), where higher symptom severity was seen in patients with lower mean GS.
Dynamic variance in GS was higher in healthy controls with lower mean DSST (r = -.364, p = 0.04), but no such relationship was seen in the SCZ group (r = .066, p = .694). Notably, when compared to controls (mean[sd] = 57.4[9.40]), patients (mean[sd]=42.4[9.97]) had significantly lower DSST scores [t(69) = 6.47, $p < 0.001$]. Neither GS nor GS variance related to root mean square of framewise displacement in the 2 groups.
Discussion: We did not find an overall increase or reduction in the global signal in patients with schizophrenia. Nevertheless, the strength of global signal obtained from resting fMRI is related to severity of persisting symptoms of schizophrenia, whereas the dynamic variance of this signal relates to the speed of processing ability assessed outside the scanner in healthy subjects. With emerging evidence relating global signal to cognitive vigilance and overall brain connectivity, our results indicate that global signal is a parameter of interest that should not be automatically discarded in resting fMRI studies of schizophrenia

T144. THE ROLE OF TRANSIENT BETA OSCILLATIONS IN ABERRANT SELECTIVE ATTENTION TO SALIENT EVENTS IN SCHIZOPHRENIA

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Background: Selective attention to situationally salient information is aberrant in schizophrenia. Following the presentation of behaviourally relevant stimuli, oscillatory power in the beta-band (13-30Hz) typically decreases (Event-Related Desynchronisation – ERD) then increases (Event-Related Synchronisation – ERS). The ERD-ERS pattern is a potential marker for the processing of behaviourally salient events. In a previous magnetoencephalography (MEG) study (Liddle et al Hum. Brain Mapp. 2016; 37:1361–74) we found that in people with schizophrenia, ERS was reduced. Recently, Jones (Curr. Opin. Neurobiol, 2016; 40: 72–80) proposed that the relatively continuous beta-synchronisation observed in trial-averaged data may reflect the probability distribution of transient beta events discernible in single trial data. She cited both animal and human data consistent with a neural model in which these beta bursts are generated by transient input to pyramidal neurons via distal dendrites concurrent with input to deeper layers presumed to be from thalamus. External stimuli are less likely to be perceived during the time period immediately following a transient beta event. The model is consistent with the hypothesis that transient beta bursts are an index of top-down modulation of the processing of perceptual information, and raises the possibility that aberrant control over this modulation might contribute to aberrant selective attention in schizophrenia. We hypothesized that in relevant trials, the beta-burst probability distribution would be skewed towards the latter part of the trial, reflecting a period of suppressed beta-burst probability, and thus of enhanced stimulus perception, followed by a period of increased burst probability, possibly reflecting sensory suppression following stimulus processing.
Methods: We recorded MEG data in 23 patients with schizophrenia and 37 healthy controls during the performance of a relevance modulation task designed to assess neural effects of situational salience. Data were recorded using a 275-channel CTF system (Coquitlam, Canada). Visual stimuli that were either task-relevant or task-irrelevant were presented in alternating, predictable, order. Beamformed data time courses were computed for 8 previously defined brain networks. Time-frequency spectrograms were computed for each trial, from 0 to 1500 ms following stimulus presentation. A 2-D peak-detection algorithm was used to identify transient increases in oscillatory power. The time point of any peak occurring within the beta band (~15–25 Hz) was recorded, and the median of these time-points computed for each trial. These medians were averaged within each participant for each trial type (relevant; irrelevant) as a measure of central tendency of the probability distribution of the beta-bursts.
Results: On average, between one or two beta-bursts were recorded per trial. As predicted, these occurred significantly later during behaviorally relevant trials than during irrelevant trials, in all networks, $F(1,58)= 93.5$, $p<0.001$), consistent with normal post-event beta enhancement. This effect was significantly attenuated in schizophrenia, $F(1,58)=6.01$, p=.017.

Discussion: These findings add to the evidence that patients with schizophrenia have reduced ability to allocate attention to behaviorally relevant information. Furthermore, the demonstration of an abnormality potentially accounted for by neural modelling of top-down influence on perceptual processing opens the way to understanding the relevant neural mechanism and to developing neuromodulatory treatments that might alleviate aberrant selective attention in schizophrenia.

T145. ALTERATIONS IN SUPERFICIAL WHITE MATTER IN THE FRONTAL CORTEX IN SCHIZOPHRENIA: A DWI STUDY USING A NOVEL ATLAS

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Background: Alterations in brain connectivity are strongly implicated in the pathophysiology of schizophrenia (SZ). Very recently, evidence is mounting to suggest that changes in superficial white matter (SWM) U-shaped short range fibers are integral components of disease neuropathology, a theory that is supported by findings from postmortem studies and less often in vivo in patients with SZ. This diffusion weighted imaging (DWI) study aimed to investigate SWM microstructure in the frontal cortex in people with SZ.
Methods: Whole brain tractography was performed in 31 people with SZ and 54 healthy controls using BrainVISA and Connectomist 2.0 software. Segmentation and labelling of superficial white matter tracts were performed using a novel atlas characterizing 100 bundles. Principal Components Analysis (PCA) using a varimax orthogonal rotation was performed on mean generalised fractional anisotropy (gFA) of bundles located in the frontal cortex. Composites scores were computed for each subject, reflecting a linear combination of mean gFA values.
Results: PCA revealed three components explaining 19.7 %, 5.8 %, and 5.4 % of the total variance. The mean score of the second component was significantly lower in the people with SZ compared with controls ($p = 0.01$) and included 13 bundles connecting regions in the pars orbitalis, insula, pars triangularis, pars opercularis, orbitofrontal cortex, anterior cingulate, superior frontal cortex and middle frontal cortex.
Discussion: Our results support findings of reduced white matter integrity in the frontal cortex in people with SZ. Moreover, PCA may be helpful in identifying specific networks as the deficits do not appear to be widespread. Identifying patterns of superficial white matter dysconnectivity may be helpful in understanding the prominent symptoms and cognitive deficits and observed in SZ.

T146. AROUSAL AFFECTS DIFFERENTIALLY FIRST-EPISODE PSYCHOSIS PATIENTS AND CONTROL SUBJECTS' DEFAULT MODE NETWORK FUNCTIONING DURING MOVIE VIEWING

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Background: Functional alterations of the default mode network (DMN) are frequently reported in psychotic disorders, but the functional role of these alterations remains poorly known. In addition to previous studies that have applied different types of tasks or recorded resting-state neuroimaging data, there has recently been more interest in the use of movie stimuli in studying brain functioning in patient populations, because this could provide a more naturalistic account of brain functioning in real life-like situations.
Methods: Seventy-one first-episode psychosis (FEP) patients (mean age = 26.0 yrs, 47 (66%) males) and 57 controls (mean age = 26.86 yrs, 24 (42%) males) from the Helsinki Early Psychosis Study watched scenes from the movie Alice in Wonderland (Tim Burton, 2010) during 3 T fMRI-BOLD imaging. We used intersubject correlation (ISC) analysis, in which the correlation between voxel-wise BOLD time series in every within-group pair of subjects is calculated. In this study, time-windowed ISC was calculated with a 10-TR (time of repetition, 1.8 s) window with 1-TR steps over the fMRI time series. In each ISC window, a two-sample t test was performed to obtain a t-statistic time series of differences between the groups. An independent group of control subjects (n = 17, 10 males, mean age 26.5 yrs) rated how emotionally arousing the currently seen events of the stimulus are, producing a time-varying rating used as a regressor. General linear model was used to identify brain regions where the t-statistic time series covaries with the arousal rating. To make the interpretation of results less ambiguous, the arousal rating was divided into high and low arousal regressor by z scoring the rating and taking only the positive and negative values, respectively. Nonparametric clusterwise permutation test was used for statistical inference (cluster-defining threshold of $p = 0.05$, familywise error corrected threshold of $p = 0.05$, number of permutations = 5000). Furthermore, by using an experience-sampling setup during the same brain-scanning session, a partially overlapping sample of participants reported how emotionally aroused they were feeling during scanning.
Results: The results show significant correlation between the t-statistic time series and low arousal regressor, especially in the DMN including the anterior and posterior cingulate cortex, medial prefrontal cortex, precuneus, and bilateral lateral temporoparietal regions. Closer inspection reveals that during moments of low arousal in the movie stimulus, the ISC of healthy controls goes up but the ISC of patients does not. In the experience-sampling portion of the study, the patients reported more arousal than the control subjects.
Discussion: Intersubject correlation in the DMN depended differentially on arousal in FEP patients and control subjects. More specifically, during moments when the stimulus was rated less emotionally arousing, control subjects' DMN functioning synchronized more while the patients' did not. In connection with the difference in reported arousal during the same imaging session, our findings provide preliminary evidence for a contribution of arousal on the functional alterations of the DMN and suggest that this may be related to higher baseline arousal in the patients. Higher arousal and the related distortion of high order integrative functioning that characterizes DMN could contribute to the pathogenesis of psychosis.

T147. DECREASED STRIATAL REWARD PREDICTION ERROR CODING IN UNMEDICATED SCHIZOPHRENIA PATIENTS

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Background: Reinforcement learning involves flexible adaptation towards a changing environment and is driven by dopaminergic reward prediction error (RPE; outcome (R) – expectation (Q)) signaling in the midbrain and projecting regions, such as the ventral striatum (Schultz, 1998). Schizophrenia patients show heightened dopamine levels in the striatum (Howes et al., 2012) as well as deficits in reinforcement learning (Waltz, 2016) which may be mediated by disrupted prediction error signaling