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

(Heinz and Schlagenhauf, 2010; Schlagenhauf et al., 2014). Using model-based fMRI, the present study aims to assess these neural signals during a reversal learning paradigm in unmedicated schizophrenia patients and healthy individuals.

Methods: In the current study, 19 schizophrenia patients and 23 age- and gender-matched healthy controls completed a reversal learning paradigm (Boehme et al., 2015) during fMRI scanning where subjects had to choose between two neutral stimuli to maximize their reward. A Rescorla Wagner learning model (Single Update, one learning rate) was fitted against the individual choice data using a softmax function. Individual RPE trajectories from the fitted Rescorla Wager learning model were correlated with the BOLD response during feedback onset. Parameter estimates of ventral striaral RPE trajectories were correlated with psychopathology scores from the PANSS (Kay et al., 1987).

Results: In the reversal learning task, schizophrenia patients chose the correct stimulus less often compared to healthy individuals (percent correct choices: 65.7 ± 10.7 vs. 76.7 ± 7.7; t=3.7, p=0.001). Across all participants, the RPE trajectories correlated with BOLD response in the bilateral ventral striatum (left ventral striatum [-10 12 10], t=7.40, pFWE <0.001, right ventral striatum [10 12 -10], t=6.56, pFWE=0.006). Schizophrenia patients displayed decreased RPE coding in the right ventral striatum compared to healthy individuals ([14 14 -10], t=3.69, pSVC for nucleus accumbens = .015). In patients, extracted parameter estimates from the right ventral striatum correlated negatively with the PANSS total symptoms score (Spearman's rho =-0.55, p=0.018).

Discussion: We found that unmedicated schizophrenia patients performed worse in the reversal learning task and displayed decreased striatal prediction error signaling. This neural deficit was increased in patients with overall higher symptom severity. While RPE coding seems to be intact in patients receiving antipsychotic medication (Culbreth et al., 2016), our findings are in line with previous studies in unmedicated schizophrenia patients (Reinen et al., 2016; Schlagenhauf et al., 2014). Therefore, deficient neural coding of this core reinforcement learning mechanism may reflect a characteristic of the disorder of schizophrenia and does not result from antipsychotic medication.

T148. THALAMIC-CORTICAL CONNECTIVITY IN PATIENTS WITH AUDITORY HALLUCINATIONS IN SCHIZOPHRENIA

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Background: The auditory verbal hallucinations (AVH) prevalence among patients diagnosed with schizophrenia is more than 70% (Hugdahl et al, 2008). The brain mechanisms of AVH are not yet clarified. In the currect study, we explore the specific brain connections that are usually associated with perception and reception of the speech, being present in patients with AVHs.

Methods: In total 70 patients with first psychotic episode, 41 with auditory hallucinations and 29 patients who had never experienced hallucinations were included into the study based on the following criteria: non-hallucinated patients were defined using PANSS scores (Hallucinations P3 scored as 1)/hallucinated patients (PANSS P3 score 3). All patients underwent resting MRI scans. We analysed the resting state functional connectivity between temporal cortices including TPJ structures (supramarginal gyrus and angular gyrus, parahypocampal gyrus) and predefined thalamic nuclei that are parts of the auditory pathways, specifically: the medial geniculate nuclei(MGB), the mediodorsal nuclei (MDN), having a big spectrum of connections with the limbic system and the reticular thalamic nuclei (RTN) which is a main source of inhibitory signals (using detailed atlas of thalamus, Morel, 2003).

Results: The analysis revealed the increased connectivity between mediodorsal nucleus L and Hesch gyrus (L, R), pahahippocampal gyrus (L,R) as well as between mediodorsal nucleus (R) and parahipocampal gyrus (L). The decreased connectivity was detected between medial geniculate body (L), Medial geniculate body (R) and inferior parietal lobule (L) as well as between medial geniculate body (L) x parahyppocampal gyrus (L) (FDR corr p=0.05).

Discussion: We confirmed our hypothesis on the altered connectivity between thalamic nuclei and auditory cortex (Heshl gyrus, parahippocampal gyrus) and inferior parietal cortex in patients with AVHs. The findings go in line with other studies on functional dysconnectivity with right hippocampal formation and mediodorsal thalamus compared to patients without lifetime AHs (Diederen et al, 2010; Shinn et al, 2013). The patterns of decreased connections presumably indicate a sensory defect: decreased connectivity between medial geniculate nuclei (main auditory pathway) and parahippocampal gyrus (memory retrieval) and inferior parietal cortex (interpretation of sensory information, Radua et al, 2010). The patterns of increased connections presumably imply alterations of emotional processing (projections from mediodorsal nuclei to auditory cortex) and deserve further investigation.

T149. METACOGNITIVE DEFICITS IN INTEROCEPTION ARE ASSOCIATED WITH DISSOCIATIVE EXPERIENCES IN PATIENTS WITH FIRST EPISODE PSYCHOSIS

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Background: Dissociative experiences, including depersonalization and derealisation, represent perturbations of consciousness and selfhood, and are commonly reported by patients during early stages of a psychotic illness. The continuity and integrity of a conscious sense of self is proposed to be grounded upon the control of internal physiological state and its predictive representation through interoception, i.e. the sensing of internal bodily changes. We tested the hypothesized relationship between dissociation and interoceptive deficits in patients with first episode psychosis (FEP), combining behavioural testing with functional neuroimaging.

Methods: Individuals with first episode psychosis (N=41) and matched community control participants (N=21) performed an interoceptive task (heart-tone synchrony judgments) during functional magnetic resonance imaging (fMRI). Trial-by-trial confidence ratings indexed subjective performance, and measures of metacognitive interoceptive awareness (insight) were derived from confidence-accuracy correspondence. We tested for regional brain activity relating to dissociative symptom scores and objective, subjective and metacognitive aspects of interoception.

Results: In patients with FEP, metacognitive impairments in interoception predicted magnitude of dissociative symptoms, accompanied by hypoactivation of right insula cortex. Other dimensions of interoception, and accuracy, confidence and metacognitive insight on an exteroceptive task were unrelated to dissociative symptoms and there were no group differences between FEP patient and control groups.

Discussion: Our findings suggest that symptoms of disturbed conscious integrity and selfhood in early psychosis arise through selective disruption of higher-order metacognitive representations of interoceptive signals. Brain systems supporting the conscious integration of bodily feelings may represent a target for interventions to enhance functioning and, speculatively, mitigate illness progression in psychosis.