Results: In our preliminary analyses, patients show significantly lower MSCEIT scores. Furthermore, MSCEIT scores are directly related to FA values in the tracts connecting prefrontal cortex to anterior cingulate and superior temporal gyrus in the patients.
Discussion: Social cognition impairments seem to be associated with altered structural connectivity in the patients.

S175. AMOTIVATION IS ASSOCIATED WITH SMALLER VENTRAL STRIATUM VOLUMES IN OLDER PATIENTS WITH SCHIZOPHRENIA

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Background: Motivational deficits are prevalent in patients with schizophrenia, persist despite antipsychotic treatment, and predict long-term outcomes. Evidence suggests that patients with greater amotivation have smaller ventral striatum (VS) volumes. We wished to replicate this finding in a sample of older, chronically medicated patients with schizophrenia. Using structural imaging and positron emission tomography, we examined whether amotivation uniquely predicted VS volumes beyond the effects of striatal dopamine D2/3 receptor (D2/3R) blockade by antipsychotics.
Methods: Data from 41 older schizophrenia patients (mean age: 60.2 ± 6.7; 11 female) were reanalysed from previously published imaging data. We constructed multivariate linear stepwise regression models with VS volumes as the dependent variable and various sociodemographic and clinical variables as the initial predictors: age, gender, total brain volume, and antipsychotic striatal D2/3R occupancy. Amotivation was included as a subsequent step to determine any unique relationships with VS volumes beyond the contribution of the covariates. In a reduced sample (n = 36), general cognition was also included as a covariate.
Results: Amotivation uniquely explained 8% and 6% of the variance in right and left VS volumes, respectively (right: β = -.38, t = -2.48, P = .01; left: β = -.31, t = -2.17, P = .03). Considering cognition, amotivation levels uniquely explained 9% of the variance in right VS volumes (β = -.43, t = -0.26, P = .03).
Discussion: We replicate and extend the finding of reduced VS volumes with greater amotivation. We demonstrate this relationship uniquely beyond the potential contributions of striatal D2/3R blockade by antipsychotics. Elucidating the structural correlates of amotivation in schizophrenia may help develop treatments for this presently irremediable deficit.

S176. SYSTEMATIC REVIEW AND META-ANALYSIS OF MAGNETIC RESONANCE IMAGING FINDINGS IN 22Q11.2 DELETION SYNDROME

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Background: Since the 22q11.2 Deletion Syndrome (22q11.2 DS) is the most important genetic model for psychotic disorders, an increasing interest in its brain structural and functional abnormalities has arisen in the last decade. However, studies so far have reported inconsistent findings. Therefore, the aims of the present study are 1) to systematic review the literature on structural and functional brain abnormalities associated to 22q11.2 DS and 2) to identify the most consistently reported abnormalities through a meta-analysis of structural (sMRI) and functional magnetic resonance imaging (fMRI) studies.
Methods: The following electronic databases were systematically searched: PubMed, ETHOS, Kings Open Portal, EMBASE, MEDLINE, PsycINFO and CINHAL. Studies were included if they presented original data, were written in English, had a sample size larger than 5, had a healthy control comparison group, and if they reported results from a whole brain analysis. As we were interested in identifying abnormalities in both brain structure and function, in the systematic review we included studies that used different imaging techniques (i.e. sMRI, fMRI and diffusion tensor imaging (DTI)). The meta-analysis was performed with studies reporting results in standardised-space coordinates (e.g. Talairach), using the Activation Likelihood Estimation (ALE) method. Results were corrected at cluster level with family wise error correction (p=0.01) and 1000 permutations.
Results: Seventy-three original articles were included in the systematic review, 25 of these were also included in the meta-analysis. Forty-two sMRI, 23 fMRI and 11 DTI articles were retrieved. Only one study performed a direct comparison between 22q11.2 DS individuals with and without psychosis.
The systematic review revealed that the most affected areas were the frontal middle gyri bilaterally, the posterior cingulum bilaterally, the right cuneus, the precuneus bilaterally, the right superior temporal gyrus, the left parietal inferior gyrus and the left side of the cerebellum.
The meta-analysis revealed consistent abnormalities in a cluster located in the inferior parietal lobe (4936 voxels, peak of activation in the coordinate -44 -52 48) and extending to the superior temporal gyrus, supramarginal gyrus and precuneus. A second cluster of consistent activation is found in the posterior cingulate cortex (3104 voxels, peak of activation in the coordinate 6 -50 16).
Discussion: The systematic review revealed widespread abnormalities throughout the brain, mainly within areas involved in visual and speech processing, language, and within association areas. The meta-analysis of structural and functional studies revealed consistent abnormalities in the inferior parietal lobe, an area consistently found affected in psychosis.
Only few studies on 22q11.2 DS individuals with psychosis were available and most studies included young individuals (mean age 15.12) rather than adults. 22q11.2 DS is one of the most compelling genetic models of schizophrenia, however most imaging studies do not provide clinical data on psychotic symptoms. This could partially be explained by the relatively low mean age of the overall sample; some participants could have been too young to manifest psychotic symptoms. Finally, the present study does not allow to make inferences on brain changes overtime as longitudinal studies were scarce.
Future studies should adopt a longitudinal design and investigate brain abnormalities in adults with 22q11.2 DS displaying symptoms of psychosis. This would help to clarify the brain structural and functional features associated with this particular form of psychosis and their longitudinal course.

S177. FRONTAL CORTICAL PLASTICITY IN SCHIZOPHRENIA PATIENTS EXAMINED BY LTP-INDUCING ANODAL TDCS AND REPETITIVE EEG

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Background: Frontal cortical deficits have repeatedly been shown to be relevant in the development of psychiatric disorders and are supposed to evoke characteristic psychiatric and cognitive symptoms in schizophrenia. It is assumed that plasticity and connectivity impairments following non-invasive brain stimulation, which are observed as common patterns in the motor system of schizophrenic patients, are as well present in frontal cortical areas and cause the mentioned dysfunctions. Until now experimental evidence is lacking substantiating that this hypothesis is correct and both cortical regions show similar patterns of deficits. Hence, this study aimed to assess the plasticity and connectivity in the frontal cortex of schizophrenia patients.
Methods: We applied anodal transcranial direct current stimulation (a-tDCS) to evoke long-term potentiation (LTP)-like plasticity in the dorsolateral prefrontal cortex (DLPFC). This non-invasive brain stimulation has been demonstrated to evoke plasticity in frontal cortical regions. As tDCS modulates cortical activity we employed electroencephalography (EEG) measurements to trace potential deficits in patients with schizophrenia compared to healthy participants. In total 20 schizophrenia patients and 20 age, gender and handedness matched healthy controls received 13Min of a-tDCS (1mA). EEG was measured before and after plasticity induction (up to 50 minutes) to record neuronal changes in excitability and plasticity.
Results: First analyses obtained a significant EEG alpha-activity change after LTP application in the frontal cortex of schizophrenia patients. This effect remained stable up to 50 minutes following a-tDCS stimulation.
Discussion: We were able to show for the first time that anodal tDCS is capable of inducing stable EEG alpha-activity changes in the frontal cortex of schizophrenia patients. Future analyses will focus on differences to healthy participants, which we hypothesize to show similar but stronger patterns of activity changes after a-tDCS stimulation.

S178. ALTERED GYRIFICATION IN THE SCHIZOPHRENIA SPECTRUM

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Background: Increased gyrification in diverse cortical areas has been reported in patients with schizophrenia, which is considered to reflect deviations in early neurodevelopment. Schizotypal personality disorder (SPD) is thought to be a prototypic disorder within the schizophrenia spectrum, which shares biological and psychological commonalities with schizophrenia as a neurobiological basis for vulnerability factors. However, to the best of our knowledge, no magnetic resonance imaging (MRI) studies have investigated the gyrification pattern in SPD.
Methods: T1-weighted structural MRI scans were obtained by 1.5-T scanner from 101 patients with schizophrenia, 46 patients with SPD, and 77 age- and gender- matched healthy control subjects. Using FreeSurfer software (version 5.3.), the local gyrification indices (LGIs) of entire cortex were obtained with the method of Schaer and colleagues. Clinical symptoms of the patients were rated with the Scale for the Assessment of Positive Symptoms (SAPS) and the Scale for the Assessment of Negative Symptoms (SANS) at the time of scanning. A general linear model controlling for age, gender, medication dose, and duration of medication was used to compare the LGIs across the groups and to conduct vertex-by-vertex whole brain LGI correlation analyses with clinical variables. This study was approved by the Committee on the Medical Ethics of Toyama University based on the declaration of Helsinki. After a complete description of the study was provided, written informed consent was obtained from all subjects.
Results: Compared with the controls, the patients with schizophrenia showed significantly higher LGI in widespread cortical areas including the bilateral frontal, parietal, and occipital regions. The patients with SPD demonstrated significantly higher LGI in the bilateral frontal and left parietal regions compared with the controls. Compared with the patients with SPD, the patients with schizophrenia showed significantly higher LGI in the left occipital and right frontal regions. Both SAPS and SANS total scores were positively correlated with LGI in the bilateral temporal regions in patients with schizophrenia, and were negatively correlated with LGI in the bilateral occipital regions in patients with SPD.
Discussion: Increased LGI in the bilateral frontal regions may be the common morphological substrates for the schizophrenia spectrum, possibly representing vulnerability to schizophrenia. In addition, increased LGI in the left occipital and right frontal regions preferentially observed in schizophrenia may have a critical role in manifestation of florid psychotic symptoms.

S179. PROGNOSTIC UTILITY OF MULTIVARIATE MORPHOMETRY IN SCHIZOPHRENIA

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Background: Groups of spatially distributed regions show shared variance in morphometric properties (e.g. grey matter volume) among subjects, thus forming independent morphometric 'sources' or covariance-based networks. Source based morphometry is a multivariate approach that is based on independent component analysis, and accounts for the inter-relationahsip among different brain regions while filtering out noisy artefactual effects of mass univariate voxel-based approaches. We have previously demonstrated that with multivariate SBM, it is possible to identify the structural basis of subtle psychopathological features such as formal thought disorder, whose anatomical correlates have been hitherto elusive. In the current study, we use multivariate SBM to identify the morphometric sources in drug-naïve first episode subjects that show progressive changes that predict symptom change over 1 year.
Methods: 63 first-episode, drug-naive patients with schizophrenia underwent brain magnetic resonance imaging scans at baseline (T0) and rescanned after 1 year follow-up (T1). Positive and Negative Syndrome Scale (PANSS) was used to assess their psychopathology. Source based morphometry (SBM) was performed to analyze the gray matter volume (GMV), paired T contrasts for loading coefficients of GMV were constructed to detect the components that showed a significant effect of time. The change in PANSS scores between baseline and 1 year was expressed as a ratio of the scores at baseline - adjusted change scores for positive symptoms (POS%), negative symptoms (NEG%) and disorganization symptoms (DISORG%), with each domain score derived using van der Gaag's 5-factor approach. Multiple regression analysis was conducted to predict the percentage change scores in each domain using the T0 and T1 loading coefficients of components showing time effect with age, gender and cumulative antipsychotic dose as covariates.
Results: Of the 30 spatial components of gray matter identified by SBM, loading coefficients of anterior cingulate cortex (ACC), anterior insula (AI) & inferior frontal gyrus (IFG), superior temporal gyrus (STG), middle temporal gyrus (MTG) and dorsal lateral prefrontal cortex (DLPFC) reduced with time in patients. The lower volume of AI & IFG at baseline and at 1 year related to poor improvement in positive and disorganization symptoms; lower volume of STG & MTG at baseline and 1 year predicted poor improvement in negative symptoms.
Discussion: The baseline distribution of GM in AI & IFG, STG and MTG are predictive of the course of illness. The relationship between GM sources and symptom severity continues even after 1 year of naturalistic exposure to antipsychotic treatment. If judiciously combined with other available predictors of prognosis, source-based morphometric analysis can aid meaningful prognostication in schizophrenia.