with less negative symptoms and controls (Fig. 1). Our reward task correlates well with negative symptoms. Thus, it could offer a behavioral measure of negative symptoms. It could be a good instrument to study the neurobiological basis of negative symptoms using functional techniques.

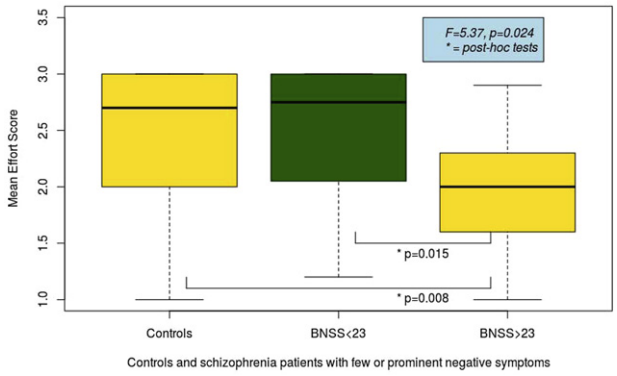

Fig. 1 Reward task output in controls and schizophrenia patients

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EW0695

Brain connectivity in patients with schizophrenia related to psychological stress

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Introduction It is commonly accepted that in most patients with schizophrenia external factors act on genetic predisposition to produce active psychotic symptoms. In fact, we showed that patients with schizophrenia have an abnormal brain activation and peripheral autonomic response to psychological stress. We sought to characterize the brain connectivity networks of such response in schizophrenia.
Methods We studied the pattern of brain connectivity in relation to mental arithmetic stress paradigm in 21 patients and 21 healthy subjects aged 18 to 50 years, using 3T-fMRI. A period of 6 minutes of resting state acquisition (PRE) were followed by a block design with three 1-minute CONTROL task (one digit sum), 1-minute STRESS task (two digit subtraction) and 1-minute rest after task (POST). Pairwise Pearson correlations were calculated between 90 regions of interest. Data were analyzed with MATLAB and SPSS software.
Results Patients with schizophrenia showed a lower connectivity network between fronto-temporal limbic areas compared with control subjects during control and stress task. Moreover, we observed a great variability of link density during resting state in patients but not in controls, and it diminishes in response to task.
Conclusions Patients present abnormalities in networks related to stress response showing an alteration in fronto-temporal connectivity, and a poor and random modulation of these networks at rest. Current and previous findings suggest abnormal fronto-temporal connectivity that ultimately would lead to psychotic symptoms emergency in response to an environmental stressor and, even, could be related to hypervigilance and misattribution feeding into the paranoid cognition characteristic of patients with schizophrenia.

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EW0696

Non-verbal learning disorder: Neuropsychological profile and neural correlates. A structural magnetic resonance imaging study

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Non-verbal learning disorder (NVLD) is a neurological condition which is considered to be a learning disability. It is characterised by a specific dysfunction in motor, visuospatial and social skills in patients with a normal intellect and development of language. Warning signs in school are poor psychomotor coordination, arithmetic skills and drawing activities. Social judgment and social problem solving are also typically impaired. Furthermore, these patients seem to have increasing risk of emotional disorders. Most of imaging studies and current theories suggest that a dysfunction of white matter in the right hemisphere could be the cause. However, there is a lack of consensus among experts regarding whether NVLD exists and what could be the underlying causes for NVLD symptoms. The aim of this paper is to clarify the neural correlates underlaying the cognitive functioning of these patients. With this objective, we analyzed a sample of brains of children with and without NVLD. We used the structural MRI technique and the voxel-based morphometry analysis. The diagnosis of the children were based on neuropsychological data. The present study suggests that not only white matter of the right hemisphere is dysfunctional in these patients. Some other gray matter areas such as precuneus (superior parietal lobule) may also be affected in NVLD.
Disclosure of interest The authors have not supplied their declaration of competing interest.

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EW0697

Apathy in depression: An arterial spin labeling study

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Introduction Apathy is usually defined as a lack of goal-directed behavior. Although it is observed in about 30% of depressed patients, neurovascular mechanisms underpinning apathy remain little-known.
Objectives The main objective of this study was to compare the cerebral perfusion of apathetic depressed patients with non-apathetic depressed patients by arterial spin labeling (ASL), a quantitative and non-invasive perfusion magnetic resonance imaging (MRI) technique. The secondary objectives were to study their clinical profile and their correlation with cerebral perfusion data.
Methods This study was conducted from a cohort of depressed patients in Rennes, France. Eighty-three depressed patients were included, of whom 22 were apathetic (AES≥42), 61 non-apathetic (AES < 42). Everyone got a clinical evaluation with scale screenings, especially for apathy (AES), anxiety (STAI) and anhedonia (SHAPS) as well as a cerebral MRI, including a pseudo-continuous ASL sequence.

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Results Apathetic depressed patients were significantly less anxious and less anhedonic. Apathetic perfused better than non-apathetic in the inferior frontal gyrus ($P = 0.022$). We found a significant positive relationship between apathy and perfusion of the left frontal inferior gyrus ($P = 0.05$, $r = 0.21$). State-anxiety was positively correlated with perfusion of the cingulate cortex, the insula and the left amygdala. Anhedonia was positively correlated with the perfusion of the ventromedial prefrontal cortex, the cingulate cortex and the insula.
Conclusions We have shown that the clinical and perfusional profiles of apathetic depressed and non-apathetic differ. This study suggests the existence of two distinct neurobiological networks for depressed patients; one involving motivational networks for apathetic patients, and another one involving emotional networks for more anhedonic patients.
Disclosure of interest The authors have not supplied their declaration of competing interest.

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EW0698

Brain anatomy of symptom stratification in schizophrenia: A voxel based morphometry study

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Introduction Although some magnetic resonance imaging (MRI) studies have investigated the existence of a relationship between clinical severity and neuroanatomical alterations in patients with schizophrenia (SCZ), the biological signature associated with illness severity in schizophrenia is still uncertain.
Objectives This study aims to investigate structural brain abnormalities in SCZ with particular regards to the identification of potential deficits associated to the severity of illness.
Methods 1.5 T MRI data were acquired for 61 subjects with SCZ and 59 matched healthy controls (HC). The patient group was divided in two subgroups based on clinical severity, one composed by 34 mild-to-moderately ill patients and the other one by 27 severely ill patients, and compared with matched HC.
Results The whole group of patients with SCZ had significantly reduced gray matter (GM) volumes in left inferior and middle temporal gyrus compared to HC ($P < 0.05$, pFWE corrected). Furthermore, compared to HC, patients with mild-to-moderate illness showed decreased GM volumes in inferior temporal gyrus ($P < 0.05$, pFWE corrected) whereas those with severe illness had reduced right cerebellum ($P < 0.05$, cFWE corrected). No differences were observed between the two subgroups of patients.
Conclusions Our results showed significant GM volume reductions in left inferior and middle temporal gyrus in patients with SCZ compared to matched HC, confirming the role of this region in the pathophysiology of SCZ. Furthermore, we identified specific cerebellar gray matter volume reductions in patients with severe illness, which may contribute to stratify patients with SCZ according to their clinical phenotype expression, ultimately helping in guiding targeted therapeutic/rehabilitation interventions.
Disclosure of interest The authors have not supplied their declaration of competing interest.

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EW0699

Neural functional correlates of empathic face processing: An activation likelihood estimation (ALE) meta-analysis of fMRI studies

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Introduction Empathy is evolutionary preserved in social organisms and emotional face processing is one of its measures. Systems possibly active during empathic processing include perspective-taking, basic emotional contagion "mirroring" and "theory of mind" systems.
Objectives fMRI studies help clarifying neural correlates of empathic face processing; ALE meta-analysing fMRI studies allows identification of brain area activation/deactivation during empathy.
Aims To identify brain areas most consistently involved in empathy.
Methods We carried ALE meta-analysis of original studies focusing on cerebral activations during empathic face processing tasks and reporting data on Talairach or MNI space coordinates, converting the former in the latter. An 11-April-2016 PubMed search, using as keywords terms like empathy combined with functional magnetic resonance imaging (fMRI), produced 124 records of which 23 were finally included (568 participants, 247 males and 321 females; mean age 32.2 years). We followed the PRISMA statement. Whole-brain data were meta-analysed; significance was set at $P = 0.0001$, uncorrected.
Results ALE meta-analysis of data from 21 experiments (totalling 527 foci) on empathic face processing during experimental task conditions showed that emotional vs. neutral/control conditions significantly correlated with activations of left anterior cingulate cortex (BA 32), right precentral gyrus (BA 6), left amygdala, right superior frontal gyrus (BA 9), left middle occipital gyrus (BA 37), right insula (BA 13), left putamen, and left posterior cingulate cortex (BA 31).
Conclusions Empathy is a complex process correlating with activation of different brain areas, which have been involved in emotional cue processing, self-other/same-different discrimination, perspective-taking, mirror neuron activation, emotional arousal and decision-making.
Disclosure of interest The authors have not supplied their declaration of competing interest.

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