Introduction

Schizophrenia is a psychiatric disorder characterized by positive, negative, and cognitive symptoms (e.g., delusions, abnormal motor behaviours) [1]. Impulsive behaviours have been associated with aggression in schizophrenia and is related to a large degree of psychiatric hospitalizations. However, the neural basis underlying these behaviours are not well understood [2].

A probabilistic reasoning task, called the FISH task (Figure 1), and an evidence integration task, used to test the bias against disconfirmatory evidence (BADE) (Figure 2), are visual tasks that have been found to be strongly related to the presence of schizophrenia symptoms in schizophrenia patients [3,4].

Objective

This study aims to examine the functional brain networks underlying the two visual task experiments in healthy controls and schizophrenia patients to elucidate the commonly activated functional brain networks and their association with abnormal motor symptoms.

Methods

Patients with schizophrenia (n=68) and healthy subjects (n=40) completed both the FISH and BADE tasks in the fMRI scanner.

Results

Three functional brain networks were extracted from the fMRI-CPCA analysis:

- No group differences were observed between schizophrenia patients with and without delusions.
- Group differences were observed between healthy and schizophrenia in the response network (Figure 3), demonstrated by hyperactivity for schizophrenia patients in the FISH task followed by reduced suppression in both tasks.

Discussion

Hyperactivity and reduced suppression in the response network is concurrent with previous literature indicating this response may be related to deficiencies in impulse inhibition.

The presence of excess dopamine in schizophrenia leading to greater activation of the substantia nigra leads to inhibition of the globus pallidus, which ultimately reduces the inhibition of the thalamus [6].

This leads to a greater motor output which may provide a biological basis for this deficiency in inhibiting movement.

Future investigations should investigate the differential activation of the thalamus and related structures with respect to the activation of the response network.

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Reference / Bibliography