Cognitive Functioning in Adults and Young People Diagnosed with Schizophrenia

SUMMARY

The Mental Health Foundation funded two research projects at the Institute of Psychiatry concerned with the difficulties that people diagnosed with schizophrenia experience with some cognitive tasks (thinking, memory, language). These projects aimed to increase understanding of the causes of cognitive difficulty and to evaluate ways of improving cognitive performance.

- **Study 1** used state-of-the-art functional magnetic resonance imaging (fMRI) scanning techniques to explore whether people diagnosed with schizophrenia and their close relatives (identical twins) show similarly unusual patterns of brain activity when carrying out language tasks.

- Both people diagnosed with schizophrenia and their twin brothers/sisters showed unusual patterns of brain activity when performing verbal fluency tasks. This suggests that unusual brain activity during this task may be related to genetic vulnerability to schizophrenia, as opposed to schizophrenia per se.

- People diagnosed with schizophrenia also had difficulty in identifying their own distorted speech, but their relatives who had no experience of psychosis did not show this difficulty. This task may, therefore, be able to discriminate between people with a genetic risk and people who have actually experienced psychosis.

- **Study 2** was an evaluation of Cognitive Remediation Therapy (CRT), with young people diagnosed with schizophrenia at a relatively young age. CRT uses guided mental exercises to improve thinking, concentration and memory.

- CRT was associated with significant additional improvements in the young people's memory and flexibility of thinking.

- CRT has the potential to improve the quality of life of young people recovering from an episode of psychosis. The researchers are continuing to analyse data from additional participants in order to increase the power of the study.
BACKGROUND

People are usually diagnosed with schizophrenia because they have had psychotic experiences, such as hearing voices or holding bizarre beliefs. However, people with schizophrenia have also been found to differ from other people on measures of brain activity when performing certain cognitive tasks. For example, when asked to think of words beginning with a certain letter (the verbal fluency task) people diagnosed with schizophrenia tend to show unusual patterns of activation in the prefrontal cortex. Difficulties on cognitive tasks (attention, memory and problem solving) can affect recovery, by making it hard for someone to return to education or work. Although anti-psychotic drugs can be very helpful in controlling psychotic experiences such as delusions and hallucinations, they have little impact on problems of thinking and memory. Cognitive remediation therapy (CRT) has been used with adults to improve their cognitive performance, but hitherto it has not been evaluated with younger age groups.

THE RESEARCH: STUDY 1

An fMRI investigation of fronto-temporal network dysfunction in schizophrenia

Vivienne Curtis, Robin Murray & Philip McGuire, of the Institute of Psychiatry, London, used fMRI to examine whether people diagnosed with schizophrenia and their close relatives have difficulties in carrying out certain cognitive tasks, or show unusual brain activity when doing so. The aim was to learn more about how genetic and environmental factors influence brain function and the risk of psychotic experiences.

Participants: 6 people diagnosed with schizophrenia and their co-twins, aged 20-35 years.

Participants carried out two cognitive tasks while receiving an fMRI scan:
- Verbal fluency - thinking of as many words as possible beginning with a given letter.
- Verbal self-monitoring - listening to speech which has been distorted by lowering its pitch, and trying to decide if it is one’s own speech or that of someone else.

A new method of discontinuous scanning was developed so that the tasks could be performed during brief periods when the scanner (which is normally noisy) was silent.

THE FINDINGS: STUDY 1

- On the verbal fluency task, participants diagnosed with schizophrenia showed reduced levels of activity in specific areas of the brain (the inferior frontal and temporal cortex and the medial prefrontal cortex) compared with their co-twins without a diagnosis of schizophrenia.

- Twins without a diagnosis of schizophrenia whose co-twins had schizophrenia also showed reduced activation (of the inferior frontal and temporal cortex and the cingulate gyrus) during this task, compared with twins where neither had a diagnosis of schizophrenia.

- On the verbal self-monitoring task, those participants diagnosed with schizophrenia were more likely to misidentify their own distorted speech as belonging to someone else. Being a co-twin of someone with schizophrenia was not associated with misidentifying speech.
THE RESEARCH: STUDY 2.

Cognitive Remediation: a new psychological treatment for young people with schizophrenia

Dr Sophia Frangou & Professor Til Wykes, of the Institute of Psychiatry set up a randomised controlled trial of cognitive remediation therapy (CRT) for children and young people aged 14 to 23 years diagnosed with schizophrenia. CRT involves the use of guided mental exercises to improve cognitive functioning, for example by teaching strategies for processing information and increasing attention span.

34 young people were assessed using tests of cognitive function, behaviour and clinical problems. They were allocated randomly to either CRT or standard psychiatric care for three months, in addition to any drug treatment they were receiving. After three months they were re-assessed.

THE FINDINGS: STUDY 2

- The study confirmed that young people with a recent diagnosis of schizophrenia have a range of behavioural and cognitive problems. These improve with medical and nursing care but are not fully resolved.
- CRT was associated with significant additional improvements in memory and flexibility of thinking.
- A larger number of participants is required in order to increase the power of the study. However, on the basis of the current data the researchers conclude that CRT can ameliorate the cognitive deficits found in young people diagnosed with schizophrenia, and can therefore contribute to improved quality of life.
- CRT may be most effective if used once the participants have recovered from their acute psychotic experiences.

THE IMPLICATIONS

It is important to note that these are preliminary findings, as both studies are continuing to collect additional data.

The findings of Study 1 will contribute to our understanding of genetic factors in psychosis and will also help future researchers select appropriate cognitive tasks when examining brain function. The findings suggest that impaired verbal fluency performance may be associated with genetic vulnerability to psychotic experiences, while difficulties in verbal self-monitoring are more related to having experienced psychosis. This study has also resulted in the development of a new methodology for fMRI scanning.

Study 2 indicates that CRT has the potential to make an important contribution to improving the quality of life of children and young people with psychotic experiences and associated cognitive difficulties. If additional data support this trend, CRT should be made available to young people with schizophrenia, in order to help them return to education and employment. The Government has stated that by 2004 all young people who experience a first episode of schizophrenia will receive the early intensive support they need. This research suggests that early treatment should also be followed by appropriate intervention such as CRT to aid recovery.
Further reading:

For further details of Study 1, please contact:
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For further details of Study 2, please contact:
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The Foundation is grateful to the Golden Charitable Trust and Barnwood House Trust for funding this research.

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