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Episodic memory in schizophrenic patients and their relatives

T. Toulopoulou [a,*], S. Rabe-Hesketh [b], H. King [a], R.M. Murray [a], R.G. Morris [c]

[a] Division of Psychological Medicine [Box 63], Institute of Psychiatry, De Crespigny Park, London SE5 8AF, UK
[b] Department of Biostatistics and Computing, Institute of Psychiatry, London, UK
[c] Department of Psychology, Institute of Psychiatry, London, UK

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Abstract

Background: Memory dysfunction among healthy relatives of patients with schizophrenia suggests that genetic liability to the disorder can also be manifested as cognitive impairment. This study was designed to further elucidate the nature of the memory dysfunction being transmitted. *Method*: Memory function was assessed in 62 schizophrenic patients, 98 of their healthy relatives and 66 controls. Material-specific immediate/delayed recall and percentage retention were investigated using the Logical Memory and Visual Reproduction tests of the Wechsler Memory Scale (WMS). A third subtest of the WMS, the Associate Learning and a visual analogue of it, the Abstract Paired Associates, were used to measure verbal and visual learning. Current general intellectual function was assessed using a five-subtest short-form of the Wechsler Adult Intelligence scale—Revised (WAIS-R). *Results*: Schizophrenic patients performed significantly worse than controls on nearly all measures. Their relatives also showed significant deficit on the immediate and delayed recall of the Logical Memory, immediate recall of the Visual Reproduction, and the Abstract Paired Associates tests. Logical memory was substantially more impaired than the other measures for both patients and relatives. The deficit in immediate recall of the Logical Memory remained significant even after excluding those relatives with an Axis I diagnosis and schizotypal personality disorder. These findings were despite the relatives having an equivalent level of general intellectual function to that of controls. *Conclusion*: Familial, presumed genetic, liability to schizophrenia may be expressed as dysfunction in verbal memory.

Keywords: Genetic liability; Cognitive dysfunction; Relatives; Verbal memory; Visual memory

1. Introduction

Dysfunction in short-term (Stirling et al., 1997; Beatty et al., 1993) and long-term declarative memory, encompassing both its episodic (Rushe et al., 1999; Goldberg et al., 1990, 1993, 1995; Landrø, 1994; Duffy and O'Carroll, 1994; Saykin et al., 1991; McKenna et al., 1990) and semantic aspects (Duffy and O'Carroll, 1994; Goldberg, 1993; Tamlyn et al., 1992) has been frequently reported in schizophrenia (see Aleman et al., 1999 for a meta-analysis). Impairment is present in first-episode (Binder et al., 1998; Albus et al., 1996; Hoff et al., 1991) and unmedicated schizophrenic patients (Saykin et al., 1994), and persists throughout the course of

* Corresponding author. Tel.: +44-207-848-0061; fax: +44-207-701-9044.
E-mail address: t.toulopoulou@iop.kcl.ac.uk (T. Toulopoulou).

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illness (Mockler et al., 1997; Heaton et al., 1994; Nopoulos et al., 1994; Landrø, 1994). It appears to be independent, at least in part, of medication (Rushe et al., 1999; Tamlyn et al., 1992) and symptom (especially positive) effects (Stirling et al., 1997; Gur et al., 1997).

Impairments especially in working memory (Krabbendam et al., 2001; Cannon et al., 2000), and episodic memory (Krabbendam et al., 2001;), including both its verbal (Faraone et al., 1995, 2000; Toomey et al., 1998; Goldberg et al., 1993, 1995; Lyons et al., 1995) and visual aspects (Faraone et al., 2000; Goldberg et al., 1993), have also been found in some relatives of patients with schizophrenia (see also Byrne et al., 2000, 1999; Laurent et al., 1999; Faraone et al., 1995, 1999; Cornblatt and Obuchowski, 1997; Kremen et al., 1994; Cannon et al., 1994). Together these findings in both patients and relatives indicate that memory impairments may be an integral part of the pathophysiological vulnerability to the illness rather than an epiphenomenon of the disease process (but see Shedlack et al., 1997).

We set out to further elucidate the nature of memory dysfunction in schizophrenic patients and their relatives in a design with the following features: (1) regression equations were used to eliminate the effects of intellectual functioning, thus exploring the residual memory impairment; (2) the memory tests were selected to measure long-term episodic memory, i.e. tests measuring memory for material recently presented, but not tapping into the working memory system; (3) within this, distinctions were made between verbal and visuo-spatial episodic memory, where the modality distinction refers to the presumed encoding of the material. This distinction has been validated in patients with focal brain lesions, where modality-specific memory impairment is seen (e.g., Goldstein and Polkey, 1993), and also may occur in schizophrenia; (4) a comparison was made between immediate and delayed recall, a method for investigating the relative integrity of encoding and consolidation processes in episodic memory; and (5) a further distinction was made between episodic recall and learning, in order to explore the retention rates of information accumulated over a single trial or alternatively, over several trials.

2. Method

2.1. Subjects

Sixty-two schizophrenic patients (22 females, 40 males) and 98 of their relatives (59 females, 39 males) from 51 families were drawn from a larger cohort of the Maudsley Family Study (Griffiths et al., 1998; Frangou et al., 1997). The number of well and unwell members for each family are given on Table 1. Neuropsychological data for eight patients were included despite the fact that there were no such data for their relatives. These relatives were assessed as part of the Maudsley Family Study though they decided not to proceed with the neuropsychological

Table 1
Number of families participated in the study

Family	Family members participated in the study	Patients	Relatives
Family 1	9	3	6
Family 2	7	2	5
Family 3	5	2	3
Family 4	5	2	3
Family 5	5	2	3
Family 6	5	1	4
Family 7	5	1	4
Family 8	5	1	4
Family 9	5	1	4
Family 10	5	1	4
Family 11	5	1	4
Family 12	4	2	2
Family 13	4	2	2
Family 14	4	2	2
Family 15	4	2	2
Family 16	4	2	2
Family 17	4	1	3
Family 18	4	1	3
Family 19	4	1	3
Family 20	4	1	3
Family 21	3	1	2
Family 22	3	1	2
Family 23	3	1	2
Family 24	3	1	2
Family 25	3	1	2
Family 26	3	1	2
Family 27	3	1	2
Family 28	3	1	2
Family 29	3	1	2
Families 30–43	2	1	1
Families 44–51	1	1	–