

SCHIZOPHRENIA AND PROSPECTIVE MEMORY: A NEW DIRECTION FOR CLINICAL PRACTICE AND RESEARCH?

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ABSTRACT

Memory deficits are commonly encountered in patients with schizophrenia, affecting everyday functioning and hindering rehabilitation efforts. To date, research has focused mainly on patients' ability to recall past information, or retrospective memory, but has neglected an important memory process known as prospective memory, or the ability to remember to perform actions in the future. Given its behavioural orientation, prospective memory is considered different from and more complex than the traditional construct of retrospective memory. Clinical experience has indicated that patients with schizophrenia experience some kind of prospective memory impairment but systematic research in this area is still lacking. Prospective memory is relevant to the management and rehabilitation of schizophrenia because prospective memory is essential for maintaining an organised daily routine and coping with social demands. For both theoretical and practical reasons, systematic investigation of the nature and extent of prospective memory impairment of patients with schizophrenia is clearly warranted. Research in this area will provide useful information for improving the assessment, management, and rehabilitation of prospective memory problems in schizophrenia. Furthermore, such research will advance our understanding of prospective memory processes and their relationship with frontal lobe functions.

Key words: *Schizophrenia, Cognitive function, Prospective memory, Rehabilitation*

INTRODUCTION

In recent years, memory impairment has been recognised as a significant problem for patients with schizophrenia.¹⁻³ Systematic studies using tests of specific memory processes (short-term, long-term, verbal, and visual memory) have found that patients with acute and chronic schizophrenia performed significantly worse than matched controls.⁴⁻⁷ These findings are hypothetically explained by the subtle damage to the medial temporal/hippocampal area frequently found in patients with schizophrenia.^{8,9}

All studies in this area have concentrated on a type of memory that involves the ability to recall and recognise past information, that is retrospective memory. In recent years, however, the importance of another type of memory, the ability to remember to perform an action in the future or prospective memory, has been acknowledged.¹⁰ This paper aims to review the significance of this new type of memory, discuss how this construct can enhance our understanding of memory problems in schizophrenia, and provide suggestions for practice and research in this area.

SIGNIFICANCE OF PROSPECTIVE MEMORY

Kvavilashvili and Ellis defined prospective memory as "... remembering to do something at a particular moment in the future or the timely execution of a previously formed intention."¹¹ Remembering to turn up for a doctor's appointment, remembering to turn off an electrical appliance, or remembering to pay a bill before the due date are examples of activities that require the proper working of prospective memory. This type of memory is regarded as more important for everyday functioning and independent living than retrospective memory because many everyday activities require more than just recalling or recognising past information but also the carrying out of an intended action at the right time or in the right context.¹²

In addition, forgetting to perform some future actions (forgetting to take medication at the right time, forgetting to lock the door) can lead to undesirable consequences or life-threatening hazards. Indeed, most recent studies of prospective memory grew out of concern for the functioning of older

individuals and patients with brain injury living in the community.¹³⁻¹⁶

Prospective memory is considered to be more complex than retrospective memory. According to Glisky, it involves at least 4 components:¹⁷

- forming and organising an intention
- remembering the intention over a period of time
- monitoring when and how to execute the action
- performing the action and remembering having done it.

Interruption or breakdown in one or more of the above components can lead to prospective forgetting. Because some of these components (organising an intention, monitoring when and how to execute an intention) are similar to executive functions, the prefrontal lobe has been implicated as the brain area involved in prospective memory. This is supported by a recent neuroimaging study demonstrating localised activation in the left and right lateral prefrontal and anterior medial frontal areas when normal subjects performed prospective memory tasks.¹⁸

SCHIZOPHRENIA AND PROSPECTIVE MEMORY

To date, research on memory functions in schizophrenia has concentrated mainly on retrospective memory. This is confirmed by a computer-assisted literature search (MEDLINE and PSYINFO) from January 1990 to August 2000 using the key words 'prospective memory' and 'schizophrenia or schizophrenic patients', which failed to find any study on this subject. This is surprising on 2 counts. First, because the prefrontal lobe, which is considered to be involved in prospective memory, is the very area of the brain that has been most actively investigated in schizophrenia.^{19,20} Second, forgetting to perform future actions is commonly identified as a primary concern for patients with schizophrenia and lapses in prospective memory can lead to life-threatening hazards (forgetting to turn off electrical appliances, forgetting to take medication). It is expected that patients with schizophrenia will show impairment of prospective memory tasks.

Indeed, there are good reasons to believe that patients with schizophrenia suffer from prospective memory deficits. Prospective memory involves prefrontal functions²¹ and impairment of prefrontal functions has been found in patients with schizophrenia. These patients exhibit consistent deficits on tests assessing prefrontal functions together with behavioural deficits, including poor planning abilities, impaired social judgement and insight, and lack of initiative.³ Direct evidence of abnormalities in the prefrontal cortex has emerged from functional brain imaging studies monitoring regional cerebral blood flow.²⁰ Clinical observations suggest that most memory problems are to do with performing future actions (missing a medical appointment) in addition to recalling or recognising past information.

It is important to investigate the extent of prospective memory deficits in patients with schizophrenia because the findings may contribute to the development of more efficient

management and rehabilitation. It has been repeatedly pointed out that most patients with chronic schizophrenia lead a highly disorganised life.²² We hypothesise that this is partly due to 'being lost' in the sequence of daily events, thus leading to idling and confusion, coupled with poor adjustment to family and other commitments. Poor prospective memory capability is probably one of the components that underlie the disorganised daily routine displayed by patients with schizophrenia. Given that coping with daily demands and being successful at constructing an orderly life often depends on remembering to do things in the future, remedying prospective memory skills would be important for independent living for patients with schizophrenia. In clinical practice, an improved understanding of the nature and extent of prospective memory impairments would enable mental health professionals to better assess and manage individuals with chronic schizophrenic illness.^{13,23} For example, if it is found that patients had difficulties in event-based prospective memory tasks, a therapist could make the cue more prominent (by including colour codes) to improve prospective recall in everyday situations. Given the theoretical and practical significance of prospective memory for schizophrenia care and research, systematic empirical research this area seems to be warranted.

SUGGESTIONS FOR PRACTICE AND RESEARCH

In terms of clinical practice, the recognition of prospective memory as a useful and significant construct means that it is important to assess a schizophrenic patient's ability to recall and recognise past information as well as the ability to remember to carry out a delayed intention, that is prospective memory. This can be accomplished by interviewing the patient and his/her therapists or relatives if the patient has difficulty in performing intended actions, and finding out the more common prospective memory problems.

The Rivermead Behavioural Memory Test can also be employed to objectively assess prospective memory in patients with schizophrenia.²⁴ Although this was developed as a behavioural memory test, 2 of the items (remembering to ask about the next appointment when an alarm clock goes off and remembering to ask for the return of a hidden belonging when told that the session was over) can be used to assess an individual's prospective memory. The normative data provided by Wilson et al can be used to compare patients' performances with those of age-matched peers.²⁴ It should be pointed out, however, that the Rivermead Behavioural Memory Test was not developed on the basis of any model or theory of prospective memory and that using only 2 of its items to assess prospective memory might not be adequate to obtain stable and valid results. Given this limitation and the fact that a lot of tasks developed in the experimental literature are not suitable for clinical use, there is an urgent need for the development of a reliable and valid prospective memory test.

A better understanding of the nature and extent of prospective memory impairment in schizophrenia has

implications for its management and treatment.¹² For example, a patient and his/her relatives can be made aware of the presence of a particular prospective memory difficulty and be informed how such a problem can affect everyday activities. In addition, the patient can be provided with strategies to avoid or overcome such a problem by using memory aids (a notebook or an electronic organiser) or memory strategies.

In terms of research, it is important to note that the study of prospective memory is still in its infancy. Compared with retrospective memory, the numbers of books and journal articles published in the area of prospective memory are small. The study of prospective memory in a clinical population such as schizophrenia can contribute to our understanding of the nature, processes, and mechanisms of this construct. In addition, results obtained in this population can help to build a better theory/model of the construct. For example, one can clarify the processes or mechanisms of prospective memory by systematically comparing the performances of schizophrenic patients and controls on a number of task variables. In addition, using neuroimaging techniques (magnetic resonance imaging or positron emission tomography) to monitor the brain activity of schizophrenic patients while they are undertaking different prospective memory tasks can help to clarify the neuroanatomical area(s) and neurocognitive functions involved in the various components of prospective memory.

Research of prospective memory and schizophrenia can also enable us to understand the nature, extent, and processes of the prospective memory problem in patients with schizophrenia. Specifically, one can employ well-established experimental tasks/paradigms to establish whether homogeneous subgroups of schizophrenic patients (patients with predominantly positive or negative symptoms or with acute or chronic disease) are impaired in various subtypes of prospective memory. For example one can compare the performances of patients with schizophrenia on the ability to remember to perform a certain action at a certain time (time-based prospective memory) or the ability to remember to perform a certain action when an external cue appears (event-based prospective memory).

Another area for research would be an analysis of the nature of prospective memory errors committed by patients with schizophrenia in comparison with those committed by controls and patients with diagnoses other than schizophrenia. This could be accomplished by using research techniques such as reaction time or event-related potential. Having access to such results is important for improving the understanding of prospective memory and for clinical practice.

CONCLUSION

Although it is logical to assume that prospective forgetting is related to everyday functioning and independent living for patients with schizophrenia, few empirical studies have been conducted. The significance of prospective memory as a construct and its ecological validity will be strengthened if such

a relationship is demonstrated. This can be achieved by correlating the performances of patients with schizophrenia on a prospective memory test with independent ratings of everyday functioning or outcome measures.

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