

**VOLUME 1 – Thesis**

**Autobiographical Memory Functioning  
and Psychosis**

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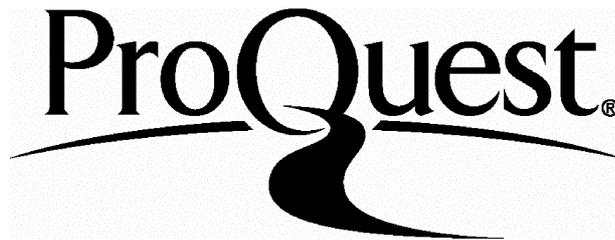
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## **Autobiographical Memory Functioning and Psychosis**

### **ABSTRACT**

Autobiographical memory (AM) relates to the memories and information that we have about ourselves, events in our lives, and the world. Memory impairments have long been associated with psychosis, both in research and clinical observation (Tamlyn et al, 1992). It is already known that in comparison with the overall intellectual decline often found in individuals with chronic psychosis, disproportionate deficits can be found in executive functioning and memory, particularly long-term memory (McKay et al, 1995).

Several studies have investigated autobiographical memory deficits in psychosis specifically (e.g. Feinstein et al, 1998; Kaney et al, 1992). All of these have found some deficit in autobiographical retrieval, although the nature of these deficits has varied or been conflicting. This study hoped to clarify the nature of these deficits and to compare the two most widely used measures of AM for the first time.

This project investigated both the memory retrieval styles of individuals with psychosis i.e. specific or over-general, and the temporal gradient of their memories. Autobiographical retrieval performance was examined in a group of 20 participants experiencing positive symptoms of psychosis and matched controls using the AMI and the AMT. Working memory, verbal episodic memory and degree of depressive symptomatology were also taken into account.

An overgeneral retrieval style of AM was found in the psychotic participants in comparison with the controls on both the measures, and this effect remained when working memory capacity and verbal episodic memory were controlled for. The psychotic group displayed an approximation to a u shaped temporal gradient for recall of personal facts and personal events, and the early adulthood period was found to be most impaired.

The personal events schedule was found to be positively correlated with the AMT in the psychotic group, although no relationship was found between the AMT and the recall of personal facts. No association was found between the AMI and the AMT when administered to the control group.

The implications of the results are discussed with respect to the theoretical understanding of autobiographical memory, the positive symptoms of psychosis, future research, and psychological treatments such as CBT for psychosis. The implications regarding the concurrent validity and clinical utility of the AMI and the AMT are also discussed.

## **Chapter 1: Introduction**

The 'pathognomonic' deficit for schizophrenia has been elusive, despite the interest of many researchers in identifying a single deficit or marker that might provide some underlying etiological unity for psychotic symptoms. There appears to be no specific deficit that is present in all people who present with symptoms of psychosis. However, with the advent of the biopsychosocial model (Zubin & Spring, 1977), recent research has focused on an exploration of some of the underlying psychological mechanisms that may be involved in the development and maintenance of psychotic symptoms. Schizophrenia as a diagnostic category affects one in a hundred people, with a wide variation in the presentation of positive, negative and disorganised symptoms, functional outcome and course of illness. However, abnormalities in attentional and cognitive processes, including memory, have been considered central features of schizophrenia since the original clinical descriptions of Kraepelin (1905) and Bleuler (1911) (Goldberg & Gold, 1995).

This study investigates one facet of long term memory, autobiographical memory, the knowledge that we have about events and facts from our own lives, and in particular whether an overgeneral retrieval style of autobiographical memory is found in individuals with psychosis. It also compares for the first time, the two most widely used measures in autobiographical memory research, the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986) and the Autobiographical Memory Interview (AMI; Kopelman et al, 1990) and reflects on their concurrent validity.

In this chapter, the history of the concept of schizophrenia will be briefly reviewed, before moving onto a discussion of the different cognitive models that have been developed to account for the symptoms of psychosis. In Chapter 2, the contribution that neurodevelopmental, biological, neurological, genetic and social studies have made to the understanding of schizophrenia will be briefly reviewed before the neuropsychological research into memory impairments in psychosis is discussed. Following this in Chapter 3, the contemporary understanding of the structure and function of autobiographical memory will be discussed, and the relationship between deficits in autobiographical memory and other clinical disorders will be considered. Finally the current literature on the relationship between autobiographical memory and psychosis will be reviewed, before moving on to a discussion of the current study.

### *1.1 History of the concept of schizophrenia*

Kraepelin (1905) first described what is now known today as schizophrenia. Dementia praecox, as it was originally labelled, was characterised by progressive intellectual deterioration with an early onset, normally during the early twenties. Kraepelin (ibid.) distinguished dementia praecox from other psychoses discovered around the same time, for example, Alzheimer's disease, viewing it as a functional psychosis because no specific neuropathology could be identified.

Later, Bleuler (1911) coined the term 'schizophrenia' or 'split mind' in order to attempt to understand schizophrenia from a more psychological perspective. He believed that the key process in the development of schizophrenia was a cognitive

deficit, the breaking or loosening of associative threads that linked thoughts together. The main difference between Kraepelin and Bleuler's concept of schizophrenia was that Bleuler did not believe that progressive deterioration was inevitable.

The symptoms of schizophrenia are diverse, ranging from auditory hallucinations, thought disorder and delusions, through to apathy and a decreased interest in social activities. The current diagnostic criteria in the Diagnostic and Statistical Manual IV (APA, 1994) are stated as follows: two or more of the following, each being present for a significant portion of time during a one-month period:

- Delusions
- Hallucinations, such as voices, and less frequently imagery
- Disorganised speech e.g. frequent derailment or incoherence
- Disorganised or catatonic behaviour
- Negative symptoms such as flattening of affect and avolition

Disturbances of social and occupational functioning since the onset of disturbance are also expected. This will include difficulties in employment and interpersonal relationships and reduced self-care. The final criterion for a diagnosis of schizophrenia is that there must have been continuous signs of disturbance for at least six months, and that symptoms described above have been present for at least one month within the six month period.

## *1.2 Classification of Symptoms*

The general trend within schizophrenia research has been to try and classify symptoms into particular groups. Schneider (1959) developed a list of first-rank symptoms, whose presence were considered mandatory for a diagnosis of schizophrenia. Such symptoms included audible thoughts, voices commenting and arguing, thought insertion and passivity experiences with subjective delusions of external control.

Distinctions have been made between positive and negative symptoms. Positive symptoms are characterised by the *presence* of an abnormality and generally include hallucinations, delusions, thought disorder (e.g. disorganised speech, flight of ideas) and somatic passivity (bodily sensations being caused by an external agent) (Morrison, Haddock & Tarrier, 1995). Negative symptoms refer to the *absence* of normal emotions and behaviour (Frith, 1992). However, the relationship between positive and negative symptoms remains a contentious issue. Andreasen & Olsen (1982) have argued for a one-dimensional dichotomous approach in which negative and positive symptoms are at opposite ends of the same dimension. Crow (1980) has distinguished between Type I and Type II symptoms, which are relatively synonymous with the aforementioned positive and negative symptoms, but which have very different aetiologies. Type I symptoms (positive) were considered to be associated with abnormalities in the neurotransmitter systems of the brain, predominantly the dopamine system, whereas the Type II syndrome was associated with cognitive impairment and underlying cerebral pathology.

More recently Liddle (1987a) identified three clusters of symptoms; reality distortion (delusions and hallucinations), disorganisation syndrome (thought disorder and inappropriate affect) and psychomotor poverty (representing the negative syndrome), based on empirical examinations of the correlations between the symptom characteristics of psychosis. Various factor analytic studies of correlations between symptoms and neuropsychological studies have supported such a three syndrome model (Liddle, 1987b; Liddle & Barnes, 1990; Baxter & Liddle, 1998; Grube, Bilder & Goldman, 1998; Smith, Mar & Turoff, 1998).

For many years the medical model dominated research into schizophrenia, with an emphasis on finding an underlying biological marker or area of neurological pathology that could account for the different symptoms of psychosis. As discussed at the beginning of this chapter, such an underlying marker has remained elusive. Some researchers have questioned the diagnostic validity of schizophrenia (Bentall, 1990), some have questioned the construct of schizophrenia as a whole (Boyle, 1990) and others have advocated that the symptoms of psychosis can only be understood by linking the steps between the phenomenological experiences and social, psychological and neurobiological levels of explanation. (Garety, Kuipers, Fowler, Freeman & Bebbington, 2001).

Research into individual differences has demonstrated that many of the symptoms of psychosis, are likely to be found in varying degrees of severity within the normal population (Claridge, 1985). Magical ideas and unusual perceptual experiences have been found to be common in the general population (McGorry, McFarlane, Patton, Bell, Dudgeon, Hibbert, Jackson & Bowes, 1995) and

relatively large subgroups of people hear voices and believe strange things that could be regarded as delusional without recourse to psychiatric services (Romme & Escher, 1989; Tien, 1991, Peters, Joseph & Garety, 1999). However only a small proportion of those who can be identified as having high levels of such schizotypal experiences and mild psychosis go on to develop a significant mental health problem (Chapman & Chapman, 1988). Given that such experiences are common in the normal population, recent research has focused on examining what the underlying cognitive mechanisms might be that mediate the transition into psychosis and maintain symptoms (Maher, 1988; Bentall, 1990; Frith, 1992; Fowler, Garety & Kuipers, 1998; Garety et al, 2001; Beck & Rector, 2002; Beck & Rector, 2003). This extensive body of research, which is continually developing, has led to the development and refinement of cognitive-behavioural interventions for psychotic symptoms. Evidence for the efficacy of cognitive behavioural therapy (CBT) for psychosis is increasing (Haddock, Tarrier, Spaulding, Yusupoff, Kinney, McCarthy; 1998; Kuipers, Fowler, Garety, Chisholm, Freeman, Dunn, Bebbington, & Hadley, 1998; Tarrier et al, 2000; Rector & Beck, 2001) and the dual processes of theory development and therapeutic trials can only serve to enhance the current understanding and effective treatment of the factors that are involved in the development and maintenance of psychotic symptoms.

In the next section, the current literature on psychological or cognitive models of psychosis will be reviewed, and in chapter 3 there is a briefer synopsis of the biological, neurological, social and genetic factors that have been postulated to be involved in the development and course of psychosis. It is beyond the scope of

this introduction to thoroughly review the evidence for the latter models, but the basic premises and arguments for and against will be presented.

### **1.3 Cognitive models of psychosis**

The vulnerability-stress model of psychosis (Zubin & Spring, 1977) has been widely accepted as a biopsychosocial framework for understanding the development of psychotic symptoms. This model suggests that psychosis occurs in the context of a vulnerable predisposition, that onset is triggered by certain events, (such as life events, difficult social circumstances or drugs) and that this leads to a disruption in the cognitive processes of attention, perception, memory and judgement. Such disruptions are often accompanied by emotional changes (Fowler, Garety & Kuipers, 1995). The main body of research into the cognitive mechanisms underlying psychotic symptoms has taken a symptom-based approach, based on the argument postulated by Persons (1986) and Bentall (1990) that different cognitive mechanisms may underlie the different symptoms.

### **1.4 What cognitive processes are associated with delusions?**

Taking a symptom based approach, Garety and Freeman (1999) reviewed the considerable body of work examining the cognitive processes underpinning the development and maintenance of delusions. There have been five main theoretical approaches to the cognitive study of delusions; perceptual disturbances, theory of mind, reasoning biases, attribution biases and self-concept.

#### *1.4.1 Perceptual disturbances*

Maher (1988) has proposed a single factor account model of delusions where an individual with delusions suffers primarily from perceptual anomalies which are biological in nature, and which involve vivid and intense sensory input. He has argued that such individuals then seek an explanation of these unusual percepts, using normal cognitive processes, such as reasoning and deduction. The delusion itself is perceived to be an explanation of anomalous experience which is then resistant to counter evidence through the normal mechanism of confirmatory bias i.e. that individuals attend more to information that confirms their beliefs, and are more likely to disregard information that contradicts them. In his theory, Maher (1988) further suggests that delusional beliefs may be reinforced by the reduction in anxiety that accompanies the development of an explanation for these unusual experiences.

Various criticisms have been levelled at Maher's (1988) model, including that some delusions occur in the apparent absence of anomalous experiences (Chapman & Chapman, 1988), and that reasoning and attributional biases have been found in individuals with delusions (Garety, Hemsley & Wessely, 1991; Dudley et al, 1997a) (see below for further discussion). However, Garety & Freeman (1999) have suggested that by proposing that deluded individuals are trying to make sense of their own experiences, Maher (1988) fuelled the resurging interest that started in the 1980's of generating psychological models for psychotic symptoms.

#### *1.4.2 Reasoning Biases*

There is considerable evidence to suggest that people with delusions display biases in reasoning. They will often make decisions on the basis of less information than others, known as 'jumping to conclusions', (Garety, Hemsley & Wessley, 1991) and this tendency is exaggerated when material is emotive or self-referent (Dudley, John, Young & Over, 1997b, Kemp et al, 1997). Based on Bayesian inference tasks, Dudley et al (1997a) found that people with delusions had a data gathering bias and were more likely to make conclusions based on less evidence than other psychiatric and control groups. Garety & Freeman (1999) concluded that such a reasoning bias can lead to the acceptance of incorrect hypotheses and that people with delusions are more likely to switch their judgements rapidly (Young & Bentall, 1997).

#### *1.4.3 Theory of Mind*

Frith (1992) has proposed that delusions arise from an inability to represent the beliefs, thoughts and intentions of others, in other words, a theory of mind deficit. Frith has proposed that a failure to accurately infer or represent the mental state of others can account for the development of delusional beliefs. Various studies have found that theory of mind deficits are detectable in people diagnosed with schizophrenia (Corcoran, Mercer & Frith, 1995; Doody et al, 1998; Pickup & Frith, 2001). Corcoran et al. (1995) has argued that when making mental state inferences, individuals refer to autobiographical memories of their own mental processes in similar circumstances, and through reasoning assume that similar processes are going on in others. Bentall, Corcoran, Howard & Blackwood (2001) have also hypothesised that theory of mind deficits in people with psychosis may

be linked to a biased retrieval of events from autobiographical memory. However Garety & Freeman (1999) concluded that while the evidence for theory of mind deficits in schizophrenia is strong, that such a deficit does not appear to be specifically related to delusions.

#### *1.4.4 Attributional Biases*

Bentall, Kinderman and Kaney (1994) proposed an attributional model of delusional beliefs, where potential threats to the self concept are attributed to external causes, protecting the self but leading to delusional beliefs, especially paranoia. These researchers suggest that persecutory delusions reflect an attributional defence against low self-esteem thoughts reaching consciousness. By blaming others for negative events, rather than the self or the situation, it is argued that negative thoughts about the self are prevented from reaching awareness. Bentall & Kaney (1996) have argued that paranoid patients have negative self-representations or schemata that are similar to the negative self-representations observed in depressed patients (Bentall et al, 1994). However, Garety and Freeman (1999) have argued that the defence hypothesis can only be applied to a minority of deluded individuals, and there is considerable evidence that depression does not increase, or self-esteem decrease when persecutory delusions improve over time or with a psychological intervention (Chadwick & Lowe, 1994; Freeman et al, 1998).

#### *1.4.5 Self Concept*

Beck & Rector (2002) have suggested that delusions, particularly of a grandiose or persecutory nature, are formed as a reaction to an underlying degraded self-concept. They have linked the formation of delusions as a response to underlying dysfunctional beliefs rather than to negative mood states and have argued that the content of the delusions often reflects the content of the persons' pre-delusional beliefs. Grandiose delusions are perceived as being compensatory for feelings of loneliness and alienation as a result of core maladaptive schemas, such as inner defectiveness, dangerousness or vulnerability to harm commonly found in people with psychosis (Fowler, Garety & Kuipers, 1995; Brabban & Turkington, 2002). Persecutory delusions are considered to develop in a similar way, but additionally are often reflections of non-delusional ideas or preoccupations that predate the delusion, and are activated by certain triggering events that are perceived to be in some way linked to these overvalued ideas (Beck & Rector, 2002).

Overall, it has been argued that there is no single pathway to delusions, but that a number of factors contribute to their formation and maintenance (Garety and Hemsley, 1994; Fowler, Garety & Kuipers, 1998; Garety & Freeman, 1999). Garety & Hemsley (1994) outlined a multi-factorial model in which past experience, affect, self-esteem and motivation play a part in some delusions, whilst in others biases in perception and judgement are more prominent. Fowler et al. (1998) concluded that careful assessment in some cases may suggest that one type of process may explain the presence of a delusion, but that in "most cases delusions appear to be the product or final common pathway of several interacting

processes and biological, psychological and social processes may be involved” (p134).

## **1.5 Cognitive models of Voices**

### *1.5.1 Attribution and self-monitoring*

Both Frith (1987, 1992) and Bentall (1990) have postulated that individuals who experience auditory hallucinations are failing to recognise that the voice they are hearing is actually self-generated and they have argued that this failure is due to a deficit in an internal monitoring process. Bentall et al (1991) and Baker & Morrison (1998) found that subjects who heard voices were more likely to misattribute words that they themselves had spoken, to an external source, and concluded that people who hear voices may be suffering from an externalising attribution style.

Conversely Frith (1992) has argued that auditory hallucinations are the consequence of an individual’s inability to recognise their own self-initiated activity and this was hypothesized to be a defect in ‘self-monitoring’ (Frith, 1987).

### *1.5.2 Beliefs about voices*

Following the discovery that many people in the general population have experienced voices (Romme & Escher, 1989) and that those who were not coping with their voices were more likely to rate themselves as less strong than the voice

and experience more negative and critical voices, the role of appraisal has become an area of research. Chadwick & Birchwood (1994) and Birchwood & Chadwick (1997) found that voices appraised as malevolent (e.g. critical or threatening) tended to be resisted and provoked negative emotional reactions, whereas people tended to engage with, and not feel threatened by voices believed to be benevolent. Close & Garety (1998) assessed negative self-evaluations associated with voices and described consistent relationships between voice content, negative self-evaluations and behavioural and emotional reactions. Morrison, Haddock & Tarrier (1995) in their cognitive model of hallucinations proposed that voices are intrusive thoughts that are appraised as unacceptable to the self, and so become externally attributed in order to minimise cognitive dissonance.

### *1.5.3 Metacognitive Beliefs*

Morrison & Wells (2003) found that psychotic individuals who hear voices tended to demonstrate higher levels of dysfunctional metacognitive beliefs than other patient groups, scoring higher on positive beliefs about worry, negative beliefs about uncontrollability and danger, and negative beliefs about responsibility and punishment. They also found that the metacognitive beliefs of their sample that had persecutory delusions and panic patients were often similar to each other. Morrison & Wells (2003) concluded that certain types of metacognitive beliefs are a general vulnerability factor in the development of psychological disorders.

The above findings are consistent with the hypothesis that beliefs about voices and illness could serve to maintain and reinforce confusion about the origins of thoughts and emotions and therefore represent a set of cognitive biases that could

potentially be maintaining the occurrence of voices, even in the absence of any underlying deficit in cognitive processes (Bentall, 1990; Fowler, 2000).

#### *1.5.4 'Hot cognitions'*

Beck & Rector (2003) have argued that voices are the result of 'hot cognitions'. Hot cognitions are considered to be negative automatic thoughts that are related to core maladaptive beliefs, which spontaneously intrude into consciousness, and are associated with a strong emotional response. Such hot cognitions become interpreted as voices through the processes of externalising bias, negative appraisal and deficient reality testing and self monitoring.

### **1.6 Integrative Cognitive Models of Psychosis**

Several groups of researchers have attempted to integrate the findings discussed above into a single model that can account for the development and maintenance of psychotic symptoms.

Frith (1992) has argued that psychosis is primarily a disorder of self-awareness. He has proposed that three principal abnormalities may be conceptualised as accounting for the major symptoms of psychosis. These are disorders of willed action, self-monitoring and disorders of monitoring the intentions of others. For example, the attribution of self-generated actions to outside agents can be used to account for thought insertion and delusions of control. For negative symptoms, Frith (1987) hypothesized that this same defect results in subjects having difficulty in producing spontaneous behaviour in the absence of external cues. This is

because spontaneous or self-generated actions are not specified by an external trigger stimulus but are internally driven (Frith, 1992). Thus, for example, poverty of action can be explained not in terms of a lack of motivation but in relation to the inability to either form or carry out self-generated intentions. He has argued that the causal mechanism in psychosis is a general defect in meta-representation, the ability to understand their own and others intentions, resulting in a lack of awareness of their own intentions.

Freeman and colleagues (2002) have outlined a model based on the stress vulnerability framework, where the emergence of symptoms is assumed to depend upon an interaction between vulnerability (from genetic, biological, psychological and social factors) and stress (which may also be biological, psychological or social). A stressful life event will occur which leads to arousal, and this arousal will initiate an inner-outer confusion (Fowler, 2000), causing anomalous experiences such as thoughts being experienced as voices, actions experienced as unintended, or other cognitive experiences such as perceptual anomalies, which will then lead to a search for meaning (Maher, 1988). Freeman et al (2002) have suggested that the inner-outer confusion and anomalous experiences may result from the types of psychological dysfunction described by Frith (1992). Fowler (2000) has proposed that it is the continuing to appraise psychotic experience as a personally significant external event that may drive a search for meaning and thus maintain the symptoms of psychosis. In the search for meaning, pre-existing beliefs about the self, others and the world are drawn upon and the explanations considered in the search for meaning will be influenced by some of the cognitive biases outlined previously that are associated with psychosis.

Garety, et al. (2001) also believe that the externalising bias and impaired reality testing are the key factors that lead to the development of psychosis in vulnerable individuals. They have also highlighted the role that negative affect as a result of core negative beliefs about the self and the world plays, particularly in the maintenance of symptoms. They argue that anxiety in particular will not only perpetuate the information processing biases described but also increase safety behaviours that prevent access to disconfirmatory evidence, (Freeman & Garety, 2000) and increase the likelihood that a threatening explanation will be sought and accepted (Garety et al, 2001).

### **Summary**

Overall, a variety of cognitive mechanisms have been suggested to account for the development and maintenance of psychotic symptoms. These include impaired self monitoring and reality testing, an external attribution bias, a tendency to jump to conclusions, and the maintaining effect of negative affect as a result of core maladaptive beliefs and reactions to anomalous experiences. At the core of all these theories, is the assumption that there is a disruption in cognitive processes in vulnerable individuals that predates the onset of psychosis, and that these disrupted processes then serve to maintain the symptoms of psychosis.

## **Chapter 2 - Other models of schizophrenia and psychotic symptoms**

In this section, the contribution that neurodevelopmental, biological, genetic, and social studies have made to the understanding of schizophrenia will be discussed, especially in terms of vulnerability (Zubin & Spring, 1977) before moving onto a more detailed description of the evidence from neuropsychological studies that impairments in memory are often found in psychotic populations.

### **2.1 Neurodevelopmental models of schizophrenia**

Neurodevelopmental models propose that vulnerability to schizophrenia results from a disruption in forebrain development during the gestation, particularly in the second trimester (Conklin & Iacono, 2002). A brain lesion that occurs early in development has been hypothesized to lie dormant until normal brain maturational events trigger the appearance of the traditional and diagnostic signs, typically around late adolescence or early adulthood (Weinberger, 1987; Roberts, 1991). Such models have been supported by reports of increased intrauterine and perinatal complications among individuals with schizophrenia, as well as demonstrations that neurological, neuropsychological and physical abnormalities predate the onset of psychosis (Harrison, 1997; Raedler, Knable & Weinberger, 1998). However Harrison (1999) has later argued that such neurodevelopmental theories do not actually explain why or how psychotic symptoms emerge at a later date and Kringlen (1994) has discussed how neurodevelopmental models do not explain why some individuals exposed to perinatal trauma go on to develop symptoms of psychosis whereas others do not.

## 2.2 Neurological Findings

It has been found that an increased size of the lateral ventricles in the brain is present in first episode schizophrenic patients and that this enlargement appears to remain static over time (Raz & Raz, 1990). From studies using neuroimaging techniques in twin studies, it has been concluded however that such structural brain abnormalities may not be an index of the illness's progression, but are more likely to constitute a pre-existing vulnerability to the development of psychotic symptoms (Jackson, 1990; Harrison, 1999).

Neuroimaging studies have demonstrated structural and metabolic abnormalities in the medial-temporal and frontal lobe (Andreasen, et al 1990, Liddle, Friston, Frith & Hirsch, 1992). Using PET technology, Liddle et al. (1992) demonstrated the three types of syndromes discussed earlier, reality distortion, disorganisation and negative symptoms, were associated with differing levels of regional cerebral blood flow in the frontal and temporal lobes, with the reality distortion syndrome being associated most with structures within the temporal lobe. A primary ability supported by medial-temporal structures (such as the hippocampus) is memory (Lezak, 1995). Primary abilities supported by the frontal lobe include attention, as well as higher level planning and organising skills sometimes referred to as executive functions (Lezak, 1995). It has been argued that temporal lobe dysfunction contributes to some of the positive symptoms of schizophrenia, such as delusions and hallucinations, whereas frontal lobe dysfunction contributes to some of the negative symptoms, such as impoverished thought, lack of goal-directed activities, and social withdrawal (Conklin & Iacono, 2002).

### **2.3 Biological Models: the role of neurotransmitters**

It is likely that multiple neurotransmitters may contribute to the aetiology of schizophrenia, although the neurotransmitter that has been the subject of most research attention is dopamine (Harrison, 1999). Neurotransmitters are chemicals that allow for communication between nerve cells or neurons. They are typically released into the space between neurons, known as a synapse, where they exert their effect by binding to specific receptors of adjacent neurons. Through this operation, neurotransmitters may serve to propagate electrochemical signals throughout the nervous system (Conklin & Iacono, 2002)

The original dopamine hypothesis suggested that schizophrenia results from a diffuse excess of dopamine in the brain. More recently this has been revised, suggesting that there is a dysregulation of dopamine production, resulting in an excess of dopamine in temporal areas, and a depletion of dopamine in frontal areas (Nestler, 1997). It has recently been argued that this alteration in dopamine neurotransmission may result from abnormalities in the regulation of dopamine by limbic and frontal regions. (Moore, West, & Grace, 1999). These have been the same brain areas implicated by histological, neuroimaging and neuropsychological studies (Conklin & Iacono, 2002). Harrison (1999) has argued that it has been difficult to differentiate the effects of antipsychotic medication on dopamine from any underlying dysregulation, and that the dopamine hypothesis remains contentious.

## **2.4 Genetic Vulnerability**

Well-replicated findings from family, twin and adoption studies indicate that there is a substantial genetic component to the predisposition for schizophrenia (Marshall, 1990). The degree to which hereditary factors play a part in the development of schizophrenia has been investigated in many twin studies and it has generally been found that the co-twins of affected individuals develop schizophrenia about half the time (Gottesman & Shields, 1982). If schizophrenia could be attributed to genes alone, then all identical twins would develop schizophrenia if one of the pairing were affected. Thus, at the very least, environmental factors must also influence the development of psychotic symptoms. Furthermore, Marshall (1990) in a review of the literature on genetic studies has seriously critiqued the methodology of many of the twin and adoption studies and concluded that the role of genetic factors has been overemphasized.

## **2.5 Environmental Factors: Family Dynamics**

High expressed emotion (EE) in the relationship between people with psychosis and their families or carers has been found to be both a predictor of relapse and the severity of symptoms (Kavanagh, 1992). High EE is characterised by interactions that would be considered critical, hostile or emotionally over-involved. The vulnerability-stress theory of psychotic break down (Zubin & Spring, 1977) led to the identification of high expressed emotion as a risk factor, and to the development of the family based interventions for psychosis (Fallon et

al, 1985; Leff & Vaughn, 1985; Burbach & Stanbridge, 1998), which have been found to be efficacious (Roth & Fonagy, 1996).

## **2.6 Neuropsychological Studies**

From the application of neuropsychological techniques, it had been found that cognitive deficits are characteristic of people with schizophrenia, and that they tend to show a particular impairment of memory (McKenna, Clare & Baddeley, 1995, Bilder, 2000). Such deficits do not appear to be the result of drug treatment, nor can they be easily explained in terms of problems of motivation, or disruption by positive symptoms such as hallucinations and delusions (Baddeley, Thornton, Chua & McKenna, 1996)

Before reviewing some of the evidence for memory impairments in schizophrenia, it seems pertinent to briefly outline the models of short and long term memory that have relevance to this study.

### *2.6.1 Model of Short Term and Long Term Memory.*

Short term memory is characterised by its limited capacity and quick loss of information and it can hold around 7 chunks of information at any one time. It can generally store information from between 6-12 seconds up to half a minute. The information in short term memory can be manipulated and rehearsed before being transferred to long term memory or it can be forgotten through the processes of decay, displacement and interference. (Lezak, 1995)

Baddeley (1992<sup>a</sup>) has suggested a model of working memory that divides short term memory into three parts: the visuo-spatial sketch pad, the articulatory loop and the central executive. The articulatory loop system is responsible for recycling verbal information within immediate memory, e.g. when a person is attempting to remember a phone number temporarily (Baddeley, 1986). The visuo-spatial sketchpad controls visual images and is the visual equivalent of the articulatory loop. The central executive system controls the awareness of information in working memory and coordinates and schedules other mental processes.

There are many models and types of long term memory (Tamlyn, McKenna, Mortimer, Lund, Hammond & Baddeley, 1992) but for the purposes of this study only one of the most influential distinctions will be described here.

Tulving (1983) and Baddeley (1990) have argued that there are two types of long term memory: episodic memory and semantic memory. Episodic memory represents our memory of events and experience, e.g. what one had for lunch, where one spent last Christmas. Semantic memory encompasses knowledge about the world, including facts, concepts, and rules.

### *2.6.2 Memory deficits and Psychosis*

Memory functions in schizophrenia were one of the first cognitive abilities to be studied (Hull, 1917). Memory impairments have long been associated with psychosis, both in research and clinical observation (Tamlyn, et al, 1992). It is already known that in comparison with the overall intellectual decline often found in chronic psychosis, disproportionate deficits can be found in executive

functioning and long term memory (McKay, McKenna, Bentham, Mortimer, Holbery & Hodges, 1996).

Such a memory deficit has been considered to have similarities with the classic amnesic syndrome, with unimpaired short term memory (as measured by digit span and story recall) but impaired long term memory especially in episodic and semantic memory (McKenna et al, 1990; Tamlyn et al, 1992). In a sample of 60 schizophrenic patients Tamlyn et al (1992) administered a battery of neuropsychological tests, and found that their sample displayed no deficits in the short term/working memory tasks, but showed clearly evident deficits in long term memory, including both semantic and episodic memory. Clare, McKenna, Mortimer & Baddeley (1993) compared 12 participants diagnosed with schizophrenia with 12 matched controls, and found that overall, the psychotic group displayed significant deficits in both episodic and semantic memory. Various other researchers have found similar findings (Goldberg & Gold, 1995; Joyce, Collinson & Crichton, 1996; Aleman et al, 1999, Van Oostrem et al, 2003). Elvevag & Goldberg (2000) have argued that such memory deficits are an enduring feature of schizophrenia and that they do not appear to be state-related, and concluded that dysfunction in memory and other cognitive domains are at the core of psychotic symptoms.

In recent years, attention has turned to one particular subtype of episodic and semantic memory, autobiographical memory. Autobiographical memory consists of personal episodic memory or memory for personal events, and personal semantic memory i.e. memory for personal knowledge and facts. Various studies

have found that autobiographical memory is impaired in people with schizophrenia (Tamlyn et al, 1992; Baddeley et al, 1996; Feinstein, Goldberg, Nowlin & Weinberger, 1998; Ruitort, Cuervo, Danion, Peretti, & Salamie, 2003).

Before these studies are reviewed in detail, the following chapter will discuss what is currently understood about autobiographical memory and its functions, before moving on to a discussion of how autobiographical memory relates to other clinical disorders.

## **Chapter 3 – Autobiographical Memory**

### **3.1 The Structure of Autobiographical Knowledge and Memories**

Conway & Pleydell-Pearce (2000) have suggested that autobiographical memories are transitory dynamic mental constructions generated from an underlying knowledge base, that are constructed by a set of central processes found in working memory (Baddeley, 1986, Conway, 1996).

#### *3.1.1 Autobiographical Knowledge*

Conway (1992, 1996) has often commented on how one of the most striking features of autobiographical knowledge is that it appears to have at least three different levels. Three broad levels of specificity have been uncovered: life time periods, general events and event-specific knowledge (Conway & Rubin, 1993). Such differentiations have guided much of the current research into autobiographical memory and its relationship to a variety of clinical disorders (e.g. post-traumatic stress disorder, or PTSD, (McNally et al, 1994); and depression (Kuyken & Dalgliesh, 1995).

These types of knowledge are considered to be organised into knowledge structures within the autobiographical memory knowledge base and autobiographical memories are constructed through different patterns of activated knowledge within each of the structures (Anderson & Conway, 1993; Conway, 1996).

Life time periods, such as “when I was at school”, “when I lived in Cambridge”, represent general knowledge of significant others, common locations, activities, plans and goals, characteristic of a period. Lifetime periods are also more likely to name distinct periods of time with identifiable beginnings and endings, although these periods can overlap and the boundaries may become a little fuzzy. The content of a lifetime period represents *thematic* knowledge about common features of that period (Conway, 1992, 1996), as well as temporal knowledge about the duration of the period.

General events are more specific, whilst also at the same time being more heterogeneous than lifetime periods. Barsalou (1988) argued that general events could encompass both repeated events (e.g. going to my favourite restaurant) and single events (e.g. my trip to York). Robinson (1992) also pointed out that general events may also represent sets of associated events and so therefore consist of a series of memories linked together by a theme. Such themes tended to be related to events that featured goal attainment knowledge (both positive and negative) that conveyed significant information for or about the self. For example, almost all of Robinson’s (1992) participants had vivid memories for the first time that they drove a car alone and for a first kiss. Robinson suggested that these first time memories were a particularly important category of general event and served to determine the nature of the self. Another form of general memories are those that occurred within a time period e.g. “when I was living in Edinburgh”, and that such events are clustered together and can be used to cue the recall of other local temporally organised events. Conway (1992) has argued that one of the prominent

features of these event clusters is that they feature vivid memories of events relating to the attainment or failure to attain personal goals.

Event specific knowledge refers to memory for very specific knowledge unique to the single event, can be measured in terms of minutes and seconds, and forms the lowest level of the hierarchy of autobiographical knowledge structures (Conway, 1996). Brewer (1988) found that the more sensory detail available at recall, the more accurate the autobiographical memory would be, and Johnson, Foley, Suengas & Raye (1988) found that sensory knowledge was fundamental in distinguishing memory for experienced events and memory for imagined events

### *3.1.2 Autobiographical Memories*

As previously discussed, the prevailing view is that autobiographical memories are *reconstructed* from knowledge in the autobiographical knowledge base (Conway, 1996). Williams & Hollan (1981) have suggested that memories are created or accessed through a process of 'cyclic retrieval'. A retrieval cycle starts with a cue or memory description (Norman & Bobrow, 1979), knowledge that is accessed by the cue is then evaluated, and following the evaluation a decision is made whether to stop the retrieval process, or to start a new retrieval process with a modified memory description. The basic premise is that the memory that is constructed is based upon any number of retrieval cycles and the detail and specificity of the final memory is dependent upon how many retrieval cycles have been conducted (Conway, 1996).

Also based on Norman & Bobrow's (1979) descriptions theory, Williams (1996) has suggested that memory for events in one's life is hierarchically organised, with the 'upper layers' containing general memory information that can act as pointers to the more specific and detailed 'lower' layers. Williams (1996) has suggested that these upper layers are thought to act as intermediate stages in the laying down and later recollection of events. In recollecting an event it is proposed that individuals first find an 'upper' layer general description which is then used to search the 'lower' layer memory database for an appropriate memory.

### **3.2 Models of Autobiographical Memory**

In their cognitive-motivational account of AM, Conway & Pleydell-Pearce (2000) have suggested that autobiographical memories are transitory dynamic mental constructions generated from an underlying knowledge base. The authors have argued that the formation of autobiographical memories is controlled by a set of structured goals, which they have labelled the 'working self', which they perceive to be directly linked to the concept of working memory developed by Baddeley (1986). Through its current goals, motivation and desires, the working self functions as a control process that coordinates and modulates the encoding and retrieval of autobiographical memories. Conway & Pleydell-Pearce (2000) have developed the idea that the working self is linked to the autobiographical knowledge base through the 'Self-Memory System'. They have argued that the goals and plans held in the working self are directly linked to the autobiographical knowledge base, in that what an individual intends or desires to do is linked to their previous knowledge about what they have achieved in the past. The range of

goals that an individual can maintain is constrained by autobiographical knowledge that places consistency and plausibility limits on what goals can be held by the working self (Conway & Pleydell-Pearce, 2000)

### **3.3 Functions of Autobiographical Memory**

Both Bluck (2003) and Pillemer (2003) have suggested that autobiographical memories have self, social and directive functions.

#### *3.3.1 Self Function*

Many theoretical formulations have emphasized the function of AM in the continuity of the self. Conway (1996) has argued that the adequacy of autobiographical knowledge is dependent on its ability to support and promote continuity and development of the self. Barclay (1996) has hypothesized that a function of the personal past is to preserve a sense of being a coherent person and many researchers have argued that self-continuity is maintained through the relationship between self and autobiographical memory. Wilson & Ross (2003) have argued that that individuals' current self-views, beliefs and goals influence their recollections of former selves and that current beliefs and goals are conversely influenced by what is remembered from individuals' personal past and how they recall their earlier selves and personal events.

The main premise of their theory is that people generally report their past selves to be inferior to their present self and this has the function of creating the impression that positive progress has been made over time and instils optimism about the

future. They have suggested that people appraise their past in ways that allow them to view their current self in a favourable way as a means of self-enhancement. McFarland & Alvaro (2000) asked individuals who had experienced a personally disturbing or traumatic past event to evaluate what they were like prior to the episode. Participants were more critical of their former selves if they had been thinking about the traumatic event, and the authors hypothesized that the reconstruction of the past may protect current identity in that by focusing on how a distressing event has led to growth or a positive outcome on the self, then individuals may minimise the negative impact of the trauma. Ross & Wilson (2002) have suggested that autobiographical memory processes have a self-esteem maintenance function, in that favourable comparisons of the current self with past selves, reflected in specific autobiographical memories, can serve to create a positive appraisal of the current self.

### *3.3.2 Social Function*

Autobiographical memory has also been conceptualised as having a social function (Nelson, 1993; 2003), in that specific autobiographical memories provide material for conversation, which facilitates social interaction as a whole. Cohen (1998) has also suggested that autobiographical memories help individuals to understand and empathise with others through the sharing of specific personal memories which can help to engage others in interactions and elicit empathic responses, especially if the listener responds with their own memory. The importance of autobiographical memory on learning about the intentions and experiences of others, and in developing, maintaining, and strengthening social

bonds has often been noted (Pillemer, 2003) and has even been considered to have an evolutionary adaptive function (Neisser, 1986; Nelson, 1993; Nelson, 2003).

### *3.3.3 Directive Function*

The third function of autobiographical memory is considered to be directive, relating to problem solving and the ability to form new goals. Pillemer (2003) has argued that specific autobiographical memories, which he has called 'personal event memories', represent an event that happened at a particular time and place, and includes the rememberer's unique circumstances at that time, with associated sensory images and feelings. He has argued that such memories provide models for present activities and contribute to the ability to successfully problem solve, to guide behaviour and to adapt, especially in novel or unfamiliar situations. Robinson & Swanson (1990) have hypothesized that specific autobiographical memories allow individuals to use their own past experience to construct models that facilitate the understanding of the inner world of others and thereby to predict their future behaviour. Through comparing different past events, and by comparing different events with developed rules about how others and ourselves behave, individuals are able to test hypotheses about how the world operates and make predictions about the future. Efficient problem solving may be reliant on satisfactory retrieval of specific autobiographical memories to provide a helpful and varied 'database' from which to construct solutions to real life problems (Pillemer, 2003).

Given that psychosis has been considered by some authors to be predominantly a disturbance in the sense of self (Hemsley, 1998; Mills, 2001), and that social

difficulties and problem solving deficits are commonly observed in individuals with psychosis (Falloon, 2000; Garety et al, 2001), it would seem appropriate to postulate that autobiographical memory deficits may well be implicated in the development and maintenance of the positive symptoms of psychosis.

### **3.4 Overgeneral Memory**

The phenomenon of overgeneral memory was first described in a study that addressed the issue of why patients who had overdosed displayed relatively long latencies to retrieve personal memories, especially in response to positive cue words. Williams & Broadbent (1986) found that participants who had attempted suicide who completed the AMT (Autobiographical Memory Test), showed biased retrieval when their performance was compared to hospital control groups. This bias was due to delayed retrieval of positive memories rather than faster retrieval of negative memories. It was hypothesised that this effect was due to inappropriate retrieval strategies that resulted in general rather than specific memories in the overdose group. General memories would include 'I always get let down by others' or 'At parties I always get ignored', whereas a specific memory would be 'My friend didn't return my call last Saturday'.

Research has found that overgenerality of autobiographical memory is not confined to parasuicidal patients. It has also been found in parents with relationship difficulties with their children (Wahler & Afton, 1980), sexual abuse survivors (Kuyken & Brewin, 1995), Vietnam veterans with post-traumatic stress disorder (McNally et al, 1994), and brain damaged patients (Baddeley & Wilson, 1986; Cimino, Verfaellie, Bowers & Heilman, 1991).

Similar studies have also indicated that people with a primary diagnosis of depression, are much more likely to respond with overgeneral memories, especially in response to positive cue words (Moore, Watts & Williams, 1988; Williams & Scott, 1988; Brittlebank, Scott, Williams & Farrier, 1993; Kuyken & Dalgliesh, 1995; Goddard, Dritschel & Burton, 1996), and that overgeneral memories were not due simply to recent negative events or the effect of any drugs taken (Williams & Dritschel, 1988). Overgeneral memories were also present in anxiety disordered patients (Burke & Mathews, 1992) and patients with obsessive compulsive disorder (Wilhelm, McNally, Baer & Florin, 1997), who had co-morbid depression. Examination of the studies cited above raises the question of whether autobiographical memory is simply an epiphenomenon of a temporary depressive state. However, the correlation between specificity of autobiographical memory and depressed mood (as measured by the Beck Depression Inventory) has not been found to be significant in all studies (e.g. Williams & Dritschel, 1988; Kuyken & Brewin, 1995; Brewin, Reynolds & Tata, 1999; Jones, Heard, Startup, Swales, Williams, & Jones, 1999). Additionally, the fact that over-generality does not disappear when depression remits suggests that it may be a life-long cognitive style or trait, rather than a state characteristic.

In support of the notion that overgenerality of autobiographical recall is a trait characteristic, patients with borderline personality disorder have also been shown to reveal significantly more over general memories on the AMT than a matched control sample (Jones et al, 1999). However, contrary to prediction, individuals with a diagnosis of BPD who showed greatest over-general recall reported the

fewest parasuicidal acts during the previous four months (Startup, Heard, Swales, Jones, Williams & Jones, 2001). If distressing memories increase emotional dysregulation (Reynolds & Brewin, 1999) and emotional dysregulation is a major cause of parasuicide (Macleod, Williams & Linehan, 1992), then Startup et al (2001) proposed that overgeneral memory may have the short-term adaptive function of helping to protect individuals from the build up of the kinds of thoughts, memories and feelings that can result in some people diagnosed with BPD to engage in self-harming behaviours.

#### *3.4.1 The process of memory retrieval and mnemonic interlock.*

A number of authors have attempted to account for problems in the retrieval of specific memories. Williams (1996) suggests that suicidal and depressed patients become stuck in the intermediate stage of memory retrieval, and fail to use the general descriptions they generate to help them retrieve specific memories. This phenomenon, which he has termed 'mnemonic interlock', may act as a way of avoiding the emotional distress associated with remembering specific traumatic memories (Williams, 1996). Therefore, whenever the memory system attempts to retrieve an event using a personal description, the description itself tends to activate other general self-descriptions. These might include global self-referent statements such as 'I have always been a failure'. Even mnemonic interlock relating to positive events may still have damaging consequences as the person does not have quick access to specific positive memories which would allow them to generate specific ideas about how to bring about similar positive events in the future.

### 3.5 Origins of overgeneral memory

Developmental psychologists have shown that retrieval of events in an overgeneral form is a normal developmental phase before specific event memory emerges at the age of 3 to 4 years of age (Nelson, 1993). Based upon anecdotal evidence, Williams' theory (1996) suggests that for some children who experience stressful events around this time, it is possible that overgeneral recall remains the preferred method of retrieval for events in their life. Attempts to recollect events may lead to mnemonic interlock, as a way of avoiding recall of specific events and therefore minimising negative affect. It is postulated that the more disrupted the early experiences, the greater the tendency for new events to be encoded in a more schematic, less distinctive form (Williams, 1996). Kuyken & Brewin (1995) found that many of the depressed women in their study who had a tendency to recall general memories compared with the control group, had been sexually abused in childhood and adolescence. Those women, whether or not they had suffered from a trauma related disorder, had greater difficulty in retrieving either positive or negative specific events from their past. Hunter & Andrews (2002) compared women who had experienced childhood sexual abuse with a matched control group on their ability to recall facts and events from childhood. They found that there was no difference between the two groups in terms of the quality or specificity of their memories for autobiographical incidents, but that the women with abuse histories were significantly less able to recall specific facts about their personal history, such as addresses and names of significant individuals.

However Wessel, Meeren, Peeters, Arntz & Merckelbach (2001) in examining the role of childhood trauma, have suggested that a current diagnosis of major

depressive disorder was more effective in predicting autobiographical memory performance than self-reported childhood trauma. In a replication of the above study using participants diagnosed with borderline personality, Arntz, Meeren & Wessel (2002) found that age and depression were significant predictors of overgeneral memories, but that a diagnosis of BPD or the experience of childhood trauma was not related to memory specificity. In a study of undergraduates who had experienced a variety of traumas in childhood, including but not restricted to child sexual abuse, Reviere & Bakeman (2001) found no significant relationship between autobiographical memory specificity and traumatic experiences in childhood.

These findings cast some doubt on theories that emphasize the role of childhood trauma in overgeneral autobiographical memory. While it could be argued that there were differences in the level of abuse histories between the participants in these studies, the latter three studies indicate that childhood trauma is not the only pathway to an overgeneral autobiographical memory. It may well be the case that for patients diagnosed with depression and/or post traumatic stress disorder, it is the occurrence of intrusive memories rather than a history of trauma per se that acts as the primary determinant of overgenerality (Brewin, et al, 1999). Brewin (1998) has suggested that the avoidance of such intrusive memories may disrupt the retrieval pathways by which specific personal memories would normally be accessed, or that the demands on working memory imposed by their attempts to avoid, may reduce the capacity they have to carry out the task.

Conway & Pleydell- Pearce (2000) have argued that specific memories cannot be formed when there is a disjunction between the goals of the working self that

mediated encoding and the goals of the working self that are operating at retrieval. In a similar vein to Williams (1996), they have argued that overgeneral memories may occur when there is significant negative affect associated with the discrepancy between current and past goals, and that in order to avoid a destabilisation of the current goals of the working self, then the memory retrieval process is terminated prematurely.

Some studies have found that experiences of early trauma are common in people with psychosis (e.g. Agid et al, 1999; Neria, et al; 2002) and that even the development of psychotic symptoms can be considered a traumatic event (Meyer et al, 1999; Frame & Morrison, 2001). There is also evidence that many psychotic individuals experience depression at a higher rate than would be expected within the normal population (Birchwood & Iqbal, 1998). Given the previous body of literature on the relationship between trauma, depression and autobiographical memory deficits, it would be expected that overgeneral memories are also more likely be found in psychotic groups.

### **3.6 Autobiographical Memory Specificity and Psychosis**

As previously discussed, several studies have investigated autobiographical memory deficits in psychosis specifically (Tamlyn et al, 1992; Baddeley et al, 1996; Feinstein et al 1998; Kaney, Bowen-Jones & Bentall, 1999, Ruitort et al, 2003).

In a small sample (n=4) Tamlyn et al. (1992) found general deficits in long term memory, but particularly in relation to autobiographical memory. Using the Autobiographical Memory Inventory (AMI: Kopelman et al, 1990), they found that autobiographical memory was impaired in childhood, early adult life and the recent past and that their sample demonstrated overgeneral memory retrieval for all time periods. They also found that there was a shallow temporal gradient of AM with more remote and early autobiographical memories being spared, and the most recent memories being impaired. In normal individuals, the temporal gradient of long term memory has been represented by a curve that rises very gradually into the most recent years. In healthy control samples, the information that is best remembered seems to be that which is most recently acquired. However, in Tamlyn et al's sample, this pattern was clearly reversed. However the authors noted that such a temporal gradient was not a consistent finding when individual performance was examined and performance on the story recall task was also impaired, suggesting possible deficits in verbal episodic memory that could have accounted for the deficits in autobiographical memory observed. Whether there was any differences between the recall of semantic (facts) and episodic autobiographical memory (events) was unfortunately not reported.

Again using the AMI, Feinstein et al (1998) investigated the temporal gradient of autobiographical memory retrieval in schizophrenia and reported that their psychotic sample (n=19) displayed an overgeneral retrieval style. However in contrast to the Tamlyn et al study, their sample exhibited a strong u-shaped temporal gradient for autobiographical facts, with the recall being poorest for the early adult period, and childhood memories being the best preserved. They also

found an overgeneral retrieval style for autobiographical events in comparison to controls although there was more of a flat temporal gradient for the psychotic group with both childhood and early adult periods being impaired, rather than the deficit being more pronounced in the early adult period. Whilst not delineating the different temporal gradients for recall of facts and events, Feinstein et al (1998) concluded that such deficits were noteworthy as they corresponded to the onset period of psychosis and indicated that little memory for this period was retained. The authors hypothesized that the normal processes of encoding or consolidation could have been disrupted, and that after the acute period, where individuals had started to adjust to internal and external changes, then this process may have stabilised.

The results from the above two studies would appear to be contradictory and suggest that this is an area in which further research is required. Both have their methodological flaws, in that Tamlyn et al's (1992) study had a very small sample size and Feinstein & colleagues (1998) made speculations about the temporal gradient of autobiographical memory without distinguishing between the different patterns of recall for autobiographical facts and events. In addition, in both studies, the relationship between autobiographical memory, working memory and deficits in encoding and retrieval in short term memory were not considered or fully explored.

Baddeley et al (1996) explored the recall of 5 deluded and 5 non-deluded participants diagnosed with schizophrenia using the AMI. They found that both the deluded and non-deluded groups were normal in their ability to recall

autobiographical facts, but found that the non-deluded group performed significantly worse on recall of autobiographical events, displaying an overgeneral retrieval style for all time periods. The deluded group were found to be comparatively normal in comparison, although it is not clear whether their performance would have been considered to be impaired in comparison with a normal population. However, the authors appropriately pointed out that their sample size was very small and that there appeared to be some overlap in the presentation of the deluded and non-deluded sample.

Following this, Kaney et al (1999) investigated the specificity of AM in individuals who met DSM-III-R criteria for delusional disorder but who had not manifested other psychotic symptoms which would have resulted in a diagnosis of schizophrenia. They found that the deluded participants recalled significantly more general memories and fewer specific memories than the control groups. As they used a different measure of AM (the Autobiographical Memory Test; AMT), they did not report any data on the temporal gradient of the memories. However, it should be noted that contradictory to previous research, (Kuyken & Brewin, 1995; Kuyken & Dagnish, 1995; Williams, 1996) they did not find that their depressed participants showed evidence of over-general memories.

More recently, Ruitort, et al (2003) investigated autobiographical memory specificity in a group of 24 patients diagnosed with schizophrenia and a matched control group. They found that their psychotic group exhibited impairment in the recall of both autobiographical facts and events in comparison with the control group, and produced fewer specific memories. However they did not find a

difference in specificity of recall across the three time periods for the patient group, although this was present in the control group, with them recalling significantly more as the time period became less remote. Overall they concluded that the deficits observed in the psychotic group were most apparent after the onset of illness. Ruitort et al (2003) suggested that the relatively impaired performance following the onset of illness might have represented an encoding deficit. The authors linked this finding with Conway & Pleydell-Pearce's (2000) model of autobiographical memory and suggested that the time of onset of illness may be a period when the encoding and consolidation of memories and information relating to the self is impaired, thus leading to a breakdown in the development of personal identity.

Ruitort et al's study used the autobiographical fluency task (Dritschel et al, 1992) and the autobiographical memory enquiry (adapted by the authors from the initial version by Borrini et al 1989). Both these measures have similarities to the AMI and the AMT, but may not be comparable given the demands of the tasks. For example the autobiographical fluency task requires the spontaneous production of lists of friends from different time periods, and the autobiographical memory inquiry involves answering questions about unspecified events that have happened in different time periods, and the memories are scored in terms of detail, content and specificity. While their control group was matched on age and education, they were not matched for IQ (as measured by the short form of the WAIS-R), with the psychotic group having a significantly lower full scale IQ.

As can be seen, the previous research into autobiographical memory deficits in psychosis is confusing and contradictory. While some of the earlier studies have found that individuals with psychosis do exhibit an over-general retrieval style, more recent studies, some which have focused on specific psychotic symptoms, have been contradictory. Furthermore, while some studies have found an unusual temporal gradient of memories in relation to specific time periods, others have found no marked difference from controls, and the distinction between recall of autobiographical events and autobiographical facts has often not been made clear.

A further confounding factor in the literature on autobiographical memory is that different measures have been used to tap into what is presumably the same construct. Research is clearly required to compare the two most commonly used measures of autobiographical memory to investigate whether this is in fact the case.

### **3.7 Summary of the current study**

This research proposes to investigate both the memory retrieval styles of people with psychosis and the temporal gradient of their autobiographical memory for recall of both personal events (episodic) and personal facts (semantic). In this study, the control group will be matched for age, education level and premorbid I.Q. and measures of working memory and short term encoding and retrieval will also be administered to investigate whether over-general memory deficits can be accounted for in any way by any potential limits in working memory capacity or short term encoding and retrieval. The inclusion of other memory tests provides

the opportunity to test whether there are specific autobiographical memory problems in psychosis or whether these are part of a general memory impairment. Given the literature on overgeneral memory in depression, the degree of depressive symptomatology in both groups will also be taken into account.

The most widely used measures of autobiographical memory, the autobiographical memory interview (AMI) and the autobiographical memory test (AMT) will both be administered and performance compared in order to investigate whether they are measuring the same construct.

### 3.8 Research Hypotheses

Given the current literature base on autobiographical memory retrieval in psychotic populations, several hypotheses have been formulated:

- 1) Individuals with psychosis will overall demonstrate an over-general retrieval style of autobiographical memory in relation to controls on the AMT
- 2) They will also demonstrate an overgeneral retrieval style of autobiographical facts and memories on the AMI
- 3) An approximation to a u-shaped temporal gradient of AM will be found in individuals with psychosis and that the poorest recall of AM will be found around the time of onset of illness in early adulthood.
- 4) Deficits in the retrieval of specific AM information will be independent of any deficits in working memory or verbal episodic memory.
- 5) The two measures of autobiographical memory will be positively correlated, thereby indicating that they are measuring the same construct.

## Chapter 4 - Method

### *4.1 Participants*

20 participants (14 men and 6 women) with a diagnosis of schizophrenia were recruited from the psychiatric inpatient populations of 9 long term rehabilitation or low secure forensic rehabilitation wards at the Whittington and St Bernard's Hospitals, London. They all fulfilled the DSM-IV criteria (APA, 1994) for chronic schizophrenia as determined by the current treating psychiatrists and were all currently symptomatic i.e. experiencing at least one positive symptom of psychosis, such as voices or delusions.

#### *Exclusion Criteria*

Exclusion criteria for the study included a history of organic brain disease, epilepsy, head injury, recurrent and extensive drug or alcohol abuse, having had ECT within the past year or having levels of disorganisation or negative symptomatology that would have precluded engagement. A co-morbid diagnosis of a personality disorder or depression was also considered to be exclusion criterion.

The mean age of the schizophrenic group was 37.9 years (SD = 9.043, range = 27-59) and they had on average 14.75 years of full time education (SD = 3.37), meaning that they had generally completed full-time education by the age of 18.7 years. The mean age of onset of symptoms, defined as the first psychiatric consultation or hospitalisation was 20.6 years (SD = 4.33, range = 16-33) and the

mean duration of illness was 17.3 years (SD = 7.73). All participants were on typical or atypical antipsychotic medication.

The control group consisted of 20 healthy participants (14 males and 6 females) who had no known history of mental illness, and were not intoxicated with alcohol or drugs at the time of testing (operationalised as no consumption of alcohol or drugs in the last eight hours). The average age of the control group was 34.8 years (SD = 12.53), and the mean number of years spent in full time education was 14.1 years (SD = 3.076). None of the control group were taking any prescribed medication.

The control group was matched to the psychotic group on age, gender, number of years in education and premorbid Full Scale I.Q, as measured by the National Adult Reading Test (NART, second edition; Nelson, 1991).

No significant differences were found between the ages of the psychotic and the control group ( $t(38) = .897, p=.375$ ). Given that the distribution of the number of years in education was positively skewed for the control group ( $S=1.113, Z= 2.17, p<0.05$ ), a non – parametric test was used to ascertain if there were any significant differences in the average number of years in education between the two groups. This was not found to be the case. (Mann-Whitney,  $Z= -.576, p = .565$ ).

The average Full Scale I.Q. of the psychotic participants was 102.6 (SD = 11.53), and 107.3 (SD = 9.95) in the control group. No significant differences in premorbid intellectual functioning between the two groups was found ( $t(38)=-$

1.379,  $p=.176$ ). Thus the control group were considered to be suitably matched to the psychiatric group in terms of age, gender, number of years in education and premorbid I.Q.

#### ***4.2 Recruitment Process***

The study was described to clinical teams at the two hospitals and two local community mental health centres in the Ealing and Islington areas of London. The Consultant Psychiatrists responsible for the inpatients (most of whom were linked to specific wards) or who were members of the two community mental health teams were then approached by letter (Appendix 2.4), informed of the study and asked to sign a consent form (Appendix 2.5) allowing the researcher access to their patients. Of the 8 Consultant Psychiatrists approached, all gave their permission for their patients or clients to be potentially considered as participants.

The participants were then recruited in one of two ways:

- 1) A meeting was arranged with ward managers, where they were given information about the study (Appendix 2.6), and asked to identify potential participants who met the inclusion criteria and who did not meet the exclusion criteria. Participants were then approached by the researcher and a member of staff well known to the patient, and they were asked if they would be willing to participate in a research study.

- 2) The study was presented to the clinical team and keyworkers or primary nurses were asked to identify suitable participants. Following a referral, the main

researcher met with the named nurse or keyworker and they were then asked to meet with their patient separately to discuss the study and to obtain consent (Appendix 2.3). Only once consent had been given, did the researcher then approach the individual and arrange a convenient time to conduct the interview.

The reason for having two different recruitment processes and means of obtaining consent was in order to meet the requirements of the two different ethics committees who provided ethical approval for the study.

For the control group, the researcher approached the manager of a London DHSS unemployment centre, the purpose of the study was explained and their permission obtained to recruit participants from their centre. An advert was placed in the job centre and also posted on their recruitment website. From the advert, two participants were recruited and a further eight controls were obtained by approaching individuals in the job centre and asking them if they would like to be involved in a research project. The control group also consisted of nursing staff from several hospitals in the London area and people known personally to the researcher who were considered suitable for the study.

All participants were then approached and asked if they would be willing to be involved in a research project. They were given a written description of the study (Appendix 2.1/2.2), asked if they would like to participate and then consented (if consent had not already been obtained)(Appendix 2.3). Participants were given the opportunity to discuss their participation with family members, guardians, staff and/or caregivers if they so desired. They were advised that the interview

normally took no longer than an hour and half, and could be conducted over two sessions if more convenient.

It should be noted that approximately 60 patients with a diagnosis of schizophrenia were approached and invited to take part in the study. Of these, almost two thirds declined, and four others gave and then withdrew their consent prior to the interview taking place. In some situations, the ability to engage with and tolerate an interview process was informally assessed through discussion with staff members, and some potential participants were excluded on the basis of risk issues e.g. risk of aggression, or where the potential of a negative impact on the patient was too high, given the nature of the study. In four cases, the researcher decided to terminate the interview prematurely as it was clear that the participants were too preoccupied or distracted by their symptoms, or their thinking was too disordered for the data collected to have been valid. Such data were not included in the final analysis.

Whilst two community mental health teams were approached and the study presented at team meetings, no suitable participants were identified or referred. Follow up letters sent to the two teams did not produce any further referrals. While it was intended that individuals with a diagnosis of schizophrenia would be recruited from both inpatient and community populations, in order to access a variety of degrees of symptom severity and level of social and occupational functioning, the final sample consisted only of inpatients.

### *Remuneration*

In line with guidelines suggested by University College London, only the control group were paid £7.50 for their time, taken from research funds allocated by the Sub-Department of Clinical Health Psychology at University College London

### **4.3 Ethical Approval**

The study was approved by the West London Mental Health Research Ethics Committee on the 10<sup>th</sup> May 2002 and by Camden and Islington Community Health Local Research Ethics Committee on 31<sup>st</sup> March 2003 (see Appendix 1). Apart from a small change in the way that the participants were approached as discussed in the recruitment process section, which was requested by the second ethics committee, no further ethical objections were raised.

### **4.4 Measures**

**Autobiographical Memory Interview (AMI)** (Kopelman, Wilson & Baddeley, 1990)

This test provides an overall estimate of remote memory function and also provides information about the temporal gradient of remote memory content. It allows a measurement of the pattern of autobiographical memory deficits and the detection of any temporal gradient in retrograde amnesia. Participants were asked to recall 3 specific incidents (personal episodic schedule) and autobiographical facts (personal semantic schedule) from three time bands: their childhood, early adulthood and very recent past. For specific incidents, scoring was in terms of

descriptive richness of the account, ranging from 0-3, and its specificity in time and place, yielding a maximum score of 9 for each time period. The personal semantic schedule assesses the ability to recall facts such as home addresses and names of friends or colleagues. The amount of information provided was scored up to a maximum of 21 for each time period and was presumed to be accurate, as outlined in the manual (Kopelman, et al 1990). Kopelman (1989) found that there was correlations of between 0.93 and 0.99 when the recall of Korsakoff's and Alzheimer's patients were verified against the reports of close relatives and concluded that detailed checking of responses with relative reports was most likely to be unnecessary. For the clinical sample, when the accuracy of the information or events recalled was in question, (e.g. when it was not clear whether the memory contained some delusional content), case notes and psychiatric reports were reviewed and staff members who had a direct relationship e.g. primary nurse, with the participant were consulted. Overall, it was normally clear when a memory was in fact delusional e.g. 'I was a fighter pilot in the US Armed Forces' or 'I was kidnapped and forced to pull huskies in Alaska', and in such circumstances the event was scored as '0'. The AMI manual presents norms and cut off scores that represent different levels of impairments across the three time periods for both healthy and clinical populations.

The AMI measure was developed primarily to assess autobiographical memory deficits in clinical populations. As such several sections of the interview schedule include questions relating to previous and present hospitalisations. When interviewing the control group, this question was adapted to incorporate previous and current addresses, instead of hospitalisations and questions relating to events

were adapted to include specific memories occurring whilst they were residing at these addresses.

The AMI has not been found to be correlated with age or IQ ( $r=0.23$  and  $0.15$  respectively) but has been found to correlate with other measures of remote memory such as the Recognition Memory Test for Words and Faces (Warrington, 1984) and the Rivermead Behavioural Memory Test (Wilson, Cockburn & Baddley, 1985)( $r$  values ranging from  $0.391$  to  $0.681$ ).

Inter-rater reliability statistics reported in the AMI manual (Kopelman et al., 1990) range from  $0.83$  to  $0.86$  and previous studies using the AMI (Brewin & Stokou, 2002) found inter rater reliability to be good (89%, weighted Kappa= $0.73$ ).

### **Autobiographical Memory Test (AMT:Williams & Broadbent, 1986)**

The Autobiographical Memory Test was developed as a means for assessing mood dependent retrieval biases in clinical populations. It was based on Francis Galton's cue word method and is now widely used as a method of assessing personal event memory in people with emotional disturbance. Participants are required to generate a specific memory in response to positive and negative cue words and their responses are timed. Responses are generally coded as specific (a single event located in time and place, e.g. my birthday party last year), or general (either relating to a multiple occurrences of an event e.g. when I play in pool tournaments, or an event lasting more than day e.g. when I was on holiday in

Paris). A more detailed outline of the presentation of the cue words and coding of responses is provided in the Procedure section following.

**National Adult Reading Test (NART);** (Nelson, 1991 - restandardisation for the WAIS-R).

The NART is a 50 item word pronunciation task that is commonly used to provide an estimate of expected premorbid functioning in relation to IQ as assessed with the Wechsler Adult Intelligence Scale – Revised (WAIS-R; Wechsler, 1981). The measure uses the fact that word reading ability and overall IQ are strongly correlated ( $r=0.75$ ) and that performance in word reading ability is more resistant to deterioration in dementia and other neurological illnesses. The participant is required to read aloud 50 words of increasing difficulty which are considered unusual in the sense that their pronunciation cannot be guessed by the application of normal phoneme decoding. (Nelson, 1982). Therefore accurate word pronunciation is taken as an indication of previous familiarity with the word, and the level of overall performance (i.e. number of errors) is then used to calculate the expected WAIS-R IQ. For example, correct pronunciation of ‘naïve’ could not be reached without previous knowledge of the word. It is argued that word pronunciation is less likely to be adversely affected by illness or socio-economic factors, than other indicators such as years of education, although it has been noted that the NART IQ should be interpreted carefully in individuals at the lower and upper range of intellectual functioning. The NART has been found to correlate highly ( $r=0.85$ ) with ‘g’, the general factor of intelligence that emerges

from factor analyses of the WAIS-R subtests, and has high levels of inter-rater (0.96-0.98) and test-retest (0.98) reliabilities (Nelson & Willison, 1991).

**Beck Depression Inventory (BDI-II)** (Beck, 1996).

This is a widely used 21 item self rating measure which assesses the intensity of depression in clinical and normal populations. Each item has a list of four statements that are arranged in increasing severity about a particular symptom of depression. The new inventory (BDI-II) was created to be in line with the depression criteria for DSM-IV (APA, 1994). Items on the new scale replaced items that dealt with symptoms of weight loss, changes in body image and somatic preoccupation. Sleep loss and appetite loss were also revised to assess both increases and decreases in sleep and appetite. The BDI-II is considered to be more clinically sensitive than the original BDI (Beck, Ward, Mendelson, Mock & Erbaugh, 1961), with a inter-rater reliability of .92 and a test-retest reliability of .93 (Beck, 1996).

**Digit Span subtest of the WAIS –III** (Wechsler Adult Intelligence Scale- 3<sup>rd</sup> revision (Wechsler, 1998a) and Wechsler Memory Scale: Wechsler, 1998b)

This is a widely used measure of auditory short term working memory and attention and represents how much data or bits of information can be encoded, held and retrieved at any given time. Participants are presented orally with an

increasing series of digits and the numbers are presented at a rate of one per second. Participants are then required to recall the numbers in the correct order, this is known as forwards digit span. Backwards digit span involves recalling the series of number backwards, and tests the ability to manipulate verbal material in working memory. The average digit span backwards is 5. The average digit span forward is 7 numbers, with a normal range of between 5 and 9. (WAIS-III).

**The Adult Memory and Information Processing Battery (AMIPB) (Coughlan & Hollows, 1985)**

This is a measure which is very similar to the Logical Memory subtests from the Wechsler Memory Scales (WMS III, Wechsler, 1998). This measure was used as opposed to the Logical Story task in order to avoid any practice effects or pre-exposure to the material prior to testing because of any neuropsychological or memory functioning assessment that they may have undergone as part of their clinical care. Story recall is frequently used as a measure of verbal episodic memory and the immediate and delayed recall components of this task can be used as a measure of intrusions into short term memory. The test involves the participant being read a short story which they are then asked to recall in as much detail as possible immediately and after a delay of between 27 and 35 minutes. This provides an estimation of the capacity for the retention of new information and the degree of forgetting over the delayed period. As with other standardised tests of verbal episodic memory, the AMIPB has comprehensive scoring criteria and norms for both clinical and healthy populations.

#### *4.5 Procedure*

Information was recorded on demographic history, experience of mental health problems and where appropriate, current medication and duration of illness. Clinical notes were reviewed in order to corroborate the above information with the reports given by the participants. Generally the AMI was administered first, followed by the NART and then the presentation of the story from the story recall task, and immediate recall of the story. The AMT was then presented (see below for details of administration) followed by delayed recall from the story recall task. Following this, the forward and backward digit span task was administered and the interview ended with the participant completing the Beck Depression Inventory. The ordering of the tests was generally as outlined above although the order was sometimes adapted to the demands of the situation in terms of concentration and motivation.

All tests were conducted at a pace that was comfortable for the participants and, in the event of any signs of distress or discomfort, the testing session was ended and rescheduled. This occurred with approximately half of the psychiatric group, where testing was conducted over two sessions, with no more than a week in between sessions. Reasons for splitting the interview process included fatigue, concentration difficulties and in order not to conflict with other ward or therapeutic activities. At various points during the interview process, participants were asked if they needed to take a break and were also advised that they could stop the interview at any point and reschedule. In the majority of cases, participants themselves asked for breaks or asked to stop, and apart from one

participant who withdrew consent half way through, all interviews were completed.

### Administration of the AMT

The participant was given a standard set of instructions about the nature of the test and an example of the desired response was given. The present study used the following instructions given in Williams' (unpublished) procedure:

*I am interested in your memory for events that have happened in your life.*

*I am going to read to you some words. For each word, I want you to think of an event that has happened to you that the word reminds you of. The event could have happened recently (yesterday or last week) or a long time ago. It might be an important event or a trivial event.*

*Just one more thing, the memory you tell me about should be of a specific event. So if I said the word 'good' – it would not be ok to say 'I always enjoy a good party', because that does not mention a specific event. But it would be ok to say 'I had a good time at Jane's party' because that it is a specific event.*

*Lets try some words for practice*

Participants were then given three practice words (enjoy, friendly and bold) and given prompts and feedback until they produced a memory that met the demands of the task, i.e. a specific memory detailing a single event which could be located in time and place. Once they were able to perform the task, then the 12 cue words were presented in a randomised order. The cue words were 6 positive words (happy, proud, relieved, pleased, excited and hopeful) and 6 negative words

(miserable, guilty, angry, insecure, lazy and uncomfortable). The cue words were taken from previous studies using this paradigm (Brittlebank, et al, 1993; Kaney, et al, 1999), and were selected to be of comparable word frequency and of equivalent emotionality rating within the two types of cue (positive vs negative) (Williams, unpublished).

After the practice trials, no further coaching was provided. The participants were presented with each word both verbally and visually (on a 10 x 30 cm card) and were asked 'Can you tell me of something that's happened to you that you are reminded of when you see the word .....?'. The standard prompt described in Williams' procedure was used when the first response was ambiguous, that is, it was not clear whether the response was a specific event. This prompt was; 'Can you tell about one specific occasion, one particular time?'. If the response remained unclear then the participant was asked whether they had a specific event in mind when they were responding. After the recall phase, participants were asked to provide a date for the memory if this was not apparent from their initial response.

### **Coding**

The types of response produced were coded in one of four ways. The response was coded 'specific' if it was a single event, located in time and place and lasting no more than a day in duration. Overgeneral responses were coded as either 'categoric' (multiple occurrences of the same event) or 'extended' (a single event lasting more than one day and having a definite beginning and end), based on the finding that only categorical responses were over-represented in depressed

populations (Williams & Dritschel, 1992) In line with Kaney et al's (1999) study exploring the memory specificity in a deluded population, a further category of 'uninterpretable' was included. The 'uninterpretable' category was used for any responses that were clearly delusional in nature, as well as responses that could not be considered the recall of a memory, but were more of an association to the word presented. If no response was provided, then this was also included in the 'uninterpretable' category. If a response was ambiguous i.e. not clearly specific, such as 'in the pub', then the prompts described previously were used. If when asked if they had been thinking of a specific event when they had first responded, then the response latency following this prompt was used as a mean of discerning whether the first response was specific or general. If the participant replied immediately e.g. 'Yes, I was thinking about when I was in the pub last night', then the response was coded specific. However, if there was a pause following the prompt, then the response would be coded either categorical or extended, depending on the content of the initial response.

Response times for each memory were generated by timing the interval with a stopwatch between the end of the presentation of each item and the response, excluding conversational or thinking noises, such as 'um' and 'let me see'. In order to allow for the opportunity to ascertain the degree of inter-rater reliability and for ease of recording of response times and review of categorisation after the interview, all participants were asked for their permission to record this section of the interview process using a mini-disc recorder and microphone. Only one participant refused to be recorded and so responses were timed using a stopwatch within the interview setting.

### Independent Ratings of Responses

The responses of ten participants from each group were randomly selected and an independent rater rated the responses of each participant, based on the protocol described above. There was good agreement between ratings made by the interviewer and an independent rater (88.33 % agreement, Cohen's Kappa = .825). Given that the independent rater was not blind to the participants group, the ratings of the main researcher were used in the final analysis.

### **4.6 Analyses**

This study used a mixed model analysis of covariance, where the dependent variables were proportion of specific responses on the AMT, and the amount of personal facts and personal information recalled on the AMI. The between subjects factor was the presence or absence of a diagnosis of schizophrenia and the within subjects factor was recall from the different time periods on the AMI. Specialist statistical advice suggested that the use of analyses of covariance would be the most appropriate analytic approach to test for group differences, and that forwards and backwards digit span and immediate and delayed recall should be used as covariates in the analyses, in order to remove the variance in the dependent variables associated with deficits of working memory and verbal episodic memory. A correlational analysis was also used to investigate the relationship between the two measures widely considered to measure autobiographical memory retrieval, the AMT and the AMI.

## Chapter 5 - Results

In this section, the result of the statistical analyses on the performance of the two groups will be presented. It was predicted that the psychosis group would recall fewer specific memories overall and also demonstrate impaired recall for both autobiographical facts (personal semantic knowledge) and events (personal episodic events). It was further predicted that the two groups would differ in the temporal gradient of their recall of both facts and events, and that the time period that would be most significantly impaired would be in early adulthood and that the graphical representation of this temporal gradient will approximate a u-shaped curve.

The statistical test used to evaluate these differences is the analysis of covariance (ANCOVA), as this will allow for the removal of variance associated with deficits in working memory and general verbal episodic memory.

The final part of the analyses will compare the performance of the two groups separately on the autobiographical memory interview (AMI) and the autobiographical memory test (AMT) in order to investigate the degree of correlation between the two measures.

All analyses were carried out using SPSS Version 10 for Windows. For the majority of the variables, assumptions of normality were not violated based on estimates of skewness and kurtosis. In these instances parametric tests were run and when a lack of normality was considered to be an issue (e.g. in the recall of personal episodic events on the Autobiographical Memory Inventory), then

analyses was carried out using both parametric and non-parametric tests, whenever possible. When conducting analysis of variance and covariance, assumptions of sphericity were not always met, and so the multivariate statistic is always reported for the sake of consistency.

In the first section the differences between the two groups on the measures of working memory and verbal episodic memory will be compared. Any significant differences between the two groups on these variables needs to be taken into account in the subsequent analysis of group differences in autobiographical retrieval.

### **5.1 Differences between the Two Groups**

Table 1 shows the average scores of the two groups on the measures of working memory (digit span forward and backwards), and verbal episodic memory (immediate and delayed story recall) and self rated scores of depression. The retention rate from the story recall is also presented, which is the difference between the amount of information recalled immediately after a story was presented and the amount recalled after on average a 30-minute delay.

Using independent samples t-tests, no significant differences were found between the two groups in terms of delayed recall and retention rate on the story recall task, pre-morbid full scale IQ and backwards digit span. The two groups were found to differ significantly on digit span forward ( $t(38) = -2.090, p=0.043$ , two-tailed), with the psychotic group recalling fewer digits (5.9,  $SD = .97$ ) in comparison with controls (6.55,  $SD = .99$ ). The psychotic group recalled on

average less information on the immediate recall task (see Table 1), although this difference did not reach quite reach significance ( $p=0.053$ , two tailed).

**Table.1** Average scores on forward and backward digit span, immediate and delayed recall and self- reported depression ratings.

	Psychotic Group	Control Group
Forwards Digit Span	5.9 (.97)	6.55 (.99)
Backwards Digit Span	4.1 (.85)	4.65 (.93)
Immediate Story Recall	28.65 (10.65)	34.45 (7.43)
Delayed Story Recall	25.96 (10.79)	31.6 (8.64)
Percentage Retention Rate	88.9 (9.88)	91.2 (12.81)
BDI	12.65 (11.41)	7.9 (5.29)

Standard Deviations are presented in parentheses. BDI = Beck Depression Inventory

While no significant differences were found between the two groups on depression ratings ( $p=.11$ ), the mean BDI score for the psychotic participants was 12.5 (SD=11.41), which would overall place them in the mild-moderate range of depression (Beck, 1996), whereas the control group with an average of 7.9 (SD = 5.29) would not be considered depressed (see Table 1)

## 5.2 Hypothesis 1 – Autobiographical Memory Specificity based on the AMT

The first main hypothesis was that individuals with psychosis would demonstrate an over-general retrieval style of autobiographical memory in relation to the control group. It was hypothesised that the psychosis group would recall fewer specific memories and more general memories than the control group on the AMT. A 2 x 4 ANCOVA was conducted with specific vs categorical vs extended vs uninterpretable as the within subjects factor and psychosis vs control as the group factor. The four covariates were immediate and delayed recall and forward and backwards digit span. This analysis showed a significant effect for group ( $F(1,34) = 4.291, p = 0.046$ ) and type of recall (Wilks' Lamda = .726  $F(3, 32) = 4.028, p = 0.015$ ) and there was a significant group x memory type interaction (Wilks' Lamda = .234,  $F(3,32) = 34.83, p < 0.001$ ) (see Figure 2).

In support of the first main hypothesis, post hoc t tests showed the psychotic group produced significantly fewer specific memories than the control group ( $p < 0.001$ ), as shown in Figure 1. On average, the proportion of specific responses produced by the psychotic group was 22.9% (SD=19.47), compared with 80.01% (SD=10.3) by the control group. (Table 2)

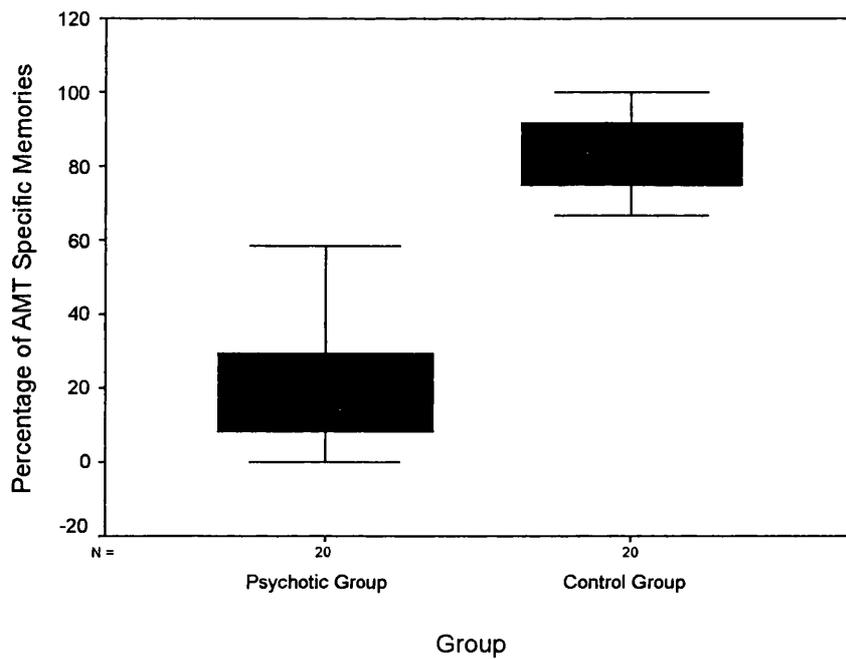
Post hoc analysis on the two subtypes of general memory, categorical (multiple events) and extended (an event lasting more than a day), the psychotic group produced significantly more categorical memories ( $p < 0.001$ ), but not extended ( $p = .654$ ). Of interest, the psychotic group produced significantly more responses that were considered 'uninterpretable', ( $p < 0.001$ ), responses such as being of a

clearly delusional nature or the response being more of an ‘association’ rather than the recall of a memory.

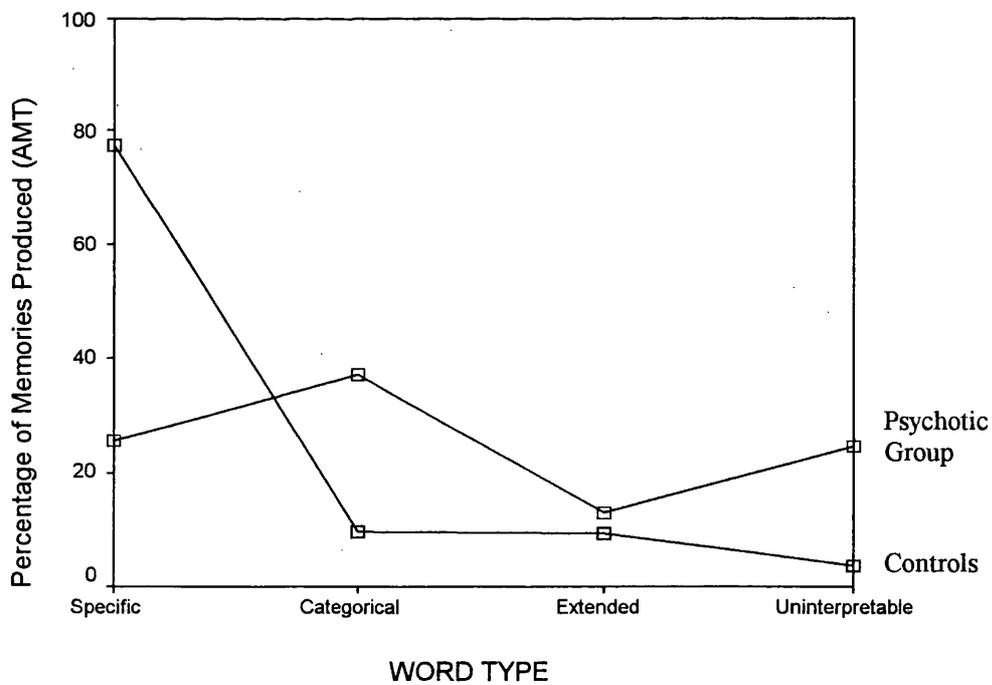
**Table 2** Mean percentage of specific, extended and categorical memories (both forms of general memory) and proportion of uninterpretable responses (standard deviations in parentheses).

Type of Memory	Psychotic Group	Control Group
Produced (%)		
Specific	22.9 (19.5)	80 (10.3)
Categorical	40.1 (18.46)	6.7 (6.4)
Extended	11.7 (9.53)	10.4 (8.5)
Uninterpretable	25.3 (20.5)	2.9 (5.6)

Pearson product-moment correlations conducted within the psychotic group between specificity of response and the measures of working memory and verbal episodic memory found that the percentage of specific responses produced was positively correlated with both immediate ( $r=.508$ ,  $p=0.022$ ) and delayed recall ( $r=.496$ ,  $p=0.026$ ). This suggests that individuals who recalled more specific responses also remembered more from the story on both immediate and delayed recall.



**Figure 1.** Box and whisker plot showing the proportion of specific responses produced on the AMT for the psychosis and control groups.



**Figure 2.** Differences in the types of memories produced of the AMT for the psychotic and control groups.

In summary, in support of the first main hypothesis, the psychotic participants produced significantly more general memories and less specific memories than the control group suggesting that the psychotic group displayed an overgeneral retrieval style of autobiographical memory, as measured by the AMT in comparison to controls. They also produced more responses that were considered 'uninterpretable'. When the two sub types of general memory were distinguished, the increased production of general responses was only found for categorical memories i.e. multiple occurrences for an event, and not for extended memories (a single event occurring over more than one day). One of the main hypotheses was that any deficits in autobiographical memory specificity would be independent of any deficits in short term working memory and verbal episodic memory. After controlling for performance on the forwards and backwards digit span task and the delayed and immediate recall task, there was still found to be a significant difference between the two groups in the proportion of specific responses produced. Within the psychotic group, a lower percentage of specific memories produced was found to be associated with poorer performance on the recall task.

### **Word Type**

The valence of the word cues was divided into positive and negative words, with 6 in each group. Table 3 depicts the proportion of specific and general memories generated for the two types of cue words and shows that both groups generated relatively more specific events for positive words, and more general events for negative cue words.

**Table 3**

Mean proportion of specific and general memories, together generated to positive and negative cue words by the psychotic and control groups

Type of Memory (%)	Psychotic Group		Control Group	
	Positive Cues	Negative Cues	Positive Cues	Negative Cues
Specific	28.3 (24.4)	17.5 (20.57)	84.2 (13.75)	75.8 (13.76)
General	45.1 (18.8)	58.3 (23.88)	12.5 (12.2)	21.7 (14.4)

A two way ANCOVA was conducted on the data for specific memories with psychosis vs control group entered as the between subject effect and positive vs negative cue words as the within subjects effect. Again the covariates were forward and backwards digit span and immediate and delayed recall. No significant main or interaction effects were found for positive vs negative cues words. However a significant group effect was found for psychosis ( $F(1,36) = 110.44, p < 0.001$ ).

Post hoc t-test comparisons showed that the psychotic group produced significantly fewer specific responses to both positive and negative cue words (both  $p < 0.001$ )

In summary this suggests that the control group produced more specific responses to both negative and positive cue words, but there was no difference in specificity of response to the two types of cue word for either group.

### **Response Latency**

The average response time of the first response of the psychotic participants was 7.85s (SD = 3.05) and 14.53s (SD =4.53) for the controls. Given that the distribution of the overall response latency for the control group was both positively skewed, ( $Z = 3.39$ ,  $p < 0.05$ ) and kurtosed ( $Z=6.19$ ,  $p < 0.05$ ), both parametric and non-parametric tests were used to evaluate whether there were any differences in the mean response time. Both the t-test and the Mann Whitney tests revealed that the psychotic group responded significantly more quickly than the control group to all cue words and so only the parametric test will be reported ( $t_{38} = -5.46$ ,  $p < 0.001$ ).

### **5.3 Hypotheses 2 and 3: The Temporal Gradient of Autobiographical Memory**

The third hypothesis was that an approximation to a u-shaped temporal gradient of the recall of autobiographical events and facts would be found in individuals with psychosis, with the schizophrenic group recalling fewer facts and events and that the time period with the poorest recall would be around the time of onset of illness in early adulthood.

The average total score of the psychotic group on the Personal Semantic scale (autobiographical facts) was 39.3 (SD=7.94), and the average total score for

Autobiographical Incidents (Personal Episodic) was 15.3 (SD=4.78). This is in comparison with the control group, who had a total score of 60.6 (SD = 1.34) for Facts and a total Autobiographical Incidents score of 26.15 (SD = 1.309). Both parametric (t-test) and non-parametric tests (Mann Whitney) were conducted and both were significant so only the parametric statistics will be reported. The psychotic group were found to have overall significantly poorer recall for events ( $t(38) = -9.79, p < 0.001$ ) and for facts ( $t(38) = -11.82, p < 0.001$ ), as predicted in Hypothesis 2.

Table 4 depicts the scores of the psychotic and control groups on the three different time periods for personal events (episodic) and facts (semantic).

**Table 4.** Autobiographical Memory Inventory Performance of recall of autobiographical events and facts in schizophrenic and normal controls.

	Childhood	Early Adulthood	Recent
	<i>Personal Facts</i> Max=27		
Psychotic Group	12.55 (3.89)	10.83 (4.74)	15.9 (2.51)
Control Group	19.38 (1.21)	20.33 (0.73)	20.87 (0.32)
	<i>Personal Events</i> Max = 9		
Psychotic Group	4.65 (2.37)	4.3 (2.32)	6.35 (1.72)
Control Group	8.3 (1.18)	8.9 (3.08)	9 (0)

Using a repeated measures 2 X 3 ANCOVA, the performance of patients and controls in the recall of Personal Facts and Personal Events was compared,

considering each of the three time periods, with immediate and delayed recall and forward and backwards digit span as covariates.

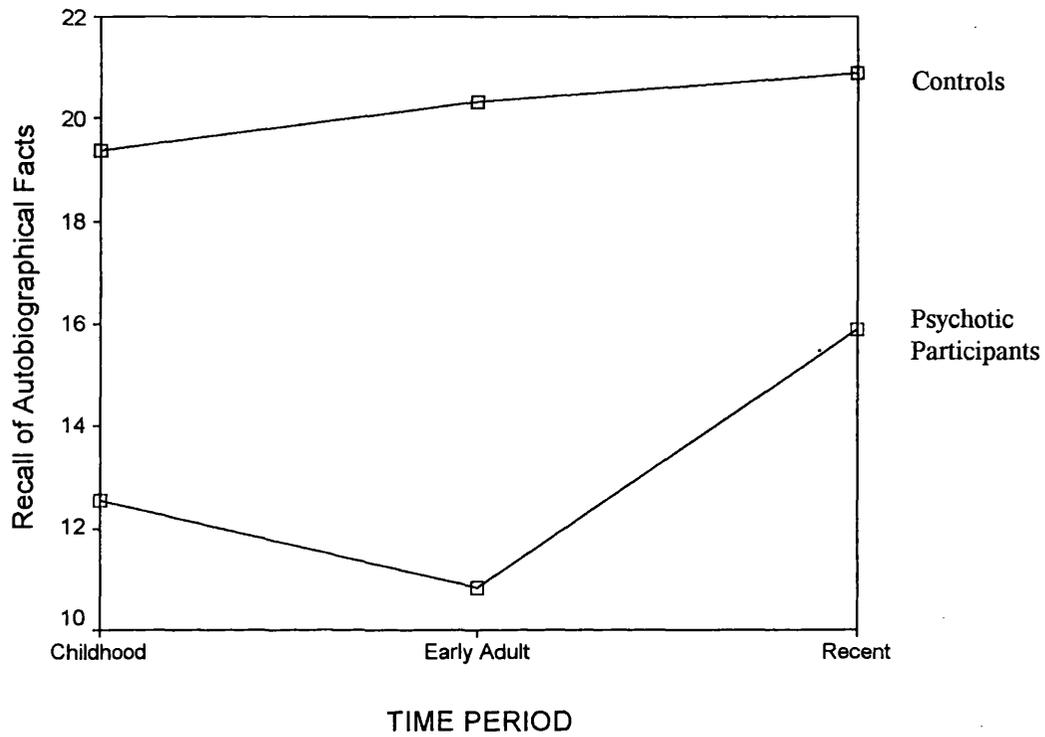
### **Personal Facts (Personal Semantic Memory)**

Out of a possible score of 21, the psychotic group scored on average 12.55 (SD=3.89) for the childhood time period, 10.83 (SD=4.74) for early adulthood and for recent facts, their mean score was 15.9 (SD=2.51). Scores for the control group across the three time periods ranged from 19.378 (SD=1.21) to 20.87 (SD=.32)(see Table 4.).

There was a significant main effect for group ( $F(1,34) = 114.622$   $p < 0.001$ ) and a significant interaction effect between group and time period (Wilks'  $\Lambda = .583$ ,  $F(2,33) = 11.78$ ,  $p < 0.001$ ) The control group exhibited a relatively flat performance, recalling an equal amount of factual information from childhood, early adulthood and the recent past. As can be seen in Figure 3., the psychotic group exhibited a u-shaped curve or temporal gradient, with the worst performance being in the early adult period. For personal facts, post hoc t test analysis found significant differences between the schizophrenic and the control group for all three time periods; childhood, early adulthood, and for recent events (all  $p < 0.001$ ).

Post hoc t-tests conducted on the psychotic group separately found that they recalled significantly fewer facts from their early adulthood period (in comparison with both childhood and recent time periods (both  $p < 0.001$ )). There was also a significant difference found between factual recall from childhood and recall from

recent times, with the psychotic group recalling significantly more from recent time periods ( $p < 0.001$ ).



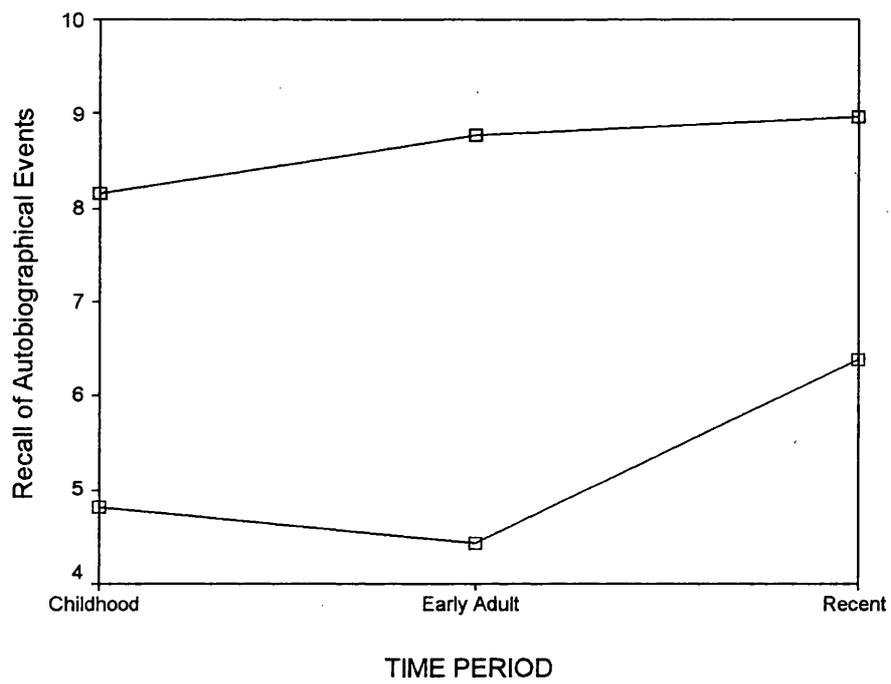
**Figure 3.** Differences in recall of Autobiographical Facts (Personal Semantic Knowledge) on the AMI for the schizophrenic and control group. (max=21)

Pearsons Product moment correlations found that again, performance on the total recall of autobiographical facts was positively correlated with immediate ( $r=.623$ ,  $p=0.03$ ) and delayed recall ( $r=.586$ ,  $p=0.07$ ) on the story recall task, suggesting that overall poorer verbal episodic recall was associated with poorer recall of autobiographical facts in the psychotic group.

#### **Personal Events (Personal Episodic Memory)**

The psychotic group scored on average 4.65 (SD=2.37) for recall of autobiographical events from childhood, 4.3 (SD=2.32) for early adulthood, and 6.35 (SD=1.72) from recent periods. The control group in comparison scored 8.3 (SD=1.18), 8.9 (SD=3.08) and 9 (SD=0) for childhood, early adulthood and recent time periods respectively.

As is depicted in Figure 4, the psychotic group recalled fewer specific events in all three time periods: childhood, early adulthood and recent. A similar pattern to Personal Facts has emerged for Personal Events, where the control group have exhibited a high and flat performance over time, whereas the psychotic group have demonstrated more of an u-shaped curve with their recall being significantly impaired for all three time periods.



**Figure 4.** Recall of Personal Autobiographical events by the psychotic and control group (max score of 9).

For the control group, recall scores on the personal episodic scales for Childhood, Early Adulthood and Recent Events were all negatively skewed. This is likely to have been caused by the ceiling effect on the scores, when a specific memory recalled located in time and place is allocated a score of 3. Almost the entire control group obtained the full number of possible points, obtaining the maximum score of 9 in each time period. As such only non-parametric tests could be used to test whether the differences observed were in fact significant. In all three time periods, significant differences were found in the recall of Personal Events between the two groups. (see Table 5)

**Table 5.** Non-parametric comparisons between the two groups of the recall scores of events from the three time periods.

Time Period	Mann Whitney	Z Score	Sig.
Childhood Events	33.5	-4.623	p<0.001
Early Adult	12	-5.393	p<0.001
Recent	20	-5.348	p<0.001

Within the psychotic group, the recall scores for the three time periods were all normally distributed and so parametric tests were conducted to test if there were any differences in the recall scores between the three time periods. The psychotic group were found to recall significantly more from recent events in comparison to childhood ( $t(19) = -2.97, p = 0.08$ ) and early adulthood ( $t(19) = -3.69, p = 0.02$ ). No significant differences were found between the recall of autobiographical events in childhood and those in early adulthood.

It should be noted that given that the scores of the controls on the personal episodic scales for all time periods violated the assumptions of normality, it was not possible to administer any type of parametric analyses where other variables are controlled for. Therefore while significant differences were found in the specificity of information recalled for all time periods between the two groups, it is not possible to conclude that psychosis was the only factor involved in this difference. However, following the trends of the previous measure of autobiographical memory retrieval, it seems likely that psychosis can account for at least some of the difference between the two groups, and such a difference would have been independent of some of the memory measures.

Pearsons product moment correlations conducted on the total recall of autobiographical events in the psychotic group again found that immediate ( $r=.567$ ,  $p=0.09$ ) and delayed recall ( $r=.584$ ,  $p=0.007$ ) were positively correlated with the total scores on the event schedule. This again suggests that poorer recall of autobiographical events was associated with poorer verbal episodic memory overall.

#### **5.4 The Relationship between the Autobiographical Memory Test and the Autobiographical Memory Interview.**

The last hypothesis of this study was that the two measures of autobiographical memory, the AMI and AMT, would be positively correlated, indicating that they were measuring the same construct. In order to take into account that the two groups performed very differently on the two measures of autobiographical

memory, correlations between the two measures were undertaken separately for the two groups.

### **Psychotic Group**

In support of this hypothesis, a significant positive correlation was observed between the proportion of specific events recalled on the AMT and the total scoring on the Autobiographical Events scale in the AMI (Pearson  $r = .610$ ,  $p < 0.004$ , two-tailed) but not the Personal Facts scale ( $r = .302$ ,  $p = .196$ ). (see Table 6) The total scores on the autobiographical event and autobiographical facts were also not significantly correlated ( $r = .334$ ,  $p = .150$ ). This means that a high score on the autobiographical events subscale of the AMI is associated with a higher proportion of specific memories being produced on the AMT which suggests that they are measuring similar types of autobiographical memory retrieval.

The autobiographical facts subscale was not significantly associated with the proportion of specific memories produced on the AMT or the autobiographical events subscale on the AMI, which suggests that it was measuring a different aspect of autobiographical memory (recall for facts) and provides further evidence that the AMI events scale is measuring a similar facet of autobiographical memory.

As can be seen in Table 6, the AMT was significantly positively correlated with the recall of personal events from two time periods, Childhood, and Early Adult as measured on the AMI, but there was no significant correlation for Recent events, and instead it was positively correlated for Recent Facts.

**Table 6** Pearsons' Product Moment Correlations between proportion of specific events recalled on the AMT and the recall of facts and events from the different time periods on the AMI for the psychotic group

	Proportion of Specific Responses (AMT)	Total Autobiographical Facts (AMI)	Total Autobiographical Events (AMI)
Childhood			
Facts	.149	.670**	.204
Events	.469*	.224	.791**
Early Adult			
Facts	.140	.755*	.281
Events	.558*	.292	.794**
Recent			
Facts	.452*	.686**	.197
Events	.297	.226	.618**
Total			
Autobiographical Facts	.302	1	.334
Total			
Autobiographical Events	.610**	.334	1

\* Correlation is significant at the 0.05 level (two tailed)

\*\* Correlation is significant at the 0.01 level (two tailed)

AMT = Autobiographical Memory Test; AMI = Autobiographical Memory Inventory.

## **Control Group**

For the control group the pattern was slightly different. The proportion of specific responses produced on the AMT was not significantly correlated with the overall recall scores on the AMI for events or facts, nor was it correlated with any of the time periods. In fact there was a trend for the proportion of specific responses to be negatively correlated with recall of autobiographical facts, suggesting that a higher proportion of specific responses produced is associated with fewer autobiographical facts being recalled.

The total autobiographical facts score was positively correlated with the recall of facts from childhood and early adulthood ( $r = .805$  and  $.478$  respectively), although no positive association was found for recall of recent facts.

It should be noted that no correlations could be calculated for the score on the recall of recent events as the control group all scored the maximum possible score of 9.

In summary, the personal events subscale of the Autobiographical Memory Interview was found to be highly positively correlated with the proportion of specific memories produced by the psychotic group. No such significant association was found for the recall of personal facts. In the control group, the AMT was not found to be significantly correlated with the recall of personal facts or events, as measured by the AMI.

**Table 7** Pearson Product Moment Correlations between proportion of specific events recalled on the AMT and the recall of facts and events from the different time periods on the AMI for the control group

	Proportion of Specific Responses (AMT)	Total Autobiographical Facts (AMI)	Total Autobiographical Events (AMI)
Childhood			
Facts	-.106	.805**	.162
Events	.415	.249	.962**
Early Adult			
Facts	-.257	.478*	.359
Events	.029	.410	.459*
Recent			
Facts	-.200	.154	-.0079
Events	na	na	.na
Total Autobiographical Facts			
	-.295	1	.292
Total Autobiographical Events			
	.399	.292	1

\* Correlation is significant at the 0.05 level (two tailed)

\*\* Correlation is significant at the 0.01 level (two tailed)

AMT = Autobiographical Memory Test; AMI = Autobiographical Memory Inventory.

## **Chapter 6 - Discussion**

The aim of this study was to investigate several hypotheses relating to the retrieval of autobiographical memory (AM) in individuals diagnosed with schizophrenia. Autobiographical memory retrieval style was investigated using two widely used measures of autobiographical memory, the Autobiographical Memory Test and the Autobiographical Memory Interview. The performance of a group of 20 participants diagnosed with schizophrenia was compared to the performance on the two measures by a group of matched controls.

### **6.1 Autobiographical memory retrieval as measured by the AMT**

Based on existing evidence, the first hypothesis was that the psychotic group in this study would display an overgeneral retrieval style of autobiographical memory, where a general memory is retrieved, rather than a specific event. On the Autobiographical Memory Test, the participants were required to produce a specific memory of an event in response to a cue word. The psychotic group were found to recall significantly fewer specific memories (22.9%) and recall significantly more general memories (51.7%) than the control group (80.1% and 17.1% respectively). Such a finding is consistent with previous research using this measure with a psychotic population. Kaney et al. (1999) found that in a sample of deluded and non-deluded participants, that their deluded participants recalled significantly more general memories (47%) and fewer specific memories (40%) than their control group (36% and 51% respectively). Ruitort et al (2003), using a comparable paradigm, also found that their psychotic participants produced less specific autobiographical memories than their controls. McLeod (unpublished)

also found that his deluded sample displayed an overgeneral retrieval style on the AMT in comparison with healthy controls.

General memories are widely viewed to have two distinguishable subtypes, categorical and extended memories (Williams, 1996). Categorical memories are responses that are related to the multiple occurrence of a single event e.g. 'when I go to the pub' and extended memories are related to events that last longer than a day e.g. 'when I was on holiday in Amsterdam'. Consistent with both Ruitort et al (2003) and Kaney et al. (1999), only categorical responses were found to be over-represented in this population. This is a similar finding to the research examining overgeneral retrieval style of AM in depressed groups (Williams & Dritschel, 1992; Kuyken & Brewin, 1995; Kuyken & Dalgliesh, 1995) where depressed people are only found to produce more categorical responses. Given that in this study, the psychotic and control groups did not differ significantly on levels of self-reported depressive symptoms and that the level of depression was not found to be positively correlated with the percentage of specific and general memories produced, it seems unlikely that the over-general retrieval style found in this psychotic sample can be considered to be the product of comorbid depressive symptomatology.

Given the evidence that schizophrenic populations often display deficits in long term memory, and especially in episodic memory (Tamlyn et al, 1992; Clare et al, 1993; Goldberg & Gold, 1995), this study also set out to investigate whether there were deficits in autobiographical memory above and beyond any general deficits in episodic and working memory. Extending the design of previous studies in this

area, a widely used measure of verbal episodic memory, the immediate and delayed story recall task (AMIPB: Coughlan & Hollows, 1985) and a measure of working memory capacity, the digit span subtest from the WAIS-III (Wechsler, 1998a) were also administered.

The immediate and delayed story recall task is commonly used as a measure of verbal episodic memory and is considered to be among one of the more sensitive of tests for detecting organic impairment (Wilson, 1996). The psychotic group did on average recall and retain less information from the story than the control group although this difference did not quite reach significance. However this would suggest that there was a trend towards the psychotic participants displaying a deficit in verbal episodic memory in relation to controls that is consistent with previous research findings (Tamyln et al, 1992)

The psychotic group also scored significantly lower on the forward digit span subtest, in comparison with the control group, although there were no differences in backwards digit span. It is now widely considered that forward digit span is more closely related to efficiency of attention and freedom from distractibility, and that backwards digit span is a more sensitive measure of genuine working memory capacity (Lezak, 1995). Given that no differences were found between the two groups on backwards digit span, and that the average score of both groups fell within the normal range (Wechsler, 1998a), this suggests that the psychotic group in this study did not display any significant working memory deficits. This finding is consistent with previous neuropsychological studies that have found that

working memory is relatively unimpaired in schizophrenic populations (McKenna et al, 1990; Tamlyn et al, 1992).

When the variance in the percentage of specific responses that could be associated with any working memory or episodic memory deficits was removed, using an analysis of covariance, the psychotic group were still found to have an overgeneral retrieval in comparison with the controls. This study has thus shown that when testing autobiographical memory retrieval using the AMT, individuals diagnosed with schizophrenia do display an overgeneral retrieval style that cannot be accounted for just in terms of any working memory or episodic memory impairments.

It was found that within the psychotic group, specificity of response was found to be positively associated with verbal episodic memory recall, both immediate and delayed, suggesting that the capacity to retain and recall meaningful verbal material may be a mediating factor in the ability to retrieve specific memories. This is plausible given that autobiographical memory for events is one form of episodic memory, and so therefore any deficits in episodic memory overall are likely to have some impact on the ability to retain and recall autobiographical memories. However, what this study has shown, is that there are deficits in autobiographical memory retrieval above and beyond any general episodic memory impairments.

Observation of the performance of the psychotic participants on the AMT suggested that their first response was often categorical and that even with

prompting they were more likely to produce another categorical response, rather than a specific response. When administering the tests, several practice items were given and prompts provided until a specific response was produced. Only when the participants had produced a specific memory for all three practice items, were the test items then administered. This would suggest that the participants had a reasonable understanding of the requirements of the task and that their overgeneral style of retrieval could not be attributed to a lack of understanding about what was required of them. The observation that prompting after an initial categorical response resulted in another categorical response provides support for the Williams' (1996) concept of mnemonic interlock.

According to Williams's (1996) theory, memory is arranged in a hierarchical way such that general descriptors are stored at a higher level than specific instances. In the usual course of recall, a cue, such as 'happy' will lead to a search at a general level of intermediate category descriptors, such as 'what events and situations make me feel happy'. The upper layer contains general descriptors (such as 'my partner', 'drinking in the pub'). In the normal process of retrieval, such a general descriptor provides pointers to the lower level specific event representations, such as 'drinking in the pub last Friday with my partner'. When the normal retrieval process breaks down, then intermediate descriptors prime other intermediate descriptors rather than a specific event and Williams (1996) labelled this process 'mnemonic interlock'. As discussed, the psychotic sample in this study appeared to be stuck in 'mnemonic interlock' and were generally more unable to produce a specific response even when prompted to do so.

Hierarchical search models hypothesise that it will take longer to produce a specific memory, as a deeper level of searching and retrieval need to take place before the specific event representations can be accessed. That the psychotic sample in this study were significantly faster in producing a first response in comparison to the controls (7.85s vs 14.53s respectively) suggest that the memory retrieval process was aborted prematurely and stopped at the intermediate stage, providing further evidence that the psychotic group may have been stuck in a 'mnemonic interlock' process of retrieval. The response latency of the participants in this study was considerably shorter than that found in the Kaney et al. (1999) study, who found that their deluded group provided a first response on average after 19.9 seconds and their control group after 15 seconds. In this study the guidelines for the administration and recording of response latencies was strictly adhered to and given that the responses were recorded on a mini-disc recorder, it was possible to time the responses accurately away from the testing session. The response times found here are more in line with the response latencies found in Williams & Dritschel's (1998) study, who found average latencies of 11.3 seconds for patients admitted following an episode of self-poisoning, 8.2 seconds for ex-patients, and 10.9 seconds for healthy control subjects and McLeod (unpublished) who found response latencies of 9.3s in his deluded participants, and 9.5 seconds for the control group.

It is possible that motivational factors played a part in the faster response times and lack of specificity of retrieval, in that the participants may have been poorly motivated to perform the task. The impact of this was avoided as much as possible by offering breaks if it appeared that the participant was becoming fatigued or

distractible. Additionally the order of the tests was designed to vary the type of demands made by each task, and overall it did not appear that the participants were any less motivated to engage with the task than the controls. On some occasions, testing was completed over two sessions, normally within a two or three day time scale, when it was apparent that participants were becoming fatigued. On only one occasion did the participant then refuse to complete the testing. Overall, the entire procedure appeared to be reasonably well tolerated by the majority of participants.

As also found in this study, Kaney et al, (1999) found that their deluded sample did not differ significantly in the measure of depressive mood in relation to the controls, and so while it can be hypothesized that comorbid depressive symptomatology may have a retarding effect on response latency, this seems to be an unlikely explanation for the discrepancies in response time observed.

Williams (1996) and Kuyken & Dalgliesh (1995) found that depressed individuals were more likely to produce categorical responses to positive cue words as opposed to negative cue words. This study found the psychotic sample did not display a differential effect for cue word, although that they were less likely to produce specific responses to both positive and negative cues overall. This is consistent with previous research that has found that unlike in depressed populations, there does not appear to be a differential effect for cue valence in psychotic populations (Kaney et al., 1999). This suggests that people with psychosis display an overgeneral retrieval style of autobiographical memory for both positive and negative events.

## **6.2 Retrieval of Autobiographical Memory as measured on the AMI**

Retrieval on the AMI is divided into recall of autobiographical facts and autobiographical events. The psychotic group in this study were found to recall fewer facts and events for childhood, early adulthood and recent time periods. This is consistent with previous research that has found that psychotic populations displayed an overgeneral retrieval style when tested using the AMI (Tamlyn et al, 1992; Feinstein et al, 1998) or similar procedures (Ruitort et al, 2003). When performance on the tasks involving working memory capacity and verbal episodic memory were taken into account, the psychotic group were still found to recall fewer facts and less specific events from all time periods than the control group. Thus, this provides further evidence, and is consistent with the results found in this study using the AMT, that psychotic groups display an overgeneral retrieval style of AM recall above and beyond any impairments in working or episodic memory. For the psychotic group, the low scores on the recall of events and facts generally could not be attributed to an overall lack of response (which would have been score '0'), as most participants attempted to recall memories and facts from the three time periods although such information was often very vague or represented categorical events, such as 'I used to play football'.

As predicted, the deficit in retrieval was found to be particularly pronounced for recall of autobiographical facts in the early adult period. This finding is consistent with that of Feinstein et al (1998) who described a u shaped temporal gradient of recall for autobiographical facts, and concluded that the normal processes of encoding and consolidation may have been disrupted around the time of onset of

illness. Such a deficit in early adulthood was less pronounced for the recall of autobiographical events, with both childhood and early adulthood time periods being significantly impaired, and this was found to be the case in the current study. However, Ruitort et al (2003) did not find a u shaped temporal gradient of recall of autobiographical facts or events but did find that impairments in recall were most apparent after the onset of illness. Ruitort et al (2003) used the Autobiographical Memory Inquiry (Borrini et al, 1989), which divides the time periods up rather differently into 'up to age 11', '11 to age of onset of illness', 'age of onset to 1 year before testing' and 'current year'. It seems likely that the 'age of onset to one year before testing' category would have included the time period that was found to be critical here and in Feinstein's (1998) study, but would also have include information that would have been categorised in the Recent Events subscale on the AMI. Thus it is possible that the methodology used in the Ruitort et al (2003) study may have missed the deficits specific to early adulthood recall, as such deficits may have been subsumed when performance across the whole time period was averaged. A further difference between this study and Ruitort et al (2003) methodology was that their participants were not matched for premorbid I.Q., and their psychotic group were found to score significantly lower on a short form of the WAIS-R. (Crawford et al, 1992).

The findings from this study, which are consistent with Feinstein et al (1998), suggest that the u shaped temporal gradient of recall of facts and for events, although less so, may indicate that there are significant disruptions in the process of encoding or retrieval for memories and facts around the time of late adolescence and early adulthood. The mean age of onset of illness in the psychotic

sample in the current study was 20.6 years of age ( $SD=4.33$ ), which would be consistent with this hypothesis. At the current time, it is difficult to speculate as to whether this lack of specificity is related to a defect in the process of encoding or a defect in the strategic processes involved in retrieval. Neurodevelopmental models would suggest that cognitive impairments appear earlier in life, before the onset of clinical symptoms (Harrison, 1997; Raedler et al, 1998). However such models do not account for the observation that there was a global impairment in the recall of events from both early and late childhood and early adulthood time periods in the current study. Unless there are encoding deficits which are present from a very early age, and these deficits remain stable even around the time of onset of illness, it seems more plausible to presume that disruptions in the retrieval of events is the main mechanism involved in autobiographical memory deficits. The finding in this study that there was no overall significant difference in the scores for the immediate and delayed recall task suggests that in this group, at the time of testing, they displayed no clinically significant deficits in the encoding and retrieval of meaningful verbal information overall. However, it is possible that encoding or consolidation processes were sufficiently disrupted at the time of onset of illness to account for the differences, and that such processes resumed their premorbid level once adjustments to internal and external changes had been made (Feinstein et al, 1998).

The observation that that there was a marked decline in the recall of autobiographical facts in early adulthood, but not for events, is interesting. The model presented by Conway & Pleydell-Pearce (2000) proposes that autobiographical memories are constructed through the interaction between the

autobiographical knowledge base and the working self. According to the authors, autobiographical knowledge includes both episodic and semantic knowledge. Both types of knowledge contribute to the construction of specific memories, but it would appear that there is an additional disruption in the encoding or retrieval of semantic information around the onset of illness, which is not reflected in the recall of autobiographical events. It is possible that a disruption in the encoding of semantic information takes place around the onset of illness, possibly due to an increased cognitive load as a result of the onset of symptoms and increased arousal, which then further confounds the subsequent retrieval process and results in an exaggerated deficit in recall for this time period. Why there may be different mechanisms involved in the encoding of semantic and episodic memory at the emergence of psychotic symptoms is not clear, but may indicate that different memory structures are affected differentially. McKenna (1991) has suggested that problems in the acquisition and recruitment of semantic knowledge could be linked to delusional ideation and Clare et al. (1993) and Chen, Wilkins & McKenna (1994) both found specific deficits on tests of semantic processing in patients with schizophrenia.

### **6.3 Comparison of the AMI and the AMT**

The fifth hypothesis was that the two measures of autobiographical memory would be positively correlated and thereby indicating they were measuring the same construct. There were significant differences in the patterns of association found between the two measures between the psychotic and control group, which provided only partial support for the fifth hypothesis.

### *Psychotic Group*

For the psychotic group, the AMT was highly positively correlated with the Autobiographical Events subscale on the AMI, but not the Facts subscale. There were certain similarities in the administration of the AMT and the questions relating to autobiographical events contained in the AMI interview schedule, in that both requested the participants to recall a specific memory located in time and place. However, the AMT used emotionally salient cue words such as 'happy' and 'angry', whereas the AMI required recall of events from certain time periods e.g. "Can you tell about a specific event that happened to while you were at primary school?". Thus while the correlation was high ( $r=.61$ ), it was not as high as might be expected if they were tapping into exactly the same construct. It seems likely that the different type of cueing paradigms, time period vs emotional events, may have led to different types of memory searches. Observation on performance of the psychotic group on the AMI and the AMT suggested that the types of memories recalled were similar, in that the majority would have been considered categorical as opposed to extended, and most had emotionally salient content e.g. "I used to get bullied at school" or "I always scored goals in football matches". However, the AMI scoring criteria do not differentiate between extended and categorical events, and this may lead to an inflated score that would not be represented in performance on the AMT. A further difference between the two measures is that response latency is not recorded on the AMI and future studies could evaluate whether the response latencies between the two measures are also comparable. If they were, then this would suggest that the either emotional or time period cues can be used interchangeably to assess autobiographical event recall. However, if the response latencies were different, this suggests that different

cueing paradigms may result in significantly different intermediate descriptors being used to cue the retrieval of specific memories and therefore possibly reflect different and potentially more challenging processes of retrieval.

For example, it may be that the word 'happy' would be elaborated into generic events such as 'sitting in the pub' or 'going out with friends', whereas the cue 'primary school' may lead to several retrieval cycles, such that 'primary school' may then activate the general descriptor 'I was unhappy at primary school' and then a search may be conducted horizontally for 'things that made me unhappy at primary school'. This may represent an extra retrieval cycle that is likely to increase the chance of a categorical response being produced in individuals who already have an over-general retrieval style. As such, measurement of response latency on the AMI would be one way of testing whether several different retrieval cycles are required to time related cues before the search for a specific event representation is aborted. Williams (1996) and Kaney et al (1999) have both argued that an increased response latency reflects greater levels of processing and a more elaborate execution of the retrieval cycle.

It is interesting to note that the autobiographical facts schedule was not significantly correlated with the AMT which suggests that it is measuring a different aspect of autobiographical knowledge, an aspect that the AMT does not tap into. This has particular relevance to the observation that the recall of personal facts was particularly impaired from the early adulthood period in the psychotic group and suggests that the AMT may miss clinically significant information about the overall impairment in autobiographical memory in psychotic

populations. Conway & Pleydell-Pearce (2000) have argued that autobiographical memories are constructed from the autobiographical knowledge base, a base which consists of both facts and events. As discussed earlier, it would appear that different mechanisms may be involved in the encoding and retrieval of facts and of events and that both may be differentially impaired in different time periods. It is suggested here that the AMT is a useful tool in evaluating the specificity of AM retrieval overall, especially in relation to episodic information, but that it is less useful in examining any potential disruptions in the encoding and retrieval of personal semantic information which is held in the autobiographical knowledge base. It is possible that there is a single dissociation between the encoding and retrieval of personal episodic and personal semantic memory that would reflect the operation of separable memory systems. This would be consistent with the general neuropsychological literature regarding the dissociability of episodic and semantic memory (Tulving, 1983).

### *Control Group*

It was found in this study that the AMT was not significantly correlated with either recall of autobiographical facts or events in the control group. Indeed there was a trend for the scores on the AMT to be negatively correlated with performance on the AMI. This finding was somewhat surprising and unexpected and does not provide support for the fifth hypothesis. Thus it would appear that the AMT and the AMI may both be used to evaluate autobiographical memory retrieval in populations that display an overgeneral retrieval style, for example depressed, psychotic or brain damaged groups, but that one or either may not be

suitable for use in healthy populations. It seems reasonable to assume that given that the AMI was originally developed to test the autobiographical memory of brain damaged patients (Kopelman et al, 1990), the AMI may not be a suitable measure to use in the comparison of the performance of clinical and healthy populations. This is also reflected in the observation that the scores for both events and facts in all three time periods were limited by the ceiling effect of the scoring criteria and that maximum scores were often obtained in the healthy control group. It is also possible however that the ceiling effects in the normal group resulted in a difficulty getting the variance to detect a correlation.

Given that this is the first time that these two measures have been compared in one study, what does this suggest about the construct validity of the two measures? The findings here would imply that both the AMI and the AMT are suitable and comparable measures, with good concurrent validity (Barker, Pistrang & Elliot, 2001), in the investigation of pathological memory processes in clinical groups. However, it would also suggest that the AMI may have less utility when investigating the relationship between normal and disrupted memory processes, and that the AMT may be a more appropriate measure when exploring autobiographical retrieval differences between healthy and clinical populations

#### **Summary of results in relation to the hypotheses.**

Overall, in support of hypothesis one and two, this study has found that individuals with psychosis do demonstrate an overgeneral retrieval style of memory as measured by both the Autobiographical Memory Test (AMT) and the

Autobiographical Memory Interview (AMI). Furthermore, an approximation to a u-shaped temporal gradient of AM was found, with recall from the early adult period being most impaired, although such a deficit was more marked for the recall of facts than events. Thus the third hypothesis in this study was also supported.

The fourth hypothesis was that the deficits in the retrieval of AM in the psychotic group were found to be independent of any deficits in working memory, and this was found to be the case. Furthermore, it was also found that there were specific disturbances in AM retrieval in the psychotic group that could not merely reflect or be accounted for by any general impairments in episodic memory.

The fifth hypothesis was that the two measures of autobiographical memory, the AMT and the AMI, would be positively correlated. This was partially found to be the case in that the AMT was positively correlated with the personal events subscale of the AMI, but not with the personal facts schedule for the psychotic patients.

#### **6.4 The consequences of an overgeneral retrieval style**

If there is a tendency for overgeneral memories to be reconstructed rather than specific memories, then this is likely to have an impact on the self, social and directive functions that specific autobiographical memories have been suggested to serve (Pillemer, 2003). The following section will explore how impairments in

these three functions of autobiographical may relate to the development and maintenance of some of the symptoms of psychosis.

#### **6.4.1 Self functions**

Conway (1996) and Barclay (1986) have suggested that autobiographical memories are related to the continuity and development of the self, and that they convey a sense of personal identity that is stable across various lifetime periods. Various authors have conceptualised psychosis as predominantly a disturbance in or loss of the sense of self, (Hemsley, 1998; Lysaker & Lysaker, 2001; Mills, 2001; Parnas & Sass, 2001), although there has been little empirical investigation into this area.

Conway & Pleydell-Pearce (2000) have suggested that late adolescence and early adulthood, in particular, is a time when autobiographical knowledge is being acquired, organised and consolidated to form a coherent personal identity. Ruitort et al (2003) have suggested that disruptions in autobiographical memory processes around this time lead to an impairment in the construction of personal identity. They have also argued that the failure of the consolidation of the self may contribute itself to the subsequent impaired encoding of autobiographical events, thus leading to a vicious cycle where defective encoding further prevents the consolidation of the self and the stabilisation of personal identity. The findings from this study also support the view that there are particular deficits in the retrieval of autobiographical facts and events from the early adulthood time period. Given that these deficits were more marked for personal semantic knowledge, it could be speculated that in terms of Conway & Pleydell-Pearce's

model (2000) there are particular disturbances in the consolidation of autobiographical facts into the knowledge base around the time of illness onset, and that the paucity of personal semantic information results in there being fewer cues to then generate and construct autobiographical memories. This will then have a further impact on the ability to recall both autobiographical facts and events. Overall it can be concluded that autobiographical memory may well have an impact on the development and continuity of the sense of self, and that disruptions in AM processes around the time of onset of illness are likely to have a negative impact on the development of self, at a life time stage that Erikson (1966) hypothesized to be crucial in the development of identity or identity confusion.

Disturbances in the concept of the self have been hypothesized to contribute to the inner-outer confusion that has been considered to be a main factor in the development of psychotic symptoms (Fowler, 2000; Freeman et al, 2002), and that leads to the attribution of internal events to an external source (Bentall, 1990; Frith, 1992). Fowler (2000) has suggested that the inner-outer confusion which he believes characterises psychosis, may arise from a catastrophic interaction between basic neurocognitive impairments in the domains of perception, and belief, appraisals and emotional biases. Hemsley (1993) has suggested that disturbances in the moment-to-moment integration of stored regularities may be associated with disruptions in self-monitoring of intentions and actions (and a similar proposition has been made by Frith; 1992). It is suggested here that the concept of the working self, which contains information about current goals and intentions, is a useful framework for understanding how such a process may develop. If anomalies in perceptual processes lead to the destabilisation of the

working self, possibly through the mechanism of unexpected experiences that would not be predicted by the working self, then it is plausible to assume that confusion may arise about what intentions and goals should be held and maintained.

#### **6.4.2 Social Function**

Specific autobiographical memories have also been conceptualised as having a social function as the process of sharing autobiographical memories develops bonds with others and facilitates learning about the intentions and experiences of others (Pillemer, 1998; Nelson, 2003). Corcoran et al (1995) have argued that when making mental state inferences, individuals refer to specific autobiographical memories of their own mental processes in similar circumstances, and through reasoning assume that similar processes are going on in others. Frith (1992) has suggested that persecutory delusions arise from an inability to accurately represent the thoughts, beliefs and intentions of others, i.e. a theory of mind deficit. If only general memories can be retrieved from autobiographical memory, then this is likely to have a significant impact on an individual's ability to form relationships and learn about others. Bentall et al (2001) have also hypothesised that theory of mind deficits in people with psychosis may be linked to a biased retrieval of events from autobiographical memory.

Garety et al (2001) have suggested that social isolation contributes to the acceptance of a psychotic appraisal through the process of reducing access to alternative more normalising experiences and reducing opportunities for reality

testing (See also White, Bebbington, Pearson, Johnson & Ellis, 2000). Thus, an overgeneral retrieval style may lead to a lack of close personal relationships within which reality testing could be undertaken and may also lead to feelings of loneliness and isolation which will then reinforce underlying core negative beliefs and facilitate the development of core compensatory schema of a delusional nature (Beck & Rector, 2002).

#### **6.4.3 Directive Function**

The final function of specific autobiographical memories has been suggested to be directive (Pillemer, 2003), in that efficient problem solving may be reliant on the satisfactory retrieval of specific memories to provide a database from which to construct solutions to real life problems. Problem-solving deficits are often found in psychotic individuals (Addington & Addington, 2000) and may have an impact on an individuals' ability to cope with their symptoms (Tarrier et al, 1993). Therefore it seems likely that an overgeneral retrieval style of autobiographical memory may contribute to difficulties in problem solving by limiting the access to possible solutions.

Problem solving deficits may even play a role in subsequent relapse of psychotic symptoms. Birchwood (1995) found that psychotic individuals are often able to recognise signs of reduced well-being, such as sleeplessness, irritability and social withdrawal, but may be less equipped to know how to deal with them. If the underlying base of possible solutions is restricted, and individuals have no specific memories of their previous experience of psychotic symptoms and how they coped, then relapsing individuals may not have the ability to reflect on their past

experiences and implement the most helpful solutions, such as contacting services or speaking to others about their difficulties. Goddard et al (1996) have found that autobiographical memory deficits are particularly implicated in difficulties in social problem-solving in depressed individuals, and this may be a key factor in why relapse of psychotic symptoms is particularly associated with stressful family dynamics, or environments where there is high expressed emotion (Kavanagh, 1992), as difficulties are not appropriately addressed or effectively resolved. Problem-solving skills have been seen to be a core feature of several intervention packages developed for people with schizophrenia (Falloon, 2000; Medalia, Revheim & Casey, 2002).

## **6.5 How might an overgeneral retrieval style develop in psychotic individuals?**

### ***6.5.1 Negative Core Beliefs***

There is considerable evidence to suggest that people with psychosis have enduring negative core beliefs, such as inner defectiveness, dangerousness or vulnerability to harm (Brabban & Turkington, 2002; Fowler, et al, 1995; Garety et al, 2001) and that these beliefs may have developed from early adverse experiences, such as social marginalisation, childhood loss or childhood trauma (Agid et al, 1999; Bentall, et al, 2001; Garety et al, 2001).

Conway & Pleydell-Pearce (2000) have suggested in their model of autobiographical memory that the working self contains information about the self

and its failure or achievement of goals. They have argued that when there is a discrepancy between the current and past goals of the working self, then in order to avoid the negative affect associated with this discrepancy, overgeneral memories will be produced so that detailed information about past goals is not accessed. Knowledge pertaining to the achievement or failure to achieve goals in the past will have been incorporated into underlying core beliefs, and when negative core beliefs are predominant, then the failure of goals will have been selectively attended to through biases in information processing (Beck & Rector, 2002). Thus, in individuals who have core negative beliefs, information relating to the failure to achieve goals is likely to be over-represented within the autobiographical knowledge base.

Conway & Pleydell-Pearce (2000) have argued that the goals and plans that are held in the working self are directly linked to the underlying autobiographical knowledge base, in that what an individual desires and intends to do is linked to their previous knowledge about what they have achieved in the past. If the underlying knowledge base consists of information about the self that is predominantly negative, and if significant negative affect is produced when this information is accessed, then the memory retrieval process required to construct specific memories from this knowledge base is likely to be terminated prematurely in order to avoid the elicitation of negative affect associated with such information.

Bentall, Corcoran, Howard & Blackwood (2001) have outlined a similar model to account for the development of delusions, whereby the attribution of negative

events to an external source avoids the activation of negative self-representations, which would otherwise lead to negative affect. Kinderman (1994) has also proposed that people with delusions have negative self-schemata which are experienced by the individual as a discrepancy between their actual and ideal selves, which could be considered to be synonymous with the current and future goals maintained within the working self.

If specific information and memories relating to the failure to achieve goals are avoided, then the working self is less likely to be confined by the parameters set by the autobiographical knowledge base, and so the goals held in the working self are less likely to be influenced by judgements of plausibility and achievability (Conway & Pleydell-Pearce, 2000). This is likely to lead to the increased acceptance of beliefs and goals that could be considered delusional or grandiose, and that are not grounded in past autobiographical knowledge of capabilities and experience.

### ***6.5.2 Fluctuating self-representations***

Bentall et al (2001) have also suggested that the current self-representations and goals are highly unstable in psychotic individuals and may fluctuate rapidly. Frith (1992) has argued that the causal mechanism in psychosis is a general defect in meta-representation, in that people with psychosis have the inability to understand their own and others goals or intentions. Therefore, if there is a lack of awareness relating to our own intentions and goals, then it is highly likely that the goals of the working self around the time of encoding of events will be very different to the

goals of the working self that are operating at retrieval. Conway & Pleydell-Pearce (2000) have argued that specific memories cannot be produced when there is a disjunction between the goals of the working self that mediated encoding and the goals of the working self that are operating at retrieval. It is plausible to think that beliefs and goals that may have been operational at the onset of illness, such as 'There is something wrong with me', 'Unexplicable things are occurring' or 'I am scared and need to escape' would have been replaced with beliefs such as 'The I.R.A are after me' or goals like 'I must prove to people that I am God', thus rendering specific recall from previous periods difficult.

### ***6.5.3 Intrusive Thoughts and Memories***

Given the literature on the relationship between depression, intrusions, and overgeneral memory, it is also quite possible that an overgeneral retrieval style of autobiographical memory may be the result of intrusive memories. As discussed in the introduction, there is some evidence to suggest that the role of early trauma has a mediating effect on the ability to recall specific memories (Kuyken & Brewin, 1995; Williams, 1996, De-Decker, Hermans, Raes, & Eelen, 2003), although later studies have argued that it is the occurrence of intrusive memories rather than a history of trauma per se that acts as the primary determinant of overgenerality (Brewin, 1998; Brewin et al, 1999)

Intrusive memories and thoughts are one of the characteristic symptoms of post-traumatic disorder, along with avoidance of reminders of the trauma and symptoms of increased arousal. (DSM-IV; APA). Avoidance may also take the

form of cognitively avoiding memories and thoughts of the trauma through distraction or suppression. Brewin (1998) has hypothesized that the avoidance of memories or thoughts may disrupt the retrieval pathways by which specific personal memories would normally be accessed.

There is now converging evidence that some people with psychosis have experienced significant early traumatic events in their lives (Agid et al, 1999; Bentall, et al, 2001; Garety et al, 2001; Neria, et al, 2002) and that a significant proportion of individuals diagnosed with schizophrenia would also meet diagnostic criteria for PTSD (Frame & Morrison, 2001; Neria et al, 2002). It is possible therefore, that the experience of some form of earlier trauma may be over-represented in psychotic populations and that this could account for the development of an overgeneral retrieval style of autobiographical memory.

Attention has recently been directed to the impact of psychotic illness and associated hospitalisations on individuals with schizophrenia. People may be traumatised by the events surrounding admission to hospital, such as compulsory detention, involvement with the police or a perceived lack of control over what is happening to them (Shaw, McFarlane & Bookless, 1997; McGorry et al, 1991; Mueser & Rosenburg, 2003). Indeed there is even evidence to suggest that even psychotic symptoms themselves may give rise to PTSD-like symptoms, or postpsychotic PTSD, as they cannot be distinguished from tangible threats (Meyer et al, 1999; Frame & Morrison, 2001; Shaw, McFarlane, Bookless & Air, 2002). Several authors have found that intrusive thoughts and images are common in people with psychosis (Morrison & Baker, 2000; Morrison et al, 2002) and

Morrison et al (1995) and Beck & Rector (2003) have hypothesised that auditory hallucinations may originate and develop from intrusive thoughts and memories.

Thus it seems that a further plausible mechanism in the development of an overgeneral retrieval style of autobiographical memory in people with psychosis is that they may be experiencing intrusive thoughts and memories from earlier trauma or from the trauma of developing psychotic symptoms. The avoidance of intrusive thoughts and memories may lead to a disruption in the retrieval pathways through which specific memories would usually be accessed, or the demands on working memory imposed by the avoidance attempts, may reduce the capacity to carry out other memory related tasks (Brewin, 1998).

### **Summary**

This study investigated autobiographical memory processes in a group of individuals diagnosed with schizophrenia and found that the psychotic group displayed an overgeneral retrieval style of autobiographical memory on both of the two most widely used measures of autobiographical memory in clinical and research arenas. This study also found that these retrieval deficits were independent of any general impairments in verbal episodic and working memory. It was found that there was a specific impairment in the recall of autobiographical events and facts in early adulthood, which for the sample used in this study, was around the time of onset of illness. The implications of an overgeneral retrieval style on autobiographical memory functions has been discussed and related to the development and maintenance of the positive symptoms of psychosis. The various

pathways through which an overgeneral retrieval style may have developed have also been examined.

## **6.6 Limitations of the study and suggestions for future research**

While the study presented here makes some contribution to the understanding of autobiographical memory functioning in psychotic individuals, there are a number of limitations that may constrain the certainty of the conclusions. The limitations of the current work and possible remedies will be discussed before considering directions for future research into autobiographical retrieval and psychosis.

One limitation of the study was regarding corroborating the accuracy of the memories reported. In scoring both the AMI and the AMT, it was observed that a number of recalled memories were somewhat unusual, although it was normally clear when a memory was completely delusional e.g. "I was a fighter pilot in the RAF in the Second World War" (by a male participant who was 32 years of age). On the AMT, when the accuracy of the memory was seriously in question, then it was rated as 'uninterpretable', which may account for the higher proportion of responses in the 'uninterpretable' category in the psychotic group (25.4%) in comparison with the controls (2.9%). This method of scoring has been used with patients with delusional disorder before without any apparent methodological difficulties (Kaney et al, 1999) and is commonly used in the assessment of depressed patients (Williams, Teasdale, Segal & Soulsby, 2000). Baddeley et al (1996) also found that there were 'a rather high proportion of rather odd recollections' (p.422) when using the AMI with their deluded and non-deluded

participants. Future administration of the AMT could incorporate a more detailed analysis of the 'uninterpretable' responses made by psychotic participants and this may help in the identification of new categories of responding beyond those applied here. It is worth noting that the early use of the AMT in depressed subjects focused only on specific versus over-general responses (Williams & Broadbent, 1986; Brittlebank et al., 1993) and it was not until later studies that attempts were made to delineate categoric, extended, and specific memories (Goddard et al., 1996). Kopelman et al (1990) report that experimenter judgements of the accuracy of retrieved memories on the AMI is acceptable when compared to externally corroborated responses for most amnesic patients, and attempts were made in this study to corroborate the information recalled with the histories reported in case notes. However, to thoroughly check the accuracy of all responses to the AMT and the AMI would be a very lengthy process and it is quite possible that the types of personal facts and memories recalled would not necessarily have been documented in clinical notes. Therefore one suggestion for future research would be to corroborate the memories and personal facts recalled with family members or significant others who may be in a better position to provide information about the accuracy of the information retrieved.

Overall, the AMT and the AMI appear to provoke responses in psychotic participants that are relevant to the understanding of their processing capacities under relatively unconstrained conditions. Given that good inter-rater reliability on the AMT (88.3%) was observed in this study and has been found in previous studies (e.g. Kaney et al., 1999) and that it was possible to adequately differentiate specific from non-specific responses in the present work, it may yield useful data

about the specificity of autobiographical memory in future studies. However, further refinement of the rating procedures to reduce the level of ‘uninterpretable’ responses would seem to be a reasonable requirement for future studies that are using the AMT with psychotic populations. The procedure for administering the AMI in this study was taken directly from the manual (Kopelman et al, 1990) and good inter-rater reliability has been found in several studies (Kopelman, 1989; Brewin & Stokou, 2002). An extension of the current study could involve obtaining inter-rater reliability ratings on both the AMT and the AMI, in order to take account of the different scoring systems and slightly different cueing paradigms.

The recording of response times on the AMT provided useful information about the level of processing that is being undertaken prior to a response being made and recordings of the responses made on the AMI would be an extremely useful addition to the current administration guidelines outlined in the manual (Kopelman et al, 1990). This would provide further means of comparing the two measures in order to investigate whether they are measuring the same or similar aspects of autobiographical memory functioning.

The finding here that the personal events schedule of the AMI and the AMT were highly correlated is a first attempt to examine the concurrent validity of both measures. However, given the relatively small sample used in this study, this result would need further replication in a much larger sample size before any conclusions about generalisability could be made.

Another limitation of this study is that while the study had sufficient power (ranging from 80% to 99%) to detect the relatively large effect size, the overall sample size was still quite small (n=20). Difficulties in the recruitment and retention of suitable psychotic participants meant that the sample size was not as large as the original design of the study had intended. Recruitment of research participants from psychotic populations is often fraught with difficulties and obtaining large sample sizes can involve a considerable investment of resources and time. As discussed in the Method section, around 60 potential participants were approached by the main researcher, and of those, only 20 agreed to participate and fully complete the interview process. It is likely that there was a certain degree of sampling bias in the recruitment process, in that certain types of psychotic participants are more likely to be interested in or able to engage with research interviews e.g. those who were more stable overall, less preoccupied with their symptoms, or experiencing fewer negative symptoms. As such, it may be difficult to generalise the findings to psychotic populations as a whole, and generalisability issues need to be taken into account in the interpretations of the findings.

While this study has provided further evidence of the existence of an overgeneral retrieval style of autobiographical memory in psychotic groups, it is important to recommend that further investigation should be conducted into this area with larger sample sizes where possible.

The heterogeneity of the sample is also an issue that should be highlighted and could be considered as a further limitation. The psychotic sample used in this

study had all been diagnosed with schizophrenia (DSM-IV: APA, 1994) and were all experiencing at least one positive symptom of psychosis i.e. voices or delusions. Various authors have advocated that research into the cognitive mechanisms underlying psychotic symptoms needs to take an individual symptom or symptom-cluster based approach in order to appropriately examine what underlying processes are linked to which symptoms (e.g. Persons, 1986; Bentall, 1990; Garety & Freeman, 1999). While this study has focused predominantly on the relationship between autobiographical memory and the positive symptoms of psychosis, it can be argued that the sample used in this study may not have been homogeneous enough to warrant any more than tentative conclusions. However, it is likely to be difficult to find potential research participants who are experiencing only one symptom of psychosis given that the delusions and voices are so inextricably linked (Fowler, 2000). As such, this study represents a relatively preliminary investigation into autobiographical memory processes in psychotic individuals and has confirmed the overall findings of the small body of research that has already been undertaken into this area.

Further studies could adopt a more symptom based approach, focusing for example on individuals whose predominant symptoms are auditory hallucinations or persecutory delusions, or they could explore how autobiographical retrieval relates to clusters of symptoms e.g. reality distortion, disorganisation and negative symptoms (Liddle, 1987a). Future research would also benefit from the inclusion of additional semantic and episodic memory measures, and measures of psychopathology, such as the Brief Psychiatric Rating Scale (BPRS: Overall & Gorham, 1962). The use of measures that are tailored specifically for individual

symptoms, such as the Peters et al. Delusions Inventory (PDI; Peters et al, 1999) or the revised Beliefs about Voices Questionnaire (BAVQ- R: Chadwick, Lees & Birchwood, 2000) might also yield interesting information about the working self and positive symptoms. The inclusion of such measures would provide the opportunity to assess for specific areas of memory impairment, levels of psychopathology and explore different facets of the relationship that psychotic individuals have with their symptoms, and how they are influenced by, or have an impact on, their retrieval style of autobiographical memory.

## **6.7 Clinical implications**

Two types of psychological intervention have been found to be effective in reducing positive symptoms and preventing their relapse. These are cognitive behavioural therapy (CBT) and family interventions (Roth & Fonagy, 1996; Haddock et al, 1998). Garety et al (2001) have suggested that the primary mechanism involved in the effectiveness of CBT is the reattribution of psychotic symptoms from external to internal causes. CBT achieves this by changing the appraisals of symptoms and negative self-schemata, and by developing new alternative, more positive schemas that are incompatible with the underlying negative core beliefs. Chadwick, Trower & Birchwood (1996) have divided the potential mechanisms of change in the treatment of delusions into deactivation and compensation. Deactivation refers to the formation of a new belief that shares sufficient attributes with the delusion to increase its probability of being accessed in situations where the delusion would normally be activated. Hence, the replacement belief is activated in preference to the delusion. Compensation refers

to the alteration of the response emitted when a delusional thought or belief is activated.

One of the primary ways that the therapeutic relationship is considered to facilitate the development of alternative schemas is through the exploration of alternative ways of interpreting experiences and testing these out in behavioural experiments. If the autobiographical knowledge base consists of information and memories that are primarily related to negative and delusional schemas, it is quite possible that the overgeneral retrieval style of autobiographical memory found in this study is likely to perpetuate the rumination and preoccupation with these beliefs through the recall of categorical events, such as “ People are always out to get me”. Difficulties in the recall of specific memories may mean that specific events that contain contradictory evidence, such as ‘My friend really went out of her way to help me out last Sunday’, are not accessible (Teasdale & Barnard, 1993). It can be argued that one function of CBT is to re-encode previous memories and thus increase their specificity through the detailed examination of the triggers, the types of thoughts and beliefs activated and the consequences of these thoughts and beliefs. The re-examination of past and ongoing experiences is likely to increase access to specific events that contain evidence that is contradictory to the appraisals that were made at the time. This information will then be subsequently incorporated into the autobiographical knowledge base for future reference (Conway & Pleydell-Pearce, 2000). As such one of the main mechanisms through which CBT can implement change is by compensating for an overgeneral retrieval style and encouraging a more specific mode of retrieval.

In CBT for neurotic disorders, the weighing of evidence and searching for alternative interpretations of events is likely to be achieved through the reappraisal of past experience by retrieving a specific event and recalling other contextual information that can alter the patients' original judgement about the meaning of the event. Given the problems in encoding and retrieval observed here in psychotic participants, it is likely that access to alternative ideas and providing cues for the retrieval of specific memories will need to be repeated frequently enough for them to become encoded in long term memory structures. It seems plausible to suggest that this part of the therapeutic process may take longer in individuals with psychosis than those with other types of clinical problem, and difficulties in generating specific memories should not necessarily be considered as resistance to engaging in the therapeutic process.

Given that it has been suggested here that an overgeneral retrieval style may develop as a result of an avoidance of the negative affect associated with the activation of negative self-representations, it should be anticipated that a certain amount of negative affect will be experienced when this process is initiated. Therefore, it would seem appropriate to suggest that coping strategies for distressing feelings should be incorporated into any treatment intervention before the task of belief modification is undertaken. Coping strategy enhancement has already been found to be effective for use in psychotic populations (Tarrier et al, 1993; Tarrier, 2002).

As previously discussed, specific autobiographical memories have been considered to have functions relating to the self, social situations and problem

solving (Pillemer, 2003). It is likely that more attention needs to be paid to the disruption in cognitive processes and disturbances in the sense of self that occur around the onset of the illness, and early intervention programs are going some way to address this (Drury, 2000). There is also evidence accruing that schema focused approaches can be effective in psychotic groups (Fowler, et al, 1995; Brabban & Turkington, 2002) and may go some way to address the negative self-representations that, as suggested here, may underly the development of an overgeneral retrieval style of autobiographical memory.

Problem solving skills and social skills training are also likely to be useful adjuncts to CBT interventions for psychosis, given that an overgeneral retrieval style may contribute to difficulties in identifying and implementing effective solutions to problems (Pillemer, 2003) and is likely to lead to difficulties in developing and maintaining relationships (Nelson, 2003). Falloon (2000) has already argued that problem solving training should be a core strategy of any psychological intervention that is directed at addressing the symptoms of psychosis and their associated stress.

Given the possible link between intrusive thoughts and an overgeneral retrieval style (Brewin, 1998; Brewin, et al, 1999) and that intrusive thoughts have been associated with auditory hallucinations (Morrison et al, 1995; Beck & Rector, 2003), the presence of intrusive thoughts should be thoroughly assessed from the outset, and interventions for post-traumatic stress disorder should be considered (see Ehlers & Clark, 1999).

A final consideration is that mindfulness training has recently been found to be effective in reducing overgeneral retrieval in depressed individuals (Williams et al, 2000). The authors suggested that mindfulness training may effect autobiographical memory because it includes a large number of homework tasks that train patients to notice the specific aspects of their environment and thus reduce overgeneric encoding. They have also postulated that by focusing on allowing mental contents to occur without judging them or trying to suppress or avoid them, then the tendency to prematurely abort the retrieval process as a means of regulating affect may be reduced (Williams et al, 2000). Mills (2001) has also suggested that mindfulness training can be used with psychotic individuals to reduce anxiety and increase feelings of 'being centred'.

## **6.8 Concluding comments**

This study has found that an overgeneral retrieval style of autobiographical memory can be found in psychotic individuals and has gone some way in extrapolating how autobiographical memory deficits may contribute to the development and maintenance of psychotic symptoms. It is not suggested here that autobiographical memory problems are the main factor in the development of psychosis but that they may be one pathway, out of many, that can be taken. It may be that a further pair of hands has been added to the 'three blind people feeling an elephant' (Bentall, 1999), or it may be that the question "what is it?" should be changed to "how did it get here?".

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## **APPENDICES**

**Appendix 1:** Ethical Approval Letters

**Appendix 2:** Letters, Information Sheets and Consent Forms

## **Appendix 1: Ethical Approval Letters**

# West London Mental Health



NHS Trust

West London Mental Health NHS Trust  
Uxbridge Road, Southall  
Middlesex UB1 3EU

Ms Nikki Wood,  
Trainee Clinical Psychologist,  
University College London,  
1-19 Torrington Place,  
London WC1E

Our Ref: WL/02/1/02

10<sup>th</sup> May 2002

Dear Ms Wood,

## Protocol: Autobiographical Memory Functioning and Psychosis.

Please accept my apologies for the delay in responding to you. Your submission was circulated to all members of the Ethics Committee on 19<sup>th</sup> April 2002 and I am pleased to report that no ethical concerns were declared. I am therefore happy to confirm the Committee's approval for your project to proceed.

May I take this opportunity to remind you of this Committee's Standard Operating Procedures:

- The need to comply, throughout the conduct of the study, with good clinical research practice standards;
- To enable the Committee to receive feedback of research approved, you are requested to provide six-monthly reviews. Where this is not provided, the Committee reserve the right to suspend approval of the protocol;
- The results of the research should be sent to the Chairman of the Committee, if necessary in draft form, pending a copy of the completed final report/publication, which will be made available in the Medical Library;
- Further research projects submitted to the Ethical Committee by researchers who fail to comply with these conditions will not be approved;
- If there are any further changes to the Protocol, these must be notified to the Committee for approval.

May I take this opportunity to wish you well in your study.

With kind regards,

*Yours Sincerely,*

Dr Ian Treasaden,  
Ethics Committee Chairman



North Central London  
Community Research Consortium

Dr Paul Fox  
Research & Development Unit  
3<sup>rd</sup> Floor West Wing  
St Pancras Hospital  
London  
NW1 0PE

E-mail Paul.Fox@camdenpct.nhs.uk

Phone 020 7530 5375  
Fax 020 7530 3235

31 March 2003

Miss Nikki Wood

Dear Miss Wood

LREC Ref: 02/151

Title: Autobiographical memory and psychosis

I am pleased to note that the Local Research Ethics Committee has recommended to the Trust that there are no ethical reasons why your study should not proceed.

Projects are registered with the North London Community Research Consortium if they utilise patients, staff, records, facilities or other resources of Camden Primary Care Trust, Islington Primary Care Trust or the Camden & Islington Mental Health and Social Care Trust. On the basis of the documentation supplied to us, your study has the support of the clinical service manager/assistant locality director of the service in which it will be based.

The Camden and Islington Mental Health and Social Care Trust therefore grants approval to begin research based on the proposal reviewed by the ethics committee and subject to any conditions set out in their letter of 21 March 2003. Should you fail to adhere to these conditions or deviate from the protocol reviewed by the ethics committee, then this approval would become void. The approval is also subject to your consent for information to be extracted from your project registration form for inclusion in NHS project registration/management databases and, where appropriate, the National Research Register and the UCL Clinical Research Network register.

Permission to conduct research is also conditional on the research being conducted in accordance with the Department of Health Research Governance Framework for Health and Social Care:

- Appendix A to this letter outlines responsibilities of principal investigators;
- Appendix B details the research governance responsibilities for other researchers. It also outlines the duties of all researchers under the Health and Safety at Work Act

The North Central London Community Research Consortium is a partnership between Camden Primary Care Trust, Islington Primary Care Trust, Camden & Islington Mental Health and Social Care Trust and the North Central Thames Primary Care Research Network (NoCTeN)

Version 3.0 July 2002

1974. Principal investigators should disseminate the contents of Appendix B to all those in their research teams.

Further information on the research governance framework for health and social care can be found on the DH web pages at <http://www.doh.gov.uk/research/>  
Staff working within trusts covered by the research consortium can also find the information on the Trust Intranet.

Researchers are also reminded that personally identifiable information on living persons must be collected, stored, processed and disclosed in accordance with the Data Protection Act 1998. Such data may be in the form of electronic files, paper files, voice recordings or photographs/scans/X-rays. Further information on the Data Protection Act is available from your organisations Data Protection Officer or from the Consortium R&D Unit. The Medical Research Council also publishes the guidance booklet 'Personal Information in Medical Research' which is available from <http://www.mrc.ac.uk/pdf-pimr.pdf>

Except in the case of commercially funded research projects, the following acknowledgement and disclaimer MUST appear on all publications arising from your work.

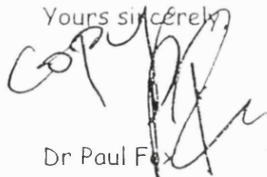
*"This work was undertaken with the support of Camden and Islington Mental Health and Social Care Trust, who received [\*\*\*insert "funding" or a "proportion of funding"\*\*\*] from the NHS Executive; the views expressed in this publication are those of the authors and not necessarily those of the NHS Executive".*

*"a proportion of funding" where the research is also supported by an external funding body;  
"funding" where no external funding has been obtained.*

This is a requirement of the contract between the Trust and the NHS Executive in which the Trust receives funding to cover the infrastructure costs associated with performing non-commercial research.

Please make all members of the research team aware of the contents of this approval. I wish you every success with your research.

Yours sincerely,



Dr Paul Fox  
Acting Director of Research and Development

**Appendix 2: Information Sheets, Consent Forms and Letters**

Appendix 2.1  
Patient Information Sheet

Camden and Islington 

Mental Health and Social Care Trust



Sub-Department of Clinical Health Psychology

**UNIVERSITY COLLEGE LONDON**

GOWER STREET LONDON WC1E 6BT

**CONFIDENTIAL**

**Autobiographical Memory Retrieval Study**

Participant Information Sheet

You are being invited to take part in a **voluntary** research study. Before you decide to take part it is important that you understand why the research is being done and what it will involve. Please take the time to read this sheet and you can discuss the project with friends, relatives, hospital or centre staff if you wish. You will also be given a copy of this information sheet to take away with you. Feel free to ask questions that will help you decide whether or not you want to be involved.

The main reason we are conducting this study is that we want to gain a greater understanding of the things that affect the way that people remember events from their life. This information will hopefully help us to develop more helpful psychological therapies. We have been asking people who are using this centre or hospital to take part, as well as members of the general population.

This study is entirely voluntary. If you decide to be involved you will be asked to sign a consent form indicating that you understand the nature and purpose of the study. You are also free to withdraw at any time and the standard of care you receive will not be affected in any way whether or not you choose to be involved.

***What is involved?***

If you agree to participate you will be interviewed by Nikki Wood about your experiences and any problems you may have. You will also be given some tests that measure your memory for events from your past and your short-term memory. You will be asked to complete a questionnaire that measures your mood and a test of general ability. This usually takes about an hour to an hour and a half and, if possible, will be done on the same day. If this is not possible then we can arrange to meet again at a time that is convenient for you.

There are no side effects or risks involved in this study, your answers will be kept confidential, and you will not be personally identifiable from any reports produced from the results. All proposals for research using human subjects are reviewed by an ethics committee before they can proceed. This project has been reviewed by a member of staff at the UCL Psychology department and approved by West London Mental Health Research Ethics Committee and Camden and Islington Community Health Service Local Research Ethics Committee and is a student study. If you have any questions you can contact Nikki Wood via your keyworker or directly by the contact information below.

You do not have to take part in this study if you do not want to. If you decide to take part you may withdraw at any time without having to give a reason. Your decision whether to take part or not will not affect your care and management in any way.

Thank you for your time.

Nikki Wood  
Trainee Clinical Psychologist  
Sub-dept of Clinical Health Psychology  
University College London  
1-19 Torrington Place  
London WC1E



**CONFIDENTIAL**

**Autobiographical Memory Retrieval Study**

Information Sheet

You are being invited to take part in a **voluntary** research study. Before you decide to take part it is important that you understand why the research is being done and what it will involve. Please take the time to read this sheet and you can discuss the project with friends, relatives, or other professionals if you wish. You will also be given a copy of this information sheet to take away with you. Feel free to ask questions that will help you decide whether or not you want to be involved.

The main reason we are conducting this study is that we want to gain a greater understanding of the things that affect the way that people remember events from their life. This information will hopefully help us to develop more helpful psychological therapies. We have been asking people from hospitals, health centres and the general population to take part.

This study is entirely voluntary. If you decide to be involved you will be asked to sign a consent form indicating that you understand the nature and purpose of the study. You are also free to withdraw at any time and the standard of care you receive or your legal rights will not be affected in any way whether or not you choose to be involved.

***What is involved?***

If you agree to participate you will be interviewed about your experiences and any problems you may have. You will also be given some tests that measure your memory for events from your past and your short term memory. You will be asked to complete a questionnaire that measures your mood and a test of general ability. This usually takes around an hour and if possible will be done on the same day. If this is not possible then we can arrange to meet again at a time that is convenient for you.

If you agree to participate you will be paid £7.50 in appreciation of your time. The money will be paid in cash when you have completed the interview and memory tests.

There are no side effects or risks involved in this study, your answers will be kept confidential, and you will not be personally identifiable from any reports produced from the results. All proposals for research using human subjects are reviewed by an ethics committee before they can proceed. This project has been reviewed by a member of staff at the UCL Psychology department and approved by West London Mental Health Research Ethics Committee and Camden and Islington Community Health Local Research Ethics Committee and is a student study. If you have any questions you can contact Nikki Wood on the information below.

You do not have to take part in this study if you do not want to. If you decide to take part you may withdraw at any time without having to give a reason. Your decision whether to take part or not will not affect your care and management in any way.

Thank you for reading this and taking part in the study.

**Nikki Wood**  
Trainee Clinical Psychologist  
Sub-dept of Clinical Health Psychology  
University College London  
1-19 Torrington Place  
London WC1E



West London Mental Health



NHS Trust

Appendix 2.4  
Consultant Psychiatrist Letter

Camden and Islington 

Mental Health and Social Care Trust



Sub-Department of Clinical Health Psychology

UNIVERSITY COLLEGE LONDON

GOWER STREET LONDON WC1E 6BT

Dr

Dear Dr

**Re: Autobiographical Memory and Psychosis Research Project**

I am writing to request access to inpatients and clients under your care for the above named study that is being conducted under the auspices of UCL and the North West London Mental Health Research and Development Consortium. The attached information sheet provides an outline of the nature and purpose of the research and describes the inclusion criteria. The West London Mental Health Research Ethics Committee and the Camden and Islington Community Health Service Local Research Ethics Committee have approved the project. I will liaise with the ward staff, keyworkers and psychologists working with participating subjects to ensure that their involvement does not disrupt any scheduled therapeutic activities. I have included a copy of the consent form that will be provided for patients who agree to participate.

If you are willing to give consent for me to approach people under your care I would be grateful if you could complete and return the attached "Consultant Psychiatrist Consent Form."

Yours sincerely,

Nikki Wood  
Trainee Clinical Psychologist

 Camden  ISLINGTON  
*supporting partnerships in mental health*

West London Mental Health



NHS Trust

Appendix 2.5

Consultant Psychiatrist Consent Form

Camden and Islington 

Mental Health and Social Care Trust



Sub-Department of Clinical Health Psychology

**UNIVERSITY COLLEGE LONDON**

GOWER STREET LONDON WC1E 6BT

**AUTOBIOGRAPHICAL MEMORY and PSYCHOSIS**

**Consultant Psychiatrist Consent Form**

Consultant Name:

Project Title: **Autobiographical Memory and Psychosis**

I give consent for Nikki Wood to approach patients and clients under my care for participation in the above-named study.

Signed:

Date:

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Please return the completed form to: **Nikki Wood, Sub-Department of Clinical Health Psychology, University College London, 1-19 Torrington Place, London, WC1E 6BT**

 **Camden**  
*supporting partnerships in mental health*

 **ISLINGTON**

**Appendix 2.6:  
Staff Information Sheet.**

**Camden and Islington **  
Mental Health and Social Care Trust



Sub-Department of Clinical Health Psychology

**UNIVERSITY COLLEGE LONDON**

GOWER STREET LONDON WC1E 6BT

**Autobiographical Memory and Psychosis Study**

Staff Information Sheet

I am a trainee clinical psychologist at University College London (UCL) and as part of my doctoral training, I am conducting some research on autobiographical memory and psychosis. My study is being supervised by Hamish McLeod (Consultant Clinical Psychologist, St Bernard's Wing, Ealing Hospital) and Professor Chris Brewin (UCL).

Autobiographical memory relates to the memories and information that we have about ourselves, events in our lives and the world. There is some evidence that deficits in autobiographical memory are found in people with psychosis. However, the nature of these deficits has varied across studies and this research hopes to provide some clarification. It is hoped that information from this study will also help to develop more effective psychological therapies and be integrated into current cognitive models of psychosis.

I am now looking to recruit research participants and I am hoping that you may be able to facilitate access to some of your patients or clients who may be willing to participate. They will need to have a diagnosis of schizophrenia, be between 18 and 65, currently symptomatic and be willing to participate. Exclusion criteria include: head injury; a comorbid diagnosis of depression, a substance misuse syndrome, or personality disorder; organic brain disease; or having had ECT in the past year. Individuals who do not have a good grasp of written or spoken English will also be excluded.

The study will involve interviewing subjects about their experiences and current problems and asking them questions about memories and information from their past. Several other memory tests will be administered along with the Beck Depression Inventory and two standardised Autobiographical Memory tests (the AMI and AMT). The whole interview process should take around 1 – 1 ½ hours.

Previous studies using the same paradigm has indicated that the procedure does not cause any distress or discomfort. Subjects will be allowed to withdraw from the study at any point and the assessments will be arranged so that they do not conflict with existing therapeutic activities

All proposals for research using human subjects are reviewed by an ethics committee before they can proceed. This project has been reviewed by a member of staff at the UCL Psychology department and approved by West London Mental Health Research Ethics Committee and Camden and Islington Community Health Service Local Research Ethics Committee.

If you have any further questions or know of any suitable patients or clients, then please contact Nikki Wood via the information below.

Thank you for your help.

**Nikki Wood**

**Trainee Clinical Psychologist  
Sub-Dept of Clinical Health Psychology  
University College London  
1-19 Torrington Place  
London WC1E**