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**University of Glasgow  
Section of Psychological Medicine**

**Prospective memory and social functioning in psychosis**

**Research Portfolio  
Submitted in partial fulfilment of the requirements for the degree of MSc  
(Med Sci) Clinical Neuropsychology**

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**August 2011**

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# Research Proposal

Glasgow University  
Msc/PgDip in Clinical Neuropsychology

Research Project Proposal

**Prospective memory and social functioning in first episode psychosis**

Student: Sarah Newton  
Research Advisor: Professor Jon Evans  
Supervisor: Dr Catherine Haslam  
Advisor: Professor Andrew Gumley  
Sponsors: Glasgow University and NHS Plymouth

July 2009  
Word count: 4,447 (5,219 with references)

## **Summary of project**

The performance of adults aged 18-38years, with and without psychosis, will be compared on tests of prospective memory and social functioning. Within group analyses will look at the association of prospective memory and social functioning, and for the group with psychosis, duration of untreated psychosis. The findings will be considered in the context of published literature referring to the memory and social functioning of people with mental health conditions and brain injury.

## **Introduction**

Prospective memory refers to remembering to carry out an activity, attend an event or do something at a particular time in the future. Previous studies suggest that it is dependent on a combination of retrospective and prospective activities; these being determined by intact executive functioning (e.g. abilities including attention, planning, problem solving) in the temporal and frontal and pre-frontal areas of the brain (Einstein and McDaniel, 1990). Remembering an action and when to carry it out is considered to be the retrospective component and retrieving the correct action at the correct time is the prospective component of prospective memory.

Impairments in prospective memory functioning could affect capacity for independent living (Fleming et al., 2008). Optimal functioning of prospective and retrospective memory is essential for activities of daily living around the home and engagement with education and training, employment and relationships with others. Deficits may not only be detrimental to maintaining existing engagement in these activities but may also prevent engagement in new activities (Haslam et al., 2008).

Prospective memory can be affected by psychological states, mental health conditions including schizophrenia, fatigue, substance use, physical health conditions and traumatic brain injury (e.g. Groot et al., 2002; Kondel, 2002;

Kumar, 2005; Pflueger, et al. 2007; Woods et al., 2007a; Woods et al., 2007b; Fleming et al., 2008). Henry et al. (2007) called for further research to identify the factors moderating prospective memory failures found in people with schizophrenia. There has been little information to date from studies of people with psychosis (who may or may not go on to develop schizophrenia), their prospective memory functioning and if and when difficulties may become apparent (Erlenmeyer-Kimling, 2000; Shum et al., 2004; Kumar et al., 2005).

Described as an abnormal condition of the mind with a loss of contact with reality, psychosis can be experienced at any age. Experiences may include visual and auditory hallucinations and delusions as well as disorganised thinking. Early intervention in adolescence and early adulthood has been promoted across the world to educate young people and their families to recognise what is occurring, to identify triggers and to prevent or manage relapses. A key aim is to decrease the likelihood of further episodes of psychosis and reduce the possibility of developing a chronic condition.

Factors that link with the development of positive and negative symptoms in psychosis are being identified and examined for their association with the rate and extent of recovery (e.g. Singh, 2007; MacBeth & Gumley, 2008). For example, Cornblatt et al. (2007) noted that while role functioning (performance at school, work, as a homemaker and need for support) deteriorated to a significant extent in the year before onset of schizophrenia, social functioning (quantity and quality of important social group networks and relations with peers and family) was a fairly stable trait and markedly reduced for those who went on to develop schizophrenia when compared to a control group. These authors concluded that social functioning may be an important predictor of schizophrenia.

The association between social functioning and prospective memory has not been well explored in this population. Intuitively, failing to remember to do things or to keep appointments could inhibit the development and

maintenance of relationships with others, increase an individual's isolation and reduce their level of being in touch with reality.

While antipsychotic medications play a significant part in ameliorating positive symptoms such as hallucinations and delusions, they probably have little impact on negative symptoms including an individual's ability to function independently in daily life (Cornblatt et al., 2007). Strategies and treatment plans such as those used in neurological rehabilitation to address memory impairments and activities of daily living (e.g. Fish et al., 2007) may be of use as part of the treatment for these functional aspects of psychosis. This research study represents a first attempt to look at prospective memory and social functioning in psychosis with a view to being able to use the information to better plan support for recovery.

The proposed research will investigate prospective memory and social functioning in people experiencing first episode psychosis and a comparative group without psychosis. This will be investigated at two points in time and related to demographic information and the duration of untreated psychosis (DUP). The data from the first point in time and from a comparative group without psychosis will be reported on to meet the requirements of the MSc/Post graduate Diploma in Clinical Neuropsychology.

## **Aims and hypotheses**

### **Aims**

To establish whether prospective memory deficits are a feature in people with first episode psychosis and whether there is an association with their social functioning and duration of untreated psychosis.

### **Hypotheses**

Compared with people who do not have psychosis, people with first episode psychosis will:

1. have deficits in prospective memory functioning,
2. have difficulties in social functioning, and
3. those with a longer duration of untreated psychosis will have greater evidence of difficulties with prospective memory functioning and an impoverished social structure than those with a shorter DUP.

Within each group:

4. there will be a positive association of prospective memory and social functioning.

## **Plan of investigation**

### **Participants**

There will be two groups in the study. Both will comprise people who speak English. The first group will be people referred to Early Intervention for Psychosis services (EIP) in Plymouth, Devon and Cornwall. The second, a comparison group, will be people attending the Youth Enquiry Services in Plymouth in relation to matters other than the need for EIP or other mental health services in Plymouth, Devon and Cornwall. The age range to be included is 18-38years. This comparison group was chosen as they may be more closely aligned to the range of backgrounds and current needs found among people who experience psychosis. An alternative would have been to involve undergraduates and postgraduates. However, they may reflect a more limited section of the continuum of competencies, developmental histories and socio economic status found among people with psychosis.

All Plymouth participants will be using services provided at the Zone, The Youth Enquiry Service for the city. This is a shop front facility in the centre of the city with an open door policy for young people and adults (mainly in the age range 14-25years) to seek advice and support in relation to their circumstances. The services include benefits, housing, sexual health, personal development, counselling, advocacy, Insight Early Intervention for

Psychosis and Icebreak Early Intervention for Emerging Personality Disorder. Several services are run in partnership with the NHS and some NHS staff are seconded full time or have set times to work there.

## **Demographics**

Previous studies have indicated that the following characteristics and historical details may affect performance on the assessments used in the study or have relevance for that person's clinical presentation and recovery trajectory (MacBeth & Gumley, 2008). The information will be taken into account in a post hoc look at the findings. Much of the information will be available in clinical files for the EIP group. A checklist will be used to prompt questions for both the EIP group and comparison group during their appointments with the researcher.

Individual Characteristics: handedness, history of dyslexia or dysgraphia, specific learning disabilities, developmental disorders, years of education and level attained, Duration of Untreated Psychosis as measured by the Nottingham Onset Schedule NOS (Singh et al., 2005).

General History: family history of developmental and psychological disorders, family (parents and siblings), significant events and when these occurred (bereavements, illness, trauma), abuse, past and current alcohol and substance use.

Medical history: Health history and status, epilepsy, history of acquired or traumatic brain injury with/without loss of consciousness, diagnosis, onset of prodromal phase, onset of psychosis, length of time with a care service, duration of treatment with medication, current medications.

## **Exclusions**

EIP group - in acute phase, under 18years, over 38years, primary diagnosis is not psychosis, intoxication with alcohol or substance use at time of assessment, not English speaking.

Comparison group - under 18years, over 38years, diagnosis of psychosis or other mental health condition, intoxication with alcohol or substance use at time of assessment, not English speaking.

## **Recruitment**

Staff at the Zone who work in the reception area and Insight Care Coordinators will have a briefing session prior to the start of the recruitment process. The researcher will cover the process of recruitment, the arrangements for the assessment interviews and confidentiality. The researcher will not be part of the initial information giving about the research. This is important not only to ensure that people are free to choose whether to find out more about possible participation but also because the researcher is a clinician for the Insight service and cannot put people she works with in a position of feeling coerced into participation. The information leaflet will include a statement similar to..."the researcher may be known to some people as she works at the Zone. Choosing not to participate will in no way affect the services you receive."

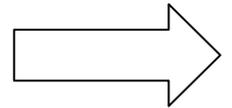
Posters will be displayed at the Zone and information leaflets made available on the reception desk, tables in the reception and given to people who come into the service by the receptionists. There is a tear off slip attached to the leaflet for people who would like to know more about the study and possibly participate to leave in a covered box with a sealable lid in the reception office area. The Care Coordinators for Insight will give leaflets to the people they see and they can return their slips to the Care Coordinator or to the receptionist in the Zone. The researcher and the honorary undergraduate placement student will collect these slips several times a week. The researcher will contact the person by phone to arrange to talk about the study and answer any questions they may have. An appointment to sign the consent form and participate in the study will be made if they wish to proceed.

The recruitment process is presented as a flow chart. Thin arrows indicate participation and large arrows multiple points to disengage from participation.

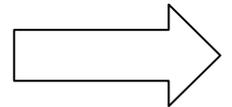
Information leaflet given to prospective participants by their Care Coordinator (EIP) or the receptionist (YES visitors).



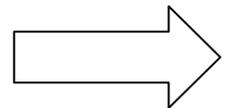
Response given to Care Coordinator or reception advisor who informs researcher of agreement of person to find out more or to decline interest.



Researcher makes contact with the person and explains procedure, making an appointment to meet if they still want to engage.



Appointment. Researcher explains the procedure and checks the details of person are correct and gives out an information leaflet detailing what support is available for them after session. The participant signs the consent form.



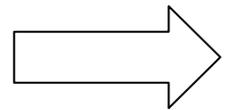
Proceed with assessments. Make a second appointment if required.



Complete assessments. Confirm payment arrangements and available support following participation. Agree any information of significance to their care that should be passed to Care Coordinators (EIP group only). Give them the PRMQ to be completed by a person who knows them well, to be returned in the pre-paid stamped addressed envelope to the researcher. Thank person for their participation.



Thank the participant with vouchers.



The assessment interview is planned to last for up to two hours. Some people may require two appointments to complete the work. Approximately one hour will be spent gathering additional information (e.g. about the duration of untreated psychosis) from the clinical file of the participants who are in receipt of services from Insight by the researcher and the honorary undergraduate placement student.

Participants will be offered a £10 voucher to thank them that can be exchanged at high street shops for food, clothes, music, books. Their details will also be put into a draw for further vouchers at the end of the study. To preserve confidentiality the draw slips will only contain codes. The Chief Executive of the Zone will be invited to make the draw. The researcher will be able to decode the winning code in order to make arrangement to send the vouchers to the winner. The researcher is applying to Glasgow University for support with funding.

Recruitment will be difficult because of the timescale to meet the requirements of the course. Plans have been made to go to other centres should insufficient participants be available in Plymouth. For example, contact has been made with Early Intervention Services for Psychosis in Devon and Cornwall and reference is being made to these on the IRAS Ethics application. In addition, contact may be made with Youth Enquiry Services in other areas in Devon and Cornwall. It may be possible to

arrange to recruit additional participants from among students at the City College for Further Education, the University of Plymouth and the University College of Plymouth St Mark and St John.

## **Measures**

### 1. Prospective memory:

**CAMPROMT Cambridge Prospective Memory Assessment** (Wilson et al., 2005)

This yields six scores on three time-based tests and three event-based tasks (maximum score for each is 18, higher scores reflecting better prospective memory) and presence or absence of note-taking behaviour.

25mins

**PRMQ Prospective and Retrospective Memory Questionnaire** (Smith et al., 2000)

There are two questionnaires each with 16 questions rated on a 5-point scale from very often to never. The first is for self-report the second for a relative or friend. Information is available about the discrepancy between the self and other reports and the prospective and retrospective memory scores, as well as the degree of abnormality.

5mins

### 2. Social Functioning

**EXITS Exeter Identity Transitions Scales** (Haslam et al., 2008)

Developed to examine group membership and used by Haslam et al. (2008) for the assessment of social functioning pre and post stroke, this instrument provides answers to 12 questions on a seven-point scale (1= do not agree at all, 7=agree completely). The word "stroke" was replaced by "being unwell" for this study.

15mins

### **Global Assessment of Functioning Scale, GF: Social and GF: Role**

(Cornblatt et al., 2007)

The two scales have scores from 1 to 10, with 10 being superior functioning and 1 extreme dysfunction. For each scale three scores are available; lowest level of functioning in the past month (current functioning) and lowest and highest level reported over the past year.

10mins

Information to be collected separately from the assessment session for the EIP group:

### **SFS Social Functioning Scale** (Birchwood et al., 1990)

Seventy-nine items are rated on a 4-point scale to reveal a profile across seven domains. Higher scale scores (calculated from raw scores) indicate higher levels of functioning. Designed as self-report and informant-report, the latter has most often been reported (Leifker et al., 2009). Care coordinators for the EIP group will be asked if they can complete the SFS.

15mins

### 3. Measures to describe the two groups in the study

The following measures will yield information about the characteristics of the participants and the extent to which the two groups match. This may be of use in interpreting the results from the assessments of memory and social functioning.

### **WMS-III Wechsler Memory Scale III Abbreviated** (Wechsler, 2003)

Four subtests yield derived scores on immediate memory, delayed memory and total memory.

15-20mins

### **Wisconsin Card Sorting Test** (Nelson, 1976)

128 cards are sorted by colour, shape and number.

15mins

### **Trail Making** (Tombaugh, 2004)

Results are the times on Test A and Test B and the difference (B-A) as this is considered as isolating the executive component of the task (Strauss et al., 2006).

5mins

**WTAR Wechsler Test of Adult Reading** (Wechsler, 2001)

Age-standardised score from this word-reading test provides an estimate of premorbid intellectual functioning (premorbid Full scale IQ, Verbal IQ and Performance IQ).

5-10mins

**WASI Wechsler Abbreviated Scale of Intelligence** (Wechsler, 1999)

Age-standardised scores on four subtests provide an estimate of current intellectual functioning (Full scale IQ, Verbal IQ and Performance IQ).

15mins

**BSI 18 Brief Symptom Inventory 18** (Derogatis, 2000)

The inventory describes nine symptom dimensions and three global indices with norms for people with and without psychiatric service contact.

4mins

## **Design and procedures**

Adults using the services at the Youth Enquiry Service will be invited to join a research group to advise the researcher on the refinement of the design and procedure. In accordance with the YES policy and practice they will be paid in vouchers for their time.

### **First study**

This is a comparative study with a cross sectional between subjects design involving people with and without first episode psychosis. The dependent measures will include demographic information, measures of cognitive and

social function and DUP (i.e. the latter in people with first episode psychosis).

### Second study

Prospective cohort study to look at changes in prospective memory and social functioning for people with referred to an Early Intervention for Psychosis service over time. Those assessed in the EIP group in the comparative study to be reassessed with their consent at a second point in time (e.g. one to two years after first assessments).

The data from the first point in time and from a comparative group without psychosis will be reported on to meet the requirements of the MSc/Post graduate Diploma in Clinical Neuropsychology.

An individual flow chart will be created for each participant detailing engagement, consent, assessments and results and post-participation activities.

### **Settings and equipment**

Rooms at The Zone (Youth Enquiry Service) in Plymouth or rooms in NHS Plymouth facilities. Locations in Devon and Cornwall EIP Services to be confirmed. These services will only be included in the study if insufficient participants are available in Plymouth.

Equipment includes assessments as listed above and furniture including two chairs and large table surface to work on.

### **Confidentiality**

Confidential data relating to the study will be kept in a locked filing cabinet at the Insight office of the Zone, Youth Enquiry Service, 14-16 Union Street, Derry's Cross, Plymouth, PL1 2SR tel: 01752 206626 and in a locked filing

cabinet when stored for analysis, write up and thereafter at Clinical Psychology Services NHS Plymouth, 140 Mt Gould Road, Mt Gould Hospital, Plymouth PL4 7QD tel: 01752 314052.

Data will be stored on a protected drive on an NHS Plymouth server with access restricted to the researcher and others on a need to know basis. Name codes will be used and names separated from data files and their codes to protect anonymity.

In order to maintain confidentiality the participants GP will not be informed about their participation in the study unless they request this. Staff at the Zone and Insight Care coordinators will be aware of who is participating through their involvement in recruitment and being in the premises (e.g. reception area) when the interviews take place. In addition they will be available to participants should issues arise as a consequence of taking part in the study.

The reception staff and the Care Coordinators will have a briefing session about the study; their role in recruitment, facilitation and support for the participants and researcher while the study is being conducted. This briefing will also include the importance of discretion and confidentiality in relation to participants and those who decline participation so as not to single them out in relation to other users of services at the Zone.

## **Risks**

There are no foreseen significant risks to subject who participate in the study. However should issues arise plans will be in place to address these.

Following completion of the interview each participant will be given information as to who to contact should they:

1. Become distressed as a result of participation in the research (Care coordinator for the EIP group) and researcher (who is also a clinician) for

the non EIP group who can then direct the person to the appropriate services for support).

2. Wish to know more about their individual results or to have a summary of the completed study in an accessible plain English, non-academic format (the researcher will organise this).

3. Require additional support and care. Should there be evidence of a participant being unwell and presenting a risk to themselves or others then care coordinators (EIP group) and duty staff at the Zone will be informed and a risk assessment completed. The participant will be kept informed and directed to appropriate services for their care and support. The researcher is an experienced clinician and professionally capable of ensuring the identification of such circumstances and that these actions are completed.

Participants will be informed prior to signing informed consent, that should they disclose information that the Zone and Insight or other agencies aren't already aware of and that leads the researcher to suspect that someone is being harmed or is at risk of being harmed, then this will be informed to the appropriate bodies. Examples of this include things like a person caring for a child while under the influence of drugs, sexual or physical abuse, self-harm or suicide risks. Participants will be informed that this will occur.

Intoxication with alcohol and /or substances at the time of gaining consent and at interview will result in that activity not proceeding on that date. An alternative date will be offered should the prospective participant still wish to participate and be willing to attend when not intoxicated.

Being unwell at the time of gaining consent and at interview will result in that activity not proceeding on that date. An alternative date will be offered should the prospective participant still wish to participate and be willing to attend when well. This includes physical illnesses and psychological ill health such as an acute episode of psychosis, period of mania or significant depression that is sufficient to impair cognitive functioning and behaviours.

Safety of participants and researcher is essential. All interviews will be conducted in a private room within the Zone. These rooms have an alarm system and there are always members of staff on duty in the department during working hours. No interviews will be conducted outside of working hours. Similar arrangements will be made should interviews need to take place in other facilities (for example if participants are to be recruited from EIP services in Devon and Cornwall).

If there are any concerns about the facilities or other staff at the locations for interviews (e.g. lack of helpfulness or attitude towards researcher or participants) the researcher will raise these issues with the appropriate manager.

## **Benefits**

The benefits subjects may gain from participating in this study are likely to be minimal. It is possible that participants may derive some emotional benefit from their participation in the study through knowing they have contributed to knowledge about the area under study and the improvement of services.

All participants will be offered a voucher to thank them for their participation. They will also be entered into a draw for additional vouchers at the end of the study. This is in line with policy for user contributions at the Zone. Travel to and from the Zone will be facilitated for those who require this.

They will have the opportunity to learn about the findings based on their participation in the form of a brief report (verbal and written) about their performance. The researcher is a qualified and experienced clinician able to compile and communicate such findings and to direct a person to appropriate care and support services should these be seen as appropriate to meet the participants' needs. They will also be able to receive a summary of the findings of the study should they request this.

## **Data analysis and power calculation**

Data analysis will be completed using SPSS.

Various sample sizes and outcome measures have been reported in the literature on schizophrenia and traumatic brain injury when looking separately at memory, social functioning, duration of untreated psychosis and demographic information. No previous studies have considered the particular combination of measures proposed in this study with populations aged 18-38 with or without psychosis. Thus it is not possible to confidently estimate effect size. An impairment in prospective memory functioning of clinical relevance could be expected to be large in terms of effect size (e.g. Cohen's  $d=0.8$ ). A smaller effect (e.g. Cohen's  $d=0.2$ ,  $d=0.5$ ) might be predicted for social functioning as less is known about possible differences in the social lives of the two groups under study here. If the effect sizes found are less than predicted in relation to the sample sizes used, then the study will be underpowered. It will nevertheless provide data for use in power calculations for studies in the future.

The idea behind having two assessments of prospective memory and three for social functioning was to attempt to provide some evidence of consistency. That is, what is intended with the assessment is what is actually being measured.

A pragmatic approach has been taken in estimating the sample sizes required using G\*Power 3 (Faul et al., 2007) and reference to Cohen's 1988 and 1992 tables.

### **T-test**

T-tests for two independent samples will be used to compare the two groups (i.e. psychosis and comparison groups). The comparisons will examine

differences in their outcomes on the key measures of memory and social functioning (hypotheses 1 and 2).

Using G\*Power 3 a one tailed T-test with independent samples (Cohen's  $d=0.8$  [large effect],  $p=0.05$  [one-tailed] and power=0.8) suggested sample sizes of 21 for each of the two groups. Cohen (1988, 1992) suggests a sample size of 26 for a T-test (with  $d=0.8$  [large effect],  $p=0.05$  [one-tailed] and power=0.8).

### **Correlations**

Correlations and analyses of variance will be used to examine whether there are within group positive associations between dependent variables memory, social functioning, and for the psychosis group, duration of untreated psychosis (hypotheses 3 and 4).

Cohen (1988, 1992) suggests a sample size of 28 for within group correlations to look for positive associations ( $r=0.5$  [large],  $p=0.05$  and power =0.8).

Thus, the aim will be to recruit more than 30 participants in each group to allow for incomplete data for some participants.

### **Practical application**

In line with the policy of involvement of young people in activities at the Zone, participants will receive a fee for participation. This will be in the form of vouchers.

### **Timescale**

Submission by 31<sup>st</sup> August 2010, viva voce September 2010

## Ethical approval

IRAS Integrated Research Application System will be completed. The ethics form will be sent to the local Ethics Committee for consideration between July and September 2009. The research will be registered with NHS Plymouth.

## References

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## Literature Review

**Prospective memory, social functioning and social identity in psychosis: a systematic review**

Submitted for examination in part fulfilment of  
MSc in Clinical Neuropsychology at the University of Glasgow

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Text presented in the style of and according to the requirements of the journal Schizophrenia Research. References presented in accordance with British Standard BS 4821:1990 as required by the University of Glasgow.

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# **Prospective memory, social functioning and social identity in psychosis: a selective review**

Sarah Newton

## **Abstract**

Research on prospective memory (PM) has increased rapidly in recent years. Many PM paradigms have been developed, neuroanatomical correlates of PM have been investigated and deficits in PM have been demonstrated in a wide range of conditions. However, the impact of deficits in PM on everyday functioning and in particular, social functioning (SF), is less well explored. While deficits in both cognitive abilities (including PM) and SF are well recognised as features in people with schizophrenia with long durations of illness, there is, as yet, limited information available in relation to these difficulties in people who are experiencing, or have recently experienced, their first episode of psychosis (FEP). A systematic search and selective examination of the literature identified four published papers by three research teams from three continents. While they all found deficits in PM, there was no conclusive evidence for the impact deficits in PM may have on SF. Methodological issues with measures and participants not being representative of first episode populations, precludes definite conclusions being drawn. It is argued that further research on the relationship between PM and SF is important for the advancement of psychosocial interventions with people who have experienced their first episode of psychosis.

*Key words:* prospective memory, social functioning, identity, psychosis

## **1. Introduction**

Cognition and social cognition are complex constructs that describe our innate and learned knowledge and abilities (e.g. Fett et al., 2011). The degree to which these abilities are intact and working together has

significant implications for being able to function well in everyday life both in a practical sense and in relationships with others. Published research describes how one or more components of cognition or social cognition may influence performance in people with limitations of genetic or ill-health origin as well as in healthy populations (e.g. Addington et al., 2010). The focus of this review is to examine the literature relating to one aspect of cognition, prospective memory (PM), and its potential impact on social functioning (SF), a behavioural expression of social cognition, in a population who have experienced their first episode of psychosis.

The motivation for reviewing the literature on PM in psychosis stems from clinical knowledge of memory failures in a population attending an early intervention service for psychosis and published literature identifying PM failures as a problem in the more chronic condition of schizophrenia (e.g. Chan et al., 2008; Wang et al., 2009) and more recently, for people experiencing first onset psychosis (e.g. Lui, S.S.Y. et al., 2011). The consequences of having deficits in this area not only have practical repercussions for health (e.g. forgetting to take medications, to buy food, keep an appointment) but also for psychological well-being (Haslam, S. et al., 2009). How a person feels about themselves and their relationships with others has particular significance in the context of psychosis where misunderstanding and misinterpretation can have negative consequences for future perceptions of self and others (Bertrand et al., 2007).

Early intervention services for psychosis, now established world-wide, aim to intervene with education and information about the condition and offer support and guidance for monitoring well-being and preventing or reducing the impact of further episodes. Education about the effects of recreational use of drugs and alcohol (which may have been used to self-medicate when starting to experience positive symptoms of psychosis) is also crucial in relation to PM as some substances are being found to be detrimental to the areas PM is thought to be dependent on (Kleigel et al, 2008). Key elements of the work during recovery focus on building personal self-esteem and confidence and relationships with others as well as learning about

opportunities for meaningful social, educational and occupational activity. Investment in strengthening personal identity and building relationships, that hopefully will be reciprocally supportive when needed, is crucial if the aims of the services are to be achieved (Sani, 2012). Identification of factors that might impede progress in these areas, such as the possibility that PM plays a part, is therefore essential as Henry et al. (2007a) concluded:

“It has been shown that problems with prospective memory cause more deficits in activities of daily living, instrumental activities of daily living and caregiver burden than retrospective memory failures (Smith et al., 2000) and also have important implications for the management and rehabilitation of clinical patients (Kurtz et al., 2001).” Henry et al. (2007a, p179).

## **1.1 Prospective memory**

### **1.1.1 Development**

Developing during the pre-school years (Atance and Jackson, 2009) and maturing through adolescence and early adulthood (e.g. Altgassen et al., 2010; Wang, L. et al., 2011) PM refers to remembering to carry out an activity, attend an event or do something at a particular time in the future (e.g. Wang et al., 2008a). It is considered to be dependent on a combination of retrospective and prospective processes including intact executive functioning (e.g. abilities including attention, planning, problem solving) and associations of the temporal, frontal and pre-frontal areas of the brain (Einstein and McDaniel, 1990). Remembering an action and when to carry it out is considered to be the retrospective component and retrieving the correct action at the correct time is the prospective component. Deficits in PM may therefore be due to failures of the retrospective or prospective components, a combination or some other factors.

### **1.1.2 Theories**

The study of PM has gained momentum particularly over the past two decades. An electronic search of PsychINFO for articles relating to PM found 674 from January 1984 to June 2011 with 401 of these published

from 2005 to 2011. Prospective memory has been studied in a range of clinical conditions and healthy populations. The clinical conditions include Alzheimer's (e.g. Smith et al., 2000); brain injury (e.g. Fish et al, 2007; Fleming et al, 2008; Groot et al., 2002; Henry et al., 2007b); Bi-polar disorder (Lee, et al., 2010); depression (e.g. Altgassen et al., 2009; Jeong and Cranney, 2009; Rude et al., 1999); HIV (e.g. Woods et al., 2007b); Korsakoffs and alcoholics (e.g. Brunfaut et al., 2000); Parkinson's disease (e.g. Raskin et al., 2011) and stroke (e.g. Brooks et al., 2004) as well as schizophrenia.

Theories are developing about the nature of PM and the way in which it operates. For example, McDaniel and Einstein (2000, 2007) described PM as a multi process system in recognition of the multiple mechanisms and neural connections by which PM works, the different types of PM task, and the relationship PM may have with the expression of abilities including independent living and social competencies. There is general agreement that the operation of PM involves a number of stages including, forming a plan or strategy for achievement, having a retrospective memory of the intention, using a strategy to recall the intention at the correct time or in response to the correct cue and being able to complete the intention having recalled it correctly (e.g. Guimond, 2008). Prospective remembering is dependent upon both internal processes such as 'keeping the intention in mind' and external stimuli that provide cues to trigger the appropriate action at the correct moment.

Evidence from fMRI (functional Magnetic Resonance Imaging) and PET (Positron Emission Tomography) studies has provided neurological explanations for the way in which PM may be working. The prospective element of PM, is thought to operate through the prefrontal cortex, being particularly dependent on area BA10 (Brodmann Area 10) (e.g. Burgess et al. 2001, Burgess et al. 2003; Simons et al., 2006) in contrast to long term memory which is considered to operate principally through the hippocampus and medial temporal lobe and their connections with the wider neocortex. Bilateral activation of BA 10 has been found in relation to cue identification

and intention retrieval components of PM (e.g. Basso et al., 2010); left lateral BA10 has been found to remain active in anticipation of PM trials as if attention is focussed on the intention to retrieve (i.e. being 'kept in mind'), and there is deactivation of the medial area of BA10 when PM trials are ongoing (Burgess et al., 2003; Simons et al., 2006). Of relevance to this review are studies of people with schizophrenia suggesting that they may have neurological abnormalities in the functioning of these particular areas that could be contributing to difficulties with social functioning (e.g. Frith, 1992, Harvey et al., 2011; Hemsley, 1994; Malla et al., 2011). Penningroth et al. (2011) recommended that more research looking at the potential consequences of PM failure (i.e. the social impact or cost) will in turn lead to more being known about PM:

“We propose that consideration of the social relevance of PM will lead to a more complete and ecologically valid theoretical description of PM performance.”, Penningroth et al., (2011, p3).

## **1.2 Social Function**

The ability to participate in forming and maintaining relationships and opportunities for socialising can be severely compromised in schizophrenia and as a consequence result in a perpetuation of social withdrawal, self-doubt and devaluation of self-worth (e.g. Addington et al., 2005, 2006, 2010, 2011). Having difficulties in relating to others has a major impact on all aspects of daily living (Couture et al., 2011). Finding out what influences changes in the ability to function socially has significant implications for early interventions that may prevent or reduce the impact of deterioration (e.g. Bertrand, et al., 2007; Combs et al., 2011; Penades et al., 2010; Henry et al., 2010; Marshall and Rathbone, 2011; Pruessner et al., 2011; Shamsi et al., 2011; Wykes and Reeder, 2005).

A number of areas of social cognition (i.e. the perception, interpretation and processing of social information, Bertrand et al., 2007) are thought to be significant factors for optimal SF but have been found to be compromised in

schizophrenia. These include facial affect recognition (Csukly et al., 2011; Pan et al., 2009) and Theory of Mind (TOM) (i.e. the ability to recognise, identify, comprehend and respond to the mental states of others) (e.g. Couture et al., 2011; Fett et al., 2011; Frith, 1992). Additionally responding to information about oneself is also affected in this condition (Harvey et al., 2011). The way in which we perceive ourselves and how we relate to others is explored in the literature looking at relationships between personal identity, health and wellbeing (Crabtree et al., 2010; Haslam, S. et al., 2009; Jetten et al., 2010). Associating with other people, whether on an individual or collective basis, can have positive benefits physiologically and psychologically that in turn enhance well-being and promote the motivation to continue with these relationships (Sani, 2012). The sense of meaning, purpose and belonging derived from such relationships is thought to contribute to social identity and thus a personal sense of well-being (Haslam, S. et al., 2009).

When these relationships are disrupted there can be a significant impact on physiological and psychological well-being. For example, changes in a person's relationships with others can affect recovery from illness (e.g. Haslam, C. et al., 2008), have an enduring and significant impact on ability to cope with life stressors and be detrimental to overall well-being (e.g. Haslam, S. et al., 2009; Jetten et al., 2010). Finding the most supportive and least stigmatising relationships and groups to be part of is a significant challenge if self-esteem, confidence and social functioning skills, post traumatic event or illness, are to be optimally developed and expressed (Crabtree et al., 2010; Haslam, C. et al., 2008; Henry et al., 2010). Although the areas of social identity, relationships and well-being have been studied in a number of non-clinical and clinical areas (e.g. Haslam, C. et al., 2008; Jetten et al., 2001), less work has been done in relation to people with schizophrenia and little, if any, with people attending a first episode psychosis service.

### **1.3 Summary and Aims**

An initial look at literature relating to PM and SF as described in this introduction, found reference to deficits in PM (e.g. Lui, S.S.Y. et al., 2011) and evidence of social cognition impairments, being present in young adults with psychosis (e.g. Addington et al., 2006; Bertrand et al., 2007) as well as confirmation that both are commonly found in older adults with chronic schizophrenia (e.g. Couture et al., 2011; Mancuso et al., 2011; Wang et al., 2009; Wang et al., 2008b). Although reference is made to SF in many studies it is often in the context of describing it as a potential outcome of studies of underlying deficits in social cognition. Two key intentions of this review were firstly to seek literature that intentionally studied both PM and SF and secondly to use knowledge of these areas in order to inform psychosocial interventions in context of first episode psychosis services.

This review describes a systematic approach to searching the literature and a selective examination of studies of PM and SF with focus on first episode psychosis with the ultimate aim of informing future research and the further development of supportive and therapeutic approaches as applied in first episode psychosis services.

## **2 Method**

Several searches were conducted using OVID and EBSCO search engine hosts to screen 10 databases and 4 specific publications<sup>1</sup>, with additional sources identified in reference lists of the previous studies. Although unusual to present this number of searches in a literature review, the approach was considered justified in order to provide a thorough perspective on the area of study. The results were cross referenced, deduplicated and limited to those published in English.

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<sup>1</sup> Medline (R) 1948 -June Week 2 2011, EMBASE 1980 to 2011 Week 24, Health and Psychosocial Instruments 1985 to April 2011, CINAHL, MEDLINE, PsycINFO, PsycARTICLES, Psychology and Behavioral Sciences Collection, Health source: Nursing/Academic Edition, SocINDEX with Full Text, Early Intervention in Psychiatry, PubMed, PsycBITE and COCHRANE.

The search terms used were chosen to reveal the greatest number of references to the three key terms — prospective memory, social functioning and psychosis — and associations between them. They included (prospective memory), (social function\* OR social competence OR social adjustment OR social behavio\*), (schizophrenia OR psychosis OR first episode psychosis) and (cog\* ability OR cog\* function OR cognit\* OR neuropsychological deficits).

The key papers, including reviews and meta-analyses were obtained and classified according to the subject matter covered — prospective memory (PM), social functioning (SF), schizophrenia or psychosis (SC) cognition/cognitive/neurocognitive (C) and finally non-prospective memory (M).

### **3 Results of the literature searches**

Using ‘prospective memory’ alone yielded over 500 articles. Many of these were duplicates across the host search engines covering the same journals and books. They also covered all health and clinical conditions. Those relating to schizophrenia and psychosis were examined to see what is already known in relation to PM, SF, C and M. Systematic reviews and meta-analyses were found relating to cognition (Allott et al., 2001; Bozikas and Andreou, 2011), social cognition (Fett et al., 2011), memory (Forbes et al., 2008) and PM (Wang et al., 2009). Although reference was made in each to the implications of deficits for everyday functioning and social relationships, none looked specifically at the impact of PM on particular aspects of social identity and functioning. They also reported significant methodological problems with studies that limit the extent to which their findings can be relied upon.

Combining search categories PM, SF and SC, produced articles of the most direct relevance to the aim of this review. They were by Altgassen et al. (2010), Atance and Jackson (2009), Brandimonte et al. (2010), Henry et al. (2007a), Twamley et al. (2008) and two papers by Xiang et al. (2010a,

Table 1 The results of the systematic search combining prospective memory, social functioning and psychosis

| Year  | Authors      | Areas studied | Subject details  | Key findings  | PM and SF assessments   | Cognitive assessments   |
|-------|--------------|---------------|--|---|---|---|
| 2010a | Xiang et al. | SC, PM, SF    | 110 patients with schizophrenia (mean age 31.8years, 65.5%male) 110 healthy controls (mean age 31.5years, 66.4%male) DSM 1V Brief Psychiatric Rating Scale | Time-based PM and RM associated in controls, event-based PM associated with non-verbal intelligence in patients. "PM deficit may arise from the impairments of the retrospective components of memory.", p680. Findings suggest and lend support to previous ones of Woods et al. (2007) and Wang et al. (2008) that PM failures relate to impairments in RM, which is, remembering the content and what was to have been done to achieve the action. | Time-, event- and activity-based PM using computerised tasks, an ongoing task-general knowledge, time-based PM to contact experimenter in next room every 5 minutes to inform of score, event-based PM to contact experimenter when the word police appeared on the screen. | WMS-R logical memory immediate and delayed, Raven's Progressive matrices DFT TOL 4-disk WCST  |
| 2010b | Xiang et al. | SC, PM, SF    | 110 patients with schizophrenia also reported in Xiang et al. 2010a (mean age 31.7years, 65.5%male) DSM 1V Brief Psychiatric Rating Scale                  | "...schizophrenia patients with good social functioning have higher education and score less perseverative errors on the WCST.", p116. Only 11%variance explained by education level and WCST perseverative errors thus other variables may also be influential on SF. Attention to negative symptoms, deficits in executive functioning and memory with anti-psychotic medications and psychosocial treatments could improve SF.                     | Time-, event- and activity- based PM using computerised tasks. SF assessed with Chinese version FNA-C (focus on self-care and community living domains of social functioning)   | WMS-R logical memory immediate and delayed, Raven's Progressive matrices DFT TOL 4-disk WCST. |

| Year  | Authors        | Areas studied | Subject details   | Key findings  | PM and SF assessments  | Cognitive assessments   |
|-------|----------------|---------------|---|---|--|---|
| 2008  | Twamley et al. | SC, PM, SF    | 72 with schizophrenia, schizoaffective disorder or psychosis (mean age 46years, 67%male, mean DOI 23years) (41 reported in a previous study, Woods et al., 2007b) No control group DSM 1V PANSS HAM-D | PM results positively correlated with attention, working memory processing speed, learning and executive functioning but not delayed recall. Learning ability independently contributes to PM. Better PM was predictive of higher functional capacity.  | Time- and event-based PM Assessed using MIST SF assessed with UCSD performance-based Skills Assessment (uses two of five scales in UPSA)   | American NART, WAIS 111 CPT-Identical Pairs d-prime Digit Span Distractibility and non-distracted scores HVLT Revised WMS 111 Logical Memory BVMT-Revised Trails A , B and B minus A WCST 64 card Stroop Color-Word Interference Test COWAT FAS |
| 2007a | Henry et al.   | SC, PM        | 30 with schizophrenia or schizoaffective disorder (mean age 35.7years, 16males, DOI 12.7years) 29 controls (mean age 37.5years, 17males) DSM 1V   | PM is impaired in schizophrenia group and this remained after other cognitive factors were controlled for. No differentiation re time- and event- results in support of Woods (2007) unlike Shum's (2004) results where methodology may have accounted for the worse results re time-based PM in his sample. PM may be a primary rather than a secondary impairment in schizophrenia. | time- and event - based PM assessed using Virtual Week, a board and dice game covering a day with each circuit and having 10 embedded tasks (4 regular, 4 irregular and 2 time-check). | NART WASI-4 Phonemic fluency with letters FAS The Hayling Sentence Completion Test RAVLT  |

Note: DOI= Duration of Illness, DUP= Duration of Untreated Psychosis, PM=Prospective Memory, SF= Social Functioning, ANART American National Adult Reading Test (Grober and Sliwinski, 1991), BVMT-R Brief Visuospatial Memory test-Revised (Benedict et al., 1998), COWAT Controlled Oral Word Association Test (Benton and Hamsher, 1989), CPT Continuous Performance Test (Cornblatt et al., 1989), DFT Design Fluency Test (Jones-Gotman Milner, 1977), Digit Span Distractibility (Oltmanns & Neal, 1975), DSM 1V Diagnostic and Statistical Manual of Mental Disorders. 4<sup>th</sup> Edition. American Psychiatric Association, 1994, FAS Phonemic Fluency (Henry and Crawford, 2005) ,FNA Functional Needs Assessment (Dombrowski et al., 1990) and FNA Chinese version, HAM-D Hamilton Depression Rating Scale (Hamilton, 1967), Hayling Sentence Completion Test (Burgess and Shallice, 1997), HVLT Hopkins Verbal Learning Test-Revised (Benedict et al., 1998), MIST Memory for Intentions Test (Raskin, 2004, Raskin and Buckheit, 2001), NART National Adult Reading test (Nelson, 1982), PANSS Positive and Negative Syndrome Scale (Kay et al., 1987), RAVLT Rey Auditory Verbal learning Test (Rey, 1964), REY Rey Auditory Verbal Learning Test (Rey, 1964), RPM Raven's Progressive Matrices for Intelligence (Raven, 1965), Stroop Color-Word Interference Test (Golden, 1978), TOL Tower of London (Shallice, 1982; Tunstall, 1999), Trails A and Trails B (Reitan, 1958; Reitan and Wolfson, 1993; Tombaugh, 2004), UCSD Performance-Based Skills Assessment-Brief Version (UPSA-Brief, Mausbach et al., 2007), Virtual Week (Rendell and Craik, 2000), WAIS III Wechsler Adult Intelligence Scale-Third Edition (Wechsler, 1997a), WASI Wechsler Abbreviated Scale of Intelligence (Wechsler, 1999), WCST Wisconsin Card Sorting Test (Kongs et al., 2000; Heaton et al., 1993; Nelson, 1976), WMS-R Wechsler Memory Scale-Revised (Wechsler, 1987), WMS III Wechsler Memory Scale-Third Edition (Wechsler, 1997b).

2010b) using the same clinical sample. Five additional articles appeared but were excluded as they were not related to the subject under study. Atance and Jackson (2009) looked at the development of future thinking in pre-school children. Altgassen et al. (2010) studied the performance of younger adults (mean age 24.73 years) with older adults (mean age 68.70 years) on a time-based PM task when social importance was varied. The performance of 100 students on an activity-based PM task under motivational conditions (prosocial and self-gain) was examined by Brandimonte et al. (2010) who asked a further 312 students to either rate responses to everyday social situations or predict their own actions in relation to them. Only Henry et al. (2007a), Twamley et al. (2008), and Xiang et al. (2010a, 2010b) presented information about people with schizophrenia and PM and the latter two also examined SF. Details of their studies are presented in Table 1.

## **4 Discussion**

### **4.1 Results of the systematic search**

The systematic search produced four studies by three research groups who were based in different continents (Xiang et al., 2010a and Xiang et al., 2010b; Twamley et al., 2008; Henry et al., 2007a). Common features of these studies included subject samples with confirmed diagnoses of schizophrenia, schizoaffective disorder or psychosis, with mean ages and durations of illness that were indicative of chronic conditions and therefore may not be of relevance for first episode psychosis. The three research groups and their participants were based in different cultures, China, America and Australia.

The studies differed in a number of ways. Twamley et al.'s (2008) study and the second study of Xiang et al. (2010b) did not have control groups. Each research group used a different set of cognitive measures, and different means of assessing PM and SF. For example, Xiang et al. (2010a, 2010b) used a computerised PM task (assessing time-, event- and activity-based

PM) coupled with interaction with a researcher; Twamley et al. (2008) used the Memory for Intentions Screening Test (time- and event-based PM, MIST, Raskin, 2004) where instructions from the researcher were carried out during the assessment session and 24 hours later and Henry et al. (2007) used Virtual Week (Rendell and Craik, 2000), a board and dice game (time- and event-based PM, regular and occasional tasks based on everyday life). Xiang et al. (2010b) assessed social functioning with sub-sections of the Chinese version of the Functional Needs Assessment (FNA-C, Dombrowski et al., 1990; Law, 1999) examining self-care and community living, with a section on social manners, while Twamley et al. (2008) used the UCSD Performance-based Skills Assessment Brief Version (UPSA-Brief, Mausbach et al., 2007) which assesses independence through role plays of community activities (e.g. making a telephone call to book an appointment).

In common with other studies of PM (e.g. Altgassen et al., 2008; Woods, et al., 2007a; Shum et al., 2004; Wang et al., 2008b), all three research groups reported deficits in PM in schizophrenia and found that these were associated with cognitive deficits including retrospective memory and executive functioning. These deficits were found with measures of time-, event- and activity-based PM. Henry et al. (2007a) proposed PM as a primary deficit of schizophrenia and Xiang et al. (2010a) concluded that PM deficits were related to retrospective memory failures and therefore the retrospective component of PM has responsibility for the deficit. This latter suggestion could fit with the findings from Bartholomeusz et al. (2011) who proposed that deterioration in hippocampal and temporal lobe functioning occurs at a later stage of illness and may result from a toxic effect of the psychosis itself, in their study of a first episode psychosis population.

Twamley et al. (2008) did find an association of PM and the ability to function socially on their measure whereas Xiang et al. (2010b) found this not to be the case for PM using the FNA-C, although outcomes on this latter measure did relate to the results on the Wisconsin Card Sorting Task (Heaton et al., 1993). As both studies did not use control groups and their

methodologies and measures were so different, any association of PM and SF remains to be confirmed.

#### **4.2 Methodological issues**

An example of the difficulty in interpreting findings for a first onset psychosis population was found in a study by Lui et al. (2011). Their first onset psychosis group (35 people, mean age 22.66years (SD 3.86)) were recruited from an early intervention service. They found impairments in PM were significant (effect size 0.08, partial eta square), particularly for event-based PM. Their computer based task considered both semantic and perceptual event- and time-based PM as well as activity-based PM. This finding of a deficit in event-based PM in first onset psychosis concurs with others who had similar results with older chronic schizophrenic groups for event-based PM (e.g. Altgassen et al., 2008) or event-based and time-based (e.g. Woods et al., 2007a; Henry et al., 2007a) but not with Shum et al. (2004) who found that people with schizophrenia have a deficit in time-based PM. Wang (2009) examined 11 studies and concluded that time-based PM involved more initiation than event-based PM (i.e. the tasks were harder so poorer scores could be expected), thus pointing to the potential for erroneous conclusions to be drawn that state one or more types of PM are stronger or weaker for some subject groups.

In another study (Chan et al., 2008) did compare a computer-based PM task with self-ratings on the Prospective and Retrospective Memory Questionnaire (PRMQ, Smith et al., 2000) and found deficits for people with schizophrenia on the former but not on the PRMQ when compared with controls. The self-reported PRMQ results related significantly to their self-reported executive deficits. Here the differences may, for example, be attributable to processes involved in using a computer more than the nature of the task and type of PM being assessed.

Uttl and Kibreab (2011) examined three self-report measures of prospective memory and concluded that they have adequate reliability but low validity and “should not be interpreted as reflecting ProM ability”, p57. The measures included the Prospective Memory Questionnaire (PMQ, Hannon et al., 1995), the PRMQ and the Comprehensive Assessment of Prospective Memory (CAPM, Chau et al., 2007). Test-retest reliabilities vary although recent developments are attempting to address this shortcoming (e.g. Virtual Week, Rendell and Craik, 2000; The Royal Prince Alfred Prospective Memory Test, Radford et al., 2011).

Examination of the methods of assessing PM highlights the difficulties of making assumptions that laboratory based controlled research has applicability in clinical contexts and visa versa (e.g. Fish et al., 2010).

#### **4.3 Implications for personal social identity and relations with others**

While disappointing, the limited findings for SF and PM in first episode psychosis provides inspiration and opportunity for further work. Early engagement in socialising activities is recommended as an aid to recovery from illness and psychological ill-health. This is of particular significance in relation to schizophrenia where apathy and a diminishing motivation to engage in activities requiring social participation is a characteristic (e.g. Faerden et al., 2010; Penn et al., 2006). Engagement in social behaviours is dependent on motivation and relevance (both personal and in relation to others, e.g. Brandimonte et al., 2010). That is, the perceived importance of remembering prospective memory tasks in the first place (Brandimonte and Ferrante, 2008; Gard et al., 2009; Jeong and Cranney, 2009; Penningroth et al., 2011). Thus, for example, it may not be that prospective forgetting of engagements leads to deterioration in social functioning but rather the individual’s social motivation and importance placed on remembering to engage in the activity in the first place.

Additionally, the impact of psychotic illness could mean that activities previously engaged in with others are no longer accessible, appropriate or

desirable. New opportunities are not always available. In these circumstances it may not just be the individual's deficits in motivation, memory or ability limiting engagement, but also the previous groups' assumptions about the individual. For example, existing social groups may assume that the individual will not be interested in continuing engagement because of what has happened to them. They may for various reasons wish to withdraw their contact with the individual who now seems (because of their change in status or health) to be associated with another grouping. Alternatively, it could be that potential new groups simply do not know about the individual's existence and possible interest.

Joining groups that are associated with the experience of psychosis, while perhaps helpful initially (so as not to feel as though you are the 'only one' to have had such an experience), may not always be the most appropriate long-term option. The literature on stigma suggests that the benefits for an individual are related to the characteristics and strength of the group (e.g. Crabtree et al., 2010; Jetten et al., 2001). In addition, what you think other people know about you can significantly affect your communication with them and with schizophrenia there may not be an awareness of behaving differently (Henry et al., 2010). Therefore, participating in associations that will be of benefit through support, if and when required, requires careful judgements and making informed choices. Supporting people to build self-esteem and confidence post first episode and providing information to guide decision-making and healthy choices is a key part of early intervention service activity. Given that people at risk of psychotic illness already have high levels of stress and poor protective factors (Pruessner et al., 2011), and their vulnerability is likely to increase should they develop schizophrenia, with associated deterioration in cognitive and social capabilities (e.g. Allott et al., 2011; Oie et al., 2011), there is a pressing need to find ways of providing this type of support at the earliest opportunity (Albert et al., 2011).

## 5 Conclusion

This review presented results of a systematic literature search and selective review of associated studies of prospective memory and social functioning in psychosis. While there is now a considerable body of evidence relating to chronic schizophrenia and memory (in particular retrospective memory) (e.g. Fitzgerald et al., 2004; Forbes et al., 2009; Pflueger et al., 2007) and social cognition and social functioning (e.g. Mancuso et al., 2011) research looking specifically at PM and social functioning in early onset psychosis is at an early stage of development. Studies, which are mainly of older people with confirmed diagnoses of schizophrenia and long durations of illness, suggest deficits in all aspects of PM (time, event and activity-based) and associate these findings with limitations in neurocognition and negative symptoms. A few studies have begun to consider the way in which PM relates to aspects of social functioning. However, there are considerable challenges to be overcome in resolving methodological issues in assessing PM and social functioning such that confidence can be assumed in the ecological validity as well as the reliability of measures that purport to examine the association between them (e.g. Wang et al., 2011).

Supporting people with strategies and technological aids to overcome difficulties related to motivation and memory and facilitating opportunities to experience new social contexts and strengthen personal social identity, should be a main thrust of psychosocial interventions in first episode psychosis services underpinned by evidence from further research (e.g. Thoits, 2011; Wong et al., 2010).

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**Conflict of Interest**

The author declares no conflicts of interest.

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## **Research Project Paper**

## **Prospective memory and social functioning in psychosis**

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## **Prospective memory and social functioning in psychosis**

Sarah Newton

### **Abstract**

Research on prospective memory (PM) has increased rapidly in recent years. However, the impact of deficits in PM on everyday functioning and in particular, social identity and functioning (SF), is less well explored, particularly in people who are experiencing, or have recently experienced, their first episode of psychosis (FEP). In this study fifteen people attending a service for first episode psychosis were compared with twenty four attending the same youth enquiry service for other reasons. Their performance was assessed on measures of cognition, prospective memory and social identity and functioning. While the psychosis group were compromised in their retrospective memory and executive function they were similar to the comparison group in their demographics, general cognitive abilities, PM and SF. The possibility that both groups were compromised in relation to PM was raised through reference to normative data for the measures used. The results suggest that further research on the relationship between PM and SF is important for the advancement of psychosocial interventions with people who have experienced their first episode of psychosis.

*Keywords:* prospective memory, social functioning, identity, psychosis

### **1. Introduction**

Remembering to carry out an activity, attend an event or do something at a particular time in the future is known as prospective memory (PM) and failures can potentially have serious consequences for an individual and their relationships with others (e.g. Wang et al., 2009). This putative

association of PM and social functioning (SF) is considered to have significance for a variety of clinical populations and the development of remedial strategies and technologies to enhance personal identity, health and wellbeing (e.g. Fish et al., 2010; Henry et al., 2010; Shamsi et al., 2011). One example where this is of interest is schizophrenia, a condition where cognitive functions can be significantly compromised (Allott et al, 2011; Bozikas and Andreou, 2011; Fett et al., 2011; Ventura et al, 2009). This study looked at PM and SF in people attending a community based early intervention service for people experiencing their first episode of psychosis.

The study of PM has gained momentum in recent years with an electronic search of PsychINFO for articles finding 674 from January 1984 to June 2011 with 401 of these published from 2005 to 2011. In parallel, interest has grown in the relationship between personal social identity, health and wellbeing (Crabtree et al., 2010; Haslam, S. et al., 2009; Jetten et al., 2010). Along with advancements in brain imaging (e.g. Basso et al., 2010; Simons et al., 2006), developments in both areas have resulted in more being known about neurological conditions (whether associated with physical or mental health) and their differential impacts on ability and performance in everyday life. Of the multitude of skills necessary for independent living, social functioning has prominence as one attribute that has implications for relationships with others and the maintenance of health and well-being.

Studies of a possible relationship between deficits in PM and limitations in SF and the consequent impact on well-being are at an early stage. Whilst there is widespread support for the theory that PM deficits may be significant and a target for rehabilitation, an examination of the literature found only one study that appeared to link PM and SF directly in schizophrenia. Xiang et al. (2010a, 2010b) did not find an association between PM and SF (they looked at functional self-care and community living skills domains of social functioning), although SF was independently associated with perseverative errors on the Wisconsin Card Sorting Task (WCST, Heaton et al., 1993; Nelson, 1976). However, methodological

issues with their study (only 1 assessment measure of PM and 1 of SF, a limited sampling of social cognition abilities and no exploration of social identity and relationships, no control group and an older population than might be expected for first episode psychosis (mean age 31.7 years)) limit the applicability of their findings in clinical contexts and may not apply to first episode psychosis population.

Xiang et al's. (2010a, 2010b) studies are not alone in having methodological limitations. Systematic reviews and meta-analyses of research in psychosis and schizophrenia have described these limitations in detail (e.g. Allott et al., 2011; Bozikas and Andreou, 2011; Fett et al., 2011; Forbes, et al., 2009; Ventura et al., 2009). They include problems with measures (e.g. questionnaires, laboratory based tasks focussed on explaining underlying cognitive and social processes, virtual reality and role play), procedures (e.g. providing focal cues may account for improved performance), the populations studied (age and types and duration of illness). Where significant results have been reported effect sizes are not always reported and when they are, are not comparable across studies due to differences in the aspects of prospective memory studied, the methods of assessment used and most of the variance remaining unexplained (Chan et al., 2008; Fett et al., 2011).

The aim of the current study was firstly to see if reported deficits in PM exist in people attending a service for first episode psychosis in comparison with people without experience of psychosis (i.e. Null hypothesis: Ho that there would not be a difference; Hypothesis 1: H1 that there would be a difference). The second aim was to examine associations between PM with SF and social group membership (i.e. social identity, e.g. Haslam, S. et al., 2009) (i.e. Ho that there would not be an association of PM and SF; H1 that there would be an association of PM and SF). The third aim was to investigate relationships between these factors and duration of untreated illness and untreated psychosis (i.e. Ho that there would not be a relationship of PM and SF with DUP; H1 that there would be an association of PM and SF with DUP).

## 2. Methods

### 2.1 Participants

Participants were volunteers from the Youth Enquiry Service (YES) based in a city in the south west of England. This shop front facility in the city centre has an open door policy for young people aged 13 to 25 years (attendance reached 6,003 young people in 2010). With a mission statement “To empower young people to live safe, healthy and positive lives”, (<http://www.thezoneplymouth.co.uk/media/downloads/25-Mission--values-2010.doc>), this service provides advice and support on matters relating to housing, benefits, sexual health, personal development, counselling, an emerging personality disorder service and an early intervention for psychosis service (EIP) (the latter being for the age range 14-38 years).

The first group were 15 people referred to the EIP service (mean age 26.47 years, range 17.92-36.25 years, SD 5.36; mean years of education 14.2 years, range 10-20 years, SD 2.81), Duration of Illness (DOI) range 2 months-6 years, Duration of Untreated Psychosis (DUP) range 0 days-8.5 months). The second, a comparison group, were 24 people attending YES, for reasons other than psychosis (mean age 22.47 years, range 18-35.25 years, SD 3.76, mean years of education 15.16 years, range 11-19 years, SD 2.48). Table 2 provides baseline cognitive data for both groups (i.e. premorbid intelligence, current general intelligence, executive function and memory).

Although less common to have a comparison group (rather than a control group) in a research study the approach was considered justified. A healthy control group may match a clinical group on age and gender but they may not match on economic and socio-demographic characteristics. These characteristics were important for this study, a main focus being on social identity and functioning. As normative data was available for the measures

used (i.e. in manuals and published papers) the results from both groups could be considered against normative 'controls'.

Exclusion criteria included being intoxicated with alcohol or substances at the time of interview, being under 18 years or over 38 years of age and having a diagnosis of psychosis in the comparison group. All participants spoke English and were resident in the United Kingdom.

## **2.2 Measures**

### *2.2.1 Demographics: development, education, family history, trauma and abuse, health, mental wellbeing*

Participants were asked a set of questions in order to provide descriptive material that could be important to consider in interpreting results (MacBeth & Gumley, 2008). These included hand dominance, developmental disorders and learning disability, education and attendance at more than one primary or senior school, experience of physical, sexual, emotional abuse or neglect, experience of significant bereavements, physical illness or trauma, family history of developmental and mental health conditions and personal use of alcohol and substances (past and current). In addition they were asked about physical and mental health conditions and medications, with specific questions about epilepsy and brain damage. The psychosis group were also asked questions about their experience of psychosis including emergent illness, diagnosis and medications in order to ascertain DOI and DUP. The DOI and DUP information was cross-checked with existing clinical file information and calculated according to the directions for use of the Nottingham Onset Schedule (Singh, 2007; Singh et al., 2005). Use of the various services at YES was noted.

Brief Symptom Inventory 18 (BSI 18, Derogatis, 2000). The BSI 18 describes nine symptom dimensions experienced in the past 7 days and produces four indices (somatic, depression and anxiety indices and global

severity index GSI). If scaled T scores of 63 or above are achieved on GSI and at least one of the indices or on at least two of the three indices then the individual is described as having met “caseness”. The BSI 18 provides normative data for community and oncology, male and female samples. The community standardisation data was used to obtain T scores in this study. The Holmes and Rahe Stress Scale (Holmes and Rahe, 1967) applies life change units to life events (adult version range 11-100 units per event) experienced over the past year and their total indicates slight risk of illness (150 or less), moderate risk of illness (150-299) or risk of illness (300 or more).

### *2.2.2 Premorbid and general intelligence, memory and executive functioning*

#### *Premorbid and general intelligence*

Premorbid and current intellectual ability was assessed using the Wechsler Test of Adult Reading (WTAR, Wechsler, 2001) and the Wechsler Abbreviated Scale of Intelligence (WASI, Wechsler, 1999). The age-standardised score from the WTAR 50 word-reading test provides an estimate of premorbid intellectual functioning. The WASI age-standardised scores on four subtests (vocabulary, similarities, block design and matrix reasoning) provide an estimate of current intellectual functioning (Verbal IQ, VIQ and Performance IQ, PIQ, and Full Scale IQ, FS-4 IQ).

#### *Executive function*

Measures of executive function included the Wisconsin Card Sorting Test (WCST, Heaton et al., 1993; Nelson, 1976) and the Trails A and Trails B (Reitan, 1958). The six category, 128 card version of the Wisconsin Card Sorting Test, WCST was used. The number of categories completed, trials to first category, number of perseverative errors, percent perseverative errors and percent conceptual level responses are presented here in line with reports in previous studies. For Trail Making A and B (Tombaugh, 2004), the time in seconds is reported for each separate component, in

addition to, the difference (B-A) which is believed to isolate the executive component of the task (Strauss et al., 2006).

### *Memory*

Memory was assessed using the Wechsler Memory Scale III Abbreviated (WMS-III Abbreviated, Wechsler, 2003) four subtests, Logical Memory I and II and Family Picture I and II and results are presented as immediate memory, delayed memory and total memory composite. The immediate-delayed discrepancy and logical memory-family pictures (auditory-verbal versus visual) differences were also examined.

### *2.2.3 Prospective Memory*

Prospective memory was assessed using the Cambridge Assessment of Prospective Memory Test (CAMPROMPT, Wilson et al., 2005) and the Prospective and Retrospective Memory Questionnaire (PRMQ, Smith et al., 2000). The CAMPROMT yields six scores on three time-based tests and three event-based tasks (maximum score for each type is 18, higher scores reflecting better prospective memory) and presence or absence of note-taking behaviour is recorded. The total scores are checked against age groups and in respect of attained full-scale IQ level to obtain a classification (impaired, borderline, poor, average, above average, very good).

The PRMQ questionnaire can be completed by an individual and someone who knows them well (e.g. a relative or family member). The 16 items include retrospective and prospective memory questions which are rated on a 5-point scale (i.e. 1=never, 5=very often). The items can be categorised according to memory subtype (short- or long-term and self- or environmentally-cued). The minimum raw score is 16 and maximum 80. Crawford et al (2003) and Crawford et al. (2006) confirmed the PRMQ has a reliable and stable tripartite factor structure (general, prospective and retrospective memory) for use with individuals and informants. The summed raw scores were converted to T scores (mean value 50 and standard deviation 10) using PRMQSCOR.EXE (participants responses) and

PRMQPROXY.EXE (proxy ratings by an informant). The higher the raw score the lower the T score, indicating poorer prospective memory.

Normalisation data is available for populations in Britain (Crawford et al., 2003, 2006), Sweden (Ronnlund et al., 2008) and Brazil (Piauilino et al., 2010).

#### *2.2.4 Social functioning*

Social functioning was assessed using three measures. The Exeter Identity Transition Scales (EXITS, Haslam, C. et al., 2008), the Global Functioning Scales, GF: Social and GF: Role (Cornblatt et al., 2007) and the Social Functioning Scale (SFS, Birchwood et al., 1990). While there are significant limitations to individual scales purporting to assess real world outcomes (social, residential and vocational) in schizophrenia, “ a consensus is possible” until such time as one instrument is developed that overcomes deficits in the others (Leifker et al., 2011).

EXITS was developed to examine group membership, social identity and the relationship with health and wellbeing (Haslam et al., 2008). EXITS considers the quality of social relationships a person has and aims to index these as capital (or number), their maintenance (or continuity) and capacity to develop new relationships. This instrument comprises subscales (each with questions on a seven-point scale (1= do not agree at all, 7=agree completely). The words “before being unwell” and “since being unwell” were included for the psychosis group and the words “before using the Zone” and “since using the Zone” for the comparison group. Four measures of identity were administered to index a person’s perception that they had access to multiple social groups. They are derived from information about the number of groups a person belongs to (multiple identities), from keeping the same memberships and relationships pre- and post-changes (social identity continuity), from establishing relationships with new groups (new identities) and the awareness a person has of their responsibilities, likes, beliefs and morals (personal identity strength). Examples of the scales and items are presented in Table 1.

Table 1 Exeter Identity Transition Scales (EXITS), indices and examples of items

| EXITS Scale                | Identity indices                                      | Items | Reliability   | Examples  |
|----------------------------|---|-------|---------------|---|
| Multiple identities        | multiple groups                                       | 4     | $\alpha=0.91$ | “Before I was unwell I was a member of lots of different groups.”                                       |
|                            | social support from multiple groups                   | 4     | $\alpha=0.93$ | “Before I was unwell I received support from members of lots of different groups.”                      |
| Social identity continuity | strength of affiliation with maintained social groups | 4     | $\alpha=0.93$ | “After being unwell, I still belong to the same group(s) that I was in before I was unwell.”            |
|                            | social support from maintained groups                 | 4     | $\alpha=0.95$ | “After being unwell, I still receive support from the same group(s) that I was in before I was unwell.” |
| New identities             | strength of affiliation with new groups               | 4     | $\alpha=0.87$ | “After being unwell, I have joined one or more new groups.”   |
|                            | social support from new groups                        | 4     | $\alpha=0.93$ | “After being unwell, I receive support from one or more new groups.”                                    |
| Personal identity strength | personal identity strength                            | 5     | $\alpha=0.70$ | “I know what I want from life.”   |

The Global Functioning Scales, GF: Social and GF: Role (Cornblatt et al., 2007) were designed to look at social and role dysfunction in the prodromal phase of psychosis. The social scale asks about peer relationships, conflict, intimate relationships and involvements with family members. Age appropriateness of social contacts, withdrawal and social isolation are also considered. The role scale includes reference to performance in school, work or the home, referenced with age appropriateness and level of independence or support required. Using the scales Cornblatt et al. (2007) found that while role functioning was found to decline prior to treatment and improve subsequently, social functioning remained stable over time and predicted later psychosis ( $p=0.002$ ) (121 prodromal and 44 normal subjects, aged 12-29years). Scores range from 1 to 10, with 10 being superior functioning and 1 extreme dysfunction. For each scale three scores are obtained; lowest level of functioning in the past month (current functioning), lowest level and highest level both reported over the past year.

The Social Functioning Scale (SFS) (Birchwood et al., 1990) has seventy-nine items rated on a 4-point scale to reveal a profile across seven domains (Withdrawal/Social Engagement-W, Interpersonal Communication-Inter, Independence-Performance-Ip, Independence Competence-Ic, Recreation-R, Prosocial-P, and Employment/Occupation-E/O). Higher scale scores (calculated from raw scores) indicate higher levels of functioning (Mean 100, SD=15). Designed with two formats, self-report and informant-report, the latter has most often been reported (Leifker et al., 2011). Raw scores can be totalled to gain an overall social functioning score. In presenting the reliability and validity data for the SFS, Birchwood et al.(1990) found that 50% of the people with schizophrenia ( $n=334$ ) had raw scores of 86-105 while the majority of the community sample ( $n=100$ ) scored 116-135 (none scored below 86 and one scored in the range 86-95) (table V1, p857). Employed people with schizophrenia had higher mean scores (111.3, SD 9.1) than unemployed (100, SD 10) in the same group, but lower than the unemployed in the community sample (112.2, SD 7.6).

Normative data was available for the instruments used and could therefore provide information regarding 'healthy controls' in relation to both the psychosis and comparison groups.

### **2.3 Procedure**

Approval to proceed with the study was received from the University of Glasgow and the National Research Ethics Service: Cornwall and Plymouth Research Ethics Committee on 29<sup>th</sup> September 2009, REC Ref.: 09/H0203/73.

Recruitment took place between November 2009 and July 2011. Posters and leaflets about the research were displayed and made available in the reception area of YES. Care Coordinators for the psychosis service had leaflets to give to potential participants they were working with. Staff at YES who work within the reception area and Care Coordinators were briefed on the process of recruitment, the arrangements for the assessment interviews and confidentiality prior to the start of the recruitment process. On completion and return of a tear off slip available in the information leaflet, the researcher contacted the potential participant by phone to arrange to talk about the study and answer any questions they may have. An appointment to sign the consent form and participate in the study was then made if they wished to proceed. At the appointment the participant had the opportunity to ask further questions before signing the consent form. The assessments were then completed at the same meeting.

All assessments were completed at YES in one of four suitable rooms, furnished with a minimum of a table and two chairs. The assessment interview lasted between two and four hours, depending on the breaks the participant wished to have. Refreshments were provided. Two people in the psychosis group required two appointments to complete the work. One person in the psychosis group did not complete initially due to their time constraints and were then not well enough to take part in a subsequent session (their information was not included in the data analysis).

Approximately one hour per participant was spent gathering additional information (e.g. about diagnosis, DOI and DUP) from the clinical file of the psychosis participants by the researcher and an undergraduate research assistant.

At the end of the assessment session participants were asked to give the PRMQ Informant form and the SFS Relatives form to someone who knew them well with an addressed envelope to be returned to the researcher at YES. Some of these were returned with proportionally more coming back from the psychosis group. In addition, they were given a £10 voucher to thank them that could be exchanged at high street shops for a variety of goods (e.g. food, clothes, music, books). Their details were also put into a draw for further vouchers at the end of the study.

## **2.4 Data analysis**

Data were analysed using SPSS for Windows (Version 17) with reference to Field (2009). Demographic information with categorical data was compared using Chi-square where cell counts were above 5, otherwise percentages were presented. Shapiro-Wilk test was applied and non-parametric tests used where there were significant deviations from normality (Mann–Whitney for CAMPROPT, Trails A and B, WCST, GF: Social and GF: Role Scales and EXITS) and parametric tests were used when data was normally distributed (T-Test for Independent samples WMS III Abbreviated, WASI, PRMQ, WTAR, SFS, BSI, Holmes and Rahe Stress Scale). Both split file for the two groups and whole sample examinations for normality were completed. Prior to running the comparisons between the two groups data was converted to z scores (standard  $z = 1.96$ ) for the CAMPROPT, PRMQ, Global Functioning Scales, SFS and WMS III Abbreviated to check for outliers. None were found to be equal to or above  $z = 3.29$ . Effect sizes were calculated for significant findings and non-significant where differences did not reach significance at  $p < .05$ . Bivariate correlations were completed to examine associations across and between cognitive and social measures. Spearman's rho is reported as the correlations combined data from normal

and non-normal score distributions. All tests were 2-tailed and significance applied at  $p < .05$  with equal variances assumed.

### 3. Results

#### 3.1 Psychosis and comparison group profiles

##### 3.1.1 Demographics

The demographic and clinical profiles of the two groups are presented in Table 2.

The psychosis group (primary diagnoses reported by participants and recorded in files as psychosis (11), schizophrenia (3), Asperger Syndrome (1)) differed from the comparison group in age (Mann-Whitney  $U=93.50$ ,  $z=-2.498$ ,  $p=.013$ ), gender (significantly more males, 60%:16.67%,  $\chi^2=7.80$ ,  $p<.05$ ), years of education (fewer with more than 14 years, psychosis group 40%:50% comparison group, more with multiple changes of schools 86.67%:79.17%), family histories of developmental and mental health disorders (more than in the comparison group, family developmental disorder history 33.33%:20.83%, family mental health disorder history 93.33%:75%), past use of alcohol and substances (more than in the comparison group alcohol 46.67%:25%, substances 60%:45.83%), incidence of head/brain injury with and without loss of consciousness<sup>2</sup> (more than in the comparison group 53.33%:20.83%) and risk through stress (more in the high risk category 20%:12.50%) (Holmes and Rahe, 1967). In addition, the psychosis group had comparable scores for verbal IQ (VIQ), lower scores for performance IQ (PIQ) and lower full scale (FS-4 IQ) on the Wechsler Abbreviated Scale of Intelligence (WASI, Wechsler, 1999) (see Table 2) but these were not significantly different, nor were the results for premorbid IQ.

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<sup>2</sup> Head/brain injury with and without loss of consciousness included hits/bangs to the head through accident or violence, stroke and congenital malformation.

Table 2 Demographic and clinical profiles of the psychosis and comparison groups

| Measure   | Psychosis n=15      |             |      | Comparison n=24 |             |      |
|---|---------------------|-------------|------|-----------------|-------------|------|
|   | mean                | range       | SD   | Mean            | range       | SD   |
| Age (years)   | 26.47               | 17.92-36.25 | 5.36 | 22.47           | 18.00-35.25 | 3.76 |
| Education (years)                                     | 14.20               |             | 2.81 | 15.16           |             | 2.48 |
| Duration of Illness                                   | 2 months - 6 years  |             |      |                 |             |      |
| Duration of Undiagnosed Psychosis DUP                 | 0 days - 8.5 months |             |      |                 |             |      |
|   | <hr/>               |             |      | <hr/>           |             |      |
|   | n                   | %           |      | n               | %           |      |
| Gender (male)*  | 9                   | 60          |      | 4               | 16.67       |      |
| <i>Development</i>                                    |                     |             |      |                 |             |      |
| Developmental disorders (LD/Autism/ADHD/dyslexia etc) | 5                   | 33.33       |      | 8               | 33.33       |      |
| Family history developmental disorders                | 5                   | 33.33       |      | 5               | 20.83       |      |
| Family history mental health disorders                | 14                  | 93.33       |      | 18              | 75          |      |
| <i>Education</i>                                      |                     |             |      |                 |             |      |
| Multiple schools                                      | 13                  | 86.67       |      | 19              | 79.17       |      |
| Education up to 14 years duration                     | 9                   | 60.00       |      | 12              | 50.00       |      |
| Education beyond 14 years duration                    | 6                   | 40.00       |      | 12              | 50.00       |      |
| <i>Lifestyle</i>                                      |                     |             |      |                 |             |      |
| Past alcohol abuse                                    | 7                   | 46.67       |      | 6               | 25.00       |      |
| Past substance abuse                                  | 9                   | 60.00       |      | 11              | 45.83       |      |
| <i>Life events</i>                                    |                     |             |      |                 |             |      |
| Significant bereavement                               | 12                  | 80.00       |      | 18              | 75.00       |      |
| Significant physical illness or life event            | 12                  | 80.00       |      | 19              | 79.17       |      |
| Abuse   | 9                   | 60.00       |      | 18              | 75.00       |      |
| <i>Health status</i>                                  |                     |             |      |                 |             |      |
| Current physical health condition                     | 7                   | 46.67       |      | 10              | 41.67       |      |
| epilepsy  | 0                   | 0.00        |      | 3               | 12.25       |      |
| Head/brain injury                                     | 5                   | 33.33       |      | 2               | 8.33        |      |
| Head/brain injury with loss of consciousness          | 3                   | 20.00       |      | 3               | 12.50       |      |
| Psychosis/schizophrenia <sup>1</sup>                  | 15                  | 100.00      |      | 0               | 0.00        |      |
| Anxiety   | 3                   | 20.00       |      | 6               | 25.00       |      |
| Depression  | 6                   | 40.00       |      | 8               | 33.33       |      |
| Bipolar Disorder                                      | 0                   | 0.00        |      | 1               | 4.16        |      |
| Other diagnosis                                       | 2                   | 13.33       |      | 8               | 33.33       |      |
| Mental Health medications (excludes antipsychotics)   | 13                  | 86.67       |      | 8               | 33.33       |      |
| Antipsychotic medications                             | 12                  | 80.00       |      | 2               | 8.33        |      |
| <i>Clinical risk</i>                                  |                     |             |      |                 |             |      |
| BSI 'caseness' met                                    | 9                   | 60.00       |      | 13              | 54.17       |      |
| Holmes and Rahe                                       |                     |             |      |                 |             |      |
| Stressful life events past year                       |                     |             |      |                 |             |      |
| 'Slight risk'   | 7                   | 46.67       |      | 9               | 37.50       |      |
| 'Moderate risk'                                       | 5                   | 33.33       |      | 12              | 50.00       |      |
| 'High risk'   | 3                   | 20          |      | 3               | 12.50       |      |

P<.05\*

Notes: <sup>1</sup>= primary or secondary diagnosis DSM 1V, n= number of participants in this category, Head/brain injury with and without loss of consciousness included hits/bangs to the head through accident or violence, a stroke and congenital malformation.

Relative to the psychosis group, the comparison group had similar rates of diagnoses of developmental disorders (comparison group 33.33%:33.33% psychosis group), experiences of significant bereavements (75%:80%), physical illness or traumatic life events (79.17%:80%), physical health conditions (41.67%:46.67%) and self-reported anxiety (25%:20%) and depression (37.49%:40%) including medications for these conditions. A greater number than in the psychosis group reported past abuse (75%:60%), epilepsy (12:25%:0%), and psychological ill health in the category of 'other' (33.33%:13:33%) which included examples of Obsessional Compulsive Disorder, Post Traumatic Stress Syndrome, eating disorders and emotional difficulties, including emerging personality disorders. They also had a higher percentage in the moderate and high risk groups for psychological 'caseness' than the psychosis group (62:50%:53.33%) (i.e. more reaching criterion for experiencing somatic illness, depression and anxiety than in the comparison group) (Derogatis, 2000).

### 3.1.2 Cognitive ability

Results of comparisons of the two groups of participants using T-Tests and Mann-Whitney are presented in Table 3. Participants from the psychosis group performed less well on the WMS-III Abbreviated immediate ( $M=82.87$ ,  $SD=15.38$ ,  $SE=3.97$ ) and delayed ( $M=99.71$ ,  $SD=14.82$ ,  $SE=3.83$ ) memory tasks. This difference was significant for both immediate memory  $t(37)=3.099$ ,  $p<.05$ ,  $r=.45$  and delayed memory  $t(37)=3.367$ ,  $p<.05$ ,  $r=.48$  and represents a medium to large effect size. The composite score reflected these results ( $M=81.87$ ,  $SD=14.93$ ,  $SE=3.85$ ,  $t(37)=3.41$ ,  $p<.05$ ,  $r=.49$ ).

The means for the psychosis group immediate ( $M=82.87$ ), delayed ( $M=83.87$ ) and total memory composites ( $M=81.87$ ) were comparable, but better than those reported as a schizophrenia normalisation sample in the WMS III Abbreviated manual (pp64-66) (78.00 immediate, 80.50 delayed, 77.90 total). Interestingly they were more similar to those for the

normalisation sample with left temporal lobe epilepsy (83.70 immediate, 84.20 delayed and 82.60 total) (manual, p 59).

Although there was only one person in the psychosis group who had a significant discrepancy between immediate and delayed memory, 53.33% in the psychosis group and 41.67% in the comparison group had a discrepancy in their scores between logical memory and family pictures subtests (with a trend towards performing better on the former).

The psychosis group (*Mdn* 84.00) differed significantly from the comparison group (*Mdn* 71.60) in their performance on Trails B,  $U=111.50$ ,  $z=-1.978$ ,  $p<.05$ ,  $r=-0.317$ , this being a medium effect size. Small to medium effect sizes were also found for WCST categories completed, raw perseverative errors, percent conceptual level responses and Trails A, although none reached significance.

### **3.2 Performance on measures of prospective memory**

Results of performance on measures of prospective memory, CAMPROMPT and PRMQ are presented in Table 4.

#### *3.2.1 Comparison with normative data for the prospective memory measures*

Comparison against normative data in the manual (Wilson et al., 2005), showed that the mean scores for the psychosis and comparison groups were in the normal range. For time-based PM the normative group mean score was 12.90 (psychosis group=13.53; comparison group=15.08); for event-based PM the normative group mean score was 14.28 (psychosis group=13.73; comparison group=15.04) and the mean total for normative group was 27.18 (psychosis group=27.27; comparison group=30.13). Fifty eight percent of the normative group wrote partial or full notes while 66.67% of the psychosis group and 70.83% of the comparison group did so. The slightly higher achievements of both groups in this study could relate to their younger age in comparison with the wider range of ages in the

normalisation groups (16 years to over 66 years). The CAMPROMPT recognises deterioration in PM over time in stratifying classifications by age as well as IQ.

Comparisons of the PRMQ data were made with the data provided by Smith et al. (2000) and Crawford et al. (2003, 2006). The mean T scores for the psychosis group (36.93 for prospective and 39.93 for retrospective elements) and the comparison group (36.83 for prospective and 41.92 for the retrospective elements) were almost 1.5 and 1 standard deviation below the mean respectively. The true scores were extracted (Crawford et al., 2006, table 3, p92) and differences between prospective and retrospective scores considered using Crawford et al. (2006, table 5, p93). These were not significant at  $p < .05$ .

### *3.2.2 Comparison of group performances on prospective memory and relationships with cognitive measures*

Mann-Whitney comparison of the groups on CAMPROMT did not reveal a significant difference on time-based ( $U=131.50$ ,  $z=-1.459$ , *ns*,  $r=-.23$ ), event-based ( $U=132.50$ ,  $z=-1.413$ , *ns*,  $r=-.23$ ) or total scores ( $U=120.00$ ,  $z=-1.745$ , *ns*,  $r=-.28$ ). However, there was a small to medium effect size with the strongest being for the total score.

T-test examination of the PRMQ results between groups was not significant for prospective items  $t(37) = -.025$ , *ns*,  $r=.13$ ), retrospective items ( $t(37)=.515$ , *ns*,  $r= .08$ ) or the total score ( $t(37)=.269$ , *ns*,  $r= .04$  ). However, treating the groups as one sample ( $n=39$ ) using a paired-samples T-test, produced a significant difference between attained T scores on the prospective and retrospective elements of the PRMQ,  $t(39)$ ,  $-3.86$ ,  $p=.000$ , indicating a worse performance of prospective memory. An additional comparison was made of the proxy T scores ( $n=20$ ) and no difference was found  $t(19)$ ,  $-1.344$ ,  $p=.195$ . There was a significant difference in the T scores of the relatives for prospective memory items when the

Table 3 Performance on measures of premorbid and current intelligence, memory and executive functioning

|                                   | Psychosis        |                     |           |            | Comparison       |                     |           |            | Inferential statistics |           |                |          |
|-----------------------------------|------------------|---------------------|-----------|------------|------------------|---------------------|-----------|------------|------------------------|-----------|----------------|----------|
|                                   | <i>M</i>         | <i>SD</i>           | <i>SE</i> |            | <i>M</i>         | <i>SD</i>           | <i>SE</i> |            | <i>t</i>               | <i>df</i> | <i>p value</i> | <i>r</i> |
| <i>Premorbid intelligence</i>     | n=15             |                     |           |            | n=24             |                     |           |            |                        |           |                |          |
| WTAR raw score                    | 38.27            | 7.99                | 2.06      |            | 40.42            | 5.68                | 1.16      |            | .983                   | 37        | .332           | .160     |
| WTAR standard score               | 106.33           | 13.30               | 3.44      |            | 111.29           | 10.18               | 2.08      |            | 1.314                  | 37        | .197           | .211     |
| <i>Current intelligence</i>       | n=15             |                     |           |            | n=24             |                     |           |            |                        |           |                |          |
| WASI VIQ                          | 102.40           | 13.17               | 3.40      |            | 102.83           | 13.68               | 2.79      |            | .098                   | 37        | .923           | .016     |
| WASI PIQ                          | 102.73           | 15.20               | 3.93      |            | 107.67           | 11.68               | 2.38      |            | 1.142                  | 37        | .261           | .185     |
| WASI FS4IQ                        | 102.87           | 11.71               | 3.02      |            | 105.88           | 13.27               | 2.70      |            | .720                   | 37        | .476           | .118     |
| <i>Memory</i>                     | n=15             |                     |           |            | n=24             |                     |           |            |                        |           |                |          |
| WMS III Abbreviated immediate     | 82.87            | 15.38               | 3.97      |            | 99.08            | 16.21               | 3.31      |            | 3.099                  | 37        | .004**         | .454     |
| WMS III Abbreviated delayed       | 83.37            | 14.82               | 3.83      |            | 99.71            | 13.96               | 2.85      |            | 3.367                  | 37        | .002**         | .484     |
| WMS III Abbreviated total         | 81.87            | 14.93               | 3.85      |            | 98.71            | 15.05               | 3.07      |            | 3.410                  | 37        | .002**         | .489     |
|                                   | <i>Mean rank</i> | <i>Sum of Ranks</i> | <i>M</i>  | <i>Mdn</i> | <i>Mean rank</i> | <i>Sum of Ranks</i> | <i>M</i>  | <i>Mdn</i> | <i>M-W U</i>           | <i>z</i>  | <i>p value</i> | <i>r</i> |
| <i>Executive function</i>         | n=15             |                     |           |            | n=23             |                     |           |            |                        |           |                |          |
| WCST categories completed         | 16.33            | 245.00              | 4.07      | 6.00       | 21.57            | 496.00              | 5.30      | 6.00       | 125.00                 | -1.722    | .085           | .279     |
| WCST trials to first category     | 21.07            | 316.00              | 37.13     | 11.00      | 18.48            | 425.00              | 17.61     | 11.00      | 149.00                 | -0.732    | .464           | .118     |
| WCST raw perseverative errors     | 23.27            | 349.00              | 18.13     | 14.00      | 17.04            | 392.00              | 11.09     | 7.00       | 116.00                 | -1.695    | .090           | .275     |
| WCST % perseverative errors       | 21.83            | 327.00              | 14.87     | 11.00      | 17.98            | 413.00              | 11.00     | 9.00       | 137.50                 | -1.049    | .294           | .170     |
| WCST % conceptual level responses | 15.57            | 233.50              | 54.93     | 60.00      | 22.07            | 507.50              | 72.17     | 80.00      | 113.50                 | -1.763    | .078           | .286     |
| Trails A (seconds)                | 20.80            | 312.00              | 44.73     | 43.00      | 19.50            | 468.00              | 33.83     | 31.00      | 168.00                 | -1.265    | .206           | .203     |
| Trails B (seconds)                | 24.57            | 368.50              | 96.13     | 84.00      | 17.15            | 411.50              | 74.57     | 71.60      | 111.50                 | -1.978    | .048*          | .317     |
| Trails B-A (seconds)              | 22.63            | 339.50              | 51.40     | 41.00      | 18.35            | 440.50              | 40.74     | 34.00      | 140.50                 | -1.141    | .254           | .183     |

\* $p < .05$  \*\* $p < .01$  Note: *M* = mean, *SD* = Standard Deviation, *SE* = Standard Error Mean, *t* = T-test parametric test with independent samples, *df* = degrees of freedom, *p* = significance level (2-tailed), M-W = Mann-Whitney nonparametric test, M-W *U* = M-W test statistic, *z* = z-score is the value of an observation in SD units ( $M=0$ ,  $SD=1$ ), *r* = effect size where .3 is medium and  $\geq .5$  large.

Table 4 Performance on measures of prospective memory: CAMPROMPT and PRMQ

|                  | Psychosis        |                     |           |            | Comparison       |                     |           |            | Inferential statistics |           |                |          |
|------------------|------------------|---------------------|-----------|------------|------------------|---------------------|-----------|------------|------------------------|-----------|----------------|----------|
|                  | <i>M</i>         | <i>SD</i>           | <i>SE</i> |            | <i>M</i>         | <i>SD</i>           | <i>SE</i> |            | <i>t</i>               | <i>df</i> | <i>p value</i> | <i>r</i> |
| <i>PRMQ</i>      | n=15             |                     |           |            | n=24             |                     |           |            |                        |           |                |          |
| prospective      | 36.93            | 13.07               | 3.37      |            | 36.83            | 11.28               | 2.30      |            | -.025                  | 37        | .980           | .13      |
| retrospective    | 39.93            | 11.34               | 2.93      |            | 41.92            | 11.91               | 2.43      |            | .515                   | 37        | .610           | .08      |
| total            | 38.20            | 12.58               | 3.25      |            | 39.29            | 12.18               | 2.49      |            | .269                   | 37        | .789           | .04      |
|                  | <i>Mean rank</i> | <i>Sum of ranks</i> | <i>M</i>  | <i>Mdn</i> | <i>Mean rank</i> | <i>Sum of ranks</i> | <i>M</i>  | <i>Mdn</i> | <i>M-W U</i>           | <i>z</i>  | <i>p value</i> | <i>r</i> |
| <i>CAMPROMPT</i> | n=15             |                     |           |            | n=24             |                     |           |            |                        |           |                |          |
| Time             | 16.77            | 251.50              | 13.53     | 14.00      | 22.02            | 528.50              | 15.08     | 17.00      | 131.50                 | -1.459    | .145           | .23      |
| Event            | 16.83            | 252.50              | 13.73     | 14.00      | 21.98            | 527.50              | 15.04     | 16.00      | 132.50                 | -1.413    | .158           | .23      |
| Total            | 16.00            | 240.00              | 27.27     | 28.00      | 22.50            | 540.00              | 30.13     | 31.00      | 120.00                 | -1.745    | .081           | .28      |
| Notes written %  |                  |                     | 66.66     |            |                  |                     | 70.83     |            |                        |           |                |          |

\* $p < .05$  \*\* $p < .01$

Note: *M* = mean, *SD* = Standard Deviation, *SE* = Standard Error Mean, *t* = T-test parametric test with independent samples, *df* = degrees of freedom, *p* = significance level (2- tailed), M-W = Mann-Whitney nonparametric test, M-W *U* = M-W test statistic, *z* = z-score is the value of an observation in SD units ( $M=0$ ,  $SD=1$ ), *r* = effect size where .3 is medium and  $\geq .5$  large.

psychosis (n=9) and comparison groups (n=11) were examined  $t(18) 3.523$ ,  $p=.002$ ), indicating lower ratings of prospective memory by people who knew the individuals in the psychosis group well. Using Spearman's correlation coefficient associations were found between cognitive measures (see Table 7). Specifically, better performance on intellectual ability (WASI FS4IQ) was associated with better performances on the CAMPRMPT  $r=.44$ ,  $p<.01$ ; WMS 111 Abbreviated  $r=.511$ ,  $p<.01$ ; Trails B  $r=-.597$ ,  $p<.01$ ; WCST raw perseverative errors  $r=-.587$ ,  $p<.01$ ; WCST number of categories completed  $r=.321$ ,  $p<.05$  and WCST percent conceptual level responses  $r=.579$ ,  $p<.01$ . CAMPRMPT Total score and WMS 111 Abbreviated total score were also related ( $r=.407$ ,  $p<.05$ ).

### **3.3 Performance on measures of social identity and functioning**

Performance results on SFS and GF:Social and GF:Role are presented in Table 5 and the results for EXITS are in Table 6.

#### *3.3.1 Comparison with normative data for the social measures*

The SFS mean raw scores of the two groups were not significantly different and did not match the normative information for this scale (i.e. 50% people with schizophrenia are expected to score 86-105 and most of the non-schizophrenic community sample to score 116-135, Birchwood et al., 1990).

Comparison of the GF: Social and Role Scales results with the control and prodromal for psychosis groups used to normalise the scales, suggests that the results for groups in this study were between the normative groups of Cornblatt et al. (2007). Both of the groups in this study did express low social and role functioning during the past year with the psychosis group reporting the lowest on a par with the prodromal for psychosis normative group of Cornblatt et al. (2007).

Table 5 Performance on social measures: Social Functioning Scale and Global Functioning Social Scale and Role Scale

|                                   | Psychosis        |                     |           | Comparison |                  |                     | Inferential statistics |            |            |          |          |          |
|-----------------------------------|------------------|---------------------|-----------|------------|------------------|---------------------|------------------------|------------|------------|----------|----------|----------|
|                                   | <i>M</i>         | <i>SD</i>           | <i>SE</i> | <i>M</i>   | <i>SD</i>        | <i>SE</i>           | <i>t</i>               | <i>df</i>  | <i>p</i>   | <i>r</i> |          |          |
| <hr/>                             |                  |                     |           |            |                  |                     |                        |            |            |          |          |          |
| <i>Social Functioning Scales</i>  | n=15             |                     |           | n=13       |                  |                     |                        |            |            |          |          |          |
| Raw score total                   | 125.40           | 22.11               | 5.71      | 126.69     | 30.40            | 8.43                | .130                   | 26         | .898       | .03      |          |          |
| Withdrawal (n=14 psychosis)       | 98.86            | 11.54               | 3.09      | 96.65      | 11.34            | 3.14                | -.500                  | 25         | .622       | .10      |          |          |
| Interpersonal communication       | 120.53           | 19.08               | 4.93      | 124.15     | 16.35            | 4.54                | .535                   | 26         | .597       | .10      |          |          |
| Independence performance          | 105.53           | 12.25               | 3.16      | 107.69     | 15.07            | 4.18                | .418                   | 26         | .679       | .08      |          |          |
| Independence competence           | 103.83           | 12.85               | 3.32      | 104.50     | 11.98            | 3.32                | .141                   | 26         | .889       | .03      |          |          |
| Recreation                        | 115.57           | 14.98               | 3.87      | 116.46     | 16.64            | 4.62                | .150                   | 26         | .882       | .03      |          |          |
| Prosocial                         | 116.33           | 10.95               | 2.83      | 115.00     | 13.47            | 3.74                | -.289                  | 26         | .775       | .06      |          |          |
| Employment/occupation             | 104.87           | 13.25               | 3.42      | 103.54     | 14.78            | 4.10                | -.251                  | 26         | .804       | .05      |          |          |
|                                   | <i>Mean rank</i> | <i>Sum of Ranks</i> | <i>M</i>  | <i>Mdn</i> | <i>Mean rank</i> | <i>Sum of Ranks</i> | <i>M</i>               | <i>Mdn</i> | <i>M-W</i> | <i>z</i> | <i>p</i> | <i>r</i> |
| <hr/>                             |                  |                     |           |            |                  |                     |                        |            |            |          |          |          |
| <i>Global Functioning: Social</i> | n=15             |                     |           | n=23       |                  |                     |                        |            |            |          |          |          |
| Highest past year                 | 18.43            | 276.50              | 7.67      | 8.00       | 20.20            | 464.50              | 8.17                   | 8.00       | 156.50     | -.502    | .616     | .08      |
| Current (lowest past month)       | 18.17            | 272.50              | 7.40      | 8.00       | 20.37            | 468.50              | 7.87                   | 8.00       | 152.50     | -.622    | .534     | .10      |
| Lowest past year                  | 17.47            | 262.00              | 5.33      | 5.00       | 20.83            | 479.00              | 6.00                   | 8.00       | 142.00     | .922     | .357     | .15      |
| <i>Global Functioning: Role</i>   |                  |                     |           | n=22       |                  |                     |                        |            |            |          |          |          |
| Highest past year                 | 17.43            | 261.50              | 7.53      | 8.00       | 20.07            | 441.50              | 7.73                   | 8.00       | 141.50     | -.922    | .425     | .15      |
| Current (lowest past month)       | 18.37            | 275.50              | 7.53      | 8.00       | 19.43            | 427.50              | 7.64                   | 8.00       | 155.50     | -.316    | .752     | .05      |
| Lowest past year                  | 18.50            | 277.50              | 5.60      | 6.00       | 19.34            | 425.50              | 6.09                   | 8.00       | 157.50     | -.238    | .812     | .04      |

\* $p < .05$  \*\* $p < .01$

Note: *M* = mean, *SD* = Standard Deviation, *SE* = Standard Error Mean, *t* = T-test parametric test with independent samples, *df* = degrees of freedom, *p* = significance level (2- tailed), M-W = Mann-Whitney nonparametric test, M-W *U* = M-W test statistic, *z* = z-score is the value of an observation in SD units (*M*=0, *SD*=1), *r* = effect size where .3 is medium and  $\geq .5$  large.

Table 6 Performance on social identity measure: Exeter Identity Transition Scales

|  | Psychosis n=15 |              |      |      | Comparison n=15 |              |      |      | Mann-Whitney |       |         |     |
|--|----------------|--------------|------|------|-----------------|--------------|------|------|--------------|-------|---------|-----|
|  | Mean rank      | Sum of Ranks | M    | Mdn  | Mean rank       | Sum of Ranks | M    | Mdn  | M-W U        | z     | p value | r   |
| <i>Identity measures</i>                           |                |              |      |      |                 |              |      |      |              |       |         |     |
| Multiple identities                                | 19.77          | 296.50       | 4.68 | 5.50 | 11.23           | 168.50       | 2.98 | 2.75 | 48.50        | -2.67 | .008**  | .49 |
| Social identity continuity <sup>1</sup>            | 12.90          | 193.50       | 2.43 | 2.50 | 17.25           | 241.50       | 3.67 | 4.13 | 73.50        | -1.38 | .167    | .26 |
| New identities <sup>1</sup>                        | 14.40          | 216.00       | 3.62 | 3.50 | 15.64           | 219.00       | 3.82 | 3.88 | 96.00        | -.394 | .694    | .07 |
| Personal identity strength                         | 16.17          | 242.50       | 5.40 | 5.60 | 14.83           | 222.50       | 5.19 | 5.20 | 102.50       | -.417 | .677    | .08 |
| <i>Social support</i>                              |                |              |      |      |                 |              |      |      |              |       |         |     |
| Social support from multiple groups                | 19.20          | 288.00       | 4.23 | 4.25 | 11.80           | 177.00       | 2.67 | 2.50 | 57.00        | -2.31 | .021**  | .42 |
| Social support from maintained groups <sup>2</sup> | 13.30          | 199.50       | 2.52 | 2.00 | 15.88           | 206.50       | 3.48 | 4.50 | 79.50        | -.845 | .398    | .16 |
| Social support from new groups <sup>1</sup>        | 14.83          | 222.50       | 3.60 | 3.00 | 15.18           | 212.50       | 3.71 | 3.13 | 102.50       | -.109 | .913    | .02 |

\*p<.05 \*\*p<.01

Note: M = mean, p value = significance level (2- tailed), M-W= Mann-Whitney nonparametric test, M-W U= M-W test statistic, z = z-score is the value of an observation in SD units (M=0, SD=1), r = effect size where .3 is medium and ≥.5 large, <sup>1</sup> = n of 14 in the comparison group, <sup>2</sup> n of 13 in the comparison group.

### 3.3.2 Comparison of group performances on social measures

Mann-Whitney comparison of the groups on GF:Social and GF:Role showed no significant differences, the results ranging from GF:Social, Lowest (past year)  $U=142.00$ ,  $z=-.922$ , *ns*,  $r=-.15$  to GF:Role, Current (past month)  $U=155.50$ ,  $z=-.316$ , *ns*,  $r=-.05$ . T-Test for independent samples was used to compare the groups on SFS subscales and the total raw score and no significant differences were found. These results ranged from SFS: Interaction scale  $t(26)=.535$ , *ns*,  $r=.10$  to SFS Total raw score  $t(26)=.130$ , *ns*,  $r=.03$ .

Non-parametric tests comparing the two groups on the EXITS subscales were significant for Multiple Identities  $U=48.50$ ,  $z=-2.67$ ,  $p<.01$ ,  $r=-.49$  and Social Support from Multiple Groups  $U=57.00$ ,  $z=-2.31$ ,  $p<.01$ ,  $r=-.42$ . Thus the psychosis group were linked with a greater number of groups and received more social support from them than the comparison group. Their lower social identity continuity than the comparison group could reflect their experiences of psychosis and consequent disruption and change to their lives. The significance of the multiple groups and social support for the psychosis group may reflect the intense intervention for social engagement (through YES) and may also reflect the groups recognised need (personal insight) for such support.

### 3.4 Correlations of cognitive and social measures

Correlational analysis was conducted to determine whether there were relationships between prospective memory and social functioning measures and the results are presented in Table 7.

Significant relationships were found between PRMQ total and SFS raw total score ( $r=.401$ ,  $p<.05$ ). When the groups were considered the relationship with the SFS appeared to be significant for the comparison ( $r=-.577$ ,  $p<.01$ ) but not for the psychosis group indicating that better performance on both

Table 7 Spearman's rho correlations of performance on cognitive and social measures

|                                   | WASI    | Trails B | WCST    | WCST    | WCST   | WMS   | CAMPROMT | PRMQ  | SFS    | GF:Social | GF: Role | EXITS |      |      |     |  |  |
|-----------------------------------|---------|----------|---------|---------|--------|-------|----------|-------|--------|-----------|----------|-------|------|------|-----|--|--|
|                                   |         |          |         |         |        |       |          |       |        |           |          | MI    | SIC  | NI   | PIS |  |  |
| WASI FS4IQ                        | 1       |          |         |         |        |       |          |       |        |           |          |       |      |      |     |  |  |
| Trails B                          | -.597** | 1        |         |         |        |       |          |       |        |           |          |       |      |      |     |  |  |
| WCST categories completed         | .321*   | -.204    | 1       |         |        |       |          |       |        |           |          |       |      |      |     |  |  |
| WCST raw perseverative errors     | -.587** | .253     | -.706** | 1       |        |       |          |       |        |           |          |       |      |      |     |  |  |
| WCST conceptual level responses % | -.579** | -.328*   | .805**  | -.880** | 1      |       |          |       |        |           |          |       |      |      |     |  |  |
| WMS                               | .511**  | -.654**  | .252    | -.338*  | .413** | 1     |          |       |        |           |          |       |      |      |     |  |  |
| CAMPROMT                          | .444**  | -.0291   | .068    | -.334*  | .296   | .407* | 1        |       |        |           |          |       |      |      |     |  |  |
| PRMQ                              | .008    | .085     | -.039   | .007    | -.026  | -.023 | .265     | 1     |        |           |          |       |      |      |     |  |  |
| SFS                               | -.064   | .133     | .008    | .146    | .058   | .014  | -.021    | .401* | 1      |           |          |       |      |      |     |  |  |
| GF:Social current                 | .054    | .144     | -.040   | .007    | .145   | .078  | .225     | .104  | .477*  | 1         |          |       |      |      |     |  |  |
| GF:Role current                   | -.026   | -.030    | -.049   | .094    | -.022  | .114  | .222     | .307  | .559** | .669**    | 1        |       |      |      |     |  |  |
| EXITS Multiple identities         | -.142   | .240     | -.116   | .116    | -.208  | -.244 | -.081    | -.310 | .124   | -.056     | .212     | 1     |      |      |     |  |  |
| EXITS Social identity continuity  | .311    | -.470*   | .264    | -.356   | .399*  | .413* | .085     | -.031 | .192   | .066      | .210     | -.134 | 1    |      |     |  |  |
| EXITS New identities              | .462*   | -.184    | .231    | -.388*  | .343   | .070  | .172     | .014  | .270   | .217      | -.012    | -.151 | .068 | 1    |     |  |  |
| EXITS Personal identity strength  | .057    | .025     | .068    | .148    | .014   | -.068 | -.053    | .206  | .700** | .209      | .551**   | .319  | .050 | .082 | 1   |  |  |

\* $p < .05$  \*\* $p < .01$  Note: EXITS=Exeter Identity Transitions Scales, MI=Multiple identities, SIC= Social Identity Continuity, NI= New identities, PIS =Personal identity strength, CAMPROMPT=Cambridge Prospective Memory Test, GF= Global Functioning, PRMQ=Prospective and Retrospective Memory Questionnaire, SFS= Social Functioning Scale, WASI= Wechsler Abbreviated Scales of Intelligence, WCST= Wisconsin Card Sorting Test, WMS= Wechsler Memory Scales III Abbreviated, Total scaled scores used for CAMPROMPT, PRMQ, WASI and WMS III Abbreviated, raw score total used for WCST perseverative errors and SFS, current level of function used for GF: Social and GF: Role.

measures was associated for the comparison group. Additional associations were WMS III Abbreviated total and Social Identity Continuity Scale ( $r=.413, p<.01$ ) and Trails B and the Social Identity Continuity Scale ( $r=-.470, p<.01$ ). Using a different measure of social functioning (Functional Needs Assessment FNA-C, Dombrowski et al., 1990; Law, 1999) Xiang (2010b) found an association of social functioning with executive functioning, as measured by the perseverative errors on the WCST. A similar correlation was completed with the three social measures and a significant association found between the WCST raw perseverative errors and EXITS New identities  $r=-.388, p<.01, n=29$ . No associations were found for the SFS and GF: Social or GF: Role subscales with the WCST raw perseverative errors.

## **4. Discussion**

### **4.1 Review**

This study examined prospective memory in a sample who have experienced first episode psychosis, the association with social identity and functioning and the relationship of these factors with duration of illness and psychosis.

In relation to the first aim of this study, results did not confirm a difference in the prospective memory or social functioning of people attending a service for first episode psychosis when compared with a comparison group attending the same facility for other reasons. When the groups were combined a significant difference was found with greater self-reports of prospective memory difficulties than retrospective difficulties. People who knew the participants in the psychosis group placed more emphasis on PM failures than relatives or friends of the comparison group. Although caution should be exercised with small numbers in the comparisons, this latter finding does echo that of Smith et al (2000) for relatives of people with Alzheimer's and is suggestive of the greater frustration carers may

experience when prospective memory failures occur in comparison with retrospective failures. When compared with normative data it would appear that both groups may be compromised with respect to prospective memory failures and this could explain finding no difference between them on the PRMQ or CAMPROMPT. The similar demographic profiles of the two groups would support their being from the same population and this hypothesis.

The second aim, to examine relationships between PM and SF found only two associations between measures of prospective memory and social functioning, PRMQ and SFS. This appeared to be attributable to the comparison group. The mean raw scores of the two groups were not significantly different and did not match the normative information of this scale (i.e. 50% people with schizophrenia are expected to score 86-105 and most of the non- schizophrenic community sample to score 116-135, Birchwood et al., 1990). As with the PRMQ, the informants' scores did differ on the SFS. Those related to the psychosis group rated performance on most subscales lower than the informants for the comparison group and lower than the individuals in the psychosis group. This may suggest their sensitivity to the problems the psychosis group have with competence and/or performance on the activities described in these subscales, or it could be that the psychosis group are not as aware of the difficulties they have as the comparison group or their relatives. Additionally they may not have wished to be seen as having limitations in their competence by the researcher whom some of them knew. However, the low numbers preclude meaningful analysis and reliance on this information.

The third aim to see if PM deficits and social functioning related to DOI or DUP was compromised by small numbers in the psychosis group and the difficulties in calculating meaningful information using the NOS. For example if diagnosed and medically treated immediately and treatment is adhered to DUP is counted as 0 days. Remembering exactly when things started to change was difficult for some individuals and inconsistencies or

omission of specific dates in the files presented a difficulty in calculating DOI.

Finding differences on cognitive measures between the groups (with the psychosis group performing significantly less well in immediate and delayed memory and executive functioning tasks) is consistent with those in previous studies reporting hippocampal, temporal, parietal and frontal and prefrontal functional differences between people with diagnoses of psychosis or schizophrenia in comparison with healthy controls (e.g. Bartholomeuz et al., 2011; Riley et al., 2000; Henry et al, 2007; Malla et al., 2011).

Although there were no group differences on independent examination of the results of SFS and GF; Social and GF: Role, there were significant differences between the groups on EXITS. These associations suggest the importance of belonging to multiple groups and gaining support from membership for the maintenance and enhancement of social identity.

## **4.2 Limitations**

There are a number of limitations of this study which may account for the results of the present study differing from previous published research. Using a comparison group was a weakness as well as a strength. While the data proved to be interesting and contextualised the findings, the comparison group would probably have been excluded as 'healthy controls' in other studies. By collecting detailed demographic data future studies might find their 'controls' also have complex histories and clinical presentations. Alternatively, they might find they are using non-representative 'control' (i.e. totally healthy physically and psychologically), a situation that perhaps would be unusual in reality. The two groups were small in number and thus the significance and strength of the effect size of any of the findings is compromised.

### 4.3 Recruitment

Basing recruitment for the study in one voluntary sector service may have resulted in participation by a specific sector of the population in contrast to previous studies where participants were recruited through statutory services. The demographics suggested very little difference between the groups, except for age, gender and family history. In view of the executive and memory deficits in the psychosis group it does appear, however, that two separate populations were being compared. Voluntary recruitment could mean that the population where there would perhaps be positive results for PM deficits and evidence of an association with a compromised level of social functioning, did not take part. There were occasions with volunteers from both groups where they forgot to attend initial meetings to take part and some repeated this until they did arrive or decided that other activities in their lives took precedence.

The researcher is also the Clinical Psychologist for the YES service and was known by some participants prior to taking part. This did not appear to have affected their performance or relationship post taking part. However this was not assessed more formally. Such an assessment is of potential importance for future studies. For example, Henry et al. (2010) found that thinking someone knows about your condition can affect your interactions with them and you may not be aware of this effect. The literature on stigma (e.g. Crabtree et al., 2010; Jetten et al., 2001) suggests that engaging in groups associated with your condition (e.g. psychosis) may not always be ultimately beneficial depending on the characteristics and strength of the group. This might explain why some people with psychosis chose not to take part. No analysis was completed to indicate whether those who did take part had a longer experience of the service and could therefore make more informed decisions about the value to them engagement in activities on offer.

Proportionally more people volunteered from the psychosis group which could relate to the method of recruitment. Not only were they able to access

the posters and leaflets in reception but they also were individually give a leaflet by the care coordinator. There may have been a felt pressure to take part or a desire to put something back into the service by taking part.

The method of recruitment was different to that in many previous studies in which all residents in a hospital or rehabilitation setting took part or healthy controls were students who were given credits for taking part. In these studies the former group would have had limited opportunities for group membership, establishing social relationships and may not have had to remember things in the future as prompts will have been made available including reminders from staff. In the latter case there is encouragement to join multiple groups and support from mentors in the first year of University that ensure there are safeguards to health and wellbeing as well as investment in social capital for future needs when faced with challenges.

#### **4.4 Experience of psychosis**

Participants this study were comparatively young and at an early stage of development of their psychosis, in comparison with previous studies. Thus over time and with illness progression and the known accompanying cognitive and temporal lobe deterioration, PM deficits may appear.

They were of varying ages and stages in their experience of psychosis from early emergent psychosis to post first episode. Those longest in the three year service would have had more support with housing, benefits, psychological wellbeing including therapy, education and employment, personal development and opportunities to take part in social activity groups. Given this level of support, length of time in the service may have been a predictor for improved social identity and functioning. However this was not possible to assess due to the small size of the psychosis group and deficits in the amount and type of information collected.

The medications being taken by participants were not properly assessed and compared between groups due to lack of information from participants

in the comparison group (not remembering names or strengths of their medications). It is possible that the psychosis group participants may have had PM deficits but their medications resulted not only in improvements in positive and negative symptoms but also enhancement of attention and concentration. However, this is perhaps not the case as executive and immediate and delayed memory deficits were evident.

#### **4.5 Measures**

Two methods of collecting information about PM (one objective and one subjective) and three of social functioning were used to attempt to address different aspects of social identity and functioning and avoid bias that might occur if one measure of each were used (Chan et al., 2008; Uttl and Kibreab, 2011). In addition, the detailed demographic information and the use of a standardised measure of memory and intellectual ability provided rich contextual material with which to view and interpret the data. However, there is no certainty that these assessment measures were tapping into prospective memory or social functioning. Prospective memory is recognised as form of memory in its' own right. Failure to find evidence of PM deficits in this study does not support the concept of PM as a primary deficit suggested by Henry et al. (2007). An alternative explanation for the findings here could be that the psychosis group under reported PM difficulties on the PRMQ because they could not remember having them. If this were the case then by implication the problem lies with RM deficits as were found in this study.

Kleigel et al. (2008) called for further research evidence that would support successful prospective remembering being a function of intact neuroanatomy (particularly prefrontal and temporal lobe areas and the connections between them) and neuropsychological functioning (e.g. RM, working memory, executive functioning and attention). Such research may lead to an explanation of the findings in this study (i.e. the psychosis and comparison groups did not differ in PM performance, although the former

looked similar to what might be predicted for schizophrenia in RM and to some extent executive functioning) as well as a better theoretical understanding of the nature of the concept of PM.

The measures used did not include computerised laboratory style tasks or virtual reality activities. Much of the research in this area has done this, hence a potential for achieving results that differ from those in the present study (Chan et al., 2008; Uttl and Kibreab, 2011). Differences in findings are reported for subjective and objective measures of PM and social functioning. One of the criticisms of the latter for PM has been the use of focal cues in the procedures. The CAMPROMT can also be criticised in this respect as the table top for the assessment is adorned with clues or cues for writing notes and changing writing implement (paper and pens), keeping an eye on the time (small alarm clock and large clock), items to return to the assessor (a book, message and keys). The final task, five minutes after the supposed end may be inadvertently cued for the participant by the assessor, depending on their filler activity and checking of the time in order to give a prompt if the task is not completed spontaneously.

In reality, and this would apply to all PM assessments that take place in a laboratory or clinic setting, there would be interruptions to the remembering of future tasks via all senses such as phones ringing, TV noise and visuals, people interrupting, getting ready for or completing tasks, routine activities (cooking, driving, washing etc.). For people with psychosis or schizophrenia there would probably be additional competing activity in attending to internal thought processes and bodily sensations that would take priority over other things at the time they were being experienced. So it may not be a deficit in PM that is seen in other studies as much as an overload on perceived experiences and the degree to which there is compulsion or felt pressure to prioritise and respond in the 'here and now' rather than remembering things for the future.

This prioritisation of internal experiences coupled with a poor RM (which may have resulted in limited learning from past negative as well as positive

social experiences) could limit the development and use of strategies for 'future- thinking', planning and problem solving.

While the manual for the WMS III states that the logical memory and family pictures subtests discrepancy has not been standardised against a large population as might be suggestive of an auditory-verbal and visual memory discrepancy, the present finding may be of interest given recent research on facial recognition in schizophrenia and the interest in social functioning in this study (Csukly et al., 2011; Pan et al., 2009).

Of the social functioning measures the GF: Social and GF: Role presented challenges in administration, rating and interpretation. Administration required a swift clinical interview as part of the research assessment in order to make the informed judgements required for scoring. Hence, there could be an under or over reporting by the researcher. While there may be intra-rater consistency, especially as the researcher was a trained clinical psychologist used to making clinical assessments, no inter-rater reliability evaluations were completed during the study. One explanation for the current functioning rating being higher than the past year functioning rating, could be that the participants were already being offered opportunities and support relating to the development of independence (as in GF: Role) and social functioning (as in GF: Social) through using services at YES. However it is important to take account of the range of scores (i.e. GF:Social current 4-9 and 5-10 and GF:Role current 5-8 and 4-10 for psychosis and comparison groups respectively) as there are clearly individuals within both groups who would match the normative prodromal group and others who would match the normative control group of Cornblatt et al. (2007).

#### **4.6 Clinical implications**

Trauma in childhood is thought to be a predictor along with age of first episode of psychosis, of left hippocampal volume changes (Hoy et al.,

2011). Although the Hoy study included 21 people who had experienced their first episode of psychosis, the age range was greater than in the present study (18-60years) and there was no control group. As found in this study people without first episode psychosis can also have high levels of trauma in childhood and adulthood. Despite the shortcoming of Hoy et al., (2011) the present findings may relate to theirs in so far as a significant deficit in general memory functioning was found suggesting hippocampal and left temporal lobe deficits or deterioration which may be associated with the traumas reported by participants. Alternatively the RM deficits and by implication hippocampal deviation from average, may be congenital given the stronger reports of family history of developmental and mental health disorders in the psychosis group.

In comparison to previous studies, the wealth of demographic information obtained in this study (i.e. information about developmental disorders, illness, trauma, bereavements and mental health conditions and family history) has served to enhance the quality of the data and thus the clinical relevance and value of this study. For example, recognising the difficulties people have at an early stage in their experience of psychosis (i.e. with RM and executive functions) has implications for the approaches staff can take in working routinely with individuals and groups and when working specifically on the amelioration and recovery from experiences of positive and negative symptoms. In addition, findings from the comparison group in this study have indicated that there are also implications for providing supportive and preventative services to young adults who might be at risk of psychological ill-health in the future.

Notwithstanding the methodological difficulties associated with this study, the lack of positive findings for prospective memory and limited relationship with social functioning serves to suggest that deficits in PM may emerge later in the development of the condition and could be determined by the rate of deterioration in the hippocampus and temporal lobe (i.e. the retrospective component of PM) as well as deterioration in the executive functions that would in turn influence the ability to organise, plan, use

strategies to successfully achieve PM tasks. The findings relating to social functioning may possibly be explained by a combination of cognitive deficits in executive functioning, the impact of life stage changes (e.g. adolescence to adulthood) and significant life experiences (e.g. bereavements, illness trauma) on social identity and wellbeing. This is an area for further research.

## **5. Conclusion**

In conclusion this study has contributed new knowledge to the literature about PM and SF in people who have experienced their first episode of psychosis. The absence of a significant deficit being found for PM and SF in both the psychosis and comparison groups raised questions about methodology and in so doing pointed to areas for future study. Further research in this area will be important for the advancement of psychosocial interventions with people who have experienced their first episode of psychosis.

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**Contributors**

The author planned the study, managed the literature searches, completed the data collection, wrote the drafts and the final manuscript. Supervision was provided by Professor Jon Evans, University of Glasgow and Associate Professor Catherine Haslam, University of Exeter. Assistance with preparation for the study and management of the data was provided by undergraduate psychology students Steven Wright and Terri-Ann Higgins.

**Conflict of Interest**

The author declares no conflicts of interest.

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## Research Log

## **Appendix 1** Record of Supervision

## Supervision Log for Sarah Newton

| Date       | Phone<br>Email<br>Meeting | Focus   | Outcome  |
|------------|---------------------------|---|--|
| 26-08-2011 | p                         | Discussed requirements for presentation of research portfolio with JE – evening call      | Advice to consider                             |
| 26-08-2011 | e                         | Advice received about presentation of statistical data (signs to use) from JE             | Advice to consider                             |
| 25-08-2011 | e                         | Request to phone JE   | n/a  |
| 23-08-2011 | p                         | Discussion with CH about points in research report - daytime call                         | Advice to consider                             |
| 23-08-2011 | e                         | Advice received from JE on research report  | Advice to consider                             |
| 23-08-2011 | e                         | Comments received on research report from CH  | Advice to consider                             |
| 22-08-2011 | e                         | Comments on layout of data tables received from CH  | Advice to consider                             |
| 22-08-2011 | e                         | Comments on research report draft from CH   | Advice to consider                             |
| 22-08-2011 | p                         | Discussion of research paper with CH - daytime call                                       | Advice to consider                             |
| 19-08-2011 | e                         | Confirmation JE received emails and is reading drafts                                     | n/a  |
| 19-08-2011 | m                         | Discussion of findings and further analyses with CH at Exeter University                  | Advice to consider                             |
| 18-08-2011 | e                         | Draft research report sent  | n/a  |
| 17-08-2011 | e                         | Question sent to check correct statistics being used                                      | n/a  |
| 17-08-2011 | e                         | Comments received from CH on literature review draft                                      | Advice to consider                             |
| 16-08-2011 | e                         | Three emails sending draft tables, data decision table and literature review to JE and CH | n/a  |
| 15-08-2011 | e                         | Advice for literature review refinement from CH   | Advice to consider a                           |
| 12-08-2011 | m                         | Discussion of progress with data analysis with CH at Exeter University                    | Advice to consider                             |
| 11-08-2011 | e                         | Update and preparation for meeting on 12 <sup>th</sup> August                             | Clarification and consideration of time scales |
| 09-08-2011 | e                         | CH replied to statistics questions and recommended book by Andy Field                     | Book purchased and used                        |
| 09-08-2011 | e                         | Question sent to check correct statistics being used                                      | Clarification                                  |
| 08-08-2011 | e                         | Question sent to check correct statistics being used                                      | Clarification                                  |

| Date       | Phone<br>Email<br>Meeting | Focus   | Outcome                          |
|------------|---------------------------|---|----------------------------------|
| 03-08-2011 | e                         | Advice sought and obtained from CH about analysing EXITS data   | Advice to consider               |
| 27-07-2011 | p                         | Discussion with JE about data and analysis –evening call  | Advice to consider               |
| 25-07-2011 | e                         | 2 emails from JE confirming receipt of update, reminder of his availability and offer to discuss statistics   | Advice to consider               |
| 25-07-2011 | e                         | CH responded to update and gave advice about EXITS analysis   | Advice to consider               |
| 24-07-2011 | e                         | Update sent to JE and CH with notice that data collection completed, data on Excel data base, update on contact with JC and University of Plymouth Stats clinic second session and problems with IT and SPSS not working on work computer | n/a                              |
| 08-07-2011 | e                         | 2 emails exchanged with John Crawford about PRMQ and paper on statistics received from him  | Advice to consider               |
| 04-07-2011 | e                         | Question sent to CH and JE about what results to use from the WCST  | n/a                              |
| 01-07-2011 | e                         | Advice sought from John Crawford about scoring and interpreting PRMQ results and reply received   | Advice to consider               |
| 01-07-2011 | e                         | JE replied on what to report for WCST   | Advice discussed in later p call |
| 29-06-2011 | e                         | CH response to update and 'well done' considering challenges  | n/a                              |
| 29-06-2011 | e                         | JE response to update on progress and notice of his availability during holiday period  | Advice to consider               |
| 28-06-2011 | e                         | Update sent to JE and CH with notice of challenges in continuing to collect data with room availability and volunteers  | n/a                              |
| 02-06-2011 | e                         | Advice from CH about EXITS  | Advice to consider               |
| 01-06-2011 | e                         | Question sent to CH about EXITS   | n/a                              |
| 24-05-2011 | e                         | 3 emails exchanged with CH about EXITS  | Advice to consider               |
| 23-05-2011 | e                         | From CH about EXITS   | Advice to consider               |
| 20-05-2011 | e                         | JE sent advice on managing data on Excel and SPSS   | Advice to consider               |
| 20-05-2011 | e                         | Update on progress sent to JE and CH  | n/a                              |
|            |                           |   |                                  |

| Date       | Phone<br>Email<br>Meeting | Focus  | Outcome  |
|------------|---------------------------|--|--|
| 19-05-2011 | m                         | University of Plymouth Statistics clinic (approved by research advisor). To ensure plan for data analysis was valid and tips for uploading onto SPSS     | Very helpful advice                              |
| 16-05-2011 | e + p                     | JE sent request for update and confirmation of intention to submit this year and asked about value of University of Plymouth first Stats clinic session  | Reply sent and phone discussion about submitting |
| 13-05-2011 | e                         | Copy of JE approval for advice to be given by University of Plymouth on statistics and SPSS  | n/a  |
| 13-04-2011 | e                         | CH sent papers and advice on an SPSS database for EXITS following meeting  | Advice to consider                               |
| 13-04-2011 | m                         | Progress discussed with CH and EXITS data collected to date shown to her   | Advice to consider                               |
| 18-03-2011 | e                         | Request to arrange to meet CH  | n/a  |
| 03-03-2011 | e                         | Poster information sent to CH  | n/a  |
| 25-02-2011 | e                         | 2 emails requesting advice about poster from CH and meeting  | Advice to consider                               |
| 24-02-2011 | e                         | 2 emails JE advised on poster and recruitment difficulties and good quality Glasgow logo attached  | Advice to consider                               |
| 23-02-2011 | e                         | Advice about poster from CH  | Advice to consider                               |
| 21-02-2011 | e                         | Request for advice about poster to JE and CH   | n/a  |
| 01-12-2010 | e                         | CH commented on update received  | Advice to consider                               |
| 30-10-2010 | e                         | Annual report sent to R&D for Ethics committee and copied to JE and CH with update and difficulties with recruitment and suggestion to look outside city | n/a  |
| 23-08-2010 | e                         | Re-registration advice from JE   | Advice to act on                                 |
| 03-06-2010 | e                         | Poster sent off for conference, JE and CH informed   | n/a  |
| 06-04-2010 | e                         | CH responded to update and confirmed arrangements to meet (April 2010)   | Advice to consider and act on                    |
| 03-11-2009 | e                         | Update sent to Andrew Gumley informing him of ethics approval  | n/a  |
| 09-10-2009 | e                         | R&D and SSI forms exchanged and former signed by JE and submitted to R&D   | n/a  |
| 06-10-2009 | e                         | Advice from JE on recruitment  | Advice to consider                               |
|            |                           |  |  |

| Date       | Phone<br>Email<br>Meeting | Focus  | Outcome            |
|------------|---------------------------|--|--------------------|
| 06-10-2009 | e                         | JE re signatures required for R&D and notice that Research costs would be discussed with T.                | n/a                |
| 27-09-2011 | e                         | Response to update and 'good luck' from CH   | n/a                |
| 27-09-2009 | e                         | Update sent on ethics-approval received, equipment purchases and completed Health and Safety form returned | n/a                |
| 23-09-2009 | e                         | From JE re H&S Glasgow forms   | For action         |
| 15-09-2009 | e                         | From JE in response to update  | Advice to consider |
| 15-09-2009 | e                         | Update sent to JE on ethics progress and ordering of tests   | n/a                |
| 06-08-2009 | e                         | Copied in to JE email of his CV to R&D Amanda Datson, for ethics IRAS form                                 | n/a                |
| 20-05-2009 | e                         | JE sent reference details for John Crawford papers and PRMQ  | Advice to act on   |

Notes: JE=Jon Evans, Professor Glasgow University, Research Advisor, CH= Catherine Haslam, Associate Professor Exeter University, Research Supervisor. Meetings were held with JE on each teaching block of the PgDip/Msc taught part of the course to discuss ideas for the research, the outline and the proposal. Two/ three meetings were also held with CH (April-June 2009) to arrange for her supervision during the outline and proposal development in addition to those listed while the research was running. Advice was also sought from Professor Andrew Gumley, Glasgow University, on two occasions in meetings during the development of the proposal (while attending teaching blocks) and by email, in view of his clinical experience of first episode psychosis services. Email advice was obtained from Professor John Crawford, Aberdeen University on use and analysis of PRMQ.

**Appendix 2** Approval from the National Research Ethics Service: Cornwall  
and Plymouth Research Ethics Committee



**NHS**  
**National Research Ethics Service**  
Cornwall and Plymouth Research Ethics Committee

Room F34  
The Knowledge Spa  
Royal Cornwall Hospital  
Truro  
Cornwall  
TR1 3HD

Telephone: 01872 256422/01752 315267

29 September 2009

Dr Sarah Newton  
Clinical Psychology Services  
NHS Plymouth  
140 Mt Gould Road, Mt Gould Hospital  
PL4 7QD

Dear Dr Newton

**Study Title:** Prospective memory and social functioning in first episode psychosis  
**REC reference number:** 09/H0203/73  
**Protocol number:**

Thank you for your letter of 22 September, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

**Confirmation of ethical opinion**

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

**Ethical review of research sites**

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

**Conditions of the favourable opinion**

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

For NHS research sites only, management permission for research ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements. Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.  
*Where the only involvement of the NHS organisation is as a Participant Identification*

This Research Ethics Committee is an advisory committee to South West Strategic Health Authority  
The National Research Ethics Service (NRES) represents the NRES Directorate within  
the National Patient Safety Agency and Research Ethics Committees in England

Centre, management permission for research is not required but the R&D office should be notified of the study. Guidance should be sought from the R&D office where necessary.

Sponsors are not required to notify the Committee of approvals from host organisations.

**It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).**

#### Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

| Document                                    | Version | Date              |
|---|---------|-------------------|
| Questionnaire: PRMQ                         |         |                   |
| Questionnaire: Social Functioning Scale     |         |                   |
| Protocol                                    |         | 31 July 2009      |
| Participant Consent Form                    | 1       | 01 August 2009    |
| Insurance docs                              |         |                   |
| CAMPROMPT record                            |         |                   |
| Interview Checklist                         | 1       | 01 August 2009    |
| CAMPROMPT                                   |         |                   |
| Global Functioning Scales                   |         |                   |
| Investigator CV                             |         | 03 July 2009      |
| GP/Consultant Information Sheets            | 1       | 31 July 2009      |
| Covering Letter                             |         | 01 August 2009    |
| REC application                             |         | 24 July 2009      |
| Trail making                                |         |                   |
| WTAR Record                                 |         |                   |
| WASI Record                                 |         |                   |
| Symptom Inventory                           |         |                   |
| University letter                           |         | 30 July 2009      |
| WMS iii Record                              |         |                   |
| WCST Scoring                                |         |                   |
| Covering Letter                             |         | 22 September 2009 |
| Participant Information Sheet               | 2       | 22 September 2009 |
| Questionnaire: EXITS                        | 2       | 22 September 2009 |
| Advertisement                               |         | 22 September 2009 |
| Response slip                               | 1       | 22 September 2009 |
| Response to Request for Further Information |         |                   |

#### Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

#### After ethical review

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document "*After ethical review – guidance for researchers*" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email [referencegroup@nres.npsa.nhs.uk](mailto:referencegroup@nres.npsa.nhs.uk).

**09/H0203/73**

**Please quote this number on all correspondence**

With every good wish



**Canon Ian Ainsworth-Smith  
Chair**

Email: [amanda.datson@nhs.net](mailto:amanda.datson@nhs.net)

Enclosures: "After ethical review – guidance for researchers"

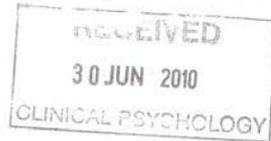


**National Research Ethics Service**  
South West 1 Research Ethics Committee

John Apley Building  
Room 11  
Royal United Hospital  
Combe Park  
Bath  
BA1 3NG

Tel: 01225 824255  
Fax: 01225 825725

e-mail: [kirsten.peck@ruh-bath.swest.nhs.uk](mailto:kirsten.peck@ruh-bath.swest.nhs.uk)



25 June 2010

Dr Sarah Newton  
Clinical Psychology Services  
NHS Plymouth  
140 Mt Gould Road  
Mt Gould Hospital  
PL4 7QD

Dear Dr Newton

**Study title:** Prospective memory and social functioning in first episode psychosis  
**REC reference:** 09/H0203/73  
**Amendment number:** 1 / 25 May 2010

Thank you for your letter of 9 April 2010, notifying the Committee of the above amendment.

The Committee does not consider this to be a "substantial amendment" as defined in the Standard Operating Procedures for Research Ethics Committees. The amendment does not therefore require an ethical opinion from the Committee and may be implemented immediately, provided that it does not affect the approval for the research given by the R&D office for the relevant NHS care organisation.

**Documents received**

The documents received were as follows:

| Document                                | Version | Date          |
|---|---------|---------------|
| Questionnaire: Social functioning scale |         |               |
| Questionnaire: Exits                    |         |               |
| Covering Letter                         |         | 09 April 2010 |
| Notification of a Minor Amendment       |         |               |

This Research Ethics Committee is an advisory committee to South West Strategic Health Authority  
The National Research Ethics Service (NRES) represents the NRES Directorate within  
the National Patient Safety Agency and Research Ethics Committees in England

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

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REC reference 09/H0203/73: Please quote this number on all correspondence

Yours sincerely

Mrs Kirsten Peck  
Co-ordinator  
South West 1 Research Ethics Committee

## **Appendix 3 Consent Form**



## **Appendix 4** Information Leaflet



To request more information about the study:

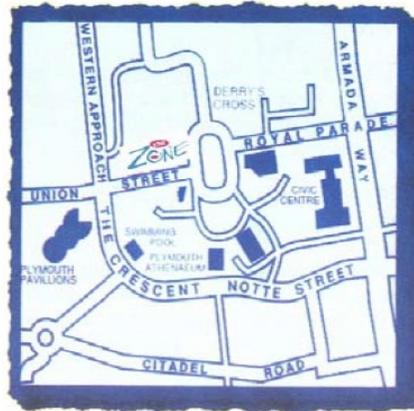
Please complete your contact details and hand the enclosed response slip into reception at the Zone or return it to your Care Coordinator. Dr Sarah Newton will be in contact by phone to talk about the study and answer any questions you may have.

If you would still like to consider taking part then she will arrange a two hour appointment at the Zone. You will be able to ask any further questions before signing the consent form. Some people may need a second appointment.

University of Glasgow

Plymouth

Teaching Partnership Trust



The Zone  
14-16 Union Street  
Plymouth Devon

PL12SR

Internet: [www.thezoneplymouth.co.uk](http://www.thezoneplymouth.co.uk)

For the Insight service at the Zone contact:

Insight Direct Line: (01752) 265775

Insight Fax: (01752) 265775

email [claire.paxton@thezoneplymouth.co.uk](mailto:claire.paxton@thezoneplymouth.co.uk)

Registered Charity No: 1051757



Youth Enquiry Service  
Plymouth Ltd

Neuropsychology  
study

by Dr Sarah Newton  
Consultant Clinical Psychologist

Are you aged 18 to 38yrs? Would you like to take part in a study we are doing at The Zone? Would you like information that may be helpful to you and to others?

It will only take a couple of hours of your time

Entry into a prize draw for high street vouchers when the study is complete

University of Glasgow

W

University of Glasgow, University Avenue  
Glasgow, Scotland, G12 8QQ

Plymouth

Teaching Partnership Trust

Hello

This information leaflet will tell you a little about the study and also has a response slip to complete and hand into reception if you would like to find out more about taking part.

You will then be able to talk to the person leading the study and find out more about it before taking part. This person is Dr Sarah Newton a Clinical Psychologist who works at the Zone with the Insight team. She can be contacted for further information at Insight on 01752 265775 and NHS Plymouth on 01752 314052.

**Why is the study being done?**

Sarah is completing a Masters degree/ Postgraduate Diploma in Clinical Neuropsychology at Glasgow University. She is planning to look at how we remember things and how this may relate to our social lives and periods of being unwell. She would like to interview people who come to the Zone who are aged between 18 and 38 years including people who are using services at the Zone.

**Will taking part affect the support I get at the Zone?**

Taking part in this study will not affect the information and support offered to you at the Zone and by the Health services based here. Some of you may already know Sarah through her work at the Zone. This work will not be affected whether or not you decide to take part in the research she is doing for her studies.

**What do I get out of it?**

You will be asked for your agreement to take part (consent) in writing and you will be able to ask for feedback about the whole study when it has been finished.

There will be support available to you should you want it after the study.

You will be thanked for your time with vouchers that can be spent on food, clothes or music and entered into a prize draw for further vouchers when the study has been completed.

**What will I be asked to do?**

Taking part will involve up to two hours with Sarah and an assistant (undergraduate psychologist) in a room at the Zone. You will be asked to complete several assessment tasks and a number of forms that relate to your lifestyle and abilities.

All the information from everyone who takes part will be put together and will be anonymous. It will be stored in a locked cabinet and on a secure computer drive provided by NHS Plymouth.

**What happens to the information after the study?**

Sarah has to write it up as a piece of work for her studies at Glasgow University. It may be published in an academic journal and presented at a conference. A report will be made available to the people who run the Zone. A summary of the findings will be available to those people who took part should they want this. Everyone who takes part can also request information about the findings that relate to them.

**What support will be available to me afterwards?**

Taking part in the study should be straightforward and should not create difficulties for anyone. However, should taking part be problematic or should it raise personal issues for an individual, then support will be available. There are choices depending on the nature of the concerns the person has. For example:

1. If you would like to talk to someone about personal issues that have arisen or come to light through taking part then you can meet with an Advisor or a Care Coordinator at the Zone. They will talk with you about your concerns and if necessary help you to see the most appropriate person to help you.

2. If you wish to make a complaint then you can contact:

Plymouth, M20 1H mu.x..Care Trust  
Complaints and Litigation  
Nuffield Clime  
Ltpson Road  
Plymouth  
PL4 8NQ  
Tel 01752 314167  
Email: complaints@plymouth.nhs.uk

[The Youth Enquiry Service Plymouth Ltd.](#)

The Chief Executive  
The Zone  
14-16 Upton Street  
Plymouth  
PL1 2SR  
Tel. 01752 206626  
Fax: 01752 206629

## **Appendix 5** Schizophrenia Research Guide for Authors

## Schizophrenia Research Guide for Authors

### Guide for Authors

Schizophrenia Research provides rapid publication of new international research that contributes to the understanding of schizophrenia and related disorders. The journal brings together previously separated biological, clinical and psychological research on this disorder, and stimulates the synthesis of clinical and research data into cohesive hypothesis.

### Types of papers:

(1) Full-length papers: 2000-3000 words (excluding tables, figures and references). (2) Short communications: 1000-1500 words (excluding tables, figures and references). (3) Letters to the Editors: 600-800 words, 10 references, 1 figure or table. (4) Special solicited research and/or reviews. (5) Invited comments or hypotheses. (6) Editorials. (7) Schizophrenia meeting reviews; solicited and/or submitted. (8) Book reviews.

### Submission Checklist:

It is hoped that this list will be useful during the final checking of an article prior to sending it to the journal's editor for review. Please consult this Guide for Authors for further details of any item.

### Ensure that the following items are present:

- One author designated as corresponding author
- E-mail address
- Full postal address
- Telephone and fax numbers
- All necessary files have been uploaded
- Keywords
- All figure captions
- All tables (including title, description, footnotes)

### Further considerations

- Manuscript has been "spell checked"
- References are in the correct format for this journal
- All references mentioned in the Reference list are cited in the text, and vice versa
- Permission has been obtained for use of copyrighted material from other sources (including the Web)
- Colour figures are clearly marked as being intended for colour reproduction or to be reproduced in black-and-white

### General

Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, without the written consent of the Publisher.

Upon acceptance of an article, you will be asked to transfer copyright (for more information on copyright see <http://authors.elsevier.com/journal/schres>). This transfer will ensure the widest possible dissemination of information. If excerpts from other copyrighted works are included in the submission, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has preprinted forms for use by authors in these cases: contact Elsevier's Rights Department, Philadelphia, PA, USA: phone (+1) 215 238 7869, fax (+1) 215 238 2239, e-mail [healthpermissions@elsevier.com](mailto:healthpermissions@elsevier.com).

Requests for materials from other Elsevier publications may also be completed on-line via the Elsevier homepage <http://www.elsevier.com/locate/permissions>

#### Presentation of manuscript

Please write your text in good English (American or British usage is accepted, but not a mixture of these). Italics are not to be used for expressions of Latin origin, for example, *in vivo*, *et al.*, *per se*. Use decimal points (not commas); use a space for thousands (10 000 and above).

Provide the following data on the title page (in the order given).

**Title.** Concise and informative. The title should indicate the main point of the manuscript. Note that titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.

**Author names and affiliations.** Where the family name may be ambiguous (e.g., a double name), please indicate this clearly. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-case superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name, and, if available, the e-mail address of each author.

**Corresponding author.** Clearly indicate who is willing to handle correspondence at all stages of refereeing and publication, also post-publication. Ensure that telephone and fax numbers (with country and area

code) are provided in addition to the e-mail address and the complete postal address.

**Present/permanent address.** If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

**Abstract.** A concise and factual abstract is required (maximum length 250 words for full-length papers or 100 words for short communications). The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separate from the article, so it must be able to stand alone. References should therefore be avoided, but if essential, they must be cited in full, without reference to the reference list. Non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

**Keywords.** Immediately after the abstract, provide a maximum of six keywords, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, 'and', 'of'). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.

**Abbreviations.** Define abbreviations that are not standard in this field at their first occurrence in the article: in the abstract but also in the main text after it. Ensure consistency of abbreviations throughout the article.

#### Arrangement of the article

**Subdivision of the article.** Divide your article into clearly defined and numbered sections. Subsections should be numbered 1.1 (then 1.1.1, 1.1.2, ?), 1.2, etc. (the abstract is not included in section numbering). Use this numbering also for internal cross-referencing: do not just refer to 'the text'. Any subsection may be given a brief heading. Each heading should appear on its own separate line.

**Introduction.** State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

**Experimental/Materials and methods.** Provide sufficient detail to allow the work to be reproduced. Methods already published should be indicated by a reference: only relevant modifications should be described. Statistical tests used for evaluation of data should be briefly explained. In case of experimental studies, animals used should be described, including information on breed, breeder, sex, age, weight and the maintenance conditions. Special chemicals and their sources should be grouped under a

separate sub-heading. For drugs generic names should be used; trade names may be given in brackets where the drug is first mentioned. In case of a new drug, a chemical description (formula) should be given. The form of a drug used should also be indicated.

**Results.** In this section the findings should be described clearly, concisely, and in logical order without extended discussions of their significance. Only in case of short communications, the results and discussion sections may be combined. Results should usually be presented in graphic or tabular form, rather than discursively. There should be no duplication in text, tables and figures. Experimental conclusions should normally be based on adequate numbers of observations with statistical analysis of variance and the significance of differences. The number of individual values represented by a mean should be indicated.

**Discussion.** This section should present conclusions to be drawn from the results accompanied by an assessment of their significance in relation to previous work. Speculative discussion is not discouraged, but the speculation should be based on the data presented and identified as such. In general, the discussion should be as concise as possible.

**Author Disclosure - NEW!!**

**Role of Funding Source.** Authors are kindly requested to briefly describe the role of the study sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. If the funding source(s) had no such involvement, authors should so state.

eg, Funding for this study was provided by NIMH Grant XXXXXXXX; the NIMH had no further role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.

Following the Role of the Funding Source text, authors are required to declare their individual contribution to the manuscript under a subheading Contributors.

eg, Author X designed the study and wrote the protocol. Author Y managed the literature searches and analyses. Authors X and Z undertook the statistical analysis, and author W wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

The third aspect of the Journal's new policy concerns the Conflict of Interest. ALL authors are requested to disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations within three (3) years of beginning the work submitted that could inappropriately influence, or be perceived to influence, their work.

Examples of potential conflicts of interest which should be disclosed include employment, consultancies, stock ownership (except for personal investment purposes equal to the lesser of one percent (1%) or USD 5000), honoraria, paid expert testimony, patent applications, registrations, and grants. If there are no conflicts of interest, authors should state that there are none.

eg, Author Y owns shares in pharma company A. Author X and Z have consulted for pharma company B. All other authors declare that they have no conflicts of interest.

Finally, before the references, the Journal will publish Acknowledgements, in a separate section, and not as a footnote on the title page.

eg, We thank Mr A, who kindly provided the data necessary for our analysis, and Miss B, who assisted with the preparation and proof-reading of the manuscript.

NB. During the online submission process the author will be prompted to upload these four mandatory author disclosures as separate items. They will be automatically incorporated in the PDF builder of the online submission system. Please do not include in the main manuscripts.

References. See separate section, below.

Figure legends, tables, figures, schemes. Present these, in this order, at the end of the article. Figures and photographs of good quality should also be submitted online as a separate file.

Tables. Number tables consecutively in accordance with their appearance in the text. Place footnotes to tables below the table body and indicate them with superscript lowercase letters. Avoid vertical rules. Be sparing in the use of tables and ensure that the data presented in tables do not duplicate results described elsewhere in the article.

Nomenclature and units. Follow internationally accepted rules and conventions: use the international system of units (SI). If other quantities are mentioned, give their equivalent in SI.

Preparation of supplementary data. Elsevier accepts electronic supplementary material to support and enhance your scientific research. Supplementary files offer the author additional possibilities to publish supporting applications, movies, animation sequences, high-resolution images, background datasets, sound clips and more. Supplementary files supplied will be published online alongside the electronic version of your article in Elsevier web products, including ScienceDirect: <http://www.sciencedirect.com>. In order to ensure that your submitted material is directly usable, please ensure that data is provided in one of our recommended file formats. Authors should submit the material in electronic format together with the article and supply a concise and descriptive caption

for each file. For more detailed instructions please visit our Author Gateway at <http://authors.elsevier.com>.

Policy and ethics. The work described in your article must have been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans; <http://www.wma.net/e/policy/b3.htm> and with the internationally accepted principles in the care and use of experimental animals. This must be stated at an appropriate point in the article.

## References

Responsibility for the accuracy of bibliographic citations lies entirely with the authors.

Citations in the text: Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications should not be in the reference list, but may be mentioned in the text. Citation of a reference as 'in press' implies that the item has been accepted for publication and a copy of the title page of the relevant article must be submitted.

Citing and listing of web references. As a minimum, the full URL should be given. Any further information, if known (author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

Text: All citations in the text should refer to:

1. Single author: the author's name (without initials, unless there is ambiguity) and the year of publication;
2. Two authors: both authors' names and the year of publication;
3. Three or more authors: first author's name followed by 'et al.' and the year of publication.

Citations may be made directly (or parenthetically). Groups of references should be listed first alphabetically, then chronologically.

Examples: "as demonstrated (Allan, 1996a, 1996b, 1999; Allan and Jones, 1995). Kramer et al. (2000) have recently shown ...."

List: References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters "a", "b", "c", etc., placed after the year of publication.

Examples:

Reference to a journal publication:

Van der Geer, J., Hanraads, J.A.J., Lupton, R.A., 2000. The art of writing a scientific article. *J. Sci. Commun.* 163 (2) 51-59.

Reference to a book:

Strunk Jr., W., White, E.B., 1979. *The Elements of Style*, third ed. Macmillan, New York.

Reference to a chapter in an edited book:

Mettam, G.R., Adams, L.B., 1999. How to prepare an electronic version of your article, in: Jones, B.S., Smith, R.Z. (Eds.), *Introduction to the Electronic Age*. E-Publishing Inc., New York, pp. 281-304.

Journal names should be abbreviated according to the List of serial title word abbreviations: <http://www.issn.org/lstwa.html>

Note: Sections of this guide for authors have been removed on electronic submission, DNA and Genetic referencing, use of colour, graphics and arrangements for proofs, but are available online.

## **Appendix 6 Declaration of Originality and Thesis Access Declaration**



## Declaration of Originality Form

This form **must** be completed and signed and submitted with all assignments.  
Please complete the information below (using BLOCK CAPITALS).

|  |
|--|
| Name Sarah Newton .....                              |
| Student Number 0803484n .....                        |
| Course Name MSc/PgDip Clinical Neuropsychology ..... |
| Assignment Number/Name Research Portfolio .....      |

**An extract from the University's Statement on Plagiarism is provided overleaf. Please read carefully THEN read and sign the declaration below.**

|   |   |
|---|---|
| <b>I confirm that this assignment is my own work and that I have:</b>   |   |
| Read and understood the guidance on plagiarism in the Undergraduate Handbook, including the University of Glasgow Statement on Plagiarism   | ☺ |
| Clearly referenced, in both the text and the bibliography or references, <b>all sources</b> used in the work  | ☺ |
| Fully referenced (including page numbers) and used inverted commas for <b>all text quoted</b> from books, journals, web etc. (Please check the section on referencing in the 'Guide to Writing Essays & Reports' appendix of the Graduate School Research Training Programme handbook.)       | ☺ |
| Provided the sources for all tables, figures, data etc. that are not my own work  | ☺ |
| Not made use of the work of any other student(s) past or present without acknowledgement. This includes any of my own work, that has been previously, or concurrently, submitted for assessment, either at this or any other educational institution, including school (see overleaf at 31.2) | ☺ |
| Not sought or used the services of any professional agencies to produce this work   | ☺ |
| In addition, I understand that any false claim in respect of this work will result in disciplinary action in accordance with University regulations   | ☺ |

### DECLARATION:

I am aware of and understand the University's policy on plagiarism and I certify that this assignment is my own work, except where indicated by referencing, and that I have followed the good academic practices noted above

Signed .....

# The University of Glasgow Plagiarism Statement

The following is an extract from the University of Glasgow Plagiarism Statement. The full statement can be found in the University Calendar at

<http://senate.gla.ac.uk/calendar/current/02-feesandgeneral.pdf#page=56&view=fitH.670>.

This should be read in conjunction with the discipline specific guidance provided in the Graduate School Research Training Programme handbook.

31.1 The University's degrees and other academic awards are given in recognition of a student's **personal achievement**. All work submitted by students for assessment is accepted on the understanding that it is the student's own effort.

31.2 Plagiarism is defined as the submission or presentation of work, in any form, which is not one's own, without **acknowledgement of the sources**. Plagiarism includes inappropriate collaboration with others. Special cases of plagiarism can arise from a student using his or her own previous work (termed auto-plagiarism or self-plagiarism). Auto-plagiarism includes using work that has already been submitted for assessment at this University or for any other academic award.

31.3 The incorporation of material without formal and proper acknowledgement (even with no deliberate intent to cheat) can constitute plagiarism.

**Work may be considered to be plagiarised if it consists of:**

- a direct quotation;
- a close paraphrase;
- an unacknowledged summary of a source;
- direct copying or transcription.

With regard to essays, reports and dissertations, the rule is: if information **or ideas** are obtained from any source, that source must be acknowledged according to the appropriate convention in that discipline; and **any direct quotation must be placed in quotation marks** and the source cited immediately. Any failure to acknowledge adequately or to cite properly other sources in submitted work is plagiarism. Under examination conditions, material learnt by rote or close paraphrase will be expected to follow the usual rules of reference citation otherwise it will be considered as plagiarism. Departments should provide guidance on other appropriate use of references in examination conditions.

31.4 Plagiarism is considered to be an act of fraudulence and an offence against University discipline. Alleged plagiarism, at whatever stage of a student's studies, whether before or after graduation, will be investigated and dealt with appropriately by the University.

31.5 The University reserves the right to use plagiarism detection systems, which may be externally based, in the interests of improving academic standards when assessing student work.

If you are still unsure or unclear about what plagiarism is or need advice on how to avoid it, **SEEK HELP NOW!**

You can contact any one of the following for assistance:

**Lecturer**

**Course Co-ordinator**

**Dissertation Supervisor**

**Postgraduate Adviser of Studies**

**Student Learning Service**