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**How social problem-solving, meta-cognition and
autobiographical memory differ in negative subtypes of
psychosis.**

AND

Clinical Research Portfolio

Jaclyn MacLeod PhD

**Submitted in partial fulfillment of the requirements for the
degree of Doctorate in Clinical Psychology (DClinPsy)**

**Institute of Health and Wellbeing
College of Medical, Veterinary and Life Sciences
University of Glasgow**

October 2017

CONTENTS

Contents.....	ii
List of tables.....	iii
List of figures.....	iv
List of Appendices.....	v
Acknowledgements.....	vi
Declaration.....	vii

Chapter 1: Systematic Review.....1

A systematic review of CBT and negative symptoms of schizophrenia.

1.1 Abstract	2
1.2 Introduction.....	3
1.3 Methods.....	7
1.4 Results	10
1.5 Discussion.....	17
References.....	20-22

Chapter : Major Research Project.....23

How social problem-solving, meta-cognition and autobiographical memory differ in negative subtypes of psychosis.

2.1 Plain English Summary	24
2.2 Abstract	26
2.3 Introduction.....	27
2.4 Methods.....	30
2.5 Results	37
2.6 Discussion.....	41
References.....	44-46

LIST OF TABLES

Table 1.1. Randomised Control trials of CBT intervention examining negative symptoms of psychosis.)	14 - 16
Table 2.1. Median and IQR on all study variables	38
Table 2.2. Spearman's rho correlations, means and SD of NPO and negative symptoms of schizophrenia	38
Table 2.3. Median and IQR scores for the predominant and prominent groups on key study variables	39
Table 2.4. Spearman's rho correlations, of social problem-solving and negative symptoms of schizophrenia	40
Table 2.5. Spearman's rho Correlations with interpersonal problem-solving and mastery	40

LIST OF FIGURES

Figure 1.1 PRISMA flow diagram of selection.....	9
Figure 2.1 Flow diagram of study recruitment.....	37

APPENDICES

Appendix 1 Outline of Journal for submission of Systematic Review and Major Research project.....	47
Appendix 2 MRP Proposal.....	60
Appendix 3 Health and Safety for Researchers.....	76
Appendix 4 University of Glasgow ethics consent.....	78
Appendix 5 Forensics Directorate of GG&C ethics consent.....	79
Appendix 6 South East Scotland REC consent	80
Appendix 7 Participant information sheet.....	81
Appendix 8 Participant Consent Form.....	85
Appendix 9 MEPS-R scoring protocol	87
Appendix 10 Table of CTAM scores for each study	94

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Declaration



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CHAPTER ONE: A systematic review of CBT and negative symptoms of schizophrenia

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Prepared in accordance with the requirements for submission to *Schizophrenia Research*. (See Appendix 1).

1.1 Abstract:

Background

Recent studies suggest that Cognitive Behaviour Therapy (CBT) is no more effective at reducing negative symptoms of schizophrenia than active control groups. There have been mixed findings whether group interventions are effective treatment delivery methods. Also, sub-population identification of negative symptoms is an important consideration because a lack of understanding could hamper treatment.

Aims

This paper aims firstly, to determine if protocol adaptations in interventions are important for treatment of negative symptoms. Secondly, are CBT interventions more effective than control groups. Thirdly, to identify if studies routinely screen for negative symptom profiles and fourth, to examine whether group interventions are an effective treatment method.

Method

Studies were identified by searching electronic databases and hand searching the reference lists of these papers. Studies were included if they were a Randomised Control Trial, CBT was the main intervention design and negative symptoms were measured and reported.

Results

Eight papers were included in the final review. Specific protocol adaptations to populations were found to be more effective at reducing negative symptoms than active control groups. Only one studied identified sub-populations of negative symptoms. Older measures of negative symptoms are still being employed in more recent studies, two studies employed a group intervention and both were found to be effective in comparison to active controls.

Conclusions

This review presents findings that suggest CBT for schizophrenia is more effective if there are appropriate adaptations made to the protocol e.g. considerations around negative symptom difficulties. In addition, studies should measure negative symptoms more thoroughly in patients to establish whether the improvements are in predominant or prominent symptom profiles. Finally, group interventions that are adapted were found to be effective over groups with no adaptations. These findings suggest that adaptation of

CBT towards the needs of the client group may be more effective than non-adapted CBT at reducing negative symptoms in schizophrenia.

1.2 Introduction

Schizophrenia is a heterogeneous clinical syndrome comprising of several psychopathological domains that vary in individuals who suffer from this illness (Fusar-Poli, Papanastasiou, Stahl, et al., 2015). Experiences can include positive psychotic symptoms such as delusions, hallucinations and disorganised thoughts and behaviour. Some people also experience negative symptoms, which are conceptualised as a deficit or loss of some functions (Strauss, Carpenter, Bartko, 1974). Although positive symptoms often respond to medication, negative symptoms are typically more difficult to treat. Indeed, negative symptoms have been described as a critical unmet need in the treatment of people with schizophrenia (Buchanan, 2007). Importantly, up to 50% of patients suffer from negative symptoms, even 1 year after their last episode of psychosis. Negative symptoms are also a key predictor of poorer quality of life and functional outcome (Klingberg, Wittorf, Herrlich, et al., 2009). In essence, negative symptoms are an important area of research because they are identified as an unmet therapeutic need, burden on carers and contribute to the enormous costs of schizophrenia to health services (Buchanan, 2007).

Negative symptoms were traditionally conceptualised as five main symptom domains: anhedonia, asociality, avolition affect flattening and alogia. Crow (1980) argued that negative symptoms have different neuropathic origins, course and prognosis. Therefore, negative symptoms have been further conceptualised as two sub-groups of primary and secondary symptoms (Buchanan, 2007). Primary symptoms are also described as deficit syndrome or predominant negative symptoms (Buchanan, 2007). Primary negative symptoms are not secondary to other symptoms they are intrinsic to schizophrenia. Secondary or prominent negative symptoms are typically described as being caused by other underlying mechanisms, for example positive symptoms, depression or anxiety, medication side effects, social deprivation and substance misuse (Stauffer, Song, Kinon, et al., 2012). This difference in sub-types of negative symptoms is important because the same behaviour may be mediated by different psychological processes (McLeod, Gumley & Schwannauer, 2015). Careful analysis of sub-type symptoms would allow for a more detailed understanding of whether improvements in treatment are secondary to improvement in positive symptoms (Stauffer et al., 2012). It would also help interventions to be more targeted. This is important because primary negative symptoms are associated with poorer recovery and any changes in these symptoms are unlikely to be

related to positive symptoms. Whereas any changes in secondary symptoms are likely to be due to a reduction in positive symptoms. The current approach to treatment development is to identify and try to modify specific mechanisms of disease action. For psychological therapy trials and CBT for psychosis in particular this issue is not well addressed. The majority of CBTp trials are actually CBT for voices and delusions. Therefore it may be important to analyse sub-patterns of symptoms and their underlying causes (or maintenance factors). No current reviews have done this with any rigour for negative symptoms.

Our evolved understanding of negative symptoms requires that instruments can accurately measure and identify the sub-types of negative symptoms. Accurate assessment enables clinicians to provide treatment goals and systematic evaluation of outcomes. The types of measures employed within schizophrenia research vary and Daniel (2013) reports that when assessing negative symptoms the evaluation of each domain is important because it is unknown if the underlying psychophysiology is the same or different. The Positive and Negative Symptom Scale (PANSS; Kay, Fiszbein, Opler, 1987) and the Scale for assessment of Negative Symptoms (SANS; Andreasen, 1984) are the two standard scales, which are recommended by the NIMH-MATRICES consensus statement (Kirkpatrick, Fenton, Carpenter, Marder, 2006). Factor analysis of studies employing the SANS (Blanchard & Cohen, 2006) have identified two clusters of negative symptoms. The first is diminished emotional expression (DEE), which incorporates affect flattening and alogia. The second factor is diminished motivation (DM), which involves avolition-apathy and anhedonia-asociality. It would seem that disturbed motivation and volition appear to exert a more pernicious and disabling effect than DEE. Therefore, it could be of benefit if trials keeping this at the forefront to ensure measurement of negative symptoms in a more precise way.

The categorisation of people with schizophrenia into sub-populations means that interventions could be more tailored to the specific difficulties caused by primary symptoms. Indeed, the NIMH consensus statement suggests that negative symptoms should be a specific treatment target and that intervention studies should be able to identify whether treatment effects have targeted primary or secondary negative symptoms.

Due to the enduring and debilitating effects of negative symptoms, psychosocial treatments for negative symptoms have drawn much attention and are a high priority for intervention development (Buchanan, 2007). The effects of standard medical treatments have been

modest (Aleman, Lincoln, Bruggeman, et al., 2016) which has stimulated attention on whether the prognosis for negative symptoms can be modified through psychosocial therapies. A meta-analysis of biological and psychological treatments found that most treatments reduce negative symptoms, however, they did not meet the threshold for clinically significant improvement (Fusar-Poli et al., 2015). In addition, this study incorporated Cognitive Behaviour Therapy (CBT), cognitive remediation and music therapy as one psychological intervention and then aggregated all outcomes to a single effect size. Therefore, it is difficult to comment on the effectiveness of individual interventions (Fusar-Poli et al., 2015).

Cognitive Behaviour Therapy for psychosis (CBTp) is the only psychosocial intervention recommended by the Patient Outcome Research Team (PORT; Dixon, Kickerson, Bellack et al., 2010). Therefore, it will be widely delivered in clinical practice, and it is the most widely studied intervention for psychosis (Aleman, Lincoln, Bruggeman, Melle, Arends, Arango & Kneegtering, 2016). CBTp was originally developed for positive symptoms however; it has also shown promise in reducing negative symptom (Grant, Huh, Perivoliotis, Stolar and Beck, 2011 and Klinberg, Wolwer, Engel et al., 2011).

Elis, Caponigro and Kring (2013) conducted a systematic review of psychosocial treatments for negative symptoms of schizophrenia. They examined the effectiveness of CBT and they concluded that that CBT was effective as an individual treatment but that it was less clear on the effectiveness with group based interventions. They also highlighted that follow-up periods after the intervention was important to fully evaluate the benefits of CBT because the effects of treatment and skills learned persisted over time. They concluded that although NICE guidelines (NICE, 2009) state that CBT is the recommended treatment for schizophrenia they found skills-based interventions to be comparable in effectiveness to CBTp.

A review summarising the evidence for the current treatments of negative symptoms (Aleman et al, 2016) was unable to find the effect sizes in more recent studies that were found in older generation studies. This was also a finding in Volthort, Koeter, van der Gaag et al., (2015). Aleman et al. (2015) concluded that CBT requires further investigation due to the heterogeneity in treatment responses in particular with low functioning patients with moderate to severe schizophrenia.

More recently, Lutgens, Genevieve and Malla (2017) investigated the outcome of negative symptoms in psychological and psychosocial interventions and found that only two out of 27 studies were specifically adapted for negative symptoms. In addition, they stated that there was high heterogeneity between studies proving comparisons problematic.

Differences in study characteristics included treatment length and number of sessions, duration, control groups and different adaptations of CBTp and measurement of negative symptoms. They did report CBTp to be an effective intervention for negative symptoms, however, not against an active control group, concluding that perhaps any intervention is helpful at reducing negative symptoms. Lutgens et al. (2017) also highlight that skills based interventions may have comparative utility to CBT.

In summary, previous meta-analyses have shown that negative symptoms can improve following CBTp even if they have not been specifically targeted as part of the protocol (Wykes, Steel, Everitt, & Tarrier, 2008). One potential interpretation of this is that the negative symptoms that are responding are secondary to positive symptoms, for example, as delusions and hallucinations reduce, so do negative symptoms. It is not clear if studies routinely screen for negative symptoms profiles, this would help to identify whether the effects of treatment have targeted predominant or prominent negative symptoms. This is important because predominant negative symptoms are more pernicious, harder to reduce and therefore warrant attention and no one has tried to analyse the CBTp literature to determine if it is the patients with predominant negative symptoms who show the most reliable treatment effect. Heterogeneity between studies is high as many studies adapt CBT and it is unclear whether these protocol adaptations are a critical factor regarding effectiveness, and in many cases the nature of the adaptations is not clear. Groups are routinely run in community mental health settings due to cost effectiveness, yet it is unclear whether this is an effective method of intervention due to conflicting findings in studies. With these factors in mind, this study will update and extend the Elis et al. (2013) systematic review by examining treatment protocols of more recent studies due to the findings of Volthorst et al. (2015) and Aleman et al. (2016) that newer studies were not replicating the findings of older studies. Secondly, there is a need to scrutinise studies and describe whether there are data that can be extracted re predominant versus prominent negative symptom profiles. Therefore, we will examine if negative symptoms are being routinely screened to identify whether patients have predominant or prominent negative symptoms. Finally, we will re-examine CBT as an individual treatment compared to group interventions, this finding was less clear in Elis et al. (2013), whereas, Volthorst et al.

(2015) found individual interventions more effective than group and Lutgens et al. (2017) found no difference between group or individual CBT for negative symptoms.

Aim and research questions

This systematic review has three key aims, firstly to determine what adaptations are implemented in CBT, how are these adaptations described and if they have any effect on the outcome of negative symptoms. Secondly, to identify if studies routinely screen for negative symptom profiles and thirdly to examine whether group interventions are an effective treatment method.

The following questions guided the systematic review:

1. Are interventions that are targeted towards negative symptoms more effective than those with no adaptations?
2. Are CBT interventions more effective compared to control groups?
3. Do studies examine primary and secondary symptom profiles of participants?
4. Are group interventions an effective CBT treatment for negative symptoms?

1.2 Method

Search Strategy

The literature search was carried out for the period of January 2012 to March 2017. As Elis et al. (2013) have published a systematic review examining psychosocial treatments for negative symptoms, which included CBT we are updating and advancing this paper. The following on-line databases were searched: EBSCO – PsychInfo, CINAHL, MEDLINE and psychological and behavioural Sciences collection. AMED, medline and EMBASE were searched in the OVID database as well as the Cochrane central register of controlled trials.

For each of the databases the following search terms were utilised using the Boolean operator “OR”: (1) schiz* “OR” psychosis; (2) Randomised control trial “OR” RCT; (3) cognitive behaviour* therapy “OR” cognitive behavior* therapy; (4) negative symptoms “OR” symptoms of psychosis. These searches were then combined using the Boolean operator “AND”. A hand search was conducted of the Elis et al. (2013) paper and In addition forward citations on this paper was carried out on all the databases searching for any articles that referenced the systematic review. This resulted in a total of 37 being

identified after the removal of duplicates. The titles and abstracts of these articles were screened to determine eligibility based on the following inclusion criteria:

- Adult participants (18-65) with a reported diagnosis of schizophrenia spectrum disorder.
- Randomised Control Trial design
- CBT intervention as the main treatment and focus of the RCT
- Negative symptoms measured and reported

Papers were excluded if they were not published in English, and if negative symptoms were not reported. In addition, reports, review papers, conference abstracts, theses and unpublished studies were all excluded. This resulted in a total of 8 papers being identified. A second researcher reviewed all the papers at this point and 100% agreement was reached on the included papers. Figure 1 shows the details of this process.

Data extraction and quality ratings

A data extraction sheet was used which recorded information of the following:

- Participant characteristics
- Nature of the CBT intervention and control group.
- Adaptations to protocol
- Measures of negative symptoms
- Information regarding the change in negative symptoms seen in the treatment arm of the trial.

Methodological rigour was assessed using the Clinical Trial Assessment Measure (CTAM; Tarrier & Wykes, 2004) The CTAM is a dedicated scale for assessing the quality of psychological treatment trials in mental health. The CTAM offers an overall assessment of the methodological rigour on six subscales, assessing sample size, recruitment method, allocation to treatment, assessment of outcome, control groups, description of treatment, and analysis. The CTAM total score of 65 or above was chosen by Wykes, Steel, Everitt, and Tarrier, (2008) to describe adequate methodology. The total scores ranged from 68 to 97 with a mean score of 80.50 (9.70; see Appendix 10)

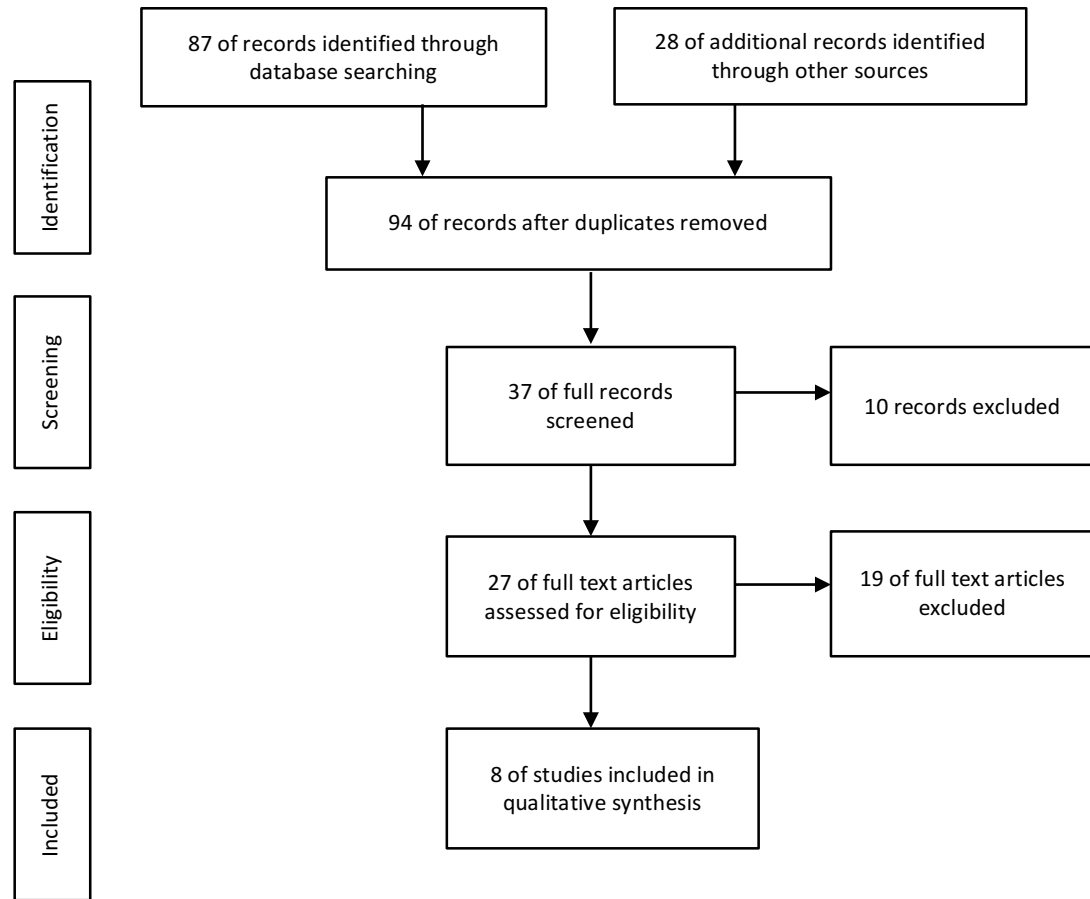


Figure 1: PRISMA diagram of study selection

1.3 Results

Table 1 shows the results for the eight studies that tested CBT for negative symptoms of psychosis. The following details the results in relation to each of the specific questions posed by the review.

CBT adaptations

Granholm, Holden, Link, and McQuaid (2014) adapted CBT to include social skills training (CBSST) and included a goal of therapy to improve functioning of negative symptoms. This was delivered as a group intervention and was a manualised approach, broken down into three modules (cognitive, social and problem-solving skills). The intervention focused on the practice of simplified thought challenging and behavioural experiment activities. Each module had a primary skill which participants were taught to develop. This study found no difference between groups but did find a significant reduction in motivation when followed up 12 months later in the CBT group.

Grant, Huh, Perivoliotis, Stolar and Beck (2012) used Cognitive therapy plus standard treatment, delivered weekly for 18 months. This was an individual treatment plan and sessions were very much tailored to the needs of each individual. This involved focusing on their interests and strengths and defeatist beliefs. The control group received standard treatment from clinicians in the community and were actively engaged in services provided by the local community. Grant et al. (2012) analysed each of the SANS subscales and found that avolition-apathy and anhedonia-asociality (diminished motivation), were significantly reduced in the CT group.

Two studies (Krakvik, Grawe & Stiles, 2013 and Lincoln, Ziegler, Mehl, Kesting, Lullmann, Westermann & Rief 2012) used a simplified version of the treatment model of CBTp, which was adapted by Chadwick, Birchwood and Trower (1996). Both trials aimed their therapy at reducing distress and challenging positive symptoms. The control group for both studies was treatment as usual and both studies were in clinical settings. Both these studies found no difference in negative symptoms between or within groups.

Lecomte, Leclerc and Wykes (2012) conducted CBT in a group setting using a manualised approach which was significantly adapted by the researchers. The adaptations to the intervention involved breaking it down into four parts: (1) stress and how it affects me; (2)

testing hypotheses and looking for alternatives; (3) drugs, alcohol, and how I feel; and (4) coping and competence. The manual follows a positive approach rather than problem based and patients learn to understand CBT. The control group was a skills training groups which was manualised and involved teaching skills for symptom management and relapse prevention. Each group received 24 session (twice weekly), which was over a 3-month period. At the end of the study they found that the skills training group had the same reduction in negative symptoms at a 9-month follow-up.

Li, Guo, Wang, Xu, Qu, Wang, Sun et al. (2015) delivered a culturally adapted CBT manualised CBT approach based on the principles and practice developed by Kingdom and Turkington (2004). The researchers made no negative symptom adaptations. The control group received supportive therapy and both groups received 15 sessions over 24 weeks and were followed up at 19 months. This study found a significant reduction of negative symptoms in both groups.

Morrison, Turkington, Pyle, Spence, Brabban, Dunn, et al. (2015) conducted individual cognitive therapy and treatment as usual using a manualised approach that was developed by the researchers. The treatment as usual group received regular monitoring and assessment with the PANSS which provided additional benefits to participants regarding the therapeutic relationship. Participants in this study were individuals who had chosen not to take antipsychotic drugs and received 26 sessions on a weekly basis for a maximum of nine months and four booster sessions in the subsequent nine months. This study did not find any reduction in negative symptoms in either group.

Naeem, Saeed, Irfan, Kiran, Mehmood, Gul, et al. (2015) employed a culturally adapted CBT intervention following intervention guidelines by Kingdon and Turkington (1994). The intervention was adapted substantially to accommodate the cultural and religious values of the patient group. A major part of the adaptation was the involvement of a family member involved in each session. A total of six sessions was delivered over a period of four months. The control group in this study was treatment as usual which involved routine psychiatric care. This study found a reduction in negative symptoms at the end of treatment only in the CBT group which was statistically significant to the control group.

In summary, studies that found a reduction in negative symptoms after treatment of CBT were Granholm et al. (2014); Grant et al. (2012); Lecomte et al. (2012); Li et al. (2015) and Naeem et al. (2015). Out of those studies, only two (Grant et al. (2012) and Naeem et

al. (2015) found a significant difference in the CBT group compared to the control group. Neither of those two studies conducted a follow-up they both conducted analysis at the end of the intervention.

Three studies Lincoln et al. (2012); Krakvik et al. (2013) and Morrison et al. (2015) found no reductions in negative symptoms in either the treatment group or the control group. Lincoln et al. (2012) and Krakvik et al. (2012) followed up at 12 months, employed a manualised approach and made no adaptations. Morrison et al. (2015) did adapt the intervention, which lasted 18 months and conducted no follow-up.

Control groups

Three studies employed an active control group (Granholm, et al, 2014; Lecomte et al, 2012 and Li et al, 2015). Granholm, et al. (2014) was the only one that found a difference between groups. The other two studies both found an equal reduction in negative symptoms. Five studies employed non-active control groups, three of those (Krakvik, et al, 2014; Lincoln et al, 2012 and Morrison et al, 2015) did not find any reduction in negative symptoms for either group

Negative symptoms

Two studies (Granholm et al, 2014 and Grant et al, 2012) focused on negative symptoms as a primary outcome measure. The only study to evaluate negative symptoms on the basis of predominant or prominent was Grant et al. (2012) which was established by scoring severity of symptoms on the SANS. Studies routinely employed diagnostic criteria to identify inclusion criteria and therefore negative symptoms were assessed as a secondary outcome measure. Table 1 shows that the most commonly employed measure of negative symptoms employed in four studies was the PANSS (Kay, et al., 1987). The SANS (Blanchard and Cohen, 2006) was employed in three studies, and one study (Lecomte, et al, (2012) used the Brief Psychiatric Rating Scale (BPRS; Lukoff, Nuechterlein, & Ventura, 1986).

Scoring on the SANS was carried out differently in each of the three studies that employed this measure. Granholm et al. (2014) used the two-factor model of diminished expression and motivation, whereas Grant et al. (2012) analysed each of the four sub-scales within the measure. Noteworthy both of those studies found an improvement in diminished motivation. Karkvik et al. (2012) only reported the total score of the SANS and found no differences in negative symptoms in either within or between groups.

Group versus individual

Two studies out of eight were group interventions (Granholm et al., 2014 and Lecomte et al, 2012). Both these studies compared CBT to active control groups and followed-up at 12 months. Granholm et al. (2014) found that the CBT SST group had a significant reduction in diminished motivation; the main aim of this study was to reduce negative symptoms. Whilst Lecomte et al. (2012) found that after treatment both groups had the same reduction in negative symptoms, but after 12 months this reduction was only maintained in the CBT group.

Table 1: Randomised Control trials of CBT intervention examining negative symptoms of psychosis

Studies	Participants	CBT	Control	Treatment: sessions, duration (months) & follow-up	NSX Measure	CBT / Control of treatment mean (SD) score n= participants	Baseline/End score	Results: Between groups And NSX
Granholt et al (2014) USA	SCID diagnosis of SCX or SCX-A Duration of illness 21 years (mean) Mean Age: CBT 41.1 Control: 41.6	CBT SST Group Goal: to improve functioning and NSX	Active goal focused supportive contact	36 + 12 booster 9 months Follow-up at 12 months	PANSS total score SANS Diminished Motivation (DM) Expression (DE)	CBT: n=71; n=25 DM: 2.26 (1.11) - 1.74(0.81) DE: 1.82 (1.13) - 1.82 (0.96) Control: n=76; n=31 DM: 2.11 (1.17) -2.27 (1.15) DE: 1.80 (1.15) -2.00 (0.96)		Sig improvement from baseline in diminished motivation in the CBT SST group
Grant et al (2012) USA	DSM-IV diagnosis Low functioning with chronic SCX Prominent NSX using SANS Mean Age: CBT: 34.3 (10.09) Control: Age: 42.9 (10.08)	CT + ST 50 mins weekly Adapted	Standard treatment (ST)	12 sessions 18 months No follow-up	SANS A: avolition B:anhedonia C: affect flattening D: alogia	CBT: n=28 A: 3.3 - 1.6 B: 3.4 - 2.6 C: 2.2 - 2.9 D: 1.5 -1 .5 No SD reported	ST: n= 26 A: 3.2 – 2.8 B: 3.5 -3.1 C: 2.1 – 2.2 D: 1.7 – 0.7	Greater mean reduction in A and B for CBT group and ST group reduction in D
Karkvik et al (2013) Norway	ICD-10 SCX or SCX-A Residual auditory hallucinations and delusions experienced in last 6 months Age: 35.26 (8.89) Age:37.5 (11.15)	CBTp	TAU & waitlist	20 sessions 6 months follow up at 12 months	SANS (only total score)	CBT: 6.48 (3.0) n=23 6.3 (3.32) n=13 Control 8.09 (4.26) n=22 8.14 (3.54) n=15		No difference Between groups and no sig difference in NSX at the end of treatment.

Table 1 Cont'd: Randomised Control trials of CBT intervention examining negative symptoms of psychosis

Studies	Participants	CBT	Control	Treatment: sessions, duration (months) & follow-up	NSX Measure	CBT / Control Baseline/End of treatment mean (SD) score n = participants	Results: Between groups and NSX
Lecomte et al (2008)	Recent onset psychosis Recently discharged from hospital some had unclear diagnosis; SCX spectrum and mood disorder with psychotic features. Age CBT: 24.92 TAU: 23.10	CBT group Manual adapted by study researchers	Skills trg (SM group) Age: 25.44 TAU + waitlist	24 (2x weekly) 3 months 9 months follow-up	BPRS (neg)	CBT (study only reported CI) 1.9 CI (1.5-2.2) n=48 1.4 CI (1.2-1.7) n=35 SM 1.9 CI (1.4-2.3) n=54 1.4 CI (1.2-1.7) n=17 Control 1.6 CI (1.2-1.9) n=27 1.5 CI (1.1-1.9) n=13	At 9 months the skills trg group had the same reduction in NSX as the CBT group.
Lecomte et al (2012) Canada				12 month follow-up		CBT: 1.37 (0.8) n=14	NSX maintained at 12 month for CBT group but not for the skills group.
Li et al (2015) China	SCID for SCX PANSS total score > 60 = mild level of psychiatric symptoms Age CBT : 29.27 (8.36) TAU: 33.44 (9.51)	CBT (CA) Individual Manual	Supportive therapy (individualised psychotherapy) 12 sessions in 12 weeks	12 sessions over 3 months + 3 booster in subsequent 12 weeks. 19 month follow-up	PANSS NEG	CBT 19.99 (5.96) n=96 14.01 (5.18) n=85 Control 20.80 (5.66) n=96 16.24 (6.4) n=82	No sig difference between groups Reduction in both groups for NSX

SCX: schizophrenia; SCX-A: schizoaffective disorder; NSX: negative symptoms; TAU: treatment as usual; ETAU: enhanced treatment as usual; SCID: structured clinical interview for the Diagnostic and Statistical Manual of Mental Disorders, fourth edition; CBTp: Cognitive behaviour therapy for psychosis; CBT (CA): culturally adapted; CT: cognitive Therapy; SANS: Scale for assessment of negative symptoms; PANSS NEG: Psychotic and negative symptom scale;

Table 1 Cont'd: Randomised Control trials of CBT intervention examining negative symptoms of psychosis

Studies	Participants	CBT	Control	Treatment: sessions, duration (months) & follow-up	NSX Measure	CBT / Control of treatment mean (SD) score n= participants	Baseline/End of treatment (SD) score	Results: Between groups And NSX
Lincoln et al (2012) Germany	Diagnosis of SCX or SCX-A or delusional disorder or brief psychotic disorder	CBTp Individual Age: 32.2 (10.4)	TAU & waitlist Standard psychiatric care twice over 4 months Age: 33.1 (10.9)	4-5 sessions 45 months 12 month follow-up	PANSS NEG	CBT 14.9 (4.6) n=40 14.5 (4.6) n=40 Control 13.4 (4.6) n=40 12.9 (3.4) n=40		No difference between groups No sig diff in NSX
Morrison et al (2015) UK	ICD-10 diagnosis of SCX, SCX-A or delusional disorder Not taking psychotic drugs	CT + TAU Individual 60min	TAU (no details)	26 + 4 booster 18 months No follow-up	PANSS NEG	CBT: 13.54 (3.17) n=28 12.53 (16.59) n=17 Control: 14.88(5.77) n=24 16.59(6.65) n=17		CBT had no effect on NSX on either group.
Naeem et al (2015) Pakistan	Diagnosis of SCX or a related disorder according to ICD10 Duration TAU: 4.7 and CBTp: 5.8 years Age: 59 (31.7) Age: 57 (31.1)	CBT (CA) Individual	TAU Routine psychiatric care	6 sessions 4 months No follow-up	PANSS NEG	CBT: 14.7 (3.7) n = 59 11.2 (3.5) n=53 Control: 14.4 (3.4) n=57 14.8 (4.9) n=49		No sig difference in NSX at baseline but Sig diff between groups at end of trial. Reduction in NSX only in CBTp group.

1.5 Discussion

This review found that five out of the eight studies developed their own CBT protocol. Two of those studies had active control groups and both reported reductions in negative symptoms for the CBT group. The other three studies compared against treatment as usual and two found a reduction of negative symptoms in the CBT group. Significantly, the only study that did make adaptations and found no change to negative symptoms was where the patients were not taking any psychotic medication (Morrison et al., 2015). Three studies followed the CBTp manual by Kingdom and Turkington (2004) and all three studies employed treatment as usual for the control group. None of those studies found a reduction in negative symptoms in either group. Only one study (Grant et al., 2012) assessed patients for negative symptoms types and six studies measured negative symptoms. Finally two studies delivered group interventions and both those studies employed active control groups and both found a reduction in negative symptoms in the CBT group.

CBT protocol adaptations

Our findings suggest that if adapted appropriately for the target population then CBT is an effective intervention for reducing negative symptoms of schizophrenia. Nevertheless, all the study adaptations were different and therefore it is not possible to evaluate successful ingredients of the interventions. Heterogeneity is frequently cited as a common issue in these studies (Lutgens, et al., 2017), however, rather than focus on treatment length or patient characteristics we felt it would be more fruitful to establish if adaptations were an important factor. Two studies (Granholtm et al., 2014 and Grant et al., 2012) made adaptations that were behavioural and directed attention towards abilities, focusing on what one could do. The results of these studies both found improvement in motivation, which could indicate that a positive orientation coupled with support in practical skills, are key adaptations to CBT for negative symptoms. Recognising the importance of culture appears to also be an important consideration when adapting CBT for negative symptoms. Naeem et al. (2015) adapted their intervention significantly to accommodate cultural beliefs, however, treatment was only six sessions over four months, yet they found a significant reduction in negative symptoms. The researchers employed the PANSS negative symptom scale which is limited in the information that it provides therefore it is difficult to say what mechanisms were important adaptations. Importantly, Morrison et al. (2015) recruited patients who were not taking any anti-psychotic medication and found no reduction in negative symptoms. The adaptations to the intervention were not explicit,

however, it may be that anti-psychotic medication is an important factor in the treatment of negative symptoms.

Elis et al. (2013) suggested that active controls could be as effective as CBT for reducing negative symptoms. Our findings suggest that an adapted intervention is more effective than active control, however due to the small number of studies in this review it is difficult to say with any certainty.

Ways of Assessing and Analysing Negative symptoms

Only one study (Grant et al., 2012) in this review assessed patients for negative symptom profiles during recruitment eligibility. They employed the SANS to identify prominent negative symptoms and adapted CBT to specifically target prominent symptoms and found a reduction in avolition/apathy. Granholm et al. (2014) also employed the SANS as an outcome measure, and reported the two-factors of diminished motivation and expression. The PANSS was the most commonly used instrument to measure negative symptoms (four out of eight studies). A major limitation with the PANSS is that it only has seven items to measure negative symptoms and is not designed to rate negative symptoms exclusively (Marder and Kirkpatrick, 2014). Although recommended as a valid and reliable measure by the NIMH-MATRICES consensus statement (Kirkpatrick et al., 2006) the advances in the description of negative symptoms require more updated measures for example the Clinical Assessment Interview for Negative Symptoms (CAINS) to address some of the shortcomings. In addition, the SANS and the PANS have been described as out-dated measures (Velthorst et al., 2015) and differ in the domains that they measure which makes comparison across studies difficult.

In summary this review found only two studies that examined negative symptoms profiles in patients. It would seem that diminished motivation shows more capacity for change in interventions, however, as the majority of studies employ the PANSS negative subscale to assess for changes in negative symptoms it is not possible to evaluate this fully. Therefore, studies are not routinely employing newer recommended measures for negative symptoms such as the CAINS and this is important enable clinicians to accurately measure changes in negative symptoms.

Group studies

Group CBT was delivered by two studies and both found a reduction in negative symptoms. Both of these studies compared CBT that was adapted for negative symptoms and compared them to an active control. Whilst no conclusions can be made from the

small number it is interesting that compared to active controls these studies found CBT to be more effective. Elis et al. (2013) reported on five group intervention studies, three of those found improvements but two of those were not above the active control.

Although the low numbers means that we cannot say anything conclusive, it would seem with adaptations CBT can be effective as a group intervention

Future considerations

In order to establish the effectiveness of CBT intervention for negative symptoms future studies should consider how they measure negative symptoms. It would seem that by identifying whether patients are experiencing predominant or prominent symptoms is helpful to establish which type of negative symptoms there has been a reduction in. This is important because a lack of understanding of negative symptoms can hamper treatment and if we can accurately identify sub-populations then treatment programmes can be more tailored.

Conclusion

The results of this review extend previous reviews by examining more recent studies; focusing on CBT intervention protocol; examining if negative symptom profiles are considered as part of the recruitment criteria and extending our understanding of group CBT. Our findings would suggest that tailoring treatment to the individually relevant factors that are identified is likely to lead to better treatment results an intervention towards negative symptoms and the needs of the population could be an important factor the effectiveness of CBT for negative symptoms of schizophrenia. In addition, studies are not employing the recommended measures for negative symptoms. It is important for clinicians to identify whether changes in negative symptoms are predominant or prominent as often changes are as a result of a reduction in positive symptoms or improvements in mood. Finally, only two studies were group interventions and both those studies found a reduction in negative symptoms compared to active controls. We cannot say with certainty but this does suggest that group intervention is effective method to deliver CBT for individuals with schizophrenia.

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CHAPTER TWO: MAJOR RESEARCH PROJECT

How social problem-solving, meta-cognition and autobiographical memory differ in negative subtypes of psychosis.

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2.1 Plain English Summary

Title

How social problem-solving, meta-cognition and autobiographical memory differ in negative subtypes of psychosis.

Background

Negative symptoms are characterized by a loss of normal functioning and as a result can have a bigger impact on life, for example individuals may have less social contact and be involved in less pleasurable activities. Negative symptoms show less improvement with medication. Therefore there is a need to explore alternative treatments such as psychosocial therapies.

Social problem-solving involves actions and thoughts about how to deal with everyday problems of ourselves and others. Difficulties with social problem-solving is common in individuals who experience negative symptoms of psychosis. We are now beginning to understand that part of the difficulty involves thinking about thinking (meta-cognition). We also know that psychological therapies do help with the negative symptoms of schizophrenia but for them to be more effective we need to understand more about the sub-groups of negative symptoms. Therefore, the more we know about all these factors that have a negative impact on the quality of someone's life the more we can adapt psychological therapies to try and improve their quality of life.

Aims and Questions

This study aimed to examine how negative symptoms experienced by people with schizophrenia interact with meta-cognitive and social problem-solving deficits.

Specific research questions include: (i) what is the nature of the relationship between social problem solving and the negative symptoms of schizophrenia? (ii) Do individuals with predominant negative symptoms exhibit more difficulties with meta-cognition and social problem-solving than those with higher levels of positive symptoms of psychosis?

Methods

We recruited inpatients from mental health wards across NHS Greater Glasgow and Clyde. Each participant met with the researcher once. Participants completed questionnaires

measuring mood, social problem-solving and about their negative symptoms. Participants then completed two tasks, one about social problem-solving and another where they were asked questions about their life.

Main Findings and Conclusions

We found that if individuals with a diagnosis of schizophrenia have good problem-solving skills and view problems positively, then they reported lower negative symptoms of avolition and apathy. We also found that mastery, a dimension of meta-cognition was positively associated with actual problem-solving performance. These findings help show support for the importance of social problem-solving skills interventions in relation to the treatment of negative symptoms of schizophrenia.

2.2 Abstract

Background

Negative symptoms in schizophrenia are an important area of research due to their relationship with reduced quality of life. Interventions targeting defeatist beliefs have been found to improve negative symptoms, which are also associated with poor meta-cognition and autobiographical memory. Understanding metacognition may help us to understand the processes that affect social problem-solving (SPS) and negative symptoms, and together this information may help focus newer, more effective interventions.

Aims

The aims of this study were to examine how negative symptoms experienced by people with schizophrenia interact with meta-cognitive, autobiographical memory and social problem-solving deficits.

Method

This was a cross-sectional study of 14 inpatients from the community mental health inpatient and forensic directorate wards across GG&C who had a diagnosis of schizophrenia and were experiencing difficulties with negative symptoms. Participants were asked to complete measures of social problem-solving, mood and negative symptoms. They were then asked to complete four social problem-solving scenarios, then asked questions about their life using the Indiana Psychiatric Illness Inventory (IPII) and finally they were presented with the AM task which consisted of 15 words and each required the participant to attribute the word to a specific memory. Finally, participants were categorized into predominant or prominent symptom profiles for comparison between groups.

Results

Participants were found to have lower levels of avolition and alogia if they have a positive orientation to solving problems and are able to consider various options when trying to solve a problem. In addition the meta-cognition subscale of mastery was positively related to actual problem-solving performance and effectiveness.

Conclusion

Post hoc analysis found that the negative symptoms of avolition and alogia are positively associated with the functional problem-solving constructs of rational problem-solving and positive problem orientation. Whilst this study experienced major methodological limitations the findings could guide future studies to focus on attitudes and actual problem-solving ability, which could be important factors in relation to interventions for negative symptoms.

2.3 Introduction

The negative symptom profiles in people diagnosed with schizophrenia can be divided into a *predominant* pattern (only negative symptoms present) and *prominent* profiles (marked by the presence of both positive and negative symptoms; Carpenter, Heinrichs, Wagman, 1998). Negative symptoms are therefore not a unitary domain and different sub-types require different approaches to treatment (McLeod, Gumley and Schwannauer, 2014). The original five-factor model (Blanchard & Cohen, 2006) can be parsimoniously explained by two factors: diminished emotional expression (which includes blunted affect and alogia) and diminished motivation (avolition, anhedonia, asociality and apathy). It is the latter that are more disabling and pernicious and by their nature these negative symptoms are associated with impairments in social functioning and deficits in social problem-solving. (Hooley, 2010).

A recent meta-analysis (Lutgens, Garipey & Malla, 2017) suggests that there are possible benefits of CBT for negative symptoms; however, little is understood about the mechanisms of change. In one of a few RCTs for negative symptoms, Grant, Huh, Perivoliotis, Stolar and Beck (2011) found a reduction in avolition-apathy in the treatment group. They adapted CBT to accommodate difficulties related to low functioning and aimed it at factors which impede goal attainment, one such factor being defeatist beliefs (If you cannot do something well, there is little point doing it at all). Their findings are consistent with demonstrated associations between negative symptoms and defeatist beliefs (Grant & Beck, 2009). There are similarities between the construct of defeatist beliefs and negative problem orientation (NPO), which is described as viewing problems with a threat to wellbeing and doubting one's own ability to solve problems successfully. This negative orientation can adversely affect the initial cognitive stage of social problem-solving (D'Zurilla & Goldfried, 1971). Studies have found NPO to be positively associated with mood finding an effect size of .47 (D'Zurilla, Nezu & Maydeu, 2002) and .55 (Miller, O'Carroll and O'Connor, unpublished thesis). Therefore, if NPO is a similar construct to defeatist beliefs it would suggest that it could also be associated with negative symptoms of schizophrenia as well as poor social functioning.

D'Zurilla & Goldfried (1971) consider social problem-solving to be a cognitive behavioural process and a vital skill needed to prosper in society as such it is an important factor in behavioural adjustment. Their model of social problem-solving was not formulated for severe psychiatric conditions, however it would seem that that the

characterisation of social problem-solving as a key contributor to psychological wellbeing is also relevant to individuals with a diagnosis of schizophrenia (Morris, Bellack & Tenhula, 2004). Individuals with schizophrenia have been found to have deficits in social problem-solving (Hatahita-Wong, Smith, Silverstein, Hull and Wilson, 2002). Importantly, Revheim, Schechter, Kim, et al. (2006) found that social problem-solving ability is negatively associated with negative symptoms of psychosis. These findings help to explain why individuals who experience negative symptoms of schizophrenia are more likely to be socially isolated, and experience communication difficulties. Social problem-solving has also been found to be affected by other factors which include mood and autobiographical memory (AM; Goddard, Dritschel, & Burton, 1996).

Individuals with schizophrenia have been found to have deficits in both autobiographical memory (Wood, Brewin & McLeod, 2006) and social problem-solving (Morris et al, 2004). Studies have shown that social problem-solving is closely linked to autobiographical memory ability (Goddard, et al., 1996). Further to this, neuroscience research using brain-imaging studies, suggests that there is a link in brain areas that support both autobiographical memory and meta-cognitive functions (Dimaggio, Salvatore, Poplolo & Lysaker, 2012). This link in brain structures therefore means that these two cognitive functions support each other and that disruption in one could lead to disruption in the other. It would seem reasonable to suggest that social problem-solving is also connected with these same brain structures.

Difficulties with meta-cognition are more pronounced in individuals with schizophrenia and they have been found to be associated with negative symptoms (Dimaggio, et al., 2012). Meta-cognitive capacities include the ability to shift back and forward from ones own perspective to that of others (Lysaker & Dimaggio, 2014). In other words this capacity allows us to form meanings, which are crucial in sustaining connections with family and friends as well as the community. A greater impairment in metacognition suggests that individuals may experience a more disabling form of psychosis, which will impact more on predominant negative symptoms, regardless of positive symptoms reduction. This would also suggest that meta-cognitive capacities are key to effective social problem-solving. Therefore, the utility in measuring one's meta-cognitive capacity could help elucidate the impact of meta-cognition on social problem-solving ability and AM.

The constructs of meta-cognition, defeatist beliefs and negative problem orientation are import concepts that warrant clear definitions regarding how they are conceptualized within this study. Firstly, metacognition is defined by Lysaker and Dimaggio (2014) as the ability to understand that others have thoughts and be able to reflect on one's own thoughts. Therefore, understanding that one has their own perspective of a situation and another has their perspective provides insight that each individual can have different perspectives of the same situation. Meta-cognition is a vital social communication tool, which allows humans to sustain relations and solve interpersonal difficulties. In relation to individuals who experience difficulties with psychosis, the greater the impairment in meta-cognition the more difficulty an individual will experience in sustaining interpersonal relationships and having awareness that their thoughts may not necessarily be accurate.

Negative problem orientation (NPO) is a dysfunctional or inhibitive cognitive-emotional set that involves a general tendency to (i) view a problem as a significant threat to well-being, (ii) doubt one's personal ability to solve problems successfully (low self-efficacy), and (iii) become frustrated and upset when confronted with problems in living (low frustration and tolerance; D'Zurilla et al, 2002). Grant and Beck (2009) operationalise defeatist beliefs employing the Dysfunctional Attitude Scale (DAS; Weissman, 1978) which overgeneralizes conclusions about one's ability to perform tasks for example, if I cannot do something well there is little point in doing it at all. Therefore, it is suggested that defeatist beliefs and NPO are similar because by doubting one's ability to do be able to solve a problem is a similar cognitive style to a belief that there is no point in trying to do something if it cannot be done well.

In summary, psychological interventions may be promising treatments for decreasing the negative symptoms of schizophrenia (Elis, et al., 2013). Although untested to date, it can be argued that defeatist beliefs impair social functioning in a similar way to negative problem orientation (NPO). Meta-cognition is key to understanding the minds of others and the meaning of their communication, this could help to explain the difficulties in social problem-solving and negative symptom in particular predominant negative symptom profiles. Therefore this study examines the link between social problem-solving, NPO, negative symptoms of schizophrenia, meta-cognition and AM. Exploratory examination of these cognitive processes will help identify effective modifiable processes for intervention programmes.

Aims and research questions

This is an innovative but early stage study that aims to explore how the development or maintenance of negative symptoms might be affected by social problem-solving, meta-cognition and AM.

Specific research questions include: (i) what is the nature of the relationship between social problem solving and the negative symptoms of schizophrenia? (ii) Do individuals with predominant negative symptoms exhibit more deficits in meta-cognition and social problem-solving than those with higher levels of positive symptoms of psychosis? (iii) Is there a positive association between negative symptoms and negative problem orientation (NPO) and is this similar in magnitude to the correlations previously observed between depression and NPO?

Main Study hypothesis

- (i) We expect there to be a positive correlation between negative problem orientation and the negative symptoms of schizophrenia.

Exploratory hypotheses

- (ii) Individuals with predominant symptoms will be poorer at social problem-solving than those with prominent negative symptoms.
- (iii) We predict that individuals with predominant negative symptoms will have poorer meta-cognitive abilities than those with prominent negative symptoms.

2.4 Method

Participants

Inpatient participants who met the DSM-5 criteria for a diagnosis of schizophrenia were recruited from Greater Glasgow and Clyde (GG&C) NHS mental health wards and Forensic directorates. Eligible participants had to be at least 18 years of age, capable of providing informed consent, had a diagnosis of schizophrenia and were experiencing difficulties with negative symptoms. Exclusion criteria included a documented or self-reported history of traumatic brain injury or learning disability, inability to provide informed consent, and insufficient command of the English language to allow meaningful participation.

Recruitment

RMOs, psychologists and nursing staff were approached to identify and refer eligible inpatients, from Rowanbank medium secure unit, Leverndale low secure unit, Gartnavel Royal Hospital (Clyde and Kelvin wards) and Leverndale hospital (rehabilitation ward and ward 2). Once identified, a staff member discussed the project with the service user, provided them with an information sheet (see Appendix 7) and gained verbal consent for the researcher to make contact. When the researcher met with the participant written informed consent was obtained prior to participant taking part in the research (Appendix 8).

Sample size

Negative symptoms are a major clinical challenge, which are marked by difficulties with meeting life's challenges. This may be due to problem orientation as we know from depression studies that negative problem orientation and symptom severity are positively correlated. Therefore, we used the literature to estimate effect sizes for our current study. The power analysis is focused on negative symptoms of schizophrenia and the relationship to problem orientation. A power analysis was conducted using G* power 3 (Faul et al; 2007) with a medium effect size of .60, alpha set at .05 and a power of .8 this yielded a sample size of 13 for the correlational analysis. The medium effect size was calculated by averaging the correlations from two studies (D'Zurilla, Nezu, Maydeu-Olivares, 2002 and Miller, O'Carroll & O' Connor, unpublished thesis)

Measures

Negative symptoms

The Self-evaluation of Negative symptoms (SNS; Dollfus, Mach & Morello, 2014) is a 20 item self-report measure of negative symptoms of schizophrenia. It assesses experiences and feelings based on the previous week. Statements are scored 2 (strongly agree), 1 (somewhat agree) or 0 (strongly disagree). The sum of all items provides a severity of negative symptoms score ranging from 0 (no symptoms) to 40 (severe symptoms).

The SNS is comprised of five sub-scales (social withdrawal, diminished emotional range, avolition, anhedonia, and alogia), presenting 5 sub-scores derived from the sum of 4 items each: social withdrawal; diminished emotional range; avolition; anhedonia and alogia.

Dollfus et al, (2015) have found the scale to be a reliable and valid measure of negative symptoms. Internal consistency (Cronbach's α) in this sample was .90 for the total score;

social withdrawal $\alpha = .90$; diminished emotional expression: $\alpha = .75$; avolition: $\alpha = .76$; anhedonia: $\alpha = .90$ and alogia: $\alpha = .78$.

Depression

The Beck Depression Inventory (BDI-II; Beck, Steer & Brown, 1996) was used as a self-report measure of depression. This is a 21 question self-report inventory; each item has four possible responses and each answer can be scored on a value of 0 to 3. Each of the 21 items on the scale measures how an individual has been feeling in the last two weeks. The sum of all items indicates the severity of depressive symptoms with a maximum possible score of 63. This measure is widely used, it has been found to yield internally consistent and valid scores and has good construct validity (Dozois, Dobson & Ahnberg, 1998; Schotte, Maes, Cluydts, DeDoncker, & Cosyns, 1997). Internal consistency (Cronbach's α) in this sample was .74.

Social Problem-Solving

The Social Problem-Solving Inventory–Revised: Short Form (SPSI-R: SF; D’Zurilla, Nezu & Maydeu-Olivares, 2002) is a 25-item self-report questionnaire with five sub-scales each of which is designed to tap into one of the five constructs that form the theoretical model of social problem-solving (D’Zurilla & Nezu, 1999). Those subscales are: Positive Problem Orientation (PPO; e.g. ‘Whenever I have a problem I believe it can be solved’); Negative Problem Orientation (NPO; e.g. ‘I feel threatened and afraid when I have an important problem to solve’); Rational Problem Solving (RPS; e.g. ‘When I have a decision to make, I try to predict the positive and negative consequences of each option’); Impulsivity/ Carelessness Style (ICS; e.g. ‘When I am trying to solve a problem I go for the first good idea that comes to mind’) and Avoidance Style (AS; e.g. ‘I wait to see if a problem will resolve itself first, before trying to solve it myself’). Items were designed to reflect cognitive, affective or behavioural responses to real-life social problem-solving situations. Participants are asked to rate the extent to which each statement is true on a five-point Likert-type scale (0 = not at all true of me to 4 = extremely true of me). The reliability and validity of the scale has previously been demonstrated (Hawkins, Sofronoff & Sheffield, 2008; D’Zurilla et al., 2002). Internal consistency (Cronbach's α) in this sample was PPO: $\alpha = .68$; NPO: $\alpha = .68$; RPS: $\alpha = .82$; ICS: $\alpha = .59$ and AS: $\alpha = .65$. According to the internal consistency data reported in D’Zurilla et al. (2002) these coefficients are lower than expected for PPO; NPO; ICS and AS.

The Means End Problem-solving task (Platt & Spivack, 1975) was used to assess actual problem-solving performance. The version employed was a revised version of the original (MEPS-R; Miller, et al., Unpublished Thesis) whereby the original ten scenarios were adapted for today's society and four were identified as appropriate for this population.

Participants were informed that four scenarios would be read aloud to them; in addition they were shown a card with each scenario written on it. Participants were advised that each scenario would include a problem to be solved and that they would also be provided with the ending to the problem. Participants were required to describe the best way to solve the problem, in other words they must connect together the beginning and the end of each of the scenarios, providing the 'ideal strategy' to solving the problem (Marx, et al., 1992). Participant responses were audio recorded and written verbatim by the researcher. The four scenarios were randomised using a web-based randomizer programme to allocate the order in which the scenarios were presented to each participant. The order of scenarios was transferred to an excel sheet to identify order for each participant.

Two dependent variables were derived from each of the MEPS-R scenarios, overall effectiveness and relevant mean steps (Williams, Barnhofer, Crane & Beck, 2005).

Relevant means (active problem-solving steps) were scored using a coding framework which provides details on how to score each scenario (see Appendix 9). The total number of categories (mean steps) was totaled for each participant per scenario, then the scores for each participant's four scenarios were totaled which gave each participant a total relevant means score across all four scenarios. Scoring involved summing the scores relevant means ($\alpha = .81$).

Effectiveness was defined according to the definition of an effective problem solution provided by D'Zurilla and Goldfried (1971). Following this definition a problem solving-strategy is deemed to be effective if it maximizes positive short and long-term consequences and minimizes negative (short and long-term) consequences, both personally and socially. The overall effectiveness of each strategy was rated on a 7-point Likert-type scale ranging from "1 - not at all effective" to "7 - extremely effective". Scores were then totaled for each participant on all four scenarios. This method of scoring was the same as detailed by Williams, et al. (2005). Cronbach alpha for effectiveness was $\alpha = .79$.

Transcripts were rated by two independent raters, consistency between raters was established on a sample of 50% of the cases yielding coefficients (Cohen, 1960) of kappa

.90, $p < .001$ for number of relevant means and Kappa (.75), $p < .001$ for ratings of effectiveness, both of which are viewed as very good and good (Landis & Koch, 1977).

Autobiographical memory

The Autobiographical Memory Test (Williams and Broadbent, 1986) is based on classic memory cueing paradigms. Participants are asked to report a specific memory detailing a personally experienced event that can be located in time and place in response to positive (happy, safe, interested, successful and surprised), negative (sorry, angry, clumsy, hurt and lonely) and neutrally cued words (grass; gigantic; absence; wildlife and bread). The words are presented in a fixed randomized order. The cue words were taken from previous studies using this paradigm (Wood, Williams & Ferrier, 2006). The participants were presented with each word verbally and visually and were asked ‘can you tell me of something that has happened to you that you are reminded of when you see the word?’. When it was not clear whether the initial response referred to a specific event the researcher provided the standard prompt: ‘Can you think of a particular time’.

A response was coded ‘specific’ if it was a single personally experienced event, located in time and place and lasting no more than a day in duration. Overgeneral responses were coded as either ‘categoric’ (multiple occurrences of the same event) or ‘extended’ (a single event lasting more than one day and having a definite beginning and end), ‘association’ if the response was not a memory but related to the word. Kaney. et al (1999) included a further category of ‘uninterpretable’, which was used if any responses that did not qualify as the recall of a memory or the participant was unable to recall a memory.

Transcripts were rated by two independent raters, consistency between raters was established on a sample of 50% of the cases yielding coefficients (Cohen, 1960) of kappa .74, $p < .001$, which is viewed good (Landis & Koch, 1977).

Indiana Psychiatric Illness Interview (Lysaker, 2002)

This is a semi-structured interview developed to assess narratives of illness experience in people with psychosis and other severe and/or enduring conditions. The first part of the interview is spent establishing rapport and the interview style is conversational in nature with minimal input or direction from the interviewer. Four main areas are examined: the life story of the participant; how they understand their illness; how their illness “controls” their life and how they control it; and what they expect for the future. The interviewer does not ask questions about specific symptoms but may ask for clarification and further

information.

Metacognition Assessment Scale-Abbreviated (MAS-A; Lysaker et al., 2005)

This has been adapted for specific use with the IPII from the original MAS (Semerari et al., 2003), which was created to assess for metacognitive changes in therapy transcripts. The transcript of the IPII provides the source material for rating metacognitive ability. It focuses on four areas reflecting each of the MAS subscales: the participant's "self reflectivity" (their understanding of their own mind), their "understanding of other's minds", "decentration" (the ability to consider the world from other perspectives) and "mastery" (using mental state to solve problems). Each subcomponent has a separate hierarchical scale and a participant is awarded one point for each step on the scale that they achieve.

Primary MAS-A ratings were provided in the United States by the team of the MAS-A authors to ensure rigour. 30% of transcripts were double rated to ensure reliability. The inter-rater reliability for the raters of the responses yielded coefficients of (Cohen, 1960), kappa .78, $p < .001$, which is viewed as good (Landis & Koch, 1977).

Predominant and prominent negative symptoms

Predominant and prominent negative symptoms were operationalized using the constructs as defined by Buchanan (2007). Predominant or primary negative symptoms of schizophrenia are intrinsic to schizophrenia, are independent of any other biological or environmental factors and are unrelated to positive symptoms. Prominent or secondary negative symptoms occur in association with or are caused by positive symptoms. In addition, they can be caused by medication side effects or other treatment and illness related factors. During recruitment clinicians were asked to identify which category of negative symptoms the participant was experiencing difficulties with using the aforementioned definitions.

Research Procedures

After signing the consent form participants were presented with a questionnaire packet, which included the SPSI-R, BDI and SNS. The next task (MEPS) required participants to solve four problem scenarios. Participants were asked to generate a specific memory (AMT) detailing an event in relation to 15 words, which were presented in a randomized order. The last procedure was the IPII, which required the participant to respond to open

ended questions that asked about their lives and experiences of their illness. The whole procedure lasted an average of 50 minutes (range 40 to 65 mins).

Data analysis

It was planned that data cleaning would be carried out to check for missing values and outliers. SPSS 22 would be used to run descriptive and correlation analysis. Due to the small sample size non-parametric tests would be used. Spearman's rho correlational analysis would be run to test for the main effect of the relationship between negative symptoms of schizophrenia and negative problem orientation. The sample would then be split into type of negative symptoms participants were experiencing (predominant or prominent) to investigate differences in scores.

Post hoc analysis

In order to ascertain if there would be a relationship between social problem-solving, meta-cognition, autobiographical memory and negative symptoms of schizophrenia, Spearman's rho correlational analysis would be calculated.

Ethics

Multi-site ethical approval was provided by South East Scotland Research Ethics Committee (see Appendix 6). Approval was also gained by NHS Greater Glasgow and Clyde's respective Research and Development Departments (See Appendix 4) and the Forensic Directorate Ethics Committee (see Appendix 5).

2.5 Results

Demographic Information

A total of 25 inpatients with a diagnosis of schizophrenia were considered eligible from 11 wards across GG&C. Of those, 16 agreed to be approached, one was unable to complete the consent form and one individual refused to take part as there was no remuneration. From the 14 that consented, Rowan bank, Gartnavel and Leverndale rehab wards each provided four participants and two were recruited from Leverndale low secure wards. One individual was unable to complete the study as they became unwell after their first meeting with the researcher. This participant did not complete the BDI-II. Most of the participants (9) were able to complete the study in one session, one individual required four separate visits from the researcher to complete the study and four participants required two visits to complete the study. Participants included 13 males and one female all with a diagnosis of schizophrenia. The mean age of the total sample was 41.71 (12.33) years with a range of 27 years to 71 years and the mean age of male participants was 39.46 (9.36) years with a range of 27 years to 55 years.

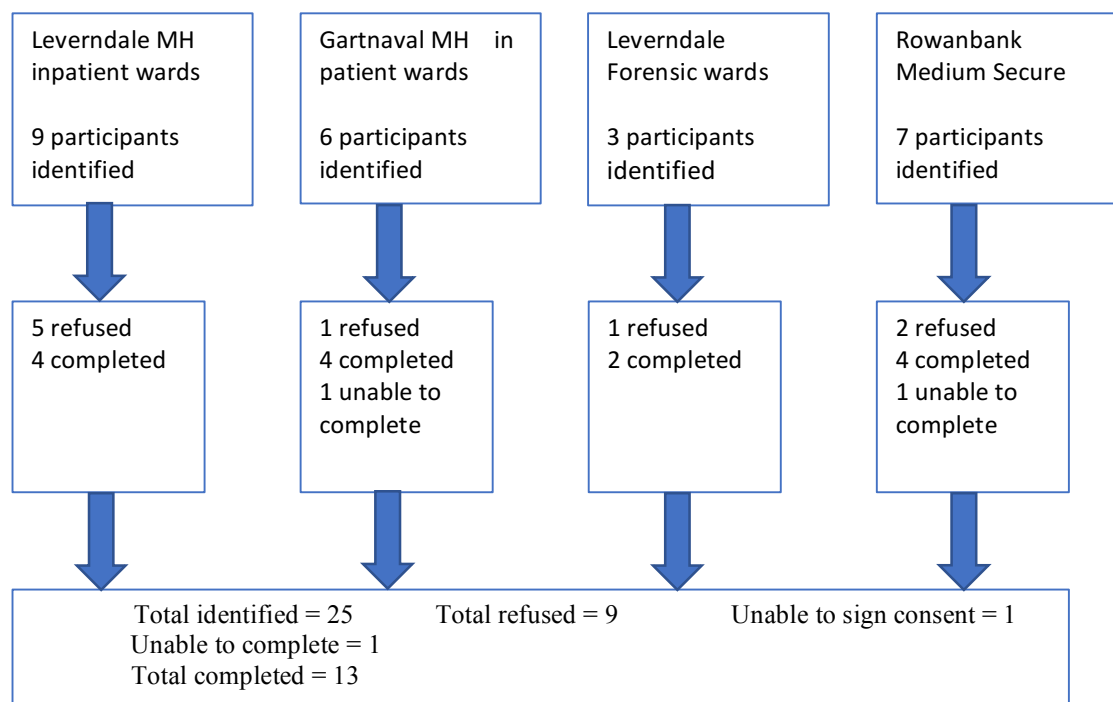


Figure 2.1: Flow diagram of study recruitment.

Table 2.1: Median and IQR on all study variables

Measure	Median	IQR
<i>SNS total</i>	12	14
• Social withdrawal	1	5
• Diminished emotional range	3	5
• Avolition	1	4
• Anhedonia	1.5	4
• Alogia	4	2
<i>BDI-II</i>	10	5
<i>Social Problem solving</i>		
• NPO	4.5	4
• PPO	13.5	8
• AS	8	7
• RPS	11.5	8
• ICS	5	7
<i>MEPS</i>		
• Mean steps	6	5
• Effectiveness	8.5	7
<i>AMT</i>	25	12
<i>MAS-A</i>		
• Total	9.5	7
• Self-reflectivity	3.25	1
• Understanding others	2	1
• Dcentration	0	1
• Mastery	2.5	3

Table 1 shows all the median scores for all study variables.

Relationship between NPO and negative symptoms of schizophrenia

To examine the main study hypothesis, that we expect there to be a positive correlation between negative problem orientation (NPO) and the negative symptoms of schizophrenia a Spearman's rho correlation analysis was conducted to examine the relationship between NPO and negative symptoms subscales and the total score of the scale for negative symptoms of schizophrenia.

Table 2.2: Spearman's rho correlation of NPO and negative symptoms of schizophrenia.

	NPO	SW	DER	AV	AN	Alogia	TSNS
NPO	-	.31	.38	.25	.19	.14	.33
SIG		.28	.19	.40	.19	.14	.25
N	14	14	14	14	14	14	14

NPO: negative problem orientation; SW: Social withdrawal; DER: Diminished emotional range; AV: avolition; AN: anhedonia and TNS: total scale for negative symptoms.

Correlation is significant at *P < .05; ** P < .01

Table 1 shows that NPO was not significantly associated with any scores on the SNS, which did not support the study hypothesis.

Differences between predominant and prominent negative symptom profiles in schizophrenia.

In order to test our exploratory hypotheses (i) Individuals with predominant symptoms will be poorer at social problem-solving than those with prominent negative symptoms and (ii) that individuals with predominant negative symptoms will have poorer meta-cognitive abilities than those with prominent negative symptoms median scores for predominant and prominent symptoms groups across study variables of social problem-solving and meta-cognition. Table 3 shows that the group with predominant symptoms were found to have slightly lower median scores on all of the social problem-solving subscales (both SPSI-R and MEPS) apart from AS. These results show some support for the study hypothesis that those with predominant symptoms would score lower on social problem-solving.

The median scores for meta-cognition, were higher for the predominant group on all subscales apart from decentration. These results do not support the study hypothesis that those with predominant symptoms would be poorer at meta-cognition.

Table 2.3: Median and IQR scores for the predominant and prominent groups on key study variables

Variable	Predominant n = 8		Prominent n = 6	
	Median	IQR	Median	IQR
PPO	13.50	9	14.00	8
NPO	4.50	8	5	10
RPS	10.50	10	11.50	7
ICS	4.5	8	5.5	8
AS	8	6	7.50	9
MEPS				
Means	5.5	8	6.5	3
Effectiveness	7.50	6	9	8
MAS total	10.00	7	8.75	6
Self-reflectivity	3.00	1	2.00	1
Understanding others	2.00	1	2	.63
Decentration	0	0	.5	1
Mastery	3.50	4	2.5	4

PPO: positive problem orientation; NPO: negative problem orientation; RPS: rational problem-solving; ICS: impulsive/careless problem-solving; AS: avoidance style; SW: social withdrawal; DER: diminished emotional range.

Post hoc analysis

Table 2.4 shows that PPO was significantly negatively correlated with avolition ($r_s = -.52$, $p < .05$) and RPS was significantly negatively correlated with alogia ($r_s = -.55$, $p < .05$).

Table 2.4: Spearman's rho correlations, of social problem-solving and negative symptoms of schizophrenia.

	1	2	3	4	5	6	7	8	9	10
1. PPO	-									
2. NPO	-.39	-								
3. RPS	.70*	-.17	-							
4. ICS	.34	.19	-.08	-						
5. AS	.04	.62*	.13	.34	-					
6. SW	-.52	.31	-.58	.06	.15	-				
7. DEM	.08	.38	-.06	.47	.24	.47	-			
8. Avolition	-.52*	.28	-.45	-.15	.24	.72*	.24	-		
9. Anhedonia	-.41	.19	-.40	.60	.33	.55*	.28	.78**	-	
10. Alogia	-.43	.14	-.55*	.31	.13	.49	.23	.18	.20	-

PPO: Positive problem orientation; NPO: Negative problem orientation; RPS: Rational problem-solving; ICS: Impulsive/careless problem-solving; AS: Avoidance style; SW: Social withdrawal; DEM: Diminished emotional range.

Correlation is significant at * $P < .05$; ** $P < .01$

Social problem-solving and meta-cognition

Spearman's rho correlation analysis was conducted to examine the relationship between the four subscales of meta-cognition and the MEPS-R.

Table 2.5: Spearman's rho Correlations with interpersonal problem-solving and mastery

Means-End Problem-solving	Mastery
Mean-steps	$r_s = .64$, $p < .05$
Effectiveness	$r_s = .63$, $p < .05$

Table 5 shows that the mastery subscale of the MAS for metacognition was significantly positively correlated with mean steps and effectiveness ratings of the MEPS ($r_s = .64$, $p < .05$; $r_s = .63$, $p < .05$).

Autobiographical memory, social problem-solving and meta-cognition

AM was not found to be significantly associated with any variables within this study.

2.6 Discussion

Main findings

This study did not find support for the main hypothesis that there would be a positive correlation between negative problem orientation (NPO) and the negative symptoms of schizophrenia. We also did not find support for our exploratory hypotheses, that individuals with predominant symptoms would be poorer at social problem-solving and meta-cognition than those with prominent negative symptoms. Post hoc analysis found that the mastery sub-scale of meta-cognition was positively associated with actual problem-solving ability.

Social problem-solving, meta-cognition and negative symptoms of schizophrenia

Interestingly, a negative relationship was found between positive problem orientation (PPO) and the negative symptom of avolition. This could mean that if problems are seen as overwhelming or challenging then they will be avoided and this may generalise to a pattern of limited goal pursuit and motivation to confront challenges.

Although not what we predicted it does provide partial support for how orientation to solving a problem is connected to levels of negative symptoms of schizophrenia.

A negative relationship was found between rational problem-solving (RPS) and alogia.

This means that individuals who are able to explore various options when trying to solve a problem are able to interact and communicate with others. Therefore, if individuals are experiencing high levels of alogia then it would be very difficult to be able to explore options to solve problems. Nevertheless, these findings are highly speculative and we must be cautious of the character of these observations.

Our study found that those with positive attitudes towards their ability to solve problems have reduced levels of avolition, which supports previous research by Grant et al. (2011). They found that by focusing on what one can do and be positive in attitude can help to improve drive and motivation. These sub-types of negative symptoms are important to them exerting a more pernicious and disabling effect on individual with schizophrenia.

In addition our findings would support Revheim et al. (2006) who found that negative symptoms predict problem-solving skills but we are able to extend this finding. Revheim et al. (2006) examined problem-solving as a whole construct, whereas, we examined specific constructs of problem solving. In particular we examined functional and dysfunctional styles and their relationship with specific negative symptoms of schizophrenia.

The mastery subscale of metacognition and actual social problem-solving performance were found to be positively associated. This may mean that the ability to use one's own mental state is crucial for actual problem-solving ability. This is an interesting finding and could help us to understand the relationship between meta-cognition and social problem-solving which will be important to understand these processes for interventions.

Limitations

A major limitation with this study was the parameters set around eligibility criteria which proved challenging for clinicians to identify appropriate participants. Also, due to the nature of negative symptoms and their impact on functioning some participants did struggle with the detail and length of the study. In addition, classifying predominant and prominent symptoms was not carried out adequately and therefore this categorization is questionable within the recruited participants. It is also likely that participants were under reporting their symptoms due to their environment in order to appear well. Many participants reported that they did not agree with their diagnosis and may have been motivated to appear well due to the levels of restrictions place on them. Therefore, it is likely that there was a bias of reporting symptoms and it may be that a community sample may have been more appropriate for this study.

Another major limitation was that the study was powered for a key hypothesis. It could be that the effect size is much smaller in patients experiencing difficulties with negative symptoms and a larger sample size was required. Due to the low sample size the secondary hypotheses were underpowered and therefore type II error is likely. Negative symptoms were a key variable in this study therefore it may have been prudent to employ a secondary measure which could have been completed by staff. This may have allowed for more accurate measurement, which may also have helped with the allocation of the sample into predominant and prominent symptoms.

Future research

Due to the difficulties with recruitment we would suggest that future research in this area recruit in a community population with a larger sample size. This was an exploratory study with major limitations but future studies could focus on the relationship with meta-cognition and problem-solving performance in order to substantiate any findings. Future research should also consider how negative symptoms profiles are identified, as this is crucial to the nature of this research. If social problem-solving and meta-cognition are

associated then it could mean that enhancing social problem-solving skills could help individuals to integrate more and improve the quality of their lives.

Conclusion

Post hoc analysis found that the negative symptoms of avolition and alogia are positively associated with the functional problem-solving constructs of RPS and PPO. We also found that the meta-cognition subscale of mastery was positively associated with actual problem-solving ability. Whilst this study experienced major methodological limitations these findings suggest that attitudes and actual problem-solving ability are important factors in relation to interventions for negative symptoms. Due to the exploratory nature of this study we have highlighted challenges in conducting research in this population and as such we suggests that future research may prove more fruitful in a community population.

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MRP proposal (V4)

How social problem-solving, meta-cognition and autobiographical memory differ in negative symptom subtypes of psychosis.

Student ID: 2104758m

Date of submission 7 Sep 2016

Word count: 3562

Abstract

Background

Schizophrenia can be marked by debilitating negative symptoms that are often treatment resistant. Negative symptoms may be linked to difficulties with meta-cognition and social problem-solving. Autobiographical memory retrieval deficits have previously been linked to meta-cognition and social problem-solving in individuals with schizophrenia. These cognitive factors go some way to explain the profound social difficulties that an individual can experience as a result of the negative symptoms of schizophrenia.

Aims

This study aims to examine individuals with psychosis to understand how meta-cognitive, autobiographical and social problem-solving deficits vary in relation to negative symptom profile.

Methods

Participants who have a diagnosis of psychosis will be recruited from inpatient wards in the forensic directorate of GG&C and be grouped according to the presence of predominant versus prominent negative symptoms. Participants will meet with the researcher face to face and be asked to respond to which will probe meta-cognitive capacity, scenarios concerning social problem-solving performance and autobiographical memory. The procedure is expected to take about 90 minutes.

Applications

This study will validate revised measures in social problem-solving and help to improve understanding of the relationship between meta-cognition and social problem-solving in those who experience negative symptoms. This will inform psychological treatment models and strategies.

Introduction

Schizophrenia affects about 1% of the population and appears to be caused by genetic and environmental factors. DSM-5 (American Psychiatric Association, 2010) describes symptoms of schizophrenia to include positive symptoms and negative symptoms. Positive symptoms include delusions and hallucinations while negative symptoms can include poverty of speech and action, difficulties sustaining intersubjectivity, failure to sustain social relations, problems expressing one's own emotions and poor understanding of the emotions, intentions and communication of others (American Psychiatric Association, 2010). Positive symptoms can respond more readily to antipsychotic medication than negative symptoms which can be persistent and are associated with poor functioning and quality of life (Elis, Caonigro & Kring, 2013) and are resistant to pharmacological medication (Barns & Paton, 2011). Therefore greater understanding of negative symptoms and the mechanisms involved in these deficits is important.

Negative symptom profiles in people diagnosed with schizophrenia can be divided into those that are *predominant* (only negative symptoms present) versus prominent negative symptom profiles (marked by the presence of both positive and negative symptoms (Carpenter, Heinrichs, Wagman, 1998). McLeod, Gumley & Schwannauer, 2014) report that different sub-types of negative symptoms have different prognostic implications and therefore, treatments work differently for different subtypes of negative symptoms. By their nature negative symptoms are associated with impairments in social functioning (Hooley, 2010) and deficits in social problem-solving.

In one of a few RCTs for negative symptoms, Grant, Huh, Perivoliotis, Stolar and Beck (2011) found cognitive therapy to be effective for individuals with a diagnosis of schizophrenia who were cognitively impaired and experienced low functioning. They adapted the therapy to accommodate difficulties related to low functioning and aimed it at factors which impede goal attainment, one such factor being defeatist beliefs (If you cannot do something well, there is little point doing it at all). The treatment group experienced improvement in global functioning and a reduction in avolition-apathy, indicating that cognitive therapy can produce meaningful improvements. This result is consistent with demonstrated associations between negative symptoms and defeatist beliefs (Grant & Beck,

2009). The construct of defeatist beliefs is similar to negative problem orientation (NPO) which can adversely affect the initial cognitive stage of social problem-solving (D’Zurilla & Goldfried, 1971). However, it is unknown whether there is a relationship between NPO and the negative symptoms of schizophrenia. This warrants attention given the intersection between negative symptoms, defeatist cognitions, poor social functioning in people diagnosed with schizophrenia.

D’Zurilla & Goldfried (1971) consider social problem-solving to be a cognitive behavioural process and a vital skill needed to prosper in society as such it is an important factor in behavioural adjustment. D’Zurilla and Goldfried’s (1971) model of social problem-solving was not formulated for severe psychiatric conditions, however it would seem that the characterisation of social problem-solving as a key contributor to psychological wellbeing is also relevant to individuals with a diagnosis of schizophrenia (Morris, Bellack & Tenhula, 2004). Individuals with schizophrenia have been found to have deficits in social problem-solving (Hatahita-Wong, Smith, Silverstein, Hull and Wilson, 2002). Importantly, Revheim, Schechter, Kim, Silipo, et al. (2006) found that social problem-solving is negatively associated with negative symptoms of psychosis. These findings help to explain why individuals who experience negative symptoms of schizophrenia are more likely to be socially isolated, never marry and have poor communication skills. Nevertheless, social problem-solving is a cognitive behavioural function that is complex and dysfunctional social problem-solving has found to be affected by other factors which include mood (Goddard, Dritschel, & Burton, 1996) and autobiographical memory (Williams, 1998).

Individuals with schizophrenia have been found to have deficits in both autobiographical memory (Wood, Brewin & McLeod, 2006) and social problem-solving (Morris et al, 2004). Studies have shown that social problem-solving is closely linked to autobiographical memory ability (Goddard, Dritschel and Burton, 1996). Further to this, neuroscience research using brain-imaging studies, suggests that there is a link in brain areas that support both autobiographical memory and meta-cognitive functions (Dimaggio, Salvatore, Poplolo & Lysaker, 2012). This link in brain structures therefore means that these two cognitive functions support each other and that disruption in one could lead to disruption in the other. It would seem reasonable to suggest that social problem-solving is also connected with these same brain structures.

Meta-cognitive capacity deficits are posited to be more pronounced in individuals with schizophrenia and they have been found to be associated with negative symptoms (Dimaggio, Salvatore, Popolo & Lysaker, 2012). Meta-cognitive capacities include the ability to shift back and forward from one's own perspective to that of others (Lysaker & Dimaggio, 2014). This is important because being able to form complex ideas about oneself and others enables one to respond to psychological challenges. In other words this capacity allows us to form meanings, which are crucial in sustaining connections with family and friends as well as the community. This would also suggest that meta-cognitive capacities are key to effective social problem-solving.

Lysaker and Dimaggio (2014) developed an interview that has the capacity to measure an individual's ability to form complex representations of their self and others (Indiana Psychiatric Illness Interview; IPII). These authors argue that this new research paradigm is a method by which to measure the core disturbances in the consciousness of individuals with schizophrenia. Therefore, the utility in measuring one's meta-cognitive capacity could help elucidate the impact of meta-cognition on social problem-solving ability.

Salvatore and Dimaggio (2007) argue that the negative symptoms of schizophrenia can be understood under the context of simulation theory which proposes that our awareness of others' minds is based on an innate ability to use our own experiences as a model. This ability is described as a simulation process, which is implicit and non-conscious actions and key to understanding the minds of others and the meaning of their communication. This theory can help to explain the difficulties in meta-cognitive capacities and deficits in social problem-solving.

Both meta-cognitive and social problem-solving rely on previous experience to function, this could therefore mean that they both rely on intact autobiographical memory to function effectively. Nevertheless, there is a dearth of research that explores this triad of cognitive factors and how they differ between sub-types of negative symptoms.

Understanding the interface between problem-solving, autobiographical memory, and metacognition functioning also has particular relevance in forensic contexts.

Poor social problem-solving may account for criminal behaviour in mentally disordered offenders (McMurran et al, 2001) and it could be argued that some offences may be a maladaptive way in which to solve an interpersonal problem. Forensic patients are a heterogeneous group with a range of mental disorders which can include brain damage; personality disorder; psychopathy; learning disability; depression; bipolar and schizophrenia (Hodgins and Muller-Isberner, 2001). With this in mind it seems fit to conduct this study with this population.

In summary, individuals with schizophrenia experience negative symptoms that can be linked to basic brain processes involved in intersubjectivity and mental state processing (Salvatore and Dimaggio, 2007). This may result in an inability to understand the minds of others and the meaning of their communication and this in turn may cause social isolation and problematic relationships. Individuals with negative symptoms are poorer at social problem-solving (Morris, et al 2004; Revheim et al, 2004) and it is well established in the literature that deficits in AM will predict poor social problem-solving (Goddard et al, 1996). Meta-cognitive abilities and AM also appear to be closely linked (Dimaggio et al, 2012) however, what is not clear is the relationship between these three key cognitive functions and their differences, if any in the subtypes of negative symptoms.

Psychological interventions may be promising treatments for decreasing the negative symptoms of schizophrenia. This is important because negative symptoms substantially affect quality of life and defeatist beliefs are posited to be key mediator of cognitive impairment, negative symptoms and functioning (Grant & Beck, 2009). Although untested to date, it can be argued that defeatist beliefs impair social functioning in a similar way to negative problem orientation (NPO). Therefore this study examines the link between social problem-solving, NPO and the negative symptoms of schizophrenia. This will help identify effective targets for psychological intervention programmes.

Aims and research questions

This study will examine individuals with psychosis to understand how meta-cognitive, autobiographical memory and social problem-solving deficits interact with negative symptom presentation profiles.

Specific research questions include: (i) What is the nature of the relationship between social problem solving and the negative symptoms of schizophrenia? (ii) Do individuals with predominant negative symptoms exhibit more deficits in meta-cognition, autobiographical memories and social problem-solving than those with prominent symptoms of psychosis? (iii) Do defeatist beliefs and negative problem orientation (NPO) relate to negative symptoms in the same way that NPO and depression scores relate?

Study hypotheses

- (i) We expect there to be a positive correlation between negative problem orientation and the negative symptoms of schizophrenia.
- (ii). We predict that individuals with predominant negative symptoms will have poorer meta-cognitive abilities and social problem-solving than those with prominent negative symptoms.
- (iii) Individuals with predominant symptoms will be poorer at observed interpersonal social problem-solving than those with prominent negative symptoms.

Plan of Investigation

Design

This will be a between subjects, cross-sectional study of inpatients from Rowanbank medium secure unit and Leverndale low secure unit.

Participants

Inpatient participants will be recruited who meet the DSM-5 criteria for a diagnosis of psychosis from the forensic directorate of Greater Glasgow and Clyde NHS. Participants will be over 18 years and be either male or female within GG&C patients will be pooled from Rowan Bank medium secure unit, which has a capacity for 74 patients and Leverndale low secure unit which has capacity for 50 patients. Participants will be split into two groups, those with predominant symptoms and those with prominent symptoms, these groups will be allocated with the assistance of clinical staff. Exclusion criteria will include traumatic brain injury, learning disability, those not able to provide informed consent and those whose first language is not English. RMOs, psychologists and nursing staff will be approached to assist with the recruitment of inpatients.

Measures

The following measures will be employed; Self-evaluation of Negative symptoms (SNS; Dollfus & Mach, 2014); The Indiana Psychiatric illness Interview (IPI; Lysaker, Clements, Plascak-Hallberg, Knipscheer & Wright, 2002); The Means-end Problem-solving Task Revised (MEPS-R; Miller, O'Carroll & O'Connor, Unpublished Thesis); The Autobiographical Memory Test (AMT; Williams and Broadbent, 1986); The Beck Depression Inventory (BDI-II; Beck, Steer & Brown, 1996) and the Social Problem-Solving Inventory (SPSI-R; D'Zurilla, Nezu & Maydeu-Olivares, 2002).

Research Procedures

Participants will be identified through discussion with treating clinicians (e.g. nurses, psychiatrist, psychologist) and only people with capacity to consent to participation will be approached. Once eligible participants have been identified they will be invited to meet with the researcher. The study will be explained again using the information sheet, if they agree to take part in the study they will be invited to provide informed consent.

If participants become unwell or distressed during the study then the researcher will contact a member of the clinical team, end the study and allow the participant to be treated appropriately. If it is appropriate then the participant will be approached and asked at a later date if they would wish to continue with the study.

The researcher will check frequently for the duration of the study that the participant is ok and happy to continue to the next task, and also offer frequent breaks.

The initial information and consent phase is expected to take about 10 minutes.

Participants will then be presented with a questionnaire packet, this will include the measures of social problem-solving (SPSI-R), mood (BDI) and negative symptoms checklist (SNS). This will take each participant about 15 minutes to complete.

Social problem-solving task (MEPS-R; Miller, O'Carroll & O'Connor, Unpublished Thesis).

Participants will then be informed that four scenarios will be read aloud to them; in addition they will be shown a card with each scenario written on it. Participants will be advised that each scenario will include a problem to be solved and that they will also be provided with the ending to the problem. Participants are required to describe the best way to solve the problem, in other words they must connect together the beginning and the end of each of the scenarios, providing the 'ideal strategy' to solving the problem (Marx, et al., 1992). As participants describe how they would solve each problem scenario the researcher will record this information by writing out their responses and in addition will be audio recorded. The four scenarios will be randomised using a web-based randomizer programme to allocate the order in which the scenarios will be presented to each participant. This is expected to take about 15 minutes to complete.

Autobiographical memory task (Williams and Broadbent, 1986).

Participants will then be asked to generate a specific memory to five positively cued words (happy, safe, interested, successful and surprised) and five negative words (sorry, angry, clumsy, hurt and lonely). Each participant will be given three practice words and this is expected to take about 15 minutes to complete.

Meta-cognition (Indiana Psychiatric Illness Interview; Lysaker, 2002).

A semi-structured interview will be employed to assess narratives of illness. At this stage it is anticipated that some rapport will be formed, as the interview is conversational in nature. The interviewer does not ask questions about specific symptoms but may ask for clarification and further information. This is expected to take about 20 minutes.

The participant will then be informed that the study is completed, and invited to ask any questions. This is expected to take 5 minutes.

The whole procedure is expected to take approximately 80 minutes; due to the length of the study participants will be offered a break of ten minutes, the total length of time for the study will be 1 hour 30 minutes.

Data analysis

SPSS 22 will be used to run descriptive analyses, correlations and t-tests. Five participants will be randomly selected to be scored by a second-rater.

Data cleaning will be carried out to check for missing values and outliers.. Violations of assumptions of normality and equal variance will be checked by using normality tests and graphs. If there are any violations of assumptions consideration will be given to transforming the data. Cases with large volumes of missing data will be excluded but, where possible, missing responses will be imputed with mean values of the data set.

Correlational analysis will be run to test for the main effect of the relationship between negative symptoms of psychosis and negative problem orientation.

Data Management Plans

All data will be anonymised by providing each participant with a unique identification number, which will conceal their identity on all paper and electronic files. All qualitative data will have identifiable information removed. This data will be saved to an encrypted memory stick and only be used on NHS computers. All data will be backed up on a secure network. Encrypted audio recording device information will be transcribed using a NHS computer and saved on an encrypted memory stick. All NHS GG&C data protection and information transfer policies will be adhered to across the conduct of the study. The only person who will have access to the data is the principle investigator and if required for audit purposes the study sponsor NHS GG&C.

Justification of sample size

It still needs to be determined how much there is a link between the problems with negative symptoms of schizophrenia and the negative problem orientation of social problem-solving. There is no study to use for effect sizes but we have investigated studies in social problem-solving and then averaged the effect sizes to enable us to calculate power for this study allowing us to detect an effect. The sample size was determined by reviewing related studies, D'Zurilla, Nezu, Maydeu-Olivares (2002) report in the Technical Manual that NPO is consistently the best predictor across distress measures, in particular the Beck Depression Inventory (BDI) and reported correlations of .49 in a college sample; .66 in a middle age sample and .66 with psychiatric inpatients. Miller, O'Carroll & O' Connor, unpublished thesis) detected a correlation of .66 correlation between NPO and the BDI. Therefore the power analysis is focused on negative symptoms of psychosis and the relationship between defeatist beliefs and problem orientation. A power analysis was conducted using G* power 3 computer software (Faul et al;

2007) with a medium effect size of .60, alpha set at .05 and a power calculation of .8 this yielded a sample size of 13 for the correlational analysis. The medium effect size was calculated by averaging the correlations of the studies previously reported. In summary, the aim is to detect an effect between NPO and negative symptoms of schizophrenia by recruiting a total sample size of 13. If participants withdraw then clinical teams will be informed to identify additional participants.

Settings and Equipment

It is anticipated that this research will take place in the inpatient wards at Rowan Bank and Leverndale Hospital. Staff will be approached in advance to establish a room within the ward on the days the study is running. Equipment will include prepared materials and also a study pack for recording all data collection with each participant.

Health and Safety Issues

Prior to each visit ward managers will be contacted to ensure that the conditions on the ward are suitable for the researcher to visit and that identified patients are able to take part.

Researcher safety issues

The researcher has completed Breakaway training. On each day of the study they will receive a briefing from staff if there are any safety issues surrounding any patients; be provided with a personal alarm; ensure that staff are aware of my location and have checked the layout of the room prior to the study commencing.

Participant safety issue

Participants will be informed that they can leave the study at any time and they will be offered a break. If the researcher feels that a participant appears to be agitated or upset in any way due to the study then they will discontinue to ensure the well-being of the participant. Ward staff will also be informed to ensure that the patient remains safe and well and is not duly upset.

Dissemination of results

Results of this research will be reported via a doctoral thesis, in addition conference presentations and scientific journals. Participants will be provided with

contact details if they wish to find out the results of the study in general, they will not be provided with individual feedback after the study.

Ethical Issues

Ethical approval will be sought from the NHS ethics board and the directorate of forensic clinical psychology ethics committee.

Participants will be identified as having capacity by the clinical team in order to be considered for the study. Participants will be informed that they can withdraw from the study at any time or that they do not need to answer any questions they do not wish to. All participant data will be linked to a research identification number to ensure confidentiality, which will be held separately from the research data.

Financial Issues

There are no known financial issues.

Equipment and stationary costs etc.

It is anticipated that about 300 photocopies (at 5p each) will be made which will be a cost of £15.00. A ream of paper (500 sheets) is cost at £2.18, making the total cost of £17.18.

Timetable

June 2016 submit ethics application

January 2016 to March 2017 data collection

March 2017 data analysis

April/May write up

June 2017 first draft submission

End July 2017 thesis submission

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Plain English summary

Social problem-solving involves actions and thoughts about how to deal with everyday problems of ourselves and others. In forensic patients we know that this skill is very poor and can therefore have an impact on the choices that they make and this can result in becoming involved with forensic services.

A large proportion of forensic patients with mental health problems have a diagnosis of psychosis. It is the negative symptoms of psychosis that can have a bigger impact on day to life, for example they may have less social contact and be involved in less pleasurable activities. Negative symptoms are not as easy to treat as positive symptoms, which can be reduced with medication. Therefore it is important that research focus more closely on negative symptoms to help us find different ways to treat these symptoms.

Poor social problem-solving is common in individuals who experience negative symptoms of psychosis. We are now beginning to understand that part of their difficulties involves thinking about thinking (meta-cognition). So, if you struggle to be able to think about how a person might respond or act to something you might say or do; then it seems more understandable why they may say or do things that are deemed socially unacceptable. We also know that psychological therapies do help with the negative symptoms of psychosis but for them to be more effective we need to understand more about the sub-groups of negative symptoms. Therefore, this research is important, the more we know about all these factors that have a negative impact on the quality of someone's life the more we can adapt psychological therapies to try and improve their quality of life.

In this study, we are trying to tease apart the negative symptoms of psychosis, social problem-solving and meta-cognition. We will recruit inpatients from Rowan Bank and Leverndale hospital and they will be split into two groups, those with only negative symptoms and those with both negative and positive symptoms. We will meet with the participants individually, and then give them some questionnaires to answer on their own asking about their mood, symptoms of psychosis and how they solve problems. We will then proceed to tasks that will involve the researcher asking questions about different scenarios and recording their answers. This will take about 1 hour 30 minutes in total so we will ensure

that all participants are provided with a break. We will also make sure that they know they can leave the study at any time. Staff will be aware of the day when the researcher will be in the wards and briefings will be provided before by staff and after from the researcher to ensure the wellbeing of the participants.

In summary, the aim of this study is to understand more about the differences in social problem-solving between those with negative symptoms and those who experience negative and positive symptoms. We think that we will find differences in meta-cognition and social problem-solving between the two groups.

**WEST OF SCOTLAND/ UNIVERSITY OF GLASGOW
DOCTORATE IN CLINICAL PSYCHOLOGY**

HEALTH AND SAFETY FOR RESEARCHERS

1. Title of Project	How social problem-solving, meta-cognition and autobiographical memory differ in sub-types of negative symptoms in psychosis.
2. Trainee	
3. University Supervisor	
4. Other Supervisor(s)	
5. Local Lead Clinician	
6. Participants: (age, group or sub-group, pre- or post-treatment, etc)	Inpatients with a diagnosis of schizophrenia
7. Procedures to be applied (eg, questionnaire, interview, etc)	Paper questionnaires completed by participant. Second part involves scenarios to respond to and then a semi-structured interview.
i) Setting (where will procedures be carried out?)Details of all settings	In inpatient settings in a medium secure unit (Rowan Bank) and a low secure unit (Leverndale). Rooms will be made available and visited before the study begins. Participants will be familiar with them. Researcher will be provided with a personal alarm.
ii) Are home visits involved	No

WEST OF SCOTLAND/ UNIVERSITY OF GLASGOW
DOCTORATE IN CLINICAL PSYCHOLOGY

HEALTH AND SAFETY FOR RESEARCHERS

<p>9. Potential Risk Factors Considered (for researcher and participant safety):</p> <p>i) Participants</p> <p>ii) Procedures</p> <p>iii) Settings</p>	<p>i) Inpatients at Rowan Bank and Leverndale with a diagnosis of psychosis.</p> <p>ii) Procedure is long and may induce distress. The procedures are similar to methods employed by clinical psychology</p> <p>iii) Room in clinical ward which participants will be familiar with.</p>
<p>10.. 10. Actions to minimise risk (refer to 9)</p> <p>i) Participants</p> <p>ii) Procedures</p> <p>iii) Settings</p>	<p>i) Participants will be vetted by clinical staff to reduce the risk of unpredictable behaviour. On each day of the study I will check with staff the status of each participant.</p> <p>ii) Participants will be provided with a break and informed they can leave the study at any time or withdraw. In addition if the researcher notices that the participant appears distressed they will end the study. Staff will be debriefed on all participants.</p> <p>iii) Room will be visited in advance, staff on day will be aware and informed as each participant begins and ends study. Personal alarm will be provided for the researcher and has completed breakaway training.</p>

Trainee signature: Date:

University supervisor signature: Date:



University
of Glasgow

Institute of Health
& Wellbeing

TMCM/CL



9th September 2016

Jaclyn Macleod
9 John Valentine Place
Reddingmuirhead
Falkirk
FK2 0FQ

Dear Jaclyn,

Major Research Project Proposal

How social problem-solving, meta-cognition and autobiographical memory differ in negative symptom subtypes of psychosis

The above project has been reviewed by your University Research supervisor and by a member of staff not involved in your project and has now been deemed fit to proceed to ethics.

Congratulations and good luck with the study.

Yours sincerely,

T M McMillan
Professor of Clinical Neuropsychology
Research Director

Institute of Health and Wellbeing

College of Medical, Veterinary and Life Sciences
University of Glasgow
Mental Health and Wellbeing
Admin Building, Gartnavel Royal Hospital
1055 Great Western Road
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The University of Glasgow, charity number SC004401



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2013



Greater Glasgow
and Clyde

Directorate of Forensic Mental Health
Rowanbank Clinic
133c Balornock Road
GLASGOW
G21 3UL

MENTAL HEALTH SERVICES

DATE: 08 February 2017
YOUR REF:
OUR REF: BG/SM

TEL: 0141 232 6405
FAX: 0141 232 6437

STRICTLY CONFIDENTIAL

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Trainee Clinical Psychologist
Institute of Health & Wellbeing
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University of Glasgow
Academic Centre, Gartnavel Royal Hospital
1055 Great Western Road
Glasgow G12 0XH

via e-mail: j.miller.4@research.gla.ac.uk

Dear Ms MacLeod,

**RE: How social problem-solving, meta-cognition and autobiographical memory differ
in negative symptom sub-types of psychosis**

I am pleased to confirm your above project has been reviewed by the NHS Greater Glasgow and Clyde Forensic Directorate Research and Audit Committee and we are happy to give managerial approval for the project.

Please feel free to contact me if you require anything further in this regard.

Yours sincerely,

**Jane Cairney
Interim General Manager
NHS Greater Glasgow and Clyde Forensic Directorate**

South East Scotland REC 01

Waverley Gate
2 - 4 Waterloo Place
Edinburgh
EH1 3EG

Telephone: 0131 465 5473

03 April 2017

Dr Hamish McLeod
Institute of health and wellbeing
University of Glasgow
1st Floor Admin Building
Garthnaval Royal Hospital
1055 Great Western Road
G12 0XH

Dear Dr McLeod

Study title:	An examination of meta-cognition and social problem-solving in individuals who experience psychosis.
REC reference:	17/SS/0037
IRAS project ID:	213773

Thank you for your letter of 21 March 2017, 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 Vice-Chair.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to make a request to postpone publication, please contact hra.studyregistration@nhs.net outlining the reasons for your request.

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.

Conditions of the favourable opinion

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



University
of Glasgow

Participant information sheet

(Version 4 – 20/03/2017)

Title of Project: Meta-cognition, social problem-solving and psychosis.

Principal Investigator:

Jaclyn MacLeod
Trainee Clinical Psychologist
Mental Health and Wellbeing
1st Floor Admin Building
Gartnavel Royal Hospital
G12 0XN
Tel: 0141 211 3922

Academic Supervisor:

Dr. Hamish McLeod
Programme Director/Senior Lecturer
Doctorate in Clinical Psychology
Mental Health and Wellbeing
1st Floor Admin Building
Gartnavel Royal Hospital
G12 0XN
Tel: 0141 211 3922

Field Supervisor (NHS GG&C)

Dr Emma Drysdale
Consultant Forensic Clinical Psychologist
Douglas Inch Centre
2 Woodside Terrace
Glasgow G3 7UY

Invitation to Participate in a Research Project

We would like to invite you to take part in a research study. Before you decide, you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Talk to others about the study if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Why do this study?

This study is being carried out by the University of Glasgow and NHS GG&C. The aim of this study is to better understand factors associated with how you think about things and the difficulties you experience as a result of your mental illness. The topics covered include social problem-solving, memory, your attitudes, and your mood.

Who is being asked to take part?

We are asking people who are inpatients in Forensic or general mental health services in Greater Glasgow and Clyde NHS. All individuals invited to take part will experience difficulties with schizophrenia.

Why have I been asked to take part?

A member of the clinical team responsible for your care (e.g. Psychiatrist, Clinical Psychologist or Nurse) has suggested that you might be interested in taking part.

What does participation involve?

- If you consent, you will then be asked to sign a consent form to participate when you meet with the researcher in your ward. If you can direct any questions you have to the researcher (Jaclyn) at any time.
- You will be given 3 written questionnaires to complete on your own, these involve responding by ticking a box that reflects the answer you think best applies to you.
- The researcher will then read out 3 lists of 5 words and you will be asked to generate a specific memory.
- The next task involves responding to four scenarios, these ask how you would go about solving an everyday problem.

- You will then be offered a break. On return you will be asked if you are happy to continue with the study.
- The final task involves responding to some questions about your life and how you feel about your illness.

How long will this take?

The study may take about 1 hour and 30 minutes to complete but it may take you less time than this. You will be offered breaks as you need them during the study. If you do not wish to continue please let the researcher Jaclyn MacLeod know.

Who is this research for?

This research is being conducted by the University of Glasgow and NHS GG&C. This project is part of a Doctorate in Clinical Psychology course funded by NHS Education for Scotland. The study has been reviewed by the University of Glasgow and the Forensic Directorate Ethics committee to ensure that it meets the required standards. The study was also reviewed by the South East Scotland Research Ethics Committee and given a favourable ethical opinion.

What happens to the consent form?

To ensure that your information is kept confidential and anonymous (*not able to identify you*), the consent form will be kept separately from all study information (which includes the transcribed interview and research forms) in a locked filing cabinet. This will be within the University of Glasgow premises in the department of Mental Health and Wellbeing.

A copy of your consent form will also be kept in your case notes.

What happens to the information collected?

Your responses will be kept confidential to the researchers and will not be added to any of your clinical records. The only exception to this rule would be if you told us something that put you or another person at risk. If we needed to break confidentiality we would make efforts to discuss this with you beforehand. We will also store all your information in an anonymised form by using research codes instead of your name in our study database. All records will be stored securely and will only be accessible by the research team or the study sponsor.

At the end of the study, all anonymised research data will be stored in a confidential manner for 10 years, and then will be destroyed.

Is participation compulsory?

Your participation in this study is completely voluntary, and you may withdraw at any time without affecting your care in any way.

If you decide to withdraw during the study you will be asked what you would like us to do with the information that we have already collected. You will have two options. 1. We can still use the information that has been collected or 2. You would like us to destroy the information and it cannot be used for research purposes.

What are the benefits of taking part?

In general, research improves our knowledge of what people's difficulties are and what we can do to help people overcome these and improve people's lives. Your participation will help increase our knowledge of areas and potentially improve treatment for others in the future.

What are the risks of the research?

As with all research that asks about people's health and wellbeing, there is a small possibility that some of the questions may lead you to think about certain experiences in your life that you find upsetting. You are free to stop the study at any point. At the end of the study if you would like to talk to someone about any of the issues covered in the survey, I will ensure that a member of staff is informed.

Can I speak to someone who is independent of the study?

Yes. You can speak to Professor Thomas McMillan at the University of Glasgow (Tel: +44(0) 141 211 0354 or thomas.mcmillan@glasgow.ac.uk).

What if there is a problem?

If you have a concern with any aspect of the study, please speak to the researcher who will do their best to assist you. To contact the research team please call 0141 211 3922. If you remain unhappy and wish to complain formally, you can do this through NHS Greater Glasgow and Clyde Complaints by telephoning 0141 201 4500

Thank you for taking the time to read this.



University of Glasgow **NHS**
Greater Glasgow and Clyde

Participant Identification Number:

CONSENT FORM

(Version 3 – 20/03/2016)

Title of Project: Meta-cognition, social problem-solving and psychosis.

Principal Investigator: Jaclyn MacLeod, Trainee Clinical Psychologist.

Chief Investigator: Dr Hamish McLeod, Programme Director for Doctorate in Clinical Psychology and Senior Lecturer, University of Glasgow.

Local Lead Investigators: Dr Emma Drysdale, Consultant Clinical Psychologist (NHS Greater Glasgow & Clyde).

Please initial

box

1. I have read and understand the Participant Information Sheet dated.....
(Version.....) for the above study.

2. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

3. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected.

4. I understand that the interview will be recorded and transcribed, and that following transcription the original recording will be destroyed and all personal information will be removed from the transcript.

5. I understand that if I say anything that makes the researcher concerned about my safety or the safety of another person, this information may be passed onto a relevant third party. I also understand that the researcher will attempt to discuss this with me, should this situation arise.

6. I understand that remarks I make may be included in an anonymous form in reports about this research (please leave this blank if you do not consent to this).

7. I understand that the relevant sections of my medical notes and data collected during the study may be looked at by individuals from Greater Glasgow and Clyde NHS and the University of Glasgow, where it is relevant to my taking part in this Research. I give permission for these individuals to access my records.

☐

8. I agree to take part in the above study.

Name of participant Date Signature

Name of person taking consent Date
Signature

Participant's Identification Number for this study

MEPS CODING FRAMEWORK FOR NEW SCENARIOS

Read through participant's entire response to evaluate logic and consistency displayed in connecting the beginning and end.

Each scenario is scored on number of relevant means.

Categories of means end scored is not only tallied but also placed in one of several categories empirically developed for each story.

Each category is broad enough to include several different means, which are similar, but the exact form can differ because of being given by different participants.

Individual means

An individual 'means' is scored for each discrete step, which is effective in enabling the hero of the story to reach the resolution stage or to overcome an obstacle preventing the hero from reaching the goal in the story. (Platt and Spivak, 1975).

In order to identify individual 'means' a list of categories have been established for each new scenario.

The following categories represent discrete steps for each scenario, each category represents a distinct type of action that might be taken in order to achieve the story ending, that is, a category corresponds to a discrete step. If a participant suggests multiple actions belonging to a single category, these constitute a single step and are then counted as one means.

Have a discussion: A lot participants go into a good deal of detail about what should go on within the context of the discussion and it is felt that in many cases too much would be lost by counting all this detail as a single mean.

3 common sub-categories have been identified into which it's useful to sort details of a discussion: i) discuss problems; ii) discuss solutions; iii) express feelings. 'Have a discussion' should be considered a super-ordinate category and counted as a discrete mean in its own right only when none of the sub-categories are present. When any of the sub-categories are present 'have a discussion' is not counted as a separate mean, but each/any of the sub-categories present are counted separately.

E.g. *"She should definitely speak to him. Hopefully that will work."*
- I would score this as one mean (i.e. 'have a discussion')

E.g. *"They should have a proper talk about it. They should talk about what was causing the arguments and what they can do to make things better in the future. She should tell him she loves him too, to make sure he knows."*

- I would score this as three separate means (i.e. 'discuss problems', 'discuss solutions'; 'express feelings'. I would not count 'have a discussion as a discrete mean in this instance-

Introspection: Platt and Spivak say “A statement of introspection is not sufficient by itself to be scored as a means, e.g., use of the word “realise” is not adequate to assume introspection. However, if the hero acts upon his introspection, e.g., by apologising, two means should be scored – one for introspection and one for his action.” I’ve generally kept to this.

A note on unsuccessful means:

Platt and Spivak are reasonably clear in stating that means that do not contribute to a successful outcome should not be counted. I would be inclined to disagree. Very often participants using a story-telling style to answer the question will mention unsuccessful strategies the protagonist tried before finding a solution. I think mostly they do this to be colourful and make the story interesting, but often these ‘unsuccessful’ strategies are good suggestions that in reality might be effective and I would be inclined to count these as distinct means.

Example:

“Julie sits down and thinks about what she might have done to cause her friends to avoid her. But she can’t think of anything so she asks another friend who isn’t one of the ones avoiding her if anyone’s said anything. Her friend doesn’t know either so she decides to go and ask them directly. They tell her they don’t like how much she’s been drinking lately. She says she didn’t realise how much she was drinking, but they’re right and she promises to cut down. They’re happy with that and everything’s fine.”

- Here Julie tries two strategies – ‘introspection’ and ‘third party’ – but they are unsuccessful. I would nonetheless be inclined to count them. The rest of this story includes two more means – ‘discuss problem’ and ‘improve self’ – so four overall

Scenario 1.5.

You are having problems getting along with someone close to you

The story ends with you and ? getting along better

- **Alter behaviour:** This includes any efforts to improve competency, e.g. do his/her job better, be a better employee or colleague, or to curtail problem behaviour, e.g. “He should cut out the drink and stop letting it affect his work”. This is typically suggested before or instead of attempting to solve a particular problem, but rather as a general approach.

- **Ask for help or reason:** I would re-work this category as ‘have a discussion/meeting’, include the sub-categories outlined for ‘have a discussion’ in Problem 1 and apply in the same way.

- **Solve problem:** This includes any action aimed at solving a problem between protagonist and boss that does not come under ‘alter behaviour’.

- **Follow advice:** I think it’s rare that this would come up as distinct from ‘alter behaviour’ and ‘solve problem’.

- **Show motivation:** Any behaviour aimed at showing enthusiasm for the job and willingness to work hard. This is subtly distinct from ‘alter behaviour’ whereby competency rather than motivation is the central feature.

- **Have a discussion or meeting:** As described above replace 'ask for help or reason' with 'have a discussion or meeting' and include three sub-categories: i) 'discuss problems', ii) 'discuss solutions' and iii) express feelings.

- **Request meeting:** When participants elaborate the process of requesting a meeting this should count as a separate means in the same way that 'establish contact' does in problems 1 and 3.

- **Third party:** Any suggestion that involves enlisting the help of a third party. This includes mediators, HR, colleagues or boss's superiors.

- **Socialise with boss:** This comes up a lot so I feel it warrants a category. Includes any effort to engage the boss on a personal level and get on better that way.

This category may involve some extreme and probably ineffective but nonetheless relevant suggestions such as sleeping with the boss.

- **Introspection:** As discussed previously

C) *COMMON NON-RELEVANT MEANS:*

- Leave job/get a new job

Scenario 2.8

You are worried about the health of a close friend or relative and you are not sure what to do. The story ends with you being less worried about your close friend/relative's health.

Categories

Introspection: As before, in addition this scenario would include 'observing the individual to see if suspicions are correct'.

Speak to third party: This can include professionals or other friends and relatives. Again if participants go into detail and say they would talk to a friend first, then Google and then go to a doctor to get advice this would be scored 3 means; get more information for self or for them.

Discussion: Ask them what you can do to support them, tell them you are worried, ask them if there is a problem.

Participants go into details about different things they can do that would help them feeling less worried. These strategies have been broken down into the following categories.

Contact: This can include, spend time with them; keep in regular contact.

Support: Just be there for them; encourage them to see a professional, offer to go with them to doctor; pray/meditate or chant with for them.

Again all of the above categories can be scored with sub-categories within as people often go into detail of the different things that they would do within each of those categories.

Cognitive restructuring: Participants often talk about cognitive strategies to help them cope with the situation. An example would include 'worry less and accept it is out of my control' this would be scored as a mean step when it is processed by the participant after they have had a conversation with the individual or other friends/family.

Non-relevant means

- Worry less accept out of my control
- Observe first to see if suspicions correct
- Send a card

Limitations/discussion

Can be ambiguous as does not state how good a friend they are and some participants have commented on this.

Scenario 3.9 (new scenario)

Recently, a friend has been repeatedly letting you down. The story ends with you no longer feeling let down.

Categories

Introspection: As before

Discussion: As with previous scenarios this can involve much detail about how they would tackle the problem when they do talk to the friend. The details are then scored as sub-categories and 1 means is scored for each one. Examples are: talk to friend, confront friend, seek explanation, tell them how feel, tell them been missing their company, look for understanding and seek a solution.

Cognitive restructuring: Participants also talk about changing their attitude towards the friend, which is a way to deal with something that you may have no control over. When this is stated, after having a conversation, it is then scored as a mean step. This can also include stop trusting them and try to be more flexible with them or just let it go.

Modifying behavior: Some participants talk about doing something nice for them or for both of them to do something nice together. It is difficult to categorise these strategies but it could effectively be viewed as reaching out to them in the way that you behave. It is therefore accepted as a means step as perhaps the participant feels that they are doing all they can to support the friendship.

No longer be their friend: When language similar to this is used we have generally scored it as a means step. An example is 'if the situation does not change then I would no longer be their friend', or 'rely on other friends'

The rationale here is that they are attempting to deal with the situation, which is in response to the ending, and it is accepted then that this would be a realistic step to take. Importantly, this would be scored as an non-effective mean when not backed up with any other problems solving strategies.

'Take a step back and wait for them to contact you.

Non-effective Means

- Try to please them more

Limitations/discussion

Perhaps the ending is wrong with this scenario as it is easy for people to say 'just no longer be friends with them' so you are not getting a true reflection from them. Despite emphasis on it being 'the ideal strategy' this seems to be forgotten by participants. The majority of participants do respond in details it could be related to their mood.

Scenario 4.10.

You have been really worried about what a friend thinks about you. The story ends with you feeling less worried about what your friend thinks about you.

Introspection

As this is an intrapersonal scenario it was felt that scoring for introspection should be different to that of previous scenarios (where introspection was always scored one means, regardless of whether they put this into action). It was agreed that if an individual went onto a different train of thought during introspection then that would score a second point. Examples include, consider things from the other person's perspective and watch your friend's behaviour when they are around you.

'Praying' was classified as a form of introspection in this scenario (other scenario's it has been scored as an ineffective mean).

It is also worthy of note that an adequate response does require some level of introspection first

Avoidance: Some participants use avoidance as a positive step to take in order to gain perspective on the situation. However, not all cases of avoidance can be scored as 1 means step; some participants mention it just to avoid the situation, as a way to deal with it, in other words just ignore it. It was agreed that ignoring the problem completely would then not be counted as 1 means step. The rationale here is that avoiding something does not mean that you do not worry about it. Indeed, the literature on coping shows us that avoidance coping is a dysfunctional form of coping.

Cognitive restructuring: Participants talk about changing his or her attitude to the person, rationalising this as 'not everyone can like you' or 'it is not worth being upset about so ignore it'. We felt that this could be an effective means step but would score low on effectiveness. It is reasonable to assume, that by changing your attitude to a situation you have no control over, is a reasonable way to cope with a situation.

Difficulties arise here when the participant does not back up their statement with any rationale, for example: 'just ignore what others think of you'; 'it does not matter what other people think of me' in these instances those statements would not be scored as a means step.

Discussion: Can include talk to the person about it; discuss anxieties; talk through problems; seek reassurance; listen to friend; apologise; ask if done anything to upset them; seek a resolution; probe friend discretely to ascertain their opinion of me; change behaviour.

Speak to third party: talk to other friends; speak to a profession

Some participants talk about 'boosting own confidence' or building up my self-esteem'.

When such statements are given as a strategy it is important that obvious steps back up these strategies. In other words clear statements are made about how that action would help you feel less worried. Otherwise they are to be scored as a non-effective mean.

Non-effective means

- Worry for a while; Cast problem to back of mind; Don't care what other people think; Relaxation techniques; Praying/chanting; Be kind to them

b) Scoring effectiveness

Part 2: Scoring Effectiveness

2.1 Definition of Effectiveness:

"Effectiveness was defined according to the definition of an effective problem solution given by D'Zurilla and Goldfried (1971). Following this definition a problem solving-solving strategy is effective if it maximizes positive short- and long-term consequences and minimizes negative (short- and long-term) consequences, both personally and socially." (From Danielle's document)

2.2 Likert Scale:

[The real challenge is remaining consistent. Overall, a good approach is scoring a large number of answers given by different participants to the same question, in one sitting. This gives you a good idea of what, for this particular question, is average, what is exceptionally bad and what is exceptionally good.]

The overall effectiveness of each strategy was rated on a 7-point Likert-type scale ranging from "1 - not at all effective" to "7 - extremely effective".

Start by reading the answer fully to get an overall sense of whether the suggested strategy would be generally ineffective (will receive a score of 1 or 2), somewhat to moderately effective (will receive a score of 3-5), or very effective (will receive a score of 6-7).

In order to decide on a final score consider how effective the strategy is likely to be in the short and long term. Generally long-term success involves addressing the cause of the problem and taking steps to overcome it. Below is a general outline of the level of effectiveness associated with each point on the Likert scale.

NB: The descriptions given are less appropriate to Problem 2 where it isn't so much a case that something has gone wrong and needs to be fixed. The above definition of effectiveness would still apply in this case, though.

Point-by-point breakdown of the Likert scale

1 point:

Unlikely to have any positive effect and/or is likely to have significantly negative effect

- Complete inaction
- Aggressive, offensive or destructive behaviour

2 points:

Likely to have a limited positive effect and/or could result in negative consequences

- Minimal action
- Manipulation
- Mild aggression/telling off

3 points:

Likely to have some positive outcome, at least in the short-term, but unlikely to have a positive long-term effect i.e. fails to get to the root of the problem

- Talking to friends without any detail as to what they might talk about
- General/generic positive actions that do not specifically address the cause of the problem

4 points:

Likely to have a significantly positive outcome in the short-term and/or begins to address long-term outcomes but is insufficient to achieve positive long-term effect; seeks to uncover the cause of the problem but is unlikely to *overcome* the cause

- Apologising but taking no further action
- Asking self, the other party or a third party about the cause of the problem, but not taking steps to overcome the cause

5 points:

Likely to have at least some long-term success; uncovers the cause of the problem and goes some way to overcoming it; or problem is overcome, but little or no detail is provided as to how this was/should be achieved

- Discussing the problem and/or possible solutions with others involved
- Discussing the problem and 'sorting it' without any specifics on how to 'sort it'

6 points:

Likely to have good long-term success; Uncovers the cause of the problem and takes active steps that are likely succeed in overcoming the problem

- Discussing the problem and/or possible solutions and taking action such as changing behaviour

7 points:

Very likely to overcome the problem fully in the long-term; Uncovers the cause of problem and takes (often multiple) active steps that are very likely to succeed in overcoming the problem

- Detailed answer working through from the beginning of the story to the ending, addressing the cause of the problem and suggesting sufficiently details descriptions of possible solutions.

Table of CTAM scores for each study

Trial	Sample (max 10)	Allocations (max 16)	Assessment (max 32)	Control (max 16)	Analyses (max 15)	Treatment Description (max 11)	Total CTAM (max 100)
Granholm et al. (2014)	10	16	32	0	15	6	79
Grant et al. (2012)	10	16	29	16	15	11	97
Karkvik et al. (2013)	5	13	19	16	15	11	79
Lecomte et al. (2008; 2012)	10	10	32	0	15	11	68
Li et al. (2015)	10	16	32	0	15	11	84
Lincoln et al. (2012)	5	16	19	16	15	6	77
Morrison et al. (2015)	10	16	16	6	11	11	70
Naeem et al. (2015)	10	16	32	6	15	11	90