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Exploring Metacognition and Social Connection as Mechanisms of Change in Individuals with Negative Symptoms of Psychosis

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Submitted in partial fulfilment of the requirements for the degree of
Doctorate in Clinical Psychology

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

April 2025

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Glossary

Loneliness: a feeling which arises when someone does not have a social network to gain support from or they experience less social connection than needed to feel a sense of belonging.

Negative symptoms of psychosis: reflect a decrease in normal functioning, for example reductions in mood or reduced feelings of pleasure.

Social connection: the extent of which someone feels supported or ‘close’ to another person.

Chapter 1

What is the Relationship Between Social Connection and Recovery in Individuals Experiencing Negative Symptoms of Psychosis? A Systematic Review

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This chapter has a greater word count than recommended by the chosen journal, for the purposes of the thesis examination process.

Abstract

Background: Individuals with mental health difficulties frequently experience loneliness (Meltzer et al., 2013), with around 80% of adults with psychosis reporting feeling lonely within the past 12 months. One of the main contributors includes issues with developing and maintaining relationships – a common component of negative symptoms.

Objectives: To investigate the relationship between social connection and recovery from negative symptoms of psychosis.

Design: Systematic review.

Methods: Quantitative studies examining links between negative symptoms and social connection in adults aged 16 years or older were identified and synthesised. PsychARTICLES, CINAHL, Medline, PsychINFO via EBSCOhost and Pubmed databases were electronically searched along with hand searching. Studies were assessed for bias using the Risk of Bias tool (RoB2) and a narrative synthesis of the data was conducted.

Result: Eight studies were selected for review which included 1,372 participants. The data provided mixed results regarding the relationships between social connection, negative symptoms of psychosis and recovery. Four studies reported significant findings related to recovery outcomes, a further two found small effects and two had no significant findings.

Conclusion: Results varied across the studies with more significant findings in family intervention designs; however, more research is needed to further explore these relationships.

Keywords (7)**:** negative symptoms, psychosis, social connection, schizophrenia-spectrum disorder.

Introduction

Psychosis is marked by a lost sense of reality (National Institute of Mental Health, 2023) and encompasses two symptom domains: positive and negative symptoms. Negative symptoms consist of avolition, asociality, blunted affect, anhedonia and alogia (Marder & Galderisi, 2017). Individuals can experience psychosis as a feature of many disorders; however, the focus of this review is psychosis as a symptom of schizophrenia. People experiencing psychosis report high levels of loneliness (Meltzer et al., 2013). For instance, Stain et al., (2012) found that 80% of adults with psychosis had felt lonely within the past 12 months. Loneliness has been associated with numerous adverse outcomes, including reductions in independent living and suicidal ideation (Tilvis et al., 2012). Loneliness can be described as a perceived discrepancy between desired and actual social connectedness. However, it remains unclear which aspects of social connection are most influential. Given the high prevalence and detrimental consequences of loneliness, it may be therapeutically important to understand how social connections affect recovery from negative symptoms. This review provides an analysis of the relevant literature.

The Impact of Negative Symptoms on Social Connection

According to Belongingness theory (Baumeister & Leary, 1995), humans have a fundamental need to feel a sense of belonging within their social relationships. If this need is not met, this can lead to feelings of loneliness, emotional distress and cognitive deficits. Loneliness has been described as “socially contagious”, with lonely individuals often gravitating towards others who exhibit similar behaviours, such as reduced facial expressions, vocalisations and body movements, resulting in emotional convergence between individuals (Hatfield et al, 1994). In people with negative symptoms, this dynamic may be especially relevant where features such as blunted affect hinder effective social signalling. Although it might be assumed that mutual loneliness fosters connection, research suggests it may instead reinforce feelings of isolation. This is often due to maladaptive cognitions (e.g., “no one wants to spend time with me”), which can inhibit relationship formation (Cacioppo et al., 2009). So, negative symptoms are likely to disrupt both the development and maintenance of social networks and if we can understand these processes better, we could design targeted interventions that address negative symptoms but also improve psychological and social conditions necessary for recovery. This includes recognising how the specific nature of negative symptoms can significantly complicate efforts to build and sustain meaningful relationships.

Types of Social Connection and Associated Interventions

It is important to examine the various forms of social connection, and the interventions designed to enhance them. Social connectedness is modifiable and can be improved using various interventions. These interventions can increase wellbeing and aid recovery from negative symptoms. Social connection comprises several subtypes, including family and friend support and peer support, each varying in frequency and quality. Consistent with the therapeutic importance of family relationships, The Scottish Intercollegiate Guidelines Network (SIGN) (2013) recommends Family Therapy as a treatment for people with schizophrenia. Linde et al., (2023) found that support from family and friends played a key role in recovery from psychosis. However, family connections can worsen psychosis if marked by critical or abusive content. The number of social contacts and its potential influence on wellbeing has been explored in the literature. Degnan et al., (2018) identified a correlation between smaller social networks and increased severity of negative, but not positive symptoms.

Peer support is an intervention which capitalises on shared experiences among individuals facing similar mental health challenges to provide support and mentorship. Research into peer-led programmes such as ‘Schizophrenics Anonymous’, suggests benefits including enhanced quality of life and increased social inclusion (Davidson et al., 2006). Nguyen et al., (2021) investigated experiences of peer support in early intervention in psychosis services and found this contributed to the development of meaningful connections and increased access to community. A recent systematic review explored the use of peer support and found that 75% of studies which measured negative symptoms reported significant reductions in symptoms post intervention (Evans et al., 2023). In contrast, a systematic review by Chien (2019) found no conclusive evidence for the efficacy of peer support. These contrasting findings indicate a need for more rigorous research.

Summary

The existing literature highlights that negative symptoms present challenges to individuals in forming and maintaining social connections. These symptoms often interfere with essential behavioural capacities—such as the intrinsic drive to engage socially—that are foundational to building relationships. In conjunction with these complexities, it is key to understand the types of social connection available to aid recovery. There are potential barriers to consider such as a reduced range of social opportunities which further compound isolation. These limitations signify the need for a more integrated understanding of how negative symptoms and social connection intersect within recovery from psychosis.

This review seeks to contribute to the understanding of the relationship between social connection and recovery from psychosis with a focus on negative symptoms. Clarifying the mechanisms underpinning these interactions will help inform the development of targeted and effective psychological interventions for negative symptoms of psychosis.

Materials and Methods

Protocol and Registration

This systematic review was guided by The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2020) and the study protocol was registered on Prospero (CRD42025574474).

Eligibility Criteria

Participants

Participants had a schizophrenia spectrum diagnosis, defined by F20-29 diagnostic codes from the International Classification of Diseases – 10th Edition (ICD-10) (World Health Organization, 1992). Studies with participants aged 16 and above were included. Articles which included participants with postpartum psychosis or drug induced psychosis were excluded.

Outcomes

Studies were included which investigated how social intervention affected the individual's recovery. Eligible studies reported outcome measures addressing negative symptoms and/or wellbeing measures.

Study Design

This review only included randomised control trial (RCT) designs. Only peer reviewed, English language publications were included. There were no restrictions on publication year.

Search Strategy

The following databases were searched: PsychARTICLES, CINAHL, Medline, PsychINFO via EBSCOhost and Pubmed, and hand searching was used to check for additional records. Backward citation searching was used to search through reference lists of included articles. The search terms used were: ('psychosis' OR 'schizophrenia') AND ('negative symptoms' OR 'diminished expression' OR 'emotion*' OR 'motivation' OR 'avolition' OR 'apathy' OR 'anhedonia' OR 'asociality' OR 'withdrawal') AND 'recovery' AND ('social connection' or ‘social support’). Search terms were adapted slightly for each database. Searches were conducted on 26th of August 2024 and are shown in Appendix 1.1.

Study Selection

The articles were de-duplicated using Endnote (Version x9), then uploaded to Rayyan systematic review software. All remaining articles were screened by the primary reviewer for eligibility using titles and abstracts. The articles were then obtained, and the researcher reviewed the full text of potentially eligible articles. A second reviewer reviewed 10% of articles at title and abstract stage, and 10% at full text stage, this was to act as a reliability check. Hand searching was used and backward citation searching was conducted to find additional papers, these were assessed for eligibility.

Data Extraction

An extraction table was created using Microsoft Excel with fields addressing features such as demographics of participants, intervention, outcome measures used and results. These categories were selected as the data was relevant to modifiable psychological processes that could be included in treatment development. The extraction template can be found in Appendix 1.2. The primary reviewer extracted 100% of data.

Quality Appraisal

The quality and risk of bias in the studies was assessed using Risk of Bias 2 tool (Sterne et al., 2019). This tool provides a structured, standardised process to evaluate the quality and internal validity of the articles. The RoB2 was used by two reviewers (R.W and Z.B) to assess the risk of bias in the articles included in the review. Both reviewers rated 100% of studies using the RoB2, any disagreements were discussed until a consensus was reached. The RoB2 criteria state that studies using self-report outcome measures should be graded as ‘biased’ due to placebo and expectancy effects. However, after consultation with colleagues at the University of Glasgow, it was decided to not rate this as a biased measure as this is a commonly used tool in psychological research. It is important to note that if an article scored ‘some concerns’ or ‘high risk’ in any domains, it automatically meant the risk of bias overall would be rated as this.

Analysis

Data was narratively synthesised following published guidelines (Popay et al., 2006). This method was appropriate to address the reviews aims of further understanding the relationship between social connection and recovery from negative symptoms, and to explore interventions and the mechanisms underpinning these.

This identified main elements of the narrative synthesis process were:

1) Developing a preliminary synthesis of findings of included studies: this includes a summary of the extracted data and what the studies found.
2) Exploration of relationships in the data which includes investigating relationships within and between the studies.
3) Assessing the robustness of the synthesis, this involves assessing the findings across studies and the quality of the synthesis overall.

Results

Search Results

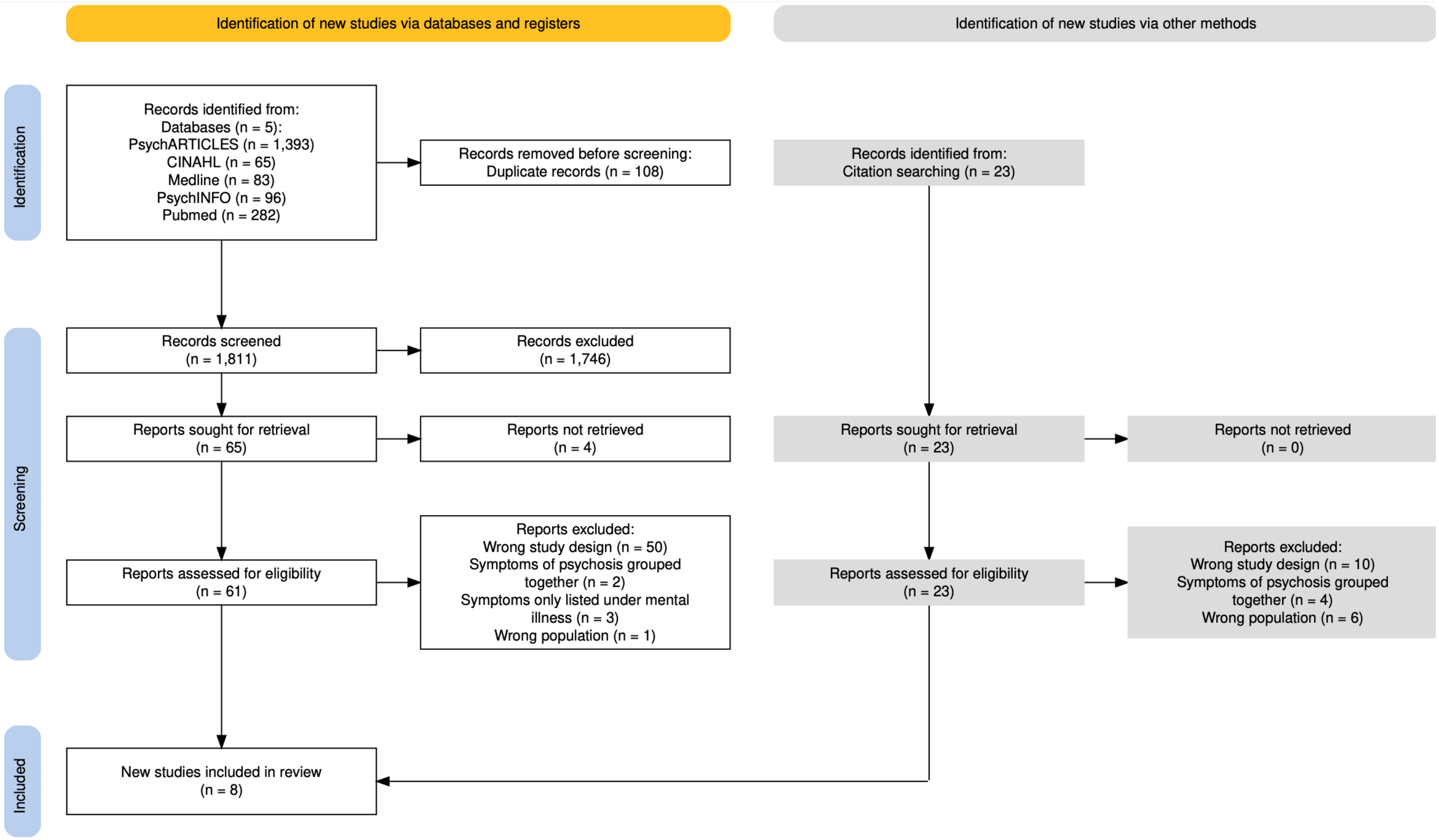
As shown in the PRISMA flow chart in Figure 1, there were 1,919 returns from all the databases searched. After de-duplication there were 1,811 articles which were screened at title and abstract level. The main reasons for exclusion were wrong topic, different focus of psychosis and wrong study design. A second reviewer screened a randomly selected 10% of the articles (181 articles) as a reliability check with excellent agreement (Cohen’s weighted Kappa = 0.991). Disagreements were resolved by consensus.

There were 65 articles which appeared to meet the criteria, however four of these article’s full text papers were not accessible. The researcher recruited the help of a librarian to obtain the articles however this was unsuccessful. The remaining 61 articles were screened at full text level, main reasons for exclusion were wrong study design and psychosis symptoms grouped into one. The second reviewer assessed seven (10%) randomly chosen articles. The Cohen’s weighted Kappa of 1.0 indicated perfect agreement. This resulted in five articles meeting criteria.

Through use of backwards citation searching, 23 articles were identified, the full texts were reviewed and 20 were excluded, three met the inclusion criteria and were included in the review. The studies found through hand searching did not have ‘negative symptoms’ written in titles, they all had ‘first episode psychosis’ which was not one of the search terms. This may explain why the search strategy did not find these studies. This resulted in eight articles being included. This process is shown in Figure 1.

Figure 1

Prisma flow Chart



1) Preliminary Synthesis

Table 1

Overview of Study Characteristics and Main Findings

Author, Year, Country	**Title**	**Participants**	**Intervention**	**Control**	**Duration of intervention and follow up**	**Negative symptom measure or other recovery measure**	**Results/Findings**
Castelein et al (2008), Netherlands	The effectiveness of peer support groups in psychosis: a randomised control trial.	106 overall: 56 in experimental condition, 50 in control condition. Gender: 68% male in experimental condition, 63% male in control condition Ethnicity: not reported Age: (experimental condition mean age was 37.8 years old) (control-mean age was 39.4 years old).	Peer support group of 10 people with facilitator; 16 biweekly 90 min sessions. Participants chose topics of sessions.	TAU	Sessions over 8 months (outcome measures given at baseline and at 8 months).	WHOQOL	Guided peer support groups (GPSG) Baseline: 60.2 (8.9) vs at 8 months: 60.9 (10.0) Control Baseline: 56.7 (10.3) vs at 8 months: 59.2 (11.0) P value =>0.87 (95% CI) (not significant)

Snethen et al (2024), USA	Independence through community access and navigation (ICAN): a supported leisure intervention for individuals with negative symptoms.	74 overall: 37 in experimental condition, 37 in control condition. Gender: male (57%) Ethnicity: non white (82%) Average age: 48	Intervention includes identification of leisure interests and supported participation.	TAU	Study duration was 6 months (outcome measures given at baseline and 6 months).	CAINS (2 subcategories- motivation and pleasure (MAP) and affective expression.	CAINS scores Only reported qualitatively There was no significant effect of the ICAN intervention on negative symptoms.
Pos et al (2019), Netherlands	Cognitive behavioural therapy for social activation in recent-onset psychosis: randomized controlled trial.	99 participants overall, treatment as usual (50), TAU plus CBTsa (49). Gender: CBTsa condition 37 males, 12 females and TAU 43 males, 7 females Ethnicity: minority group 69% (CBTsa condition) and 51% (TAU condition) Age: mean age of 25 years old in both conditions	CBT for social activation (CBTsa) 8 group sessions of one hour (twice a week) then 6 weekly individual sessions for 45 mins. Addressed dysfunctional beliefs and supported social activity.	TAU	Treatment delivered over 3 months (measures at baseline, month 3- end of treatment and 6 months).	BNSS and GAF	They found a decrease in negative symptoms in the intervention group compared to TAU (P=<.001) (using BNSS) However, effects were small and not maintained at 6 month follow up. Improvements using GAF (P=<.001-.002) in treatment condition compared to TAU. They found a decrease in negative symptoms in the intervention group compared to TAU. However, effects were small and not maintained at 6 month follow up.
Fowler et al (2018), UK	Social recovery therapy in combination with early intervention services for enhancement of social recovery in	155 participants (76 in experimental condition, 79 in TAU).	Stage one involves engagement and formulation; stage two involves preparing for new activities and stage three involves	TAU was early intervention in psychosis service	9 months intervention (measures taken at baseline, 9 months (post-intervention) and 6 months follow up.	PANSS and SANS	**PANSS** (positive and negative symptoms grouped together)- p= >0.22 (95% CI) (not significant) **SANS** p= >0.43 (95% CI) (not significant)

	patients with first-episode psychosis (SUPEREDEN3): a single-blind, randomised controlled trial.	Gender Experiment condition (M- 56 (75%) and (F- 19 (25%) Control condition (M-60 (76%), and F-19 (24%) Ethnicity Experimental condition- British 55 (73%), next highest was Pakistani -7 (9%) Control condition- British 58 (73%), next highest was Pakistani 6 (8%). Age 16-35 years (treatment condition- average 24.84 years old) (TAU- average 24.15 years old)	engagement in new activities.				No significant differences in PANSS or SANS scores between groups.
Wong et al (2024), China	Strength-based cognitive-behavioural therapy (SBCBT) and peer-to-peer support (PSP) in the recovery process for people with schizophrenia: a randomised control trial.	127 participants with schizophrenia spectrum disorders (strength-based CBT group: 42, Peer to peer group: 44 and TAU:41). Gender: not reported Ethnicity: Chinese (100%) Age: aged 18 to 65; means- (SBCBT- 41.52 years) (PSP- 45.0 years) (TAU- 42.10 years)	SBCBT which involves 12 one-hour sessions and uses CBT approaches to facilitate building strengths to reach goals and overcome barriers. The second intervention group is PSP which involves 12 sessions.	TAU was outpatient drop-in services.	12-month intervention (measures taken at pre intervention, mid intervention, post intervention and 6 months follow up).	MHRM and WHOQOL	Hierarchal linear modelling was used to analyse correlations among the data. In the SBCBT condition, change in personal recovery predicted pre-post intervention change in social functioning (β= -.40, P=<.05). It was found that changes in hope predicted change in QoL physical post intervention (β=.45, P=<.05), at follow up (β=.68, p=<.001). It predicted change in QoL psychological post intervention (β.46, P=<.01), follow up (β=.55,

							P=<.001). It predicted change in QoL social at follow up (β=.47, P=<.01) (all significant). In the PSP condition, changes in hope predicted change in QoL psychological at follow up (β=.38, P=<.01), QoL environmental post intervention (β.38, P=<.05). Change in personal recovery predicted change in QoL physical at follow up (β=.32, P=<.05), change in QoL psychological at follow up (β=.51, P=<.001), change in QoL social at post intervention (β=.40, P=<.05) and change in QoL environmental at post intervention (β=.35, P=<.05) and follow up (β=.48, P=<.01). Change in defeatist beliefs predicted change in QoL physical at post intervention (β=.41, P=.05), change in QoL psychological post intervention (β=.40, P=<.01) and change in QoL social at follow up (β=.52, P=<.001). Change in asocial beliefs predicted change in QoL physical at follow up (β= -.37, P=<.05) (all significant).
Dyck et al, 2000, USA	Management of negative symptoms among patients with schizophrenia attending multiple family groups.	63 outpatients with schizophrenia spectrum disorders. Gender: males (46) and females (17)	Multiple family group psychoeducation which consisted of information about schizophrenia, treatment process information, guidelines	TAU in outpatient clinic for 12 months.	12-month intervention. (measures take at baseline, months 1-3, months 4-6, months 7-9 and at 12 months).	MSANS	Findings for the MSANS baseline and over 12-month intervention: Family intervention was significant in reducing negative symptoms compared to TAU (P= <0.05) (significant)

		Ethnicity: white Age: ages 18 to 45 years (mean 33 years old)	for coping, support relapse and expand family's social network. Group led by staff weekly.				
Thorup et al, 2005, Denmark	Integrated treatment ameliorates negative symptoms in first episode psychosis: results from the Danish OPUS trial.	547 individuals with schizophrenia spectrum disorders. Gender: 224 women, 323 men Ethnicity: not reported Age: aged 18-45	Integrated treatment which consisted of assertive community treatment, family groupwork, psychoeducation and social-skills training.	TAU was standard outpatient care.	Treatment duration was 2 years. Measures administered at baseline, 1 year and post intervention at 2 years.	SANS	Scores post intervention: SANS (Negative dimension) Integrated treatment: 1.42 Vs TAU: 1.84 Difference in parameter estimation -0.45 CI (-0.67 to -0.23) (significant) All negative symptom subcategories reduced in IT compared to TAU. * Follow ups have been published: 1 Year- findings maintained 2 Year- continued to find significant results 5 Year- effects were not sustainable at follow up 10 Year- most of the positive short-term effects not found 20 Year- no differences between conditions
Chien et al, 2018, China	A randomised controlled trial on mutual support group intervention for families of people with recent-onset psychosis: a four year follow up	210 Chinese families of patients with schizophrenia spectrum disorders (mutual support group: 70, psychoeducation group: 70 and TAU: 70).	Mutual support group consisted of 16, two-hour sessions where patients attended 3 sessions. Sessions included info sharing, caregiving skill practices	TAU was 1:1 nurse appointment.	Treatment duration was 9 months. 4 year follow up (measures at pretest (time 1), week 1 (time 2), 12 months (time 3), 24 months (time 4), and 48 months (time 5).	PANSS and SLOF	PANSS (negative symptoms subcategory) = p value: 0.09 (not significant) PANSS scores were not significant between groups. Lower PANSS scores in psychoeducation group and in

		Gender: 111 male patients, 99 females. Ethnicity: Chinese (100%) Age: mean ages of the patients were from 26.2 to 28.9 years (range 21–44 years)	and Chinese culture issues (e.g. stigma). Psychoeducation consisted of 16, 2-hour sessions where patients attended 3 sessions.				FMSG group than TAU. No difference between psychoeducation and FMSG. SLOF =p value: <0.005 (significant) SLOF scores were significant at all follow up points for the mutual support compared to psychoeducation group or TAU. However, SLOF scores did increase for the psychoeducation group at follow ups indicating there was still increased improvement compared to TAU.

Note. Abbreviations: TAU= Treatment as Usual, CBT= Cognitive Behavioural Therapy, CAINS= The Clinical Assessment Interview for Negative Symptoms , PANSS= Positive and Negative Symptom Scale, SANS= Scale for The Assessment of Negative Symptoms, MSANS= Modified Scale for The Assessment of Negative Symptoms, MHRM= Mental Health Recovery Measure, SLOF= Specific Level of Functioning Scale and WHOQOL= World Health Organisation Qualify of Life Scale.

Characteristics of the Report

Participant Characteristics

The eight included studies present data on 1,372 participants. Although two of the studies included patients and their family members, only patients were included in the overall number. The participant sample comprised 835 males (60.8%) and 537 females (39.2%). The largest study had a sample of 547 participants (Thorup et al., 2005), while the smallest included 63 participants (Dyck et al., 2000). The age of the participants ranged from 18-65 years old across studies.

Ethnicity was reported in six of the eight studies, with proportions as follows: White (5.3%), British (8.2%), Pakistani (0.95%), Chinese (23.9%), Minority (8.8%) and Unknown (52.85%). All studies included participants with a diagnosis of schizophrenia spectrum disorders, as classified under codes F20-F29 in the ICD-10. This includes, 'Schizophrenia, Delusional Disorders, Brief Psychotic Disorder, Shared Psychotic Disorder, Schizoaffective Disorders, Other Psychotic Disorder not due to substance or unknown physiological condition, and Unspecified Psychosis not due to a substance or known physiological condition'.

Characteristics of Studies

Table 1 summarises the eight included studies. The studies came from a variety of countries, including Netherlands, Denmark, USA, UK and China. The studies were published between 2000 and 2024.

Duration and Chronicity of Participant's Illness

Across the included studies, the majority reported including participants with recent diagnoses of schizophrenia spectrum disorders (Fowler et al., 2018; Wong et al., 2024; Chien et al., 2018; Pos et al., 2019). Castelein et al. (2008) and Snethen et al. (2024) provided no information on duration or chronicity. Thorup et al. (2005) offered limited information. In contrast, Dyck et al. (2000) described a predominantly white male sample with extensive psychiatric histories. This suggests a more chronic presentation compared to the other predominantly recent-onset samples.

Intervention and Delivery Method

Two studies used peer support interventions. Castelein et al., (2008) used a peer support intervention where participants decided the topic of group sessions and discussed life experiences in buddy pairs. Pos et al., (2019) carried out CBT for social activation, this had individual and group sessions, both focused on addressing dysfunctional beliefs through use of cognitive restructuring, and support to increase social activity. They also used buddy pairs.

Three studies used family interventions. Dyck et al., (2000) carried out a Multi-Family Group, which consisted of psychoeducation and supported with illness management. Thorup et al., (2005) used an integrated treatment. This included social skills training, which included psychoeducation, basic social skills and relapse prevention. The multi-family groups included psychoeducation. Community treatment was listed as a treatment element however was not expanded on. Chien et al., (2018) intervention was a Family Led Mutual Support Group (FMSG). Groups had five stages; introductions, psychosocial needs (e.g. emotion regulation), managing needs (e.g. medication guidance), taking up caregiving roles/demands, and group ending (e.g. review of content). Chien et al., (2018) also implemented a Psychoeducation Group condition which was attended by family and patients, it consisted of mental health promotion and self-management skills.

The other interventions were varied. Snethen et al., (2024) used ‘Independence through Community Access and Navigation (ICAN)’, and motivational interviewing to help participants identify and participate in meaningful activities. Wong et al., (2024) implemented Strength Based Cognitive Behavioural Therapy (SBCBT) and Peer to Peer Support (PSP). SBCBT focused on building strengths to achieve goals and overcome barriers. PSP focused on sharing of self-management skills and mutual support. Fowler et al., (2018) used Social Recovery Therapy which consisted of formulation, preparing for new activities and engagement in activities.

The interventions were delivered by; nurses (Castelein et al., 2008), CBT therapists (Fowler et al., 2018), social workers (Wong et al., 2024), clinical professionals (e.g. psychologists, psychiatrists, occupational therapists) (Thorup et al., 2005), and both nurses and family members (W. T. Chien et al., 2018). Three studies did not clarify which clinicians delivered interventions (Snethen et al., 2024; Dyck et al., 2000 Pos et al., 2019).

Intervention Duration

The duration of the interventions varied considerably, from three months (Pos et al., 2019), six months (Snethen et al., 2024), eight months (Castelein et al., 2008), nine months (Fowler et al., 2018; Chien et al., 2018), twelve months (Dyck et al., 2000; Wong et al., 2024) and two years (Thorup et al., 2005). The frequency of contact also varied from weekly (Thorup et al., 2005), fortnightly (Castelein et al., 2008; Chien et al., 2018), and monthly (Wong et al., 2024). One study had sessions every two weeks, then switched to three weeks (Dyck et al., 2000). Another study alternated between having sessions once a week and twice a week (Pos et al., 2019), and two studies did not specify how often sessions took place (Fowler et al., 2018; Snethen et al., 2024). Session duration varied from 45 minutes (Pos et al., 2019), 60 minutes (Wong et al., 2024), 90 minutes (Castelein et al., 2008; Thorup et al., 2005), 120 minutes (Chien et al., 2018), and three studies did not report session lengths (Dyck et al., 2000; Fowler et al., 2018; Snethen et al., 2024). Overall, duration and frequency of interventions varied.

Trial Design

Methodology differed between studies. Two studies featured two intervention conditions and one control condition. Wong et al. (2024) had three conditions: 1) Strength Based Cognitive Behavioural Therapy (SBCBT), 2) Peer-to-Peer Support (PSP), and 3) treatment as usual (TAU). Similarly, Chien et al. (2018) examined: 1) Mutual Support 2) Psychoeducation and 3) treatment as usual (TAU). The remaining six studies implemented a two-arm design.

Outcome Measures

Recovery was assessed using two types of outcome measures: self-reported wellbeing and clinician-rated negative symptom severity. Both Castelein et al. (2008) and Wong et al. (2024) used the World Health Organisation Quality of Life Scale (WHOQOL). In addition, Wong et al. (2024) also utilised The Mental Health Recovery Measure (MHRM). Pos et al. (2019) used the Global Assessment of Functioning (GAF), while Chien et al. (2018) utilised the Specific level of Functioning Scale (SLOF).

The negative symptom scales used included; Brief Negative Symptom Scale (BNSS) (Pos et al., 2019), Positive and Negative Symptom Scale (PANSS) (Fowler et al., 2018; Chien et al., 2018), Modified Scale for Assessment of Negative Symptoms (MSANS) (Dyck et al., 2000), Clinical Assessment Interview for Negative Symptoms (CAINS) (Snethen et al., 2024), and Scale for Assessment of Negative Symptoms (SANS) (Fowler et al., 2018; Thorup et al., 2005). Of note, Fowler et al. (2018) was the only study to use two negative symptom measures, the remaining studies used one. Two studies incorporated both self-reported and clinician-rated outcome measures (Pos et al., 2019; Chien et al., 2018).

Administration of Outcome Measures

The administration of outcome measures differed across studies. Some studies used research assistants (Fowler et al., 2018; Snethen et al., 2024; Chien et al., 2018; Wong et al., 2024). Castelein et al., (2008) used an ‘independent professional’. Thorup et al. (2005) used ‘independent trained professionals’ consisting of psychiatrists, psychologists and student doctors training in psychiatry. Pos et al., (2019) used ‘clinicians’ to administer measures and Dyck et al., (2000) did not specify who the assessors were.

Study Locations and Settings

Delivery setting comprised a variety of services. Participants were recruited from early intervention in psychosis services (Fowler et al., 2018; Pos et al., 2019), community mental health services (Wong et al., 2024; Dyck et al., 2000; Chien et al., 2018; Snethen et al., 2024; Castelein et al., 2008), general practitioner (GP) clinics (Thorup et al., 2005), mental health inpatient wards (Thorup et al., 2005) and social service centres (Thorup et al., 2005).

Cultural Context

The included studies were conducted across a range of geographical and cultural contexts: in the Netherlands (Castelein et al., 2008; Pos et al., 2019), Denmark (Thorup et al., 2005), The United States (Dyck et al., 2000; Snethen et al., 2024), The United Kingdom (Fowler et al., 2018) and China (W. T. Chien et al., 2018; Wong et al., 2024). Only one study discussed how they incorporated culture into their intervention (Chien et al., 2018). As such, five of the eight studies included were conducted in Western cultural contexts, while the remaining two studies were conducted in Eastern settings. However, country will not always indicate cultural context due to presence of migrant and ethnic subgroups. These distinctions are relevant given potential cultural variations in social connection and conceptualisations of recovery.

Efficacy and Effectiveness

Four studies found significant findings related to outcome measures of negative symptoms and/or wellbeing. Dyck et al., (2000) investigated a multiple family group intervention and found a significant result, indicating that family intervention was successful in alleviating negative symptoms. Thorup et al., (2005) utilised an integrated treatment which found a significant reduction in negative symptoms in the treatment condition compared to TAU. Chien et al., (2018) explored a family led mutual support group, psychoeducation group vs TAU. They did not find a reduction in negative symptoms, however, did note an increase in wellbeing in the mutual support group and psychoeducation group in comparison to TAU. Wong et al., (2024) explored the use of strengths-based cognitive behavioural therapy (SBCBT), peer-to-peer support (PSP) and TAU. This study found numerous significant correlations in both the SBCBT and PSP conditions.

Two studies found some small findings. Castelein et al., (2008) investigated a peer support intervention. They found a non-significant result between conditions. Pos et al., (2019) implemented CBT for social activation. They found a decrease in negative symptoms in the intervention group compared to TAU. However, effects were small and not maintained at six month follow up.

Two studies had no significant findings. Fowler et al., (2018) investigated social recovery therapy within early intervention services, there were no significant differences in outcome measures between groups. Snethen et al., (2024) investigated the independence through community access and navigation (ICAN) intervention. There was no significant effect of the intervention on negative symptoms.

Methodological Quality

The Cochrane Risk of Bias Tool for Randomised Trials (RoB2) (Sterne et al., 2019) was used to critically appraise the studies. This tool appraises five categories of bias: randomisation process, deviations from the intended (e.g. protocol), missing outcomes, measurement of the outcome and selection of reported results. It then provides an overall risk of bias rating. This tool requires studies to be separated into relevant outcome measures to be assessed for quality, this is why some studies in Table 2 have two ratings. Table 2 depicts the score patterns for studies. The studies overall risk of bias ratings were scored as ‘low risk’, ‘some concerns’ or ‘high risk’.

The studies with the lowest risk of bias were Castelein et al., (2008), Chien et al., (2018) and Thorup et al., (2005). The latter two were studies which were found to have significant findings on outcome measures, suggesting reliability in findings. The other two studies which had significant findings were Dyck et al., (2000) and Wong et al., (2024) which scored as ‘high risk of bias’, which poses queries about the reliability of findings. Others with high risk of bias were Snethen et al., (2024), and Fowler et al., (2018). Pos et al., (2019) scored as having ‘some concerns’.

The three domains which had the highest rates of ‘some concerns’ and ‘high risk’ were domain 2, domain 3 and domain 5. Domain 2 includes whether participants, assessors and researchers were blinded, it also asks whether there were any deviations from the intervention and whether these likely affected outcomes. A few of the included studies did not blind assessors to participant’s treatment condition which resulted in lower scores on this domain (Wong et al., 2024; Dyck et al., 2000; Snethen et al., 2024). Domain 3 includes whether all data for the outcomes were randomised and whether results may be biased due to missing data. Two studies experienced significant drop out rates which affected data distribution across conditions which may have affected outcomes (Fowler et al., 2018; Wong et al., 2024). This led to higher bias ratings for this domain. Domain 5 included whether the data was analysed in accordance with the protocol, whether outcome measures were appropriate and how data was analysed. The main defining factor for this domain for the studies in this review was adherence to protocol. The researcher was not able to locate protocols for the following studies: Pos et al., (2019), Dyck et al., (2000), Wong et al., (2024), and Snethen et al., (2024). This led to higher risk of bias for these studies. All studies used reliable and commonly used outcome measures to measure negative symptoms and wellbeing. Overall, the RoB2 quality appraisal indicated the studies in this review varied in their quality. This highlights a need to consider the findings with caution as four out of the eight studies were found to have a high risk of bias which may affect the reliability of findings.

Table 2

The Cochrane Risk of Bias Tool for Randomised Trials (RoB2)

Author	Outcome measure	Domain 1: Randomisation process	Domain 2: Deviations from the intended	Domain 3: Missing outcomes	Domain 4: Measurement of the outcome	Domain 5: Selection of reported results	Risk of bias Judgement
Pos et al (2019)	1) Brief negative symptom scale (BNSS)	LOW	LOW	LOW	LOW	SOME CONCERNS	SOME CONCERNS
Pos et al (2019)	2) Global assessment of functioning (GAF)	LOW	LOW	LOW	LOW	SOME CONCERNS	SOME CONCERNS
Fowler et al (2018)	1) Positive and negative syndrome scale (PANSS)	LOW	LOW	HIGH	LOW	LOW	HIGH
Fowler et al (2018)	2) Schedule for the assessment of negative symptoms (SANS)	LOW	LOW	HIGH	LOW	LOW	HIGH
Chein et al (2018)	1) Positive and negative syndrome scale (PANSS)	LOW	LOW	LOW	LOW	LOW	LOW
Chien et al (2018)	2) Specific levels of functioning scale (SLOF)	LOW	LOW	LOW	LOW	LOW	LOW
Dyck et al (2000)	1) Modified scale for the assessment of negative symptoms (MSANS)	SOME CONCERNS	HIGH	LOW	LOW	SOME CONCERNS	HIGH

Castelein et al (2008)	1) WHO quality of life scale (WHOQOL)	LOW	LOW	LOW	LOW	LOW	LOW
Wong et al (2024)	1) Mental health recovery measure (MHRM)	LOW	SOME CONCERNS	HIGH	LOW	SOME CONCERNS	HIGH
Wong et al (2024)	2) WHO quality of life scale (WHOQOL)	LOW	SOME CONCERNS	HIGH	LOW	SOME CONCERNS	HIGH
Snethen et al (2024)	1) Clinical assessment interview of negative symptoms (CAINS)	LOW	HIGH	LOW	LOW	SOME CONCERNS	HIGH
Thorup et al (2005)	1) The scale for the assessment of negative symptoms (SANS)	LOW	LOW	LOW	LOW	LOW	LOW

2) Exploration of Relationships in the Data

The relationships across the included studies were explored and key themes were identified. These are discussed below.

Dropout Rates

Dropouts are important to consider due to their potential effect on reliability of findings. Within the study sample, all had dropouts except Snethen et al., (2024), this is unusual and raises queries about disclosure. Most studies dropout rates did not skew the number of participants across groups, except Wong et al., (2024) where dropout rates were high and led to large variations in final numbers; SBCBT (19.51%), PSP (39.02%) and TAU (41.46%). Thorup et al., (2005) raised queries about dropout rates across conditions for follow up, reporting a 40% drop out rate for TAU and 25% in treatment condition. Indicating a significant number of participants refused follow up which raises queries about why this occurred. Studies which had more dropouts in treatment conditions were Chien et al., (2018) and Wong et al., (2024). There were more dropouts in TAU for Fowler et al., (2018), Pos et al., (2019) and Thorup et al., (2005). There were no trends in dropout rates in a singular condition. Some of the studies used approaches to counteract effects from dropouts, such as intention-to-treat analyses which may reduce bias (Chien et al., 2018; Pos et al., 2019; Thorup et al., 2005). Fowler et al., (2018) experienced significant drop out rates which they state compromised their study, this may contribute to lack of significant findings.

Outcome Measures

One main difference across studies was the use of clinician reported measures compared to use of self-report measures. Some studies only utilised clinician rated scales (Castelein et al., 2008; Wong et al., 2024). Wong et al., (2024) had significant findings for the review question and Castelein et al., (2008) had limited positive findings. The use of only 'self-report measures' may raise limitations as data is therefore subjective and can be affected by confounding factors, which creates a level of bias. Whilst it is common practice for psychological studies to use self-report measures, it can also be beneficial to incorporate clinician administered measures to gain an objective perspective. Two studies chose to use both types of measures (Pos et al., 2019; Chien et al., 2018), this led to a variety of data. Three out of four studies which found more significant results for outcome measures used only clinician administered outcome measures (Dyck et al., 2000; Chien et al., 2018; Thorup et al., 2005). This suggests there may be a trend indicating that clinician administered outcome measures may be more reliable to use.

Duration of Illness

The duration of illness in the participant samples were similar across most studies. Several studies had criteria ranging from three months to five years duration since receiving a schizophrenia spectrum disorder diagnosis (Chien et al., 2018; Pos et al., 2019; Wong et al., 2024). Fowler et al., (2018) did not report the mean duration for their sample but did recruit their sample from early intervention services, suggesting a shorter duration of illness. Thorup et al., (2005) had criteria that their participants had first episode psychosis. Generally, participant samples who were recently diagnosed may be more optimistic about recovery and potential of independent living, compared to individuals who had their diagnosis for longer. However, there were no trends between studies with short durations of illness. Castelein et al., (2008) and Snethen et al., (2024) did not report a duration or chronicity of illness. Most of the studies in the review could be considered to have a shorter duration of illness except for Dyck et al., (2000). Dyck et al., (2000) had significant findings on the relevant recovery outcome measures, which could suggest that social connection is beneficial for participants with longer duration of negative symptoms as well as shorter.

Age of Participants

The age of participants may have influenced study outcomes or retention of participants. Many studies had a middle-aged sample with a mean age of early to late 40s (Snethen et al., 2024; Wong et al., 2024; Castelein et al., 2008). In comparison, Pos et al., (2019) and Fowler et al., (2018) had a mean age of 24 and 25 years old. This split in age groups may have led to participants having different expectations or goals, and differing levels of family support. Younger samples are also known to have more fluid social networks. It additionally may have been confounded by illness episode/chronicity. However, these studies did not differ dramatically in outcomes, there was no trend towards a certain age group having decreased negative symptoms or improvements in wellbeing. It does raise the question about why there were restrictions on age for some studies, such as Thorup et al., (2005) with a maximum inclusion age of 45 years old and Pos et al., (2019) with a maximum age of 36 years old. In comparison, Snethen et al., (2024) recruited individuals aged 18-64 years old. Studies generally did not provide a rationale for this, however Thorup et al., (2005) reported their integrated treatment as ‘having special appeal to young patients’. It is interesting to note that the studies with lower age criteria are not comprised of mainly early intervention studies which may be expected, only Pos et al., (2019) had an early intervention participant sample.

Intervention Type

Three studies in the review included family involvement. Dyck et al., (2000) intervention was a family group and Chien et al., (2018) trialled two interventions: mutual support group and psychoeducation, versus TAU. Whereas Thorup et al., (2005) implemented an integrated intervention where the family group was only one element of treatment. All interventions focused on self-management skills and psychoeducation. The duration varied significantly across studies ranging from nine months (Chien et al., 2018), one year (Dyck et al., 2000), and two years (Thorup et al., 2005). The administration of the groups differed as two studies were led by clinicians, and one was led by family (Thorup et al., 2005). It is crucial to note that all the family intervention studies had significant findings, indicating this approach may be beneficial to recovery.

There were two studies which involved peer support in their interventions (Castelein et al., 2008; Pos et al., 2019). Castelein et al., (2008) trialled a peer support group intervention which was led by a professional facilitator (nurse). In comparison, Pos et al., (2019) trialled cognitive behavioural therapy for social activation (CBTSA), this consisted of group sessions which promoted peer to peer support, this was then followed by individual sessions. Castelein et al., (2008) duration was eight months in comparison to a much shorter duration of three months for Pos et al., (2019). Pos et al., (2019) went on to report the intervention duration as a limitation of the study, as they found limited successful results and findings were not maintained at follow up. Both studies reported positive reflections about group format from participants as they were able to expand their social network. Studies which used peer support had mixed findings with some improvements in recovery.

3) Consideration of the Robustness of the Synthesis

The creation of this review followed PRISMA guidelines (Page et al., 2020) which provided a clear, standardised process to follow. A comprehensive search strategy was created which was used to search commonly used data bases. A second reviewer screened 10% of the titles and abstracts with excellent agreement (Cohen's weighted Kappa = 0.991) and screened 10% of the full text articles, again with excellent agreement (Cohen's weighted Kappa = 0.991). This ensured consistency and reliability in the screening process. The second reviewer rated 100% of included studies using the RoB2 tool for quality appraisal, this minimised bias and subjectivity which led to strengthening of methodological transparency.

It is also crucial to consider the robustness of the included studies. As previously discussed, studies varied in their overall risk of bias as identified using the RoB2 quality appraisal tool (Sterne et al., 2019). The studies with significant findings varied in their risk of bias with two studies (Chien et al., 2018; Thorup et al., 2005) being rated as having 'low risk of bias', in comparison to Dyck et al., (2000) and Wong et al., (2024) which were rated as having 'high risk of bias'. Two main reasons for higher bias ratings were use of a single blind design and not having an accessible protocol. Due to a variety of quality appraisal ratings across the included studies, findings should be considered with caution.

Discussion

The aim of this review was to investigate the relationship between social connection and recovery from negative symptoms of psychosis. Recovery was considered in two ways: reduction from negative symptoms and improvement in wellbeing. The review synthesised evidence on social connection intervention types, delivery modes, duration and frequency of interventions, participant demographics, cultural considerations and study quality. Considering all the included studies there was clear evidence that increasing social connection resulted in a positive change in negative symptom recovery.

The included studies largely followed three themes: family approaches, peer support and adapted CBT interventions. Findings were mixed across the studies. Notably, three of the four studies which found significant positive outcomes involved family-based interventions which focused on psychoeducation and self-management skills. Group delivery and peer support also demonstrated beneficial effects on recovery. Thorup et al. (2005) implemented an integrated approach, incorporating social skills training, community involvement and psychoeducation, which showed promising results. Consequently, integrated interventions combining these elements may represent effective strategies to support recovery. However, it is also crucial to acknowledge the complexity of recovery as it is non-linear and subjective. There were no notable patterns regarding optimal intervention duration or frequency. Participant retention emerged as a consistent challenge. Individuals experiencing psychosis can be difficult to recruit, engage and retain. These difficulties have been reported across the literature base.

Importantly, none of the studies reported the intervention effects on individual negative symptoms and the relationship with recovery, highlighting a gap in the research base. Using a composite score to summarise negative symptom profile can be efficient, given the known comorbidity of negative symptoms. However, it overlooks the underlying mechanisms of individual negative symptoms and how change processes may vary across social interventions.

Strengths and Limitations of the Systematic Review

A strength of the review is the inclusion of a range of outcome measures, spanning both wellbeing and negative symptom domains, provided a wealth of information and allowed the review to fully encompass the idea of ‘recovery’. In addition, the high inter-rater reliability strengthens the credibility and objectivity of the screening process.

A possible limitation of this review is the search strategy, whilst it managed to identify articles which focused on primarily negative symptoms of psychosis, it did not identify articles with “first episode psychosis” within their titles. This search term should be included in future studies researching negative symptoms. Furthermore, considerable heterogeneity was observed across the studies, particularly in relation to intervention type, which poses a difficulty for direct comparison. Whilst the interventions may vaguely follow three themes, there were substantial differences in content, mode of delivery and underlying theoretical frameworks. A few studies did not report sufficiently on their interventions, which posed difficulties in understanding whether certain methods were beneficial to recovery. Lastly, the review had limited cultural generalisability. Cultural norms around family roles, stigma and expectations of social functioning could influence both how the interventions were received and how recovery is conceptualised. This highlights a need for culturally adapted interventions.

Implications for Practice

The findings of this review have significant implications for clinical practice. Firstly, they contribute to the evidence base for the role of socially oriented psychological interventions in the recovery from negative symptoms. The review supports recommended use of Family Therapy for psychosis. However, the nature of the family interventions varied across studies and deviated from traditional Family Therapy, highlighting a need for greater consistency in intervention design.

The review also identified additional factors that may be beneficial to recovery, including mode of delivery, incorporation of psychoeducation and the use of integrated approaches. Furthermore, the difficulty in retaining participants across multiple studies highlights a common barrier within this population, which should be addressed in future intervention planning and trial designs.

Conclusion

This systematic review met its aim in exploring the relationship between social connection and recovery from negative symptoms of psychosis. The included studies provided valuable insights into the type of interventions that may support individuals with psychosis and the contextual factors that influence their effectiveness. The review highlights the importance of ongoing research on psychological interventions for negative symptoms of psychosis. Continued systematic reviews and empirical investigations are essential to build robust evidence and improve treatment options for individuals experiencing negative symptoms of psychosis.

Statements and Declarations

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Chapter 2

Understanding Change Processes in Psychological Therapy for Negative Symptoms Using Therapy Transcript Coding and Analysis

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This chapter has a greater word count than recommended by the chosen journal, for the purposes of the thesis examination process.

Plain Language Summary

Understanding Change Processes in Psychological Therapy for Negative Symptoms Using Therapy Transcript Coding and Analysis

Psychosis can be described as "a collection of symptoms that affect the mind, where there has been some loss of contact with reality" (National Institute of Mental Health, 2023). Symptoms of psychosis fall into positive and negative sub-categories, negative symptoms can include inability to feel pleasure, social withdrawal and difficulty showing emotions (Marder & Galderisi, 2017). Medicines can be helpful for treating positive symptoms, but negative symptoms are usually less responsive to standard approaches. Cognitive Behavioural Therapy (CBT) and Family Therapy are commonly used to support recovery in individuals with negative symptoms of psychosis and are recommended by the Scottish Intercollegiate Guidelines Network (SIGN) (Scottish Intercollegiate Guidelines Network (SIGN), 2013). However, they do not benefit everyone, there remains the need for the development of new psychological interventions. We need to identify the mental processes that could be focused on in psychological therapies to improve recovery from negative symptoms of psychosis. Possible targets include levels of social connectedness or aspects of self-awareness such as the ability to reflect on and understand our minds (known as 'metacognition'). These need to be further studied to understand their role in the maintenance of negative symptoms.

One method of exploring metacognition and social connection is to analyse the interactions that occur in psychological therapy and to identify any themes or processes. Coding therapy transcripts is one way to develop new approaches to psychological therapies. This might help to study what is said in interactions in sessions. Transcript coding analysis is a way of potentially discovering new insights into therapeutic change processes.

Aim

- To develop and test a therapy transcript coding procedure designed to detect changes in metacognition and social behaviour in people receiving psychological treatment for negative symptoms.

Methods

This was a mixed methods study embedded within a single case-experimental design (SCED) study (rec: UGN19MH107). Three individuals with psychosis who were experiencing negative symptoms were recruited and received six therapy sessions. Eighteen recorded therapy sessions were transcribed, one was not able to be received, which resulted in seventeen being analysed using the coding book developed for the study.

Ethics

The study has ethical approval (rec: UGN19MH107) and all data was electronically stored only accessible by the researchers in the study. Any paper documents were stored securely on University of Glasgow property.

Practical applications

This project allows for an exploration of how talking therapies may help individuals with negative symptoms. It provides an important early step toward more fully understanding the way that negative symptoms might be helped using talking therapies.

References

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Abstract

Background: Negative symptoms of psychosis have been linked to deficits in metacognition and a reduction in socialisation. Negative symptoms need therapeutic attention and the development of effective psychological interventions will be advanced if we understand the complexities of how mental and interpersonal processes unfold in therapeutic interactions. Coding therapy transcripts is one way to develop new approaches to psychological therapies. This is needed to explore hypotheses regarding possible areas of important focus; metacognition and social connection.

Objectives: To develop and pilot-test a therapy transcript coding procedure to detect changes in metacognition and social behaviour in individuals receiving psychological treatment for negative symptoms.

***Design*:** Mixed methods applied to qualitative and quantitative data obtained as part of a Single Case Experimental Design (SCED) study.

Methods: Three patients were recruited from inpatient psychiatric rehabilitation units for a psychological therapy for negative symptoms. Treatment sessions were audio recorded, transcribed and a coding system was developed and refined to explore changes in metacognition and social connection.

Results: A theory-informed coding scale was created. The scale demonstrated sensitivity in identifying variations in metacognitive ability of one's own mind across the sample. With more difficulties prevalent for metacognition of others. Additionally, there was a desire for social connection.

Conclusions: This study contributes to expanding the evidence base for understanding and treatment of negative symptoms of psychosis, the study has developed a tool which can explore themes of metacognition and social behaviours.

Key Words (7): negative symptoms, psychosis, metacognition, social connection, schizophrenia.

Introduction

Psychosis can be described as "a collection of symptoms that affect the mind, where there has been some loss of contact with reality" (National Institute of Mental Health, 2023). Psychosis is a key feature of Schizophrenia which affects approximately 0.8% of the population in the UK and often has detrimental effects, including persistent disability, higher risk of suicide (8%) and self-harm (Fazel et al., 2009). Symptoms of psychosis fall into positive and negative sub-categories with negative symptoms divided into domains such as blunted affect, alogia, anhedonia, asociality and avolition (Marder & Galderisi, 2017). Rabinowitz et al, (2013) analysed data from 20 trials involving more than 7,400 participants with schizophrenia and reported that two-thirds exhibited clinically significant negative symptoms. The prevalence and impact of negative symptoms underscore the need for effective treatments, though the intractability of negative symptoms has posed challenges to the advancement of interventions beyond pharmacotherapy.

Psychological Interventions

Cognitive Behavioural therapy (CBT) and Family Therapy are commonly used to treat psychosis (Scottish Intercollegiate Guidelines Network (SIGN), 2013). A recent meta-analysis of CBT for negative symptoms (total n=1366), found a significant reduction in treatment groups compared to standard care ($p < .0001$) (Xu & Xu, 2024). In contrast, a meta-analysis by Velthorst et al., (2015) (n= 2,312) reported a non-significant effect ($p = >.225$) for CBT for negative symptoms. A review by McLeod, (2022) argues for a more nuanced approach, recommending the targeting of specific negative symptoms using tailored techniques aligned with the underlying mechanisms of development and maintenance. There is a crucial need for a greater mechanistic understanding of the development of methods that can more illuminate the processes involved in negative symptom maintenance and therapeutic change.

Metacognition and Social Connectedness

Metacognitive ability reflects how individuals make sense of their own and other's mental states and behaviour (P. Lysaker et al., 2021). Processes such as reflecting on and understanding our own mental state and those of others, can be linked to the development and maintenance of negative symptoms (Rabin et al., 2014). For example, if someone is unable to understand what they are thinking, this may lead to difficulties identifying their emotions which may lead to reduced feelings of pleasure (‘anhedonia’). Evidence of metacognitive deficits has been observed in individuals with both first episode psychosis and prolonged psychosis, finding higher metacognitive abilities for understanding the mental state of others in individuals with prolonged psychosis (Vohs et al., 2014). Across the literature, metacognition has been reported as a key therapeutic target in the treatment of negative symptoms (P. H. Lysaker et al., 2022). One of the ways that psychological therapy might aid recovery is by supporting re-connection with aspects of narrative identity—the ability to construct a coherent account of one’s experiences and goals expressed over time (Greben, Schweitzer, & Bargenquast, 2014). Therapies that promote meaning making have shown potential to support recovery in individuals with psychosis (P. Lysaker et al., 2022).

Another important factor in the maintenance of negative symptoms is a loss of opportunities for social connection (Deci & Ryan, 2000). The onset of psychosis is associated with reduced community participation contributing to diminished social integration and lower quality of life (Killaspy et al., 2014). Some theories suggest that loneliness can be a causal factor for psychosis. For example, the Social Defeat Hypothesis states that chronic loneliness and exclusion leads to stress sensitisation, thereby increasing the risk for psychosis (Selten et al., 2013). Various factors may affect socialisation such as level of social skills, social cognition and social motivation (Fulford et al., 2018). Effective social functioning in a reciprocal relationship with others involves a level of metacognitive skills (Fulford et al., 2018). For example, if someone is unable to understand other’s perspectives, this may lead to difficulties building and sustaining relationships. Given the strong social-interpersonal deficits present in negative symptom presentations, a talking therapy that promotes self-other understanding and engagement in social exchange might be effective.

Developing a Coding System to Measure Change Processes

There is a crucial need to understand the processes that may be influential in inducing change in negative symptoms therapies. When considering how to explore utterances, a coding system could be developed and applied to qualitative data to identify relevant patterns and examine processes of maintenance and change. Coding ways that different content and interaction patterns unfold across psychotherapy sessions is warranted to support the development of effective treatments. Content analysis is a common approach used to identify themes and explore how these develop over therapy (Erlingsson & Brysiewicz, 2017). This project will draw upon established measures to inform the coding framework. This mixed methods approach will use frequency counts which creates statistical data measuring verbal or behavioural indictors of change over time. This approach allows for an exploration of potential mechanisms of change.

Summary

Negative symptoms of psychosis need therapeutic attention and the development of effective psychological interventions will be advanced if we understand the complexities of how mental and interpersonal processes unfold in therapeutic interactions. Given the limited state of current knowledge, a sensible goal is to clarify potential mechanisms of change that may operate in psychological therapies for negative symptoms. A necessary first step is to develop research methods suitable for examining treatment change processes. Developing and testing a therapy coding system should help enhance our understanding and provide valuable insights to inform the development of more effective, targeted psychological interventions. The methodological approach of content analysis has been found to be successful in previous studies (Fassone et al 2012; Fassone et al 2016). It provides a structured way to quantify underlying processes key to expanding the literature base on negative symptoms of psychosis.

Aim

- To develop and test a therapy transcript coding procedure designed to detect changes in metacognition and social behaviour in people receiving psychological treatment for negative symptoms.

Research Questions

1. What aspects of metacognition are reflected in statements observed across therapy transcripts?
2. What categories of social behaviours are reflected in statements observed across therapy transcripts?

3. What changes in utterances about metacognition and social behaviour are detectable across therapy sessions?
4. What specific patterns of interactions between therapist and participant are observed in therapy transcripts?
5. What changes in interaction patterns between therapists and participants are evident as therapy sessions progress?

Materials and Methods

Design

Mixed qualitative and quantitative data analysis methods were applied to therapy transcripts obtained as part of a single-case experimental design (SCED) study. The SCED was a companion study lead by another researcher.

Participants

Participants were recruited through a pre-approved SCED study (REC: UGN19MH1070). The sample comprised three individuals diagnosed with schizophrenia spectrum disorders according to the International Classification of Diseases, 10th Edition (ICD-10) (World Health Organization, 1992), who were experiencing persistent and functionally impairing negative symptoms. Each participant received six sessions of an adapted metacognitive therapy intervention (P. H. Lysaker et al., 2020). This provided a pool of 18 recordings. However, one session recording was unavailable, resulting in 17 recordings being used as the dataset for the design, testing and refinement of the therapy process coding system.

Eligibility Criteria

The following inclusion criteria were used:

- Aged 18 or above.
- Inpatient on NHS Greater Glasgow and Clyde (NHSGGC) rehabilitation wards.
- Diagnosed with a schizophrenia spectrum disorder, as classified under codes F20-F29 in the ICD-10 and based on multidisciplinary team discussion and confirmation via medical records.
- Demonstrated capacity to provide informed consent.
- Scored in the moderate to severe range on either the Motivation and Pleasure Scale or the Expression Scale of the Clinical Assessment Interview for Negative Symptoms (CAINS) (Kring et al., 2013), defined as a total score of ≥ 18 for items 1–9 and ≥ 8 for items 10–13.

Recruitment/Data Access Procedures

Participants were recruited from inpatient rehabilitation services within NHSGGC. Clinical psychologists working within services identified individuals who met the inclusion criteria. A researcher approached potential participants to discuss the study.

Those who expressed interest were provided with a participant information sheet and consent form. Upon providing informed consent, participants completed the initial screening measures required for the SCED study. If they were eligible, they continued completing baseline measures.

Materials

An encrypted dictaphone was used by the therapist to record therapy sessions. Audio files were uploaded to an encrypted NHS laptop, which was used for playback and transcription of recordings. All data were securely stored and analysed on NHS computers, in accordance with NHS data protection policies and information governance standards. Microsoft Word was used to code transcripts and record comments.

Ethical considerations

Participants gave consent for their therapy sessions to be audio recorded, transcribed and used in research at the University of Glasgow. Participants could withdraw from the study at any time. In the event of any distress, the researchers contacted the participant's care teams. The researchers received supervision where they could reflect on their experiences of conducting the research and receive emotional support.

Measures

A therapy transcript coding procedure was developed from existing operational definitions for variables in existing scales that were thought to potentially be theoretically relevant to treatment response, this is shown in Appendix 2.2. Appendix 2.3 shows the scales which were extracted from and implemented into the finalised scale. The newly created scale was an adaptation of the Phase 1 rating scale (shown in Figure 1) and was adapted from the Metacognition Assessment Scale and its Applications (MAS-A) (Semerari et al., 2003).

All the included elements of the newly created scale are known correlates of negative symptom difficulties in individuals diagnosed with schizophrenia spectrum disorders. The subdomains are divided into some capacities that reflect relevant mental processes (e.g. understanding own mind), some that reflect key social-interpersonal skills and some behavioural processes (e.g. ability to exhibit behaviours in functional/occupational domains).

The development and testing procedures for the coding scale are described in the following section. A detailed manual for applying and scoring the scale is provided in Appendix 2.4.

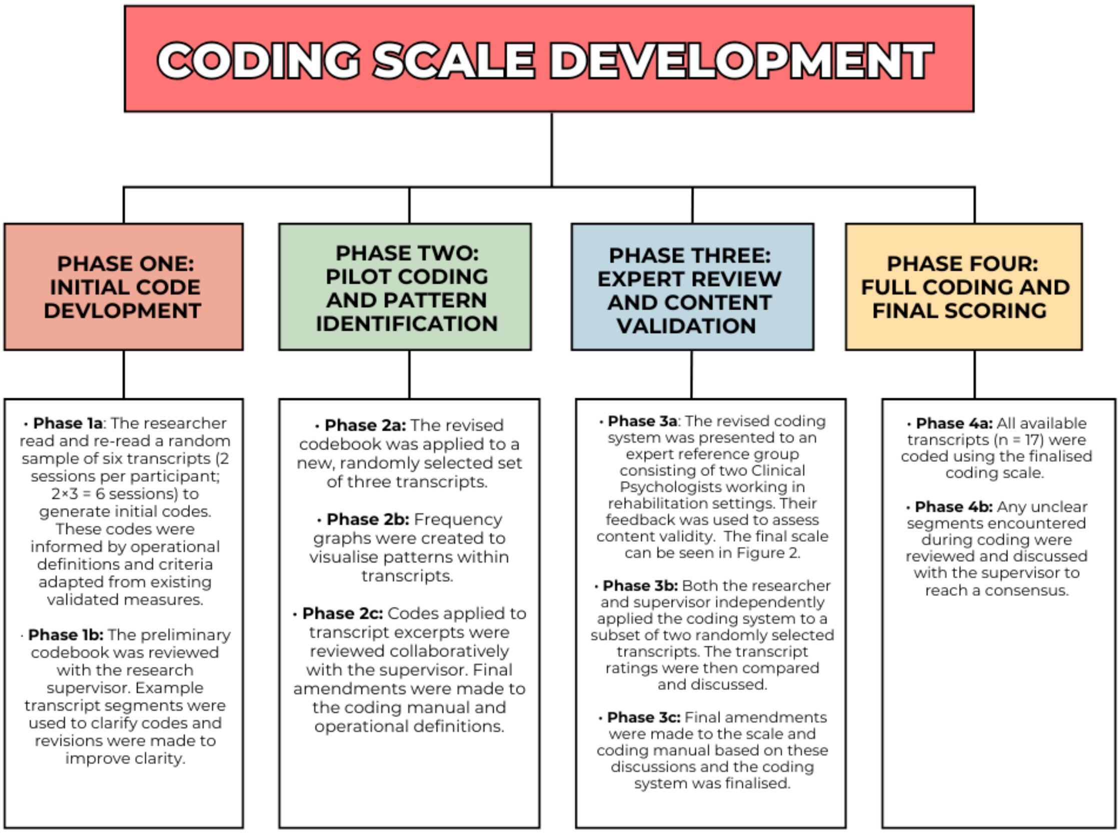
Research Procedures

Data collection for the single-case experimental design (SCED) study was conducted by Nicola McGuire and Rachel Whyte. Therapy sessions were audio-recorded, transcribed and rated using the adapted Phase 1 rating scale. Transcripts were uploaded in a randomised order by Professor McLeod to ensure blinding. The researcher then selected a random subset of transcripts (e.g., session five from Participant 3) to begin the scale development process.

The development of the coding scale followed guidance proposed by Anna Clark & Watson, (2019) for establishing construct validity and proceeded in several structured phases which are shown in Figure 1.

Figure 1

Coding Scale Development Flow Chart



- **Phase 1a**: The researcher read and re-read a random sample of six transcripts (2 sessions per participant; 2×3 = 6 sessions) to generate initial codes. These codes were informed by operational definitions and criteria adapted from existing validated measures.
- **Phase 1b:** The preliminary codebook was reviewed with the research supervisor. Example transcript segments were used to clarify codes and revisions were made to improve clarity.

- **Phase 2a:** The revised codebook was applied to a new, randomly selected set of three transcripts.
- **Phase 2b:** Frequency graphs were created to visualise patterns within transcripts.
- **Phase 2c:** Codes applied to transcript excerpts were reviewed collaboratively with the supervisor. Final amendments were made to the coding manual and operational definitions.

- **Phase 3a**: The revised coding system was presented to an expert reference group consisting of two Clinical Psychologists working in rehabilitation settings. Their feedback was used to assess content validity. The final scale can be seen in Figure 2.
- **Phase 3b:** Both the researcher and supervisor independently applied the coding system to a subset of two randomly selected transcripts. The transcript ratings were then compared and discussed.
- **Phase 3c:** Final amendments were made to the scale and coding manual based on these discussions and the coding system was finalised.

- **Phase 4a:** All available transcripts (n = 17) were coded using the finalised coding scale.
- **Phase 4b:** Any unclear segments encountered during coding were reviewed and discussed with the supervisor to reach a consensus.

Reflexivity

As the researcher's role is central in content analysis, it is important to consider individual experiences, beliefs and biases the researcher may have and how it could impact the research. A reflective log was completed throughout the process of listening to audios, transcribing and creating the coding scale, this can be found in Appendix 2.15.

Results

Characteristics of the Sample

Three patients were included in the sample. All participants were residing in mental health rehabilitation wards and had resided here for over two years. They were all prescribed anti-psychotic medication and had a history of recreational drug and alcohol use, though were sober at the time of participation.

Table 1

Participant Characteristics

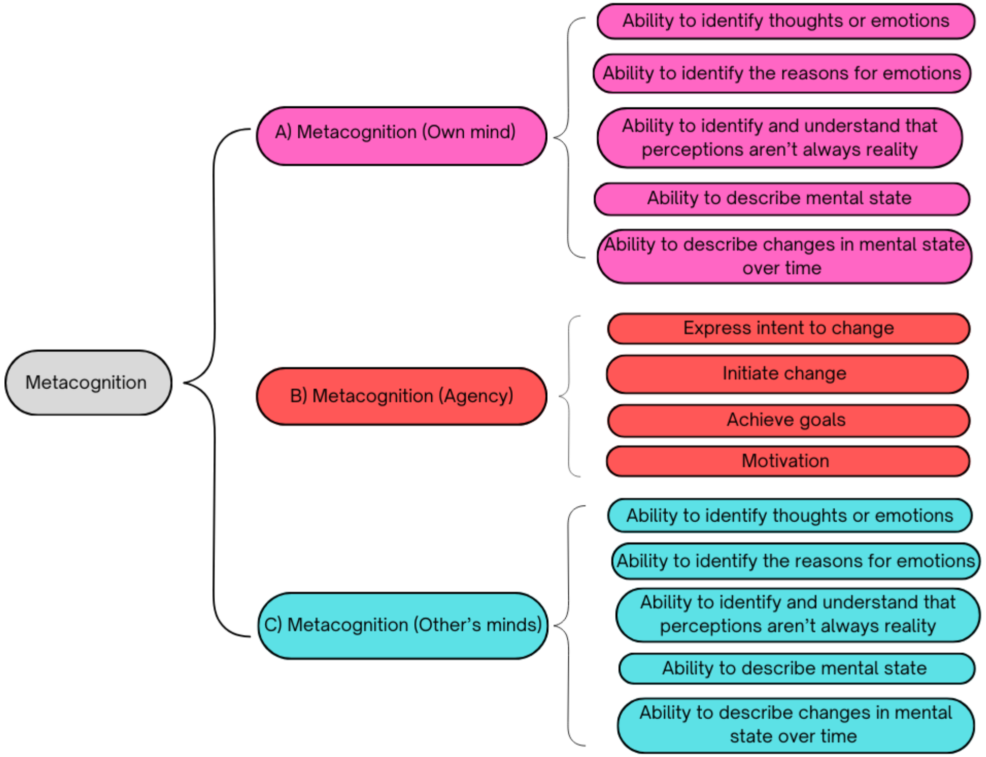
Participant	Age	Gender	Ethnicity	Diagnosis
Participant 1	36	Female	White Scottish	Schizoaffective disorder
Participant 2	30	Male	White Scottish	Schizophrenia
Participant 3	50	Male	White Scottish	Paranoid Schizophrenia

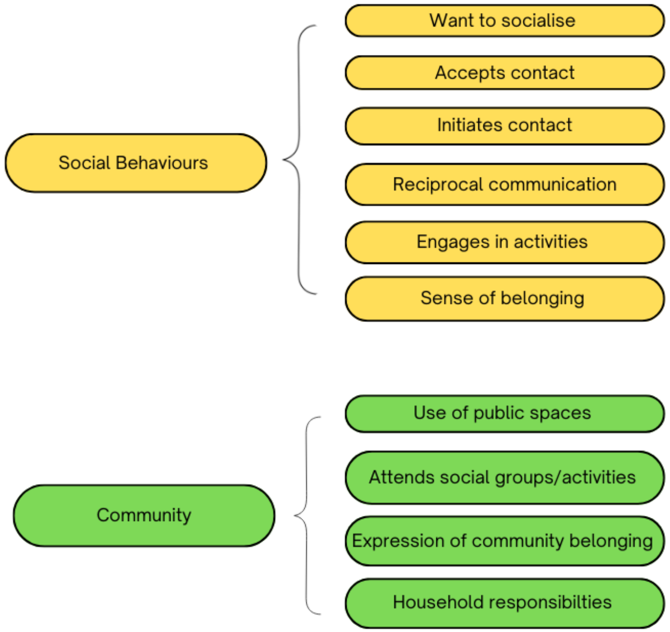
Themes

All 17 sessions were coded using the scale. The main themes included: 1) Metacognition, comprising three subdomains: ‘Own Mind’, ‘Agency’ and ‘Other’s Minds’, 2) Social behaviours and 3) Community. Themes were subdivided into specific subcategories. The finalised scale was then applied to all transcripts. A visual representation of the scale is provided in Figure 2.

Figure 2

The Newly Created Coding Scale: 'Social and Metacognitive Aspects Scale (SMAS)'





Coding Process

To use the scale to score a transcript, the process was conducted in 3 steps. Step 1 involved the rater reading the transcript and identifying whether segments of the transcript relate to either ‘Metacognition (Own mind)’, ‘Metacognition (Agency)’, ‘Metacognition (Other’s minds)’, ‘Social behaviours’ or ‘Community’. Step 2 involved deciding which aspect of the category was present (e.g. this may involve selecting ‘Metacognition (Agency)’ and then selecting ‘express intent to change’). Step 3 was deciding on the level of achievement, (e.g. ‘failure’, ‘partial’ or ‘success’ in meeting the code). The number of times someone scored ‘failures’, ‘partial’ or ‘success’ was noted. The Coding Manual can be found in Appendix

2.4, this includes examples of transcript segments coded as ‘failures’, ‘partials’ and ‘successes’. The scoring template can be found in Appendix 2.6.

Tables 2-4 visualise the frequency of the categories in the scale (where “frequency” refers to the number of utterances ascribed to each code):

- Metacognition (including ‘Own Mind’, ‘Agency’ and ‘Other’s Minds’)
- Social Behaviour
- Community

This shows how the themes were patterned across sessions and allows for a comparison between participants. The participant’s scores for metacognition differed with Participant 1 and 2 showing more rates of utterances in early sessions and a reduction in later sessions, whilst the opposite occurred for Participant 3. Metacognition (agency) across sessions appeared consistent for Participant 1, whilst this reduced throughout therapy for Participant 2, and consisted of limited utterances for Participant 3. Other categories appeared to have more fluctuations, with social behaviours occurring in all sessions.

Table 2: *Frequency Counts of Metacognitively Focused Therapy Excerpts*

	Understanding Own Mind			Agency			Understanding Other's Minds		
	P1	**P2**	**P3**	**P1**	**P2**	**P3**	**P1**	**P2**	**P3**
Session 1	10	14	7	8	10	2	3	6	3
Session 2	6	13	17	2	7	2	1	0	3
Session 3	6	9	11	6	8	1	4	4	7
Session 4	4	9	12	4	6	2	1	6	9
Session 5	5	5	16	9	4	2	1	6	6
Session 6	8	7		10	1		0	5	

Table 3: *Frequency Counts of Social Behaviour-Focused Therapy Excerpts*

	P1	**P2**	**P3**
Session 1	3	9	6
Session 2	6	2	6
Session 3	1	6	6
Session 4	4	2	4
Session 5	4	9	6
Session 6	2	7	

Table 4: *Frequency Counts of Community-Focused Therapy Excerpts*

	P1	P2	P3
Session 1	3	3	6
Session 2	2	2	3
Session 3	7	2	4
Session 4	2	0	3
Session 5	1	1	5
Session 6	5	3	

Heat maps from all 17 transcripts within the new scale can be found in Appendix 2.5. A selection of heat maps is shown below, these have been chosen due to demonstrating key findings. Each theme for each participant is split across two tables, for example Table 5 and Table 6 both show Participant 1's scores for the theme of 'metacognition (own mind)' and show subcategories within this theme. The quotes are labelled as 'T' for Therapist and 'P' for Participant.

Metacognition ('Own Mind')

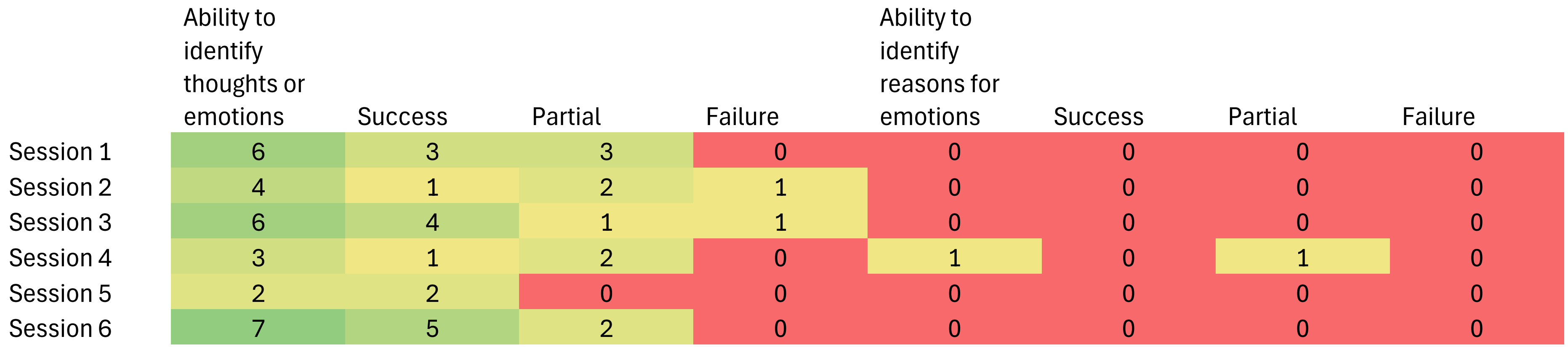
Participant 1 demonstrated fluctuating rates of Metacognition (own mind) across sessions with highest counts in the first session. There were attempts to express 'ability to identify thoughts or emotions' which resulted in a variety of 'successes', 'partials' and 'failures' to meet the code. These failures were only present in earlier sessions with higher numbers of successes in later sessions. Below is an example of Participant 1's ability to identify own thoughts or emotions, this was scored as a 'success' as she was able to describe her thought process and emotions in relation to her fluctuating self-belief in her abilities.

> "T: I mean to be honest eh… we can be, we can sort of get a bit umm.. I don't know, not overcommitted or get a bit worried if I don't know this completely then it's not a success but actually to go from sort of vaguely having the ideas to within a week having done the maths course and enrolling in the science and technology, that does sound like a good bit of progress, I wonder, when you finished the maths course and thought 'yeah that was pretty easy', what did that do to your sense of competence and confidence in your own abilities?
> P: It improved
> T: Did it? Any kind of, can you think about what sort of thoughts it made you have about yourself, judgements about your abilities?
> P: It surprised me what I was capable of, I'm just wondering if I can do this course alright, if I can I could go onto a higher-level course and then go back to do my business and accounts, the knowledge I need to do a HNC in accounts"

Participant 1’s metacognitive abilities to understand her own thoughts increased throughout therapy. This can be seen in Table 5 and Table 6.

Table 5

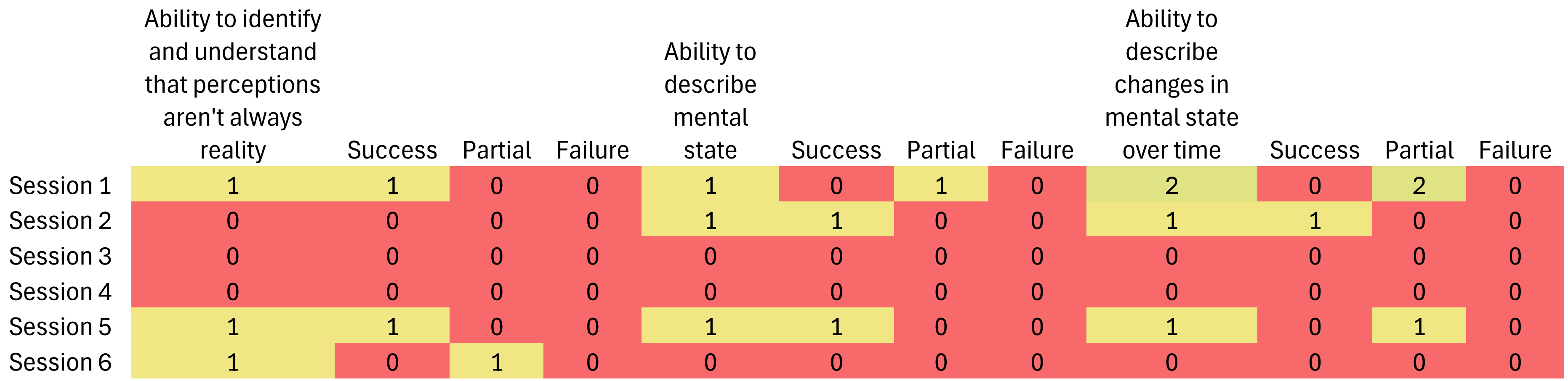
Frequency of Metacognition (Own Mind) Codes for Participant 1 Across Six Therapy Sessions



	Ability to identify thoughts or emotions	Success	Partial	Failure	Ability to identify reasons for emotions	Success	Partial	Failure
Session 1	6	3	3	0	0	0	0	0
Session 2	4	1	2	1	0	0	0	0
Session 3	6	4	1	1	0	0	0	0
Session 4	3	1	2	0	1	0	1	0
Session 5	2	2	0	0	0	0	0	0
Session 6	7	5	2	0	0	0	0	0

Table 6

Frequency of Metacognition (Own Mind) Codes for Participant 1 Across Six Therapy Sessions



	Ability to identify and understand that perceptions aren't always reality	Success	Partial	Failure	Ability to describe mental state	Success	Partial	Failure	Ability to describe changes in mental state over time	Success	Partial	Failure
Session 1	1	1	0	0	1	0	1	0	2	0	2	0
Session 2	0	0	0	0	1	1	0	0	1	1	0	0
Session 3	0	0	0	0	0	0	0	0	0	0	0	0
Session 4	0	0	0	0	0	0	0	0	0	0	0	0
Session 5	1	1	0	0	1	1	0	0	1	0	1	0
Session 6	1	0	1	0	0	0	0	0	0	0	0	0

For Participant 2, Metacognition (own mind) was a prevalent theme, it appeared frequently in the first four sessions, then reduced in later sessions. For the subcategory, ‘ability to identify thoughts or emotions’, this arose more in initial sessions, there was a mixture of scores and did not follow a trend of improving. There were several utterances regarding ‘ability to describe mental state’ which were scored as ‘successes’ and ‘partials’. There were no failures on any subcategories, suggesting a level of ability to identify and understand own thoughts.

Participant 3 scored high values across sessions; with the lowest value in session 1. They mainly had a trend of increasing throughout sessions. However, these were mainly ‘partials’ or ‘failures’, showing this participant had difficulties identifying and expressing his own thoughts. Throughout the subcategories, they continued to score ‘partials’ and ‘failures’ which show a limited understanding of metacognition (own mind).

Metacognition (‘Agency’)

Participant 1 experienced the highest counts of ‘agency’ in their final sessions. The subcategory of ‘express intent to change’ varied with it peaking in session five. They scored mainly ‘successes’. Below is a quote from Participant 1 where she expresses what she hopes will change in her life, this was scored as a ‘success’.

> “T: Okay good, emm... I wondered if you would be willing to, try something with me, just try, emm.. do you reckon you could try and tell me a story about what [Participant’s name] in you know six months time, what life will be like if you could write your own story about how things would be?
> P: [Participant’s name] in six months time would have her own flat, in Ayr, Prestwick or Troon. Emm… she would have just have finished an open university course and going onto college, she would be seeing more of her friends and family as well, family a wee bit more often, I’ve not seen my dad for months now, seen my mum, seen my daughters but I have not seen my dad, or seen my aunts or uncles or that yet either.
> T: Great, and what is [Participant’s name] in the future, what is she doing that is helping her follow this path, how is she helping herself get there?
> P: Taking her medication, doing her exercise, losing weight, she will have lost 2 stone and emm... been in touch with friends and family for support, can’t think of anything else”

For Participant 1, ‘initiate goals’ peaked in session three and mainly scored as ‘successes’. This did not translate into ‘achieve goals’ as this was limited to one mention in session five and session six. Motivation stayed consistent throughout. This can be seen in Table 7 and Table 8.

Table 7

Frequency of Metacognition (Agency) Codes for Participant 1 Across Six Therapy Sessions

	Express intent to change	Success	Partial	Failure	Initiate goals	Success	Partial	Failure
Session 1	3	3	0	0	2	2	0	0
Session 2	1	0	1	0	0	0	0	0
Session 3	1	1	0	0	4	4	0	0
Session 4	1	1	0	0	0	0	0	0
Session 5	5	3	2	0	1	1	0	0
Session 6	3	2	1	0	3	2	1	0

Table 8

Frequency of Metacognition (Agency) Codes for Participant 1 Across Six Therapy Sessions

	Achieve goals	Success	Partial	Failure	Motivation	Success	Partial	Failure
Session 1	0	0	0	0	3	1	2	0
Session 2	0	0	0	0	1	0	1	0
Session 3	0	0	0	0	1	1	0	0
Session 4	0	0	0	0	3	0	3	0
Session 5	1	0	0	1	2	2	0	0
Session 6	1	1	0	0	3	3	0	0

Participant 2's Metacognition (Agency) counts moved in a downward trend as sessions progressed. For 'express intent to change', highest scores were shown in the first session and this fluctuated across sessions with a mixture of scores. There were attempts to initiate goals which developed from 'partials' into 'successes' as sessions progressed, showing improvement. 'Motivation', appeared to be a more prominent theme in earlier sessions and scores were mixed.

Participant 3's scores for Metacognition (Agency) were relatively low throughout. There were some attempts to express 'intent to change' but this did not progress into trying to make changes happen as there were no reports to 'initiate goals' or 'achieve goals'. There were limited utterances of motivation.

Metacognition (Other’s Minds)

For Participant 1, the prevalence of this theme reduced throughout sessions. The subcategory of ‘ability to identify thoughts or emotions’ had also reduced as sessions progressed, however the number of failures was only apparent in earlier sessions, with more ‘partials’ in later sessions, suggesting some increase in ability. For ‘ability to understand that perceptions aren’t always reality’, there was one mention of this subcategory which was a ‘success’. There were no mentions of other subcategories.

For Participant 2, this category was prominent throughout most sessions. For ‘ability to identify thoughts or emotions’, scores remained consistent throughout, with scores of mainly ‘partials’ and ‘failures’. This indicates some difficulties being able to reflect on the mental state of others. For ‘ability to understand that perceptions aren’t always reality’ this did occur but only in the last three sessions, where scores were ‘successes’ and a ‘failure’. This may indicate some progress in utterances for this code. ‘Ability to describe mental state’ occurred in a few sessions and were all scored as ‘partials’ suggesting some difficulty expanding on utterances of this. This can be seen in Table 9 and Table 10.

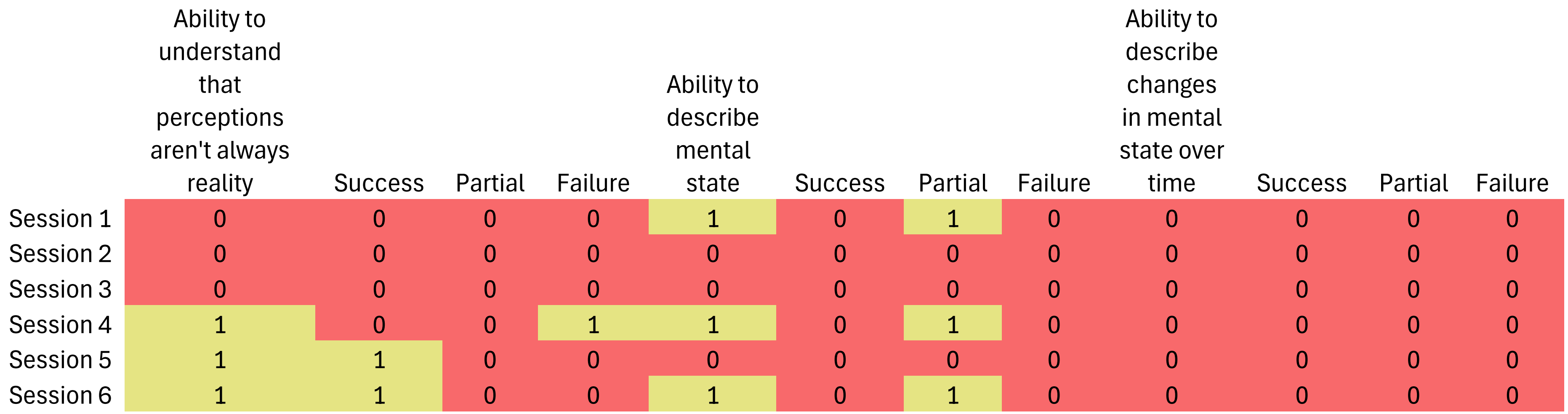
Table 9

Frequency of Metacognition (Other's Minds) Codes for Participant 2 Across Six Therapy Sessions

	Ability to identify thoughts or emotions	Success	Partial	Failure	Ability to identify the reasons for emotions	Success	Partial	Failure
Session 1	5	0	1	4	0	0	0	0
Session 2	0	0	0	0	0	0	0	0
Session 3	3	2	1	0	1	1	0	0
Session 4	4	0	2	2	0	0	0	0
Session 5	5	2	1	2	0	0	0	0
Session 6	3	0	2	1	0	0	0	0

Table 10

Frequency of Metacognition (Other's Minds) Codes for Participant 2 Across Six Therapy Sessions



	Ability to understand that perceptions aren't always reality	Success	Partial	Failure	Ability to describe mental state	Success	Partial	Failure	Ability to describe changes in mental state over time	Success	Partial	Failure
Session 1	0	0	0	0	1	0	1	0	0	0	0	0
Session 2	0	0	0	0	0	0	0	0	0	0	0	0
Session 3	0	0	0	0	0	0	0	0	0	0	0	0
Session 4	1	0	0	1	1	0	1	0	0	0	0	0
Session 5	1	1	0	0	0	0	0	0	0	0	0	0
Session 6	1	1	0	0	1	0	1	0	0	0	0	0

For Participant 3, Metacognition (other's minds) scores had a trend of increasing in number of mentions throughout, with a reduction in the last session. However, these were scored as mainly 'partials' and 'failures'. Indicating difficulties at identifying and/or understanding other people's thoughts or emotions. There was limited mention of other sub-themes.

Social Behaviours

For Participant 1, social behaviours were consistent across sessions with utterances from subcategories such as ‘want to socialise’, ‘initiates contact’, ‘reciprocal communication’ and ‘engages in activities’, scoring as mainly ‘successes’. ‘Sense of belonging’ did occur in a few sessions and was scored as one ‘success’, one ‘partial’ and one ‘failure’. Indicating variability in how included the participant felt socially.

The category of ‘social behaviours’ was prominent across sessions for Participant 2, with peaks in earlier and later sessions. Subcategories of ‘want to socialise’, ‘accepts contact’ and ‘engages in activities’ appeared many times and scored as mainly ‘successes’. Below is a quote from Participant 2 for ‘reciprocal communication’, this was scored as a ‘success’ as he explained his interaction with his friend and expanded on what topics they discussed.

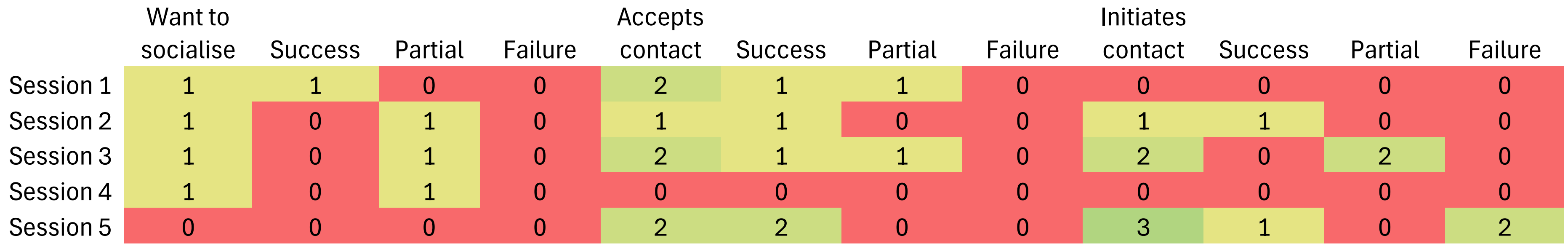
> “T: Should we talk about how that went this past week?
> P: I forgot I had any, I’ve not seen my dad this week yet or my friend [name]
> T: What about [other friend]? He’s on the ward?
> P: Yeah, I see him, he’s moved room now he was in the dorm with me but he’s moved to a side room as he’s getting discharged, but we still talk, we still socialise and talk about sports and whatever.”

‘Initiate contact’ arose once in session five for Participant 2. ‘Reciprocal communication’ was a more consistent theme occurring in most sessions and scoring mainly ‘successes’. ‘Sense of belonging’ was prevalent, occurring in four out of six sessions however these were mainly ‘failures’, suggesting the participant did not experience a sense of belonging.

For Participant 3, social behaviours were consistent across sessions. ‘Want to socialise’ was a consistent theme throughout therapy, scoring mainly ‘partials’. There were attempts to ‘initiate contact’ which increased as sessions progressed, these scored a mixture of responses with failures occurring during the last two sessions. ‘Reciprocal communication’ was not prevalent. The occurrence of ‘engages in activities’ utterances was consistent throughout. ‘Sense of belonging’ appeared in three sessions and was scored as ‘partials’. This can be seen in Table 11 and Table 12.

Table 11

Frequency of Social Behaviour Codes for Participant 3 Across Five Therapy Sessions



	Want to socialise	Success	Partial	Failure	Accepts contact	Success	Partial	Failure	Initiates contact	Success	Partial	Failure
Session 1	1	1	0	0	2	1	1	0	0	0	0	0
Session 2	1	0	1	0	1	1	0	0	1	1	0	0
Session 3	1	0	1	0	2	1	1	0	2	0	2	0
Session 4	1	0	1	0	0	0	0	0	0	0	0	0
Session 5	0	0	0	0	2	2	0	0	3	1	0	2

Table 12

Frequency of Social Behaviour Codes for Participant 3 Across Five Therapy Sessions

	Reciprocal communication	Success	Partial	Failure	Engages in activities	Success	Partial	Failure	Sense of belonging	Success	Partial	Failure
Session 1	1	1	0	0	1	1	0	0	1	0	1	0
Session 2	1	1	0	0	2	1	1	0	0	0	0	0
Session 3	0	0	0	0	0	0	0	0	1	0	1	0
Session 4	0	0	0	0	2	1	1	0	1	0	1	0
Session 5	0	0	0	0	1	1	0	0	0	0	0	0

Community

Community was frequent across all sessions for Participant 1 but fluctuated with ‘use of public spaces’ occurring in half of the sessions. ‘Attends social groups/activities’ was prominent, whilst ‘community belonging’ did not come up. ‘Household responsibilities’ did frequently arise during sessions and were ‘successes’. For Participant 2, ‘community’ was present in sessions, however ‘use of public spaces’ did not arise. For ‘attends social activities/groups’ this was prevalent in most sessions and were scored as ‘successes’. ‘Expression of community belonging’ did not appear and ‘household responsibilities’ appeared once.

For Participant 3, community was consistent across sessions with overall ‘community’ score peaking at the start and end. Participant 3 used ‘public spaces’ across four out of five sessions and these were scored as mainly ‘successes’, this was due to consistent use of public transport. They ‘attended social groups/activities’ and this was scored as mainly ‘successes’. There were no mentions of ‘expression of community belonging’. Lastly, there were some attempts to meet ‘household responsibilities’ which were mainly ‘successes’. This is shown in Table 13 and Table 14.

Table 13

Frequency of Community Codes for Participant 3 Across Five Therapy Sessions

	Use of public spaces	Success	Partial	Failure	Attends social groups/ activities	Success	Partial	Failure
Session 1	3	2	1	0	2	2	0	0
Session 2	1	1	0	0	2	2	0	0
Session 3	0	0	0	0	2	2	0	0
Session 4	2	2	0	0	1	0	1	0
Session 5	1	1	0	0	2	2	0	0

Table 14

Frequency of Community Codes for Participant 3 Across Five Therapy Sessions

	Expression of community belonging	Success	Partial	Failure	Household responsibilities	Success	Partial	Failure
Session 1	0	0	0	0	1	1	0	0
Session 2	0	0	0	0	0	0	0	0
Session 3	0	0	0	0	2	1	1	0
Session 4	0	0	0	0	0	0	0	0
Session 5	0	0	0	0	2	1	1	0

Discussion

The aim of this research project was to develop and test a therapy transcript coding procedure designed to detect changes in metacognition and social behaviour in people receiving psychological treatment for negative symptoms. This was achieved through the construction of a theory-informed coding framework, grounded in existing literature, and applied to 17 therapy transcripts. The coding scale, '*Social and Metacognitive Aspects Scale (SMAS)*', enabled the systematic categorisation of utterances reflecting metacognitive processes, social behaviours and community engagement. The use of frequency counts allowed for a visual portrayal of how these themes transpired throughout metacognitive therapy.

Analysis revealed variability both within and across participants. Participant 1 demonstrated improvements in metacognitive skills, particularly in recognising and describing thoughts and emotions, alongside sustained motivation, though with limited goal attainment. Participant 2 exhibited initial high frequency counts in expressions of metacognition and agency, followed by declines in areas; however, social behaviours and community activities remained consistent. In contrast, Participant 3 consistently struggled with identifying and describing metacognitive experiences and displayed limited progression, despite showing sustained engagement in social behaviours and community involvement. Overall, social behaviours were consistently expressed and valued across participants; however, all participants reported desire for increased social engagement, alongside barriers to achieving this. The fact that there were distinctive patterns observed across sessions and between subjects suggest that the scale can be used to detect individual differences and change across therapy sessions. The following discussion synthesises these key findings in greater depth, structured around the study's five research questions.

Research question 1: What aspects of metacognition are reflected in statements observed across therapy transcripts?

It was evident that the less complex subcategories in the theme of Metacognition (own mind), such as 'ability to identify thoughts or emotions' received high numbers of utterances, with a mixture of scores. Participant 1 and 2 scores were more successful in responding with metacognitive statements about their own mind whilst Participant 3 found this difficult. Other subcategories had lower frequency counts for all participants, such as 'ability to describe changes in mental state over time'. Arguably, this is a higher-level metacognitive skill, as noted by Rabin et al., (2014) the ability to describe mental state and any changes in this is an intricate metacognitive skill which can be linked to the maintenance of negative symptoms. This may explain why this subcategory returned lower frequency counts across participants and may identify this concept as a challenge for individuals with negative symptoms.

For Metacognition (agency), this was a prominent theme, with Participant 1 and 2 demonstrating intent to change, initiating change and starting to achieve goals, however being detained may have affected goal achievement. For example, Participant 1 wanted to set up her own business (i.e. expressing intent) but the restrictions of her care prevented this action being undertaken. Participant 3 mainly expressed intent to change but appeared to have difficulty in converting this into initiating change and achieving goals. This may be due to difficulties in metacognitive ability, they may have the capacity to express intent but not the ability to notice that the conversion into action wasn't occurring. When considering this link to metacognitive ability, it can also be seen in Participant 1. There were high rates of utterances in both 'metacognition (own mind)' and 'ability to identify thoughts or emotions', and high rates of 'agency' and 'initiate goals' in earlier sessions and later sessions. This suggests there is a level of metacognitive ability required to initiate goals, indicating this is a potential mechanism of change.

When considering Metacognition (other's minds), this theme was identified across all participants. For the sub-category of 'ability to identify thoughts or emotions', participant 3 had the highest number of utterances which consisted of 'partials' and 'failures'. The participant appeared to have difficulties in this area or struggled to expand on utterances. Participant 1 showed some improvement in metacognitive ability with progression from 'failures' to 'partials'. Participant 2 also scored 'partials' and 'failures' but this appeared more randomly. This highlighted that the subcategory was a difficulty for all. However, for the subcategory of 'ability to understand that perceptions aren't always reality', Participant 2 developed the ability to recognise that there are multiple interpretations of the meaning behind another's behaviour and this awareness was developed over the course of treatment. This may have been the result of building his understanding of metacognition of others and being able to exhibit higher level metacognitive skills (Rabin et al., 2014). In summary, the metacognitive concepts arose on many occasions for all participants, with differing levels of ability, but a key finding was difficulty for the sample in the realm of metacognition of others.

Research question 2: What categories of social behaviours are reflected in statements observed across therapy transcripts?

It was clear that social behaviour was an important element of recovery with it occurring in all sessions. However, it was clear that desire and actively participating socially with friends and family fluctuated for all. Participant 1 and 2 appeared more active in initiating and carrying out activities, whilst Participant 3 appeared to value social connection but was more passive in his approach to maintaining it. This was evidenced by utterances of 'accept contact' and 'engages in activities' but limited utterances of 'reciprocal communication' or 'initiate contact'. This suggests that social passivity rather than social anhedonia best describes the pattern for Participant 3. There were clear reflections from all participants on their 'want to socialise'. Whilst 'initiate contact' was less prominent in Participant 2, this was an area that he had reflected he struggled with, initiating conversations. This calls attention to a level of metacognitive skill needed to hold mutual conversations and supports research outlining social skills and social cognition as main factors applicable to ability to successfully socialise (Fulford et al., 2018). In contrast to his perception of his social ability, he scored significantly higher than other participants in 'reciprocal communication' with mainly 'successes'. This may be due to him having established 'safe people' in the hospital and family members who he regularly talked to. Whereas the other participants appeared to socialise with a wider range of people through taking part in activities out with the hospital (e.g. Men's Shed). The subtheme of 'sense of belonging' came up for all participants with mainly 'partials' and 'failures', indicating an unmet need for socialisation. This links to 'low expectations of acceptance' which is a core feature in the cognitive model of negative symptoms (Rector et al., 2005).

The theme of 'Community' was prevalent throughout the sessions. The only code which was not coded at all was 'expression of community belonging'. This was surprising for Participant 1 as she valued social connection with family/friends, however, her use of community activities appeared to be superficial. Participant 2 did not access their community as frequently as others. In contrast, Participant 3 engaged in multiple community groups (e.g. ‘Men’s shed’) however they struggled to identify thoughts or emotions regarding this. This is consistent with their findings for metacognition (own mind) as they struggled to express thoughts and emotions. Self-determination theory (Ryan & Deci, 2000) would predict that a greater sense of connectedness would act as a primary motivational driver of action, however this doesn’t appear to be clear in the data. It raises the question of whether it is possible for individuals to be “present” in community spaces and “using” them for functional purposes, but without developing a sense of connection to others that more meaningfully links an individual to their community.

In summary it was portrayed how valued social interactions were for this sample, and how each participant approached the maintenance of this in different ways.

Research question 3: What changes in utterances about metacognition and social behaviour are detectable across therapy sessions?

a) Patterns seen in each of the participants as they progressed through therapy

Participant 1 consistently expressed metacognitive utterances across sessions, for metacognition (own mind), this resulted in improved ability to identify her thoughts or emotions. For all subcategories, earlier sessions were scored as ‘partials’ which then progressed to ‘successes’. This improvement is also seen in metacognition (agency) with high counts of this theme, they ‘express intent to change’, ‘initiate goals’ and express ‘motivation’ consistently which mainly score ‘successes’. The subtheme of ‘achieve goals’ is difficult to reach a strong conclusion about as any difficulty with goal achievement may have affected by the opportunities afforded to the participant whilst in hospital. There is a small improvement in her metacognition of other’s minds, as scores progress form ‘failures’ to ‘partials’. If the therapy format was a longer duration, we may have seen further improvement in metacognitive ability.

For Participant 2, the category of Metacognition (own mind) frequency counts reduced throughout sessions, with scoring being mixed. This is challenging to interpret as whilst occurrence of metacognition (own mind) reduces, which may be due to different priorities in conversation or the therapist reducing their metacognitive questions, it does not explain why there was no change. However, they had no 'failures' for any subcategory, suggesting some level of ability to express own thoughts. There is a decrease throughout sessions for metacognition (agency), with mixed scoring. For Metacognition (other's minds), the prevalence of this theme is consistent across sessions and scoring is again mixed. This may indicate that Participant 2 did not shift from their baseline levels of metacognitive ability.

Participant 3 exhibited high frequency counts which increased throughout therapy, for metacognition (own mind) and their ability to identify thoughts or emotions. However, their ability decreased throughout sessions. Metacognition (other's minds) followed an increase in occurrence of the theme across sessions and an increase in 'failures' to meet the code. Suggesting metacognitive ability appears to be decreasing throughout sessions for Participant 3 for both 'own mind' and 'other's minds'. A possible explanation for this could be potential cognitive deficits from previous substance use affecting metacognitive ability (Ramey & Regier, 2018)

There were no unifying patterns that spanned all three participants for themes of social behaviours or community.

b) Patterns observed across early versus late sessions

There were no trends across participants for early versus late sessions.

Research question 4: What specific patterns of interactions between therapist and participant are observed in therapy transcripts?

It was clear during the coding process that all three participants engaged with the therapist, this is shown by consistent frequency counts across sessions. This engagement may have been influenced by the therapist's attempts to ensure there was less of a power imbalance e.g. in one transcript, the therapist engaged in a conversation about his academic background, this small use of disclosure allowed Participant 2 to humanise the therapist, and he went onto to open-up more. All sessions included reciprocal communication with Participant 1 and 2's sessions including equal speech, this contrasted with Participant 3 who spoke very little or engaged in long segments of utterances which were thought disordered. The therapist summarised back points to participants, this supported metacognitive development and helped with therapist and patient rapport. The therapist demonstrated interest which positively influenced the therapeutic relationship, e.g. discussing Participant 1's favourite music and sharing their favourite music. This resulted in future conversation flowing more naturally and the participant appeared to feel comfortable with the therapist. The therapeutic techniques used by the therapist allow for a psychologically safe environment.

Research question 5: What changes in interaction patterns between therapists and participants are evident as therapy sessions progress?

Throughout the therapy, the therapist knows when to support, when to challenge and when to retreat. For Participant 1, this support and challenge results in an increase in metacognitive skills and reflection on abilities. It is evident that Participant 1 improves in narrative reflexivity, as sessions progress her ability to coherently discuss her story and difficulties increase. This is shown by higher frequency counts of metacognition (own mind), and more 'successes' in 'ability to identify thoughts or emotions' in later sessions. This appears to be a mechanism of change for this participant.

Participant 2 frequently expresses the belief that he does not understand other people's thoughts or social behaviours, this is evidenced in session 1 where he exhibits the most 'failures' in relation to metacognition (other's minds) for 'ability to identify thoughts or emotions'. The therapist and participant then make this perceived difficulty a focus of their work, which results in an increase in confidence to express metacognitive thoughts. This does not necessarily indicate an improvement in metacognitive ability, however, does show improvement in narrative reflexivity as sessions progress.

When considering Participant 3, in earlier sessions, utterances are thought disordered, however as therapy progresses, utterances become less thought disordered. The therapist tries to challenge the participant to reflect on metacognition however this frequently results in ‘failures’, the therapist continues to try to offer support and provide opportunities to express metacognitive utterances but also knows when to retreat.

Overall, these changes in interaction pattern have been varied with different therapeutic approaches having been used by the therapist to provide person centred support. It is necessary to acknowledge the limitation of the six-session therapy format, as the sample of material is somewhat restricted compared to the usual duration of treatment offered to individuals.

Strengths and Limitations

There were several strengths in this study, firstly, the use of content analysis was robust with multiple calibration points, as well as presenting the scale to an expert reference group which enhanced the content validity of the scale. There is a manual (Appendix 2.4) which provides guidance on how to understand, implement and score the scale. It is hoped that this would allow for the scale to be implemented in a reliable, generalisable way. The mixed methods methodology enabled an in-depth exploration of therapy transcripts, yielding rich, contextualised data. This approach was particularly suited to examining the nuanced and subjective processes underpinning metacognitive and social functioning. In doing so, the study contributes to a growing body of literature aimed at understanding the underlying mechanisms of therapeutic change in this population.

Despite these strengths, limitations must be acknowledged. One transcript was not able to be retrieved, resulting in an imbalance in the number of sessions analysed across participants. As the coding was conducted by a single researcher, there may be risk of subjective interpretation or coder bias, despite efforts to mitigate this using a structured manual, calibration points with supervisor, and expert consultation. Future studies should consider using multiple coders and calculating inter-rater reliability.

Directions for Future Research

The current sample of participants were not recently diagnosed with schizophrenia spectrum disorders. This study's findings indicated an area of difficulty was understanding other's minds. This differs from Vohs et al., (2014), who found that individuals with prolonged psychosis had higher metacognitive abilities for understanding mental state of others than those with first episode psychosis. It is important to identify why this difference may occur and at what point ability alters across illness. The next step in testing the scale would be to implement the scale on recently diagnosed individuals to explore whether metacognitive ability and social aspects differ depending on severity and chronicity of illness.

Conclusion

In summary, this study developed and applied a novel transcript coding scale to identify changes in metacognition and social behaviour among individuals receiving psychological treatment for negative symptoms. The findings revealed individual variability in therapeutic change, demonstrating the scale's capacity to capture subtle, process-level shifts in reflective thinking, agency and social engagement.

This study contributes to expanding the evidence base for negative symptoms of psychosis. The findings of this study have several implications for clinical practice, particularly in the psychological treatment of individuals with negative symptoms. Through having an enhanced understanding of potential mechanisms of change, this could lead to more targeted psychological interventions. This is a crucial area to focus on as negative symptoms cause unaddressed suffering for patients and their families.

Statements and Declarations

There was no funding for this study and authors have no competing interests to declare.

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Appendices

Appendix 1.1: Search Strategies

PsychARTICLES

(‘psychosis’ or ‘schizophrenia’) AND (‘negative symptoms’ OR ‘diminished expression’ OR ‘emotion*’ OR ‘motivation’ OR ‘avolition’ OR ‘apathy’ OR ‘anhedonia’ OR ‘asociality’ OR ‘withdrawal’) AND (‘social connection’ or ‘social support’) AND ‘recovery’

CINAHL
(‘psychosis’ OR ‘schizophrenia’) AND (‘negative symptoms’ OR ‘diminished expression’ OR ‘emotion*’ OR ‘motivation’ OR ‘avolition’ OR ‘apathy’ OR ‘anhedonia’ OR ‘asociality’ OR ‘withdrawal’) AND ‘recovery’ AND (‘social connection’ OR ‘social support’)

Medline
(‘psychosis’ OR ‘schizophrenia’) AND (‘psychosis’ OR ‘schizophrenia’) AND (‘negative symptoms’ OR ‘diminished expression’ OR ‘emotion*’ OR ‘motivation’ OR ‘avolition’ OR ‘apathy’ OR ‘anhedonia’ OR ‘asociality’ OR ‘withdrawal’) AND ‘recovery’ AND (‘social connection’ OR ‘social support’)

PsychINFO
(‘psychosis’ OR ‘schizophrenia’) AND (‘psychosis’ OR ‘schizophrenia’) AND (‘psychosis’ OR ‘schizophrenia’) AND (‘negative symptoms’ OR ‘diminished expression’ OR ‘emotion*’ OR ‘motivation’ OR ‘avolition’ OR ‘apathy’ OR ‘anhedonia’ OR ‘asociality’ OR ‘withdrawal’) AND ‘recovery’ AND (‘social connection’ or ‘social support’)

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(‘psychosis’ OR ‘schizophrenia’) AND (‘psychosis’ OR ‘schizophrenia’) AND (‘psychosis’ OR ‘schizophrenia’) AND (‘negative symptoms’ OR ‘diminished expression’ OR ‘emotion*’ OR ‘motivation’ OR ‘avolition’ OR ‘apathy’ OR ‘anhedonia’ OR ‘asociality’ OR ‘withdrawal’ AND ‘recovery’ AND (‘social connection’ OR ‘social support’)

Appendix 1.2 Extraction template

Title:
Year:
Country:
Setting:
Participants:
Age of participants:
Gender:
Ethnicity:
MH Diagnosis:
Intervention and duration:
Psychosis symptom measure:
Study aims:
Analyses conducted:
Stats used:
Main results:
Number of participants in analyses:
Length of follow up (if any):
Study sponsor:
Strengths:
Limitations:

Appendix 1.3: PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Page where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	12
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	13
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	15
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	16
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	17
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	17
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	17
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	18
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	20
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	22
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	22
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	18
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	22
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	18
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data	N/a

Section and Topic	Item #	Checklist item	Page where item is reported
		conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	22
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	18
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/a
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/a
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	35
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	N/a
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	21
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	21
Study characteristics	17	Cite each included study and present its characteristics.	22
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	35
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	22
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	35
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	28
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	37
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/a
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	37
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	35
DISCUSSION			

Section and Topic	Item #	Checklist item	Page where item is reported
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	41
	23b	Discuss any limitations of the evidence included in the review.	42
	23c	Discuss any limitations of the review processes used.	42
	23d	Discuss implications of the results for practice, policy, and future research.	42
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	17
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	17
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/a
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	43
Competing interests	26	Declare any competing interests of review authors.	43
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	18

Appendix 2.1: Final Rating Scale Domains - *Social and Metacognitive Aspects Scale (SMAS)*

Metacognition

1. Understanding one's own mind:
    - i. Ability to identify thoughts or emotions
    - ii. Ability to identify the reasons for emotions
    - iii. Ability to identify and understand that perceptions aren't always reality
    - iv. Ability to describe mental state
    - v. Ability to describe changes in mental state over time

2. Agency:
    - i. Express intent to change
    - ii. Initiate change
    - iii. Achieve goals
    - iv. Motivation

3. Understanding other's minds:
    - i. Ability to identify thoughts or emotions
    - ii. Ability to identify the reasons for emotions
    - iii. Ability to identify and understand that perceptions aren't always reality
    - iv. Ability to describe mental state
    - v. Ability to describe changes in mental state over time

Social behaviours

Interpersonal relationships

1. Family & friends
    - i. Want to socialise
    - ii. Accepts contact
    - iii. Initiates contact
    - iv. Reciprocal communication
    - v. Engages in activities
    - vi. Sense of belonging

Community

- i. Use of public spaces
- ii. Attends social groups/activities
- iii. Expression of community belonging
- iv. Household responsibilities

Appendix 2.2: Coding scale development

Scale name	**Constructs assessed**	**Scoring**	**Extracted sections for new scale**	**Examples**	**Rational for using this scale**
The Metacognition Assessment Scale and its Applications (MAS-A) (Semerari et al., 2003)	Category 1 'Understanding one's own mind' and Category 2 'Understanding other's minds' subcategories: • Identification: this has two subfunctions a) ability to recognise thoughts and images b) ability to recognise emotions. • Relating variables: ability to identify emotions and the reasons for them. • Differentiation: understanding that our perceptions aren't always reality. There are two items: a) difficulty considering and critically analysing truth content of a representation. B) that thought and reality may influence each other. • Integration: There are two subfunctions of this a) ability to describe mental state and b) ability to	Scored by selecting 'yes' or 'no' for each subtheme, if the subtheme has two points, they are skill scored as an overall 'yes' or 'no'.	Within 'Understanding one's own mind' and 'understanding other's minds' categories, will include themes of identification, relating variables, differentiation and integration. Mastery will be included but shortened to a single level which is related to ability to work through mental states, make plans for change and implement these.	Identification: P.: "I went to the university. (silence) " T.: "How did you get on?" P.: "Well, . . . (silence)" T.: "How did you feel?" P.: "My hands were trembling." This is an example of failure of identification. Relating variables: P.: "I don't know how, but I always find myself in front of the fridge and empty it completely." This is an example of a deficit in relating variables. Differentiation: P.: "Whenever I put the key into the lock, I think my parents could die. To avoid this, I open and close the door three times". This is failure of differentiation. Integration: a) P.: "Well, today it seems to me I haven't got any reason for living... [she starts crying] . . . I can't say if I'm annoyed, angry or anything else because of my family, because I can't stand them! There are things I can't stand and if it depended on me, I'd cancel them out but I can't do that, which makes me feel	This is a robust, well-structured scale for measuring metacognition. It provides a clear method of defining the separate parts of metacognition e.g. understanding our own mind and understanding other's minds. This would be beneficial for the new scale to follow similar categories.

	describe changes in mental state over time. * Category 2 Understanding other's minds also has a subcategory of Decentration: ability to understand others' mental state from a non-egocentric perspective Category 3 Mastery subthemes: - Level 1: modifying mental state through modifying the self - Level 2: modifying attention to tackle problems - Level 3: rational/critical approach to beliefs about mental health			powerless. And then I'm powerless in my life and in all I do, because I was trying to work hard for my future . . ." This is a failure of integration as shows contradictory representations of self. b) P.:" I remember her as a very warm and friendly person.... she gave me assurance." Then when asked a short time later. P.: "I felt that she wasn't sincere; there was something that didn't convince me." This shows a deficit in the integration as inability to describe changes in mental state over time. Mastery: Level 1: taking psychiatric drugs Level 2: actively modifying attention to tackle problems Level 3: having a rational and critical approach to beliefs behind a difficult mental state and regulating self and accepting own limits.	
Specific Levels of Functioning Scale (SLOF) (Schneider & Struening, 1983)	43 questions under 6 themes: A) physical functioning B) personal care skills C) interpersonal relationships D) social acceptability E) activities of community living	Scored on a 5-point likert scale where 1 is the poorest function and 5 is the best function. This scale is	Sections that will be extracted will be physical functioning, interpersonal relationships, social acceptability, and activities of community living.	A) Physical functioning; vision, hearing, speech, walking and use of hands/arms. C) Interpersonal relationships; accepts contact with others, initiates contact, communicates effectively, engages in activities without prompting, participates in groups, forms, and	This scale provides succinct categories of functioning which would help structure the new scale. E.g. the concept of 'interpersonal relationships' and a

	F) work skills	administered to the caregiver of an individual.		maintains contacts and asks for help when needed. D) Social acceptability; verbally abuses others, physically abuses others, destroys property, physically abuses self, is fearful/crying/clinging, takes property from others without permission and performs repetitive behaviours. E) Activities of community living; household responsibilities, shopping, handling personal finances, use of telephone, travelling from residence without getting lost, use of public transportation, use of leisure time, recognising and avoiding common dangers, self-medication, use of medical and other community services, basic reading, writing and arithmetic.	recommended way of recording this would aid the new scale.
Agency and Communion Scale (Holm et al., 2018)	Agency included aspects associated with ability to initiate action: • need to be in control of one's life • to initiate change • to achieve personal goals • to feel motivated •	This scale rated these codes as present (1) or absent (0) then asked, 'was it fulfilled?' yes (1) or no (0) and 'was it	The themes extracted from this scale will be from within 'agency' and include to 'initiate change' and 'achieve personal goals'	Agency: "Then I applied for university, the film production program, which was a dream for me and I got accepted which was a very big deal … At that time I had sort of made a decision that I needed to do something in order to regain my self-worth and independence." This shows fulfilled agency.	The main reason for including this scale is the method they have created for scoring. The idea of concepts being present (yes or) and then fulfilled (yes or no) is beneficial in understanding the

	Communion included aspects which were associated with a need for intimate relationships: • friendship, romance • sharing, nurturance • belonging	unfilled?' yes (1) or no (0).	From within 'communion', the following will be included; friendship, romance, and belonging.	Communion: "We never talked about feelings, or how things were going, or how I was doing, or what it was like to be a teenager, or what it was like to live in a different country." This shows unfulfilled communion.	quality of that concept e.g. a relationship may be present, hut how much does that relationship benefit an individual.
Assessing Interpersonal Motivations in Transcripts (AIMIT Scale) (Fassone et al., 2012) (Fassone et al., 2016)	Interpersonal Motivational Systems includes 5 categories with a total of 60 questions: - Attachment - Caregiving - Ranking - Sexuality - Peer cooperation	The 5 categories were granted colours (yellow, green, blue, purple and red) and transcripts were colour coded. Each question was rated on a 6-point likert scale of (0-5), ranging from 0 (no correspondence) to 5 (full correspondence).	The categories of attachment system and peer cooperation will be considered in the new scale.	Attachment system question example: "Descriptions of such carelessness of potential caregivers as to suggest the impossibility even of asking, expecting or hoping for help, protection and soothing moments of pain" Peer cooperation question example: "Joint investigation of topics of shared interests"	This scale includes categories which would give the new scale more depth and consideration of additional factors such as 'attachment' and 'peer cooperation'. The use of colour coding concepts would also be helpful to use in coding the new scale.

(Linked to AIMIT above) Social Mentalities Scales (Brasini et al., 2020)	This includes 75 questions under 5 categories of - Insecurity - Prosociality - Agonism - Belongingness - Sexuality - Playfulness	This scale rated the responses on a likert scale: Never (1), rarely (2), sometimes (3), often (4) and very often (5)	The categories of – insecurity, prosociality and belongingness will be considered in the new scale.	Insecurity sub questions example: “feeling insecure, fragile or vulnerable” Prosociality sub question example: “Being attuned to someone's needs” Belongingness sub question example: “Feeling that you belong to a group”	This scale continues to provide additional concepts to consider in negative symptoms of psychosis e.g. ‘insecurity’ and what this means for the individual. The likert scale also may be adapted and used in the new scale.
Coding for Agency and Coherence (Adler, 2012)	Coded for agency then coded for coherence (4 types) 1) Orientation index: refers to ability to provide enough background information to understand story. 2) Structure index- refers to the ability to present the story in a logical way. 3) Affect index- refers to whether the story makes an evaluative point. 4) Integration index- refers to whether narrator relates story to their larger sense of self.	Agency was coded on a likert scale of 0-4. Then each type of coherence was coded on a likert scale of 0-3.	Agency will be included in the new scale. Coherence structure index will be considered for new scale.	Agency: “These are a lot of changes in my life. I was feeling completely at their mercy, but now I see that I do have control. It’s up to me to be able to stick with it and I will rise” Coherence structure index: Telling a story in a logical structure.	This scale provides additional depth to the analysis and asks about the coherence of the story. This would be crucial to consider in the new scale and would provide additional consideration for all concepts explored e.g. social connectedness, their understanding of this and what it means to the individual.

Appendix 2.3: Existing scales and which elements were extracted into new scale

All scales	New scale
MAS-A (Semerari et al., 2003) **Understanding one's own mind** 1) Identification (ID)- ability to identify a) thoughts b) emotions 2) Relating variables (RV)- is the ability to establish relations among the separate components of a mental state and between the components of mental states and behaviour 3) Differentiation (D) is the ability to recognize that the contents of representations are subjective events of a mental nature and, therefore, different from reality and without a direct influence on it. 4) Integration (I) (a) the ability to provide an integrated description of one's own mental state 5) (b) the ability to describe the changes over time in one's own mental states and give them a coherent narrative form.	Metacognition **(understanding one's own mind)** 1) Ability to identify thoughts or emotions 2) Ability to identify the reasons for emotions 3) Ability to identify and understand that perceptions aren't always reality 4) Ability to describe mental state 5) Ability to describe changes in mental state over time
Agency and communion scale (Holm et al., 2018) Within Agency category: 1) To initiate change 2) To achieve personal goals 3) To feel motivated	Agency *Express intent to change (added after discussion with colleague- included as a first step to assess agency- if they had intent to change) 1) Initiate change 2) Achieve goals 3) Motivation
MAS-A (Semerari et al., 2003) **Understanding other's minds**	Metacognition **(Understanding other's minds)**

1) Identification (ID)- ability to identify a) thoughts b) emotions 2) Relating variables (RV)- is the ability to establish relations among the separate components of a mental state and between the components of mental states and behaviour 3) Differentiation (D) is the ability to recognize that the contents of representations are subjective events of a mental nature and, therefore, different from reality and without a direct influence on it. 4) Integration (I) (a) the ability to provide an integrated description of one's own mental state 5) Integration (I) (b) the ability to describe the changes over time in one's own mental states and give them a coherent narrative form.	1) Ability to identify thoughts or emotions 2) Ability to identify the reasons for emotions 3) Ability to identify and understand that perceptions aren't always reality 4) Ability to describe mental state 5) Ability to describe changes in mental state over time
The Specific Level of Functioning Assessment scale (SLOF) (Schneider & Struening, 1983) C. Interpersonal relationships 13. Accepts contact with others (does not withdraw or turn away) 14. Initiates contact with others 15. Communicates effectively (speech and gestures are understandable and to the point) 17. Engages in activities without prompting *The Social Mentalities Scale (Brasini et al., 2020) Factor 4: Belonging -Feeling that you belong to a group	Social behaviours • Want to socialise • Accepts contact • Initiates contact • Reciprocal communication • Engages in activities • Sense of belonging*
The Specific Level of Functioning Assessment scale (SLOF) (Schneider & Struening, 1983)	Community 1. Use of public spaces

E. Activities 33. Use of leisure time (this was altered to public spaces in the current scale) C. Interpersonal relationships 17. Participates in groups E. Activities 27. Household responsibilities *The Social Mentalities Scale (Brasini et al., 2020) Factor 4: Belonging -Feeling that you belong to a group	2. Attends social groups/activities 3. Expression of community belonging* 4. Household responsibilities

Appendix 2.4: Coding Manual

OSF | Coding Manual.pdf

https://osf.io/cx6fd

Appendix 2.5: Heat maps for all categories for all participants

OSF | Heat Maps For All Categories For All Participants.pdf

https://osf.io/5w8q2

Appendix 2.6: Scoring template for the new scale

OSF | Scoring Template For Scale.pdf

https://osf.io/py25a

Appendix 2.7: Reporting checklist

Mixed Methods Reporting in Rehabilitation & Health Sciences (MMR-RHS)

Instructions: The following checklist outlines essential information for mixed methods reporting. **1) Indicate "Y" if the standard is *fully met* or "N" and additional comments if lacking**. **2) Document page number where element is located**.

For more specific guidance, refer to the following linked checklists and individual journal requirements: Clinical Trials (CONSORT), Diagnostic Studies (STARD), Measurement Evaluation (COSMIN); Observational studies (STROBE); Intervention (TIDieR); Quality Improvement (SQUIRE); Qualitative (SRQR).

Title	**Y/N; Comments**
Concisely describes the topic of the study identifying the study as mixed methods	Y (47)
Abstract	**Y/N; Comments**
Summarizes key elements using *journal specific* abstract format; For example: Introduction, Methods, Results, Discussion, and Significance/potential impact to rehabilitation and/or societal health	Y (50)
	Y/N; Page # Comments
Introduction	
Includes literature review on the topic of interest (quantitative, qualitative, and mixed)	Y (51)
Identifies gap that justifies the need for mixed methods approach	Y (53)
Clearly states overarching goal of the study that supports a mixed methods approach	Y (53)
States the rationale for using mixed methods research	Y (53)
Clearly identifies discrete aim(s) for qualitative and quantitative components Aims align with corresponding component methods	Y (53)
Provides statement of significance and potential impact	Y (53)
Methods	
Design – *Clearly describes the mixed methods design* (exploratory sequential, explanatory sequential, concurrent, etc.) used to accomplish the overarching goal of the project: • *Emphasis noted* (i.e., Sequential QUAL--> quan or QUAN--> qual; Concurrent QUAL + QUAN) • *Visual display of overall design highlighting integration* (e.g., model, flow chart, figure)	Y (54)

Mixed Methods Reporting in Rehabilitation & Health Sciences (MMR-RHS)

Methods (continued…)	Y/N; Page # Comments
Describes and supports the qualitative and quantitative methodologies (phenomenology, randomized control trial) used to accomplish the discrete aim(s) of the project	Y (54)
States researcher(s) background and contributions to project (e.g. content or methods expertise, relationships to participants)	Y (57)
Identifies setting (e.g. hospital system, geographical location)	Y (54)
Subjects/Participants - Clearly describes and supports the following: • Sampling and recruitment • Inclusion/Exclusion criteria • Ethical considerations (consent process, researcher relationship with participants)	Y (54)
Data collection - Clearly describes and supports the following: • Pilot study (if applicable) • Instrumentation (validity, reliability) • Implementation matrix (e.g. data source, timeline, type, anticipated outcomes)	Y (55)
Data analysis - Clearly states and describes analysis procedures for: • Qualitative • Quantitative • *Mixed Methods (integration)*	Y (56)
Methodological Rigor – Clearly describes steps taken to establish rigor: • Qualitative (e.g. credibility, dependability, confirmability, transferability) • Quantitative (e.g. validity, reliability, generalizability) • *Mixed Methods* (validity or legitimacy)	Y (57)
Results/Findings	
Clearly presents findings for study components: • Qualitative (includes data exemplars) • Quantitative • *Mixed Methods-Provides integrated findings/overall study results* (e.g., joint display)	Y (58)
Discussion	
• *Incorporates discussion on implications of integrated findings*	Y (77)
• Provides synthesis and interpretation of findings in the context of existing literature and theoretical/conceptual framework	Y (77)
• Includes subsection of limitations	Y (82)

Appendix 2.8: MRP Proposal

Has been removed due to confidentiality issues.

Appendix 2.9: Ethics forms

Removed due to confidentiality issues.

Appendix 2.10: Participant information leaflet

OSF | Information Leaflet.pdf

https://osf.io/v6u4g

Appendix 2.11: Participant consent form

OSF | Consent Form.pdf

https://osf.io/m3xnq

Appendix 2.12: Data analysis plan

OSF | Detailed Data Analysis Plan.pdf

https://osf.io/truc6

Appendix 2.13: Detailed Data Analysis Process

OSF | Detailed Data Analysis Process.pdf

https://osf.io/cx5e8

Appendix 2.14: Data availability statement

Data Management Plan (DMP)

Note:

This DMP template is adapted from the guidance provided here:
https://www.gla.ac.uk/myglasgow/datamanagement/creatingyourdata/dataplanning/
Trainees should seek advice from their University Supervisor when developing the DMP. Examples of DMPs from different types of projects (including both quantitative and qualitative research) can be viewed here:
https://www.dcc.ac.uk/resources/data-management-plans/guidance-examples
The University of Glasgow data repository is Enlighten:
http://researchdata.gla.ac.uk/

Title of project

Understanding Change Processes in Psychological Therapy for Negative Symptoms Using Therapy Transcript Coding and Analysis

What data will be created?

- Note the type and amount of data that will be created, e.g. assessment scores; transcripts; etc
- Explain how you will capture the data, e.g. paper record forms; online survey; spreadsheet
- What file formats will you use and why? e.g. "Microsoft Excel will be used as it is in widespread use" (adapt such statements to suit your project)

Data included consent form, screening measures, baseline measures and therapy transcripts. The data was captured on paper forms and inputted into an excel spreadsheet, therapy sessions were audio recorded and transcribed.

Microsoft word was used to transcribe audios. Excel was used to record data collected from screening, baseline and post intervention measures. These are programmes recommended by Glasgow University.

How will the data be documented and described?

- What contextual details are needed? e.g. a written description of the data collection and analysis methods; dictionary of variable labels and values (e.g. category labels)
- How will you document this? e.g. in the project write-up; in a 'readme' text file alongside the dataset(s)

The data was documented in written form for all measures such as the transcripts. The transcripts were analysed using content analysis.
Microsoft word was used to code the transcripts and write up the research.

How will you manage ethics, governance and intellectual property?

- How will you safeguard the privacy of research participants? e.g. via informed consent (state if consent for future data sharing will be sought)
- What organisational approvals will you obtain?
- If any intellectual property is to be generated in the project, how will this be managed? e.g. if you are developing a novel questionnaire or a software app

All participants gave informed consent, consent for future data sharing was sought. Ethical approval from The University of Glasgow, NHS GGC and the appropriate ethics Committee was obtained. All intellectual property was managed and stored by researchers via an encrypted shared drive, using password protected computer. For paper documents, they were stored in a locked filing cabinet within NHS GGC premises.

What are the plans for data sharing and access?

- Who is expected to use the completed dataset(s) and for what purpose?
- How will the data be developed with future users in mind? e.g. use of widely-used or open source file formats
- How will you make the data available? e.g. deposit in a data repository; forward copies on request; create website
- If there are no plans for data sharing an appropriate justification must be provided

I (researcher) will use the completed dataset for research purposes.
Data was developed using reliable programmes (excel and word), it is easy to read and well maintained. Data will be stored in a data repository.

What is the strategy for long-term preservation and sustainability?

- How will you store and back-up the data? e.g. University server with automatic back-up; University OneDrive account
- What are the plans for sustainability? e.g. choose open source file formats; deposit in data repository
- Which repository/data centre have you identified as a place to deposit your data? e.g. Enlighten; Open Science Framework
- How will you prepare data for preservation and sharing? Indicate the time and resource required for this
- How and when will you transfer ongoing responsibility for preservation/archiving to your University Supervisor?

The data will be stored on the NHS server on an NHS GGC laptop. It will be backed up frequently. Plans for sustainability will be to deposit it in data repository.
I will prepare data for sharing by keeping it easily readable and using well known systems (e.g. excel). I will transfer ongoing responsibility for preservation/archiving to Professor McLeod after I complete my Viva (June Y3).

Appendix 2.15: Reflection log

Has been removed due to confidentiality issues.