

Metacognition, social functioning and mental health

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Abbreviations

AMOS: Analysis of Moment Structures

ARMS: At Risk Mental State

BAPS: Beliefs about Paranoia Scale

BCSS: Brief Core Schema Scale

BDI: Beck Depression Inventory

BJ-PERFECT: Beijing Performance-based Functional Ecological Test

CAARMS: Comprehensive Assessment of At-Risk Mental States

CAS: Cognitive Attentional Syndrome

CAS-I: Cognitive Attentional Syndrome-I (Measure)

CBT: Cognitive Behavioural Therapy

CFA: Confirmatory Factor Analysis

CFI: Comparative Fit Index

CI: Cognitive interview

CMHT: Community Mental Health Team

COSMIN: COnsensus-based Standards for the selection of health Measurement Instruments

DSM-III: Diagnostic and Statistical Manual of Mental Disorders (Third Edition)

DSM-IV: Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition)

FA: Framework analysis

FEP: First Episode Psychosis

FESFS: First Episode Social Functioning Scale for early psychosis

GAD: Generalised anxiety disorder

GFI: Goodness-Of-Fit Index

GFS: Global Functioning: Social

HADS: Hospital Anxiety and Depression Scale

HSFQ: Hospital Social Functioning Questionnaire

ICD-10: International Statistical Classification of Diseases 10th revision

KMO: Kaiser-Meyer-Olkin

MCQ: Metacognitions Questionnaire

MCQ-30: Metacognitions Questionnaire-30

MCT: Metacognitive Therapy

MSPSS: Multidimensional Scale of Perceived Social Support

NEET: Not in Education, Employment or Training

NHS: National Health Service

NICE: National Institute for Health and Care Excellence

PANSS: Positive and Negative Syndrome Scale

PCA: Principal Components Analysis

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analysis

PRODIGY: Prevention and treatment of long-term social disability amongst young people with emerging severe mental illness: A definitive randomised controlled trial

PROM: Patient Reported Outcome Measure

PROSPERO: International prospective register of systematic reviews

PSP: Personal and Social Performance scale

QFS: Questionnaire de Fonctionnement Social

RCT: Randomised Controlled Trial

RMSEA: Root Mean Square Error of Approximation

SASS: Social Adaption Self-evaluation Scale

SAS-SR: Social Adjustment Scale - Self report

SAS-SR: Screener: Social Adjustment Scale - Self report: Screener

SAS-SR: Short: Social Adjustment Scale - Self report: Short

SBS: Social Behaviour Schedule

SDI: Social Dysfunction Index

SFS Spanish: Social Functioning Scale Spanish

SFS: Social Functioning Scale

SFSchedule: Social Functioning Schedule

SIS: Social Integration Survey

SLOF: Specific Level of Functioning Scale

SOFS: Social Occupational Functioning Scale

SRCBT: Social Recovery Cognitive Behavioural Therapy

S-REF: Self-Regulatory Executive Function

SRMR: Standardised Root Mean Residual

TAU: Treatment as usual

TB: Time Budget Measure

TLI: Tucker Lewis Index

TUS: Time Use Survey

Abstract

The University of Manchester

Candidate: Measha Bright

A thesis submitted to the University of Manchester for the degree of Doctor of Philosophy in the Faculty of Biology, Medicine and Health in September 2018

Thesis title: Metacognition, social functioning and mental health

This thesis explored social functioning in mental health, primarily related to its measurement, and relationship to the S-REF model of metacognition. A mixed-methods approach was used throughout. Chapter 1 provides an overview of the area and background to the thesis. Chapter 2 describes the methodologies used in the thesis. Study 1 (Chapter 3) presents a systematic review that evaluated the methodological quality of social functioning measures in order to identify the best instrument for measuring this construct. No particular measure was found to be 'gold standard'. It was found that researchers need to improve the way in which they validate measures by including service users and professionals in the development phase. A secondary outcome of this systematic review was establishing how social functioning is conceptualised in mental health research. A content analysis was used for this purpose. This identified that social functioning is a multifaceted and complex construct, and that researchers were consistent in including relevant items for its measurement. Study 2 (Chapter 4) is a psychometric study validating the metacognitions questionnaire-30 (MCQ-30) measure in an at risk mental state (ARMS) for psychosis sample. The original 5-factor structure of the MCQ-30 was replicated and had an acceptable fit for this group. Study 3 (Chapter 5) investigated if metacognitive beliefs (measured by the MCQ-30) predicted social functioning in an ARMS in a cross-sectional design. Negative beliefs about uncontrollability and danger were found to be negative predictors of social functioning, with danger metacognitions being of particular importance. Age was also found to predict social functioning with younger people having lower levels of social functioning. Study 4 (Chapter 6) used a qualitative methodology to explore how the S-REF model was represented in a sample of young adults at risk of long-term social disability, and the perceived effects of this on social functioning. Three overarching themes were identified relating to the cognitive attentional syndrome (CAS) and metacognitive beliefs, and one overarching theme relating to adjustments to levels of social functioning. Study 5 (Chapter 7) involved cross-sectional and longitudinal analyses to investigate if metacognitive beliefs predicted social functioning in a non-clinical sample. Positive beliefs about worry and negative beliefs about uncontrollability and danger correlated negatively with social functioning, but were positive predictors in the cross-sectional regression. This finding requires further investigation. Cognitive confidence was found to negatively predict social functioning with lower confidence leading to lower levels of social functioning. Social anxiety was the only factor to predict social functioning longitudinally. Overall findings suggest that social functioning includes multiple dimensions and should be measured using multiple instruments to adequately capture the complexity of its relationships with other factors. Early indicators suggest that metacognitive beliefs predict social functioning in clinical and non-clinical samples, of particular importance are negative beliefs about uncontrollability and danger and positive beliefs about worry. Further, the direction of the relationship between these metacognitive beliefs appears to vary, which could be related to the severity or stage of mental health or social functioning difficulties. However, results included in this thesis cannot explain the reason for this and more research in this area is required. The qualitative study highlighted that the CAS is also present in the samples of young people at risk of long-term mental health and social functioning problems, and that this appears to be a contributory factor to levels of social functioning. Clinical implications and future directions are discussed.

Declaration

I declare that no portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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Alternative format

This thesis has been presented in alternative format to allow for the continuous dissemination of completed research studies conducted as part of this thesis. A two-part systematic review (study 1) was completed is being prepared for submission. Study 2 has been published at Clinical Psychology and Psychotherapy. Study 3 has been published at Psychiatry Research. Study 4 has been submitted for review, and study 6 is being prepared for submission.

Data

Data for studies 2 and 3 were obtained from a convenience sample of people who took part in randomised controlled trials including people at risk for psychosis. Study 2 included data from the Early Detection and Intervention Evaluation (EDIE) and Early Detection and Intervention Evaluation-2 (EDIE-2) trials. Study 3 included data from EDIE-2 only. For Study 4, the candidate recruited individuals who had taken part in the Prevention and treatment of long-term social disability amongst young people with emerging severe mental illness: A definitive randomised controlled trial (PRODIGY) pilot trial. This involved a separate ethical approval and the candidate interviewed all participants for this qualitative study. Data related to mental health problems experienced by participants in Study 4 during their participation in the PRODIGY trial was used as descriptive statistics in Study 4. As the author of this thesis worked on the PRODIGY trial as a research assistant throughout the conduction of this thesis, most of this descriptive data was collected by them.

Collaborators and authorship

Supervision related to the design, execution and analysis of studies included in this thesis was provided by Professor Adrian Wells and Dr Sophie Parker. Due to this, they are included as authors on all papers. Study 1 includes Emmeline Joyce who was a second reviewer for the systematic review. As Studies 2 and 3 included data from EDIE and EDIE-2, key investigators as well as the trial manager are included as authors. Further for Study 2 Sarah Tully provided guidance on the use of AMOS and methodology for factor analyses and as such is a named author on this paper. Study 4 includes Professors Paul French and David Fowler as they are both leads of the PRODIGY study, and Dr Adam Danquah is included on this paper because he provided guidance on qualitative methodology throughout.

Analysis and write-up

All data analyses for studies included in this thesis were conducted by the candidate under the supervision of Professor Adrian Wells and Dr Sophie Parker.

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support and technical help throughout as well as my friends and family. Finally, I would like to thank my grandmother Hannah for raising me, and her tenacity in enabling and encouraging me how to get the best out of life.

The author

I started working in the National Health Service in 2009 as a Nursing Assistant in a forensic psychiatric hospital, whilst also studying for my psychology undergraduate degree. To pursue my interest in early intervention, I went onto work in an early intervention service for first episode psychosis as a Support Time and Recovery Worker in 2010. I graduated in 2012, and later obtained a role at PRU in 2013 as a Research Assistant Psychologist primarily working on the PRODIGY study (a randomised controlled trial with young people experiencing psychological difficulties and resulting low levels of social functioning). The PRODIGY study aims to test the efficacy of an adapted form of Cognitive Behavioural Therapy (CBT) known as Social Recovery CBT at increasing levels of social functioning. I also worked on the iACT study (feasibility study with people experiencing psychosis) as part of my Continuous Professional Development at PRU as a Research Assistant Psychologist both assessing participants and providing the psychological intervention, Attention Training Technique, a brief intervention drawn from metacognitive therapy. I started my Ph.D. in 2015, and have been conducting this alongside my role at PRU.

Chapter 1: Introduction

1.1 Overview

This chapter aims to provide an overview of the research that has been conducted in the area of social functioning, mental health and metacognition. It will do this by firstly describing the concept of social functioning based on past research, and some of the perceived problems with the current definitions in the literature. Following on from this, social functioning measures will be discussed and the associated difficulties researchers have found in attempts to measure this construct considered. Next, research will be presented in the area of social functioning and mental health to provide an overview of factors found to be associated to social functioning outcome. A history of the development of the concept of metacognition will be described, leading to a particular focus on the self-regulatory executive functioning (S-REF) model of metacognition and why it might be important to social functioning in mental health. Finally, the overall aims of this thesis will be described along with a rationale for the areas of focus, and studies conducted.

1.2 What is social functioning?

Social functioning problems were officially recognised as being associated with psychological disorders in 1980 when criteria relating to deficits of social functioning were included in the Diagnostic Statistical Manual-III (DSM-III) (American Psychiatric Association, 1980). The criteria used in the DSM relates to problems in employment or education, self-care and interpersonal relationships (American Psychiatric Association, 2013). A paper that investigated social functioning in schizophrenia provided a more comprehensive definition:

'Social functioning has been defined globally as the capacity of a person to function in different societal roles such as homemaker, worker, student, spouse, family member or friend. The definition also takes account of an individuals' satisfaction with their ability to meet these roles, to take care of themselves, and the extent of their leisure and recreational activities.' (Brissos, Molodynski, Dias, & Figueira, 2011, p.2)

This definition presents social functioning as a complex construct involving a number of different elements. To add an additional layer to the complexity of this construct, a review found that multiple terms were used to describe ‘social functioning’:

“Social functioning’ is often used interchangeably with ‘social performance’ and a variety of similar and overlapping concepts such as ‘social adjustment’ (how a person conforms to social expectations), ‘social dysfunction’ (an impaired ability to get along with others and function in society), ‘social adaptation’ (one’s ability to live in accordance with interpersonal, social and cultural norms) and ‘social competence’ (the overall ability of a person to impact favourably on his or her social environment).’ (Burns & Patrick, 2007, p.414)

It has been suggested that this lack of consistency in terminology has led to difficulties measuring the construct (Burns & Patrick, 2007), and as such it has been difficult to establish a suitable ‘gold standard’ to use with people experiencing mental health problems.

1.3 How is social functioning measured?

There are a number of different ways in which social functioning is measured in psychological disorder. A 2007 review of schizophrenia measures (Burns & Patrick, 2007) found that the most frequently used measures were the Global Assessment of Functioning (GAF) scale (Bodlund, Kullgren, Ekselius, Lindström, & Knorrning, 1994), the Global Assessment Scale (GAS: Endicott, Spitzer, Fleiss, & Cohen, 1976), and the Social functioning Scale (SFS: Birchwood, Smith, Cochrane, Wetton, & Copestake, 1990). The GAF and GAS are both unidimensional scales that provide a single score of functioning which makes them quick to administer by clinicians or researchers. However, they also measure symptoms thus contaminating the measure. The Personal and Social Performance scale (PSP: Morosini, Magliano, Brambilla, Ugolini, & Pioli, 2000) was created to try and overcome this problem by only including items associated with social functioning in the unidimensional scale. Whilst the PSP is a well validated measure (Juckel et al., 2008; Morosini et al., 2000; Nasrallah, Morosini, & Gagnon, 2008), based on the definition of social functioning earlier in this chapter it could

be argued that using a single unidimensional score to measure such a complex construct may not be sufficient. Further, the clinician or researcher generates the score adding an additional limitation of subjectivity. The SFS on the other hand is more comprehensive in its measurement. It has 76-items across seven subscales covering: withdrawal; interpersonal behaviour; prosocial; recreation; independence competence; and occupational/employment. This is a self-report measure that asks about social functioning in the past three months, and is reported to be sensitive to change in schizophrenia samples (Birchwood et al., 1990).

An At-Risk Mental State (ARMS) refers to individuals who are identified as experiencing subthreshold symptoms of psychosis (e.g. auditory or visual hallucinations, delusional beliefs, disorganised speech), and are thus considered to be at higher risk of developing psychosis than people without these subthreshold symptoms (Yung, Phillips, Yuen, & McGorry, 2004). A systematic review investigating the factors contributing to functioning in an (ARMS) found measures of functioning differed substantially between studies and assessed different functional factors (Cotter et al., 2014). This makes it difficult to ascertain reliable drivers of functioning, and generalisability of results. Different measures of functioning included social, role and global assessments (e.g. Global Functioning: Social Scale (GFS), Global Functioning: Role Scale (GFR) and GAF). These measures do not quantify actual social functioning over a given time period, so scoring is usually as a result of the assessors subjective opinion. These measures have also been designed to be specifically used with a clinical sample, which arguably makes drawing a true comparison with those who do not require input from mental health services more difficult. Further, as highlighted earlier, the GAF includes mental health issues experienced within in the overall score. This could lead to inaccurate results if symptoms are reducing functioning scores as is not a pure measure of functioning.

Social functioning measures have also been developed for use with people experiencing other mental health problems. The self-report Social Adjustment Scale (SAS-SR) was designed and validated in a psychiatric sample that included depressed individuals as well as those

experiencing schizophrenia (Weissman, Prusoff, Thompson, Harding, & Myers, 1978). It has 42-items and asks about social functioning over the past two weeks. Whilst measures do exist for non-psychotic disorders, there appears to be a prevalence in the amount of measures available (or that have been validated in) psychosis spectrum conditions. This could be a problem for researchers or clinicians who require a reliable measure for mental health problems other than psychosis.

1.4 Mental health problems and their association with social functioning

1.4.1 Psychosis spectrum conditions

Psychosis refers to the presence of positive symptoms (such as hallucinations, delusions, disorganised thoughts and speech), and negative symptoms including difficulties with social functioning (e.g. problems engaging in activities or interactions with others) or self-care (American Psychiatric Association, 2013). Psychosis is considered to be on a spectrum (also referred to as the schizophrenia spectrum (Paris, 2013)) ranging from mild or subthreshold symptoms (e.g. ARMS), moderate (e.g. first episode psychosis), to more severe presentations (such as receiving a diagnosis of schizophrenia) (Paris, 2013). Not all symptoms need to be present to be identified as experiencing psychosis, and not all individuals fit clearly on the spectrum (Paris, 2013).

A vast amount of literature surrounds the social functioning of people experiencing psychosis spectrum conditions with past research aiming to better understand the development and causes of social functioning problems in this group. Evidence of a psychosis prodrome started to emerge with research studies identifying a reduction in social functioning in periods prior to the onset of psychosis. One study found that the prodromal period covered around five years in 73 per cent of a schizophrenia sample, and that this reduction in social functioning was present prior to and during psychotic episodes (Häfner, Nowotny, Löffler, an der Heiden, & Maurer, 1995). Further, the researchers of this study reported that they were able to predict social disability (low levels of social functioning) in 81 per cent of cases after two years of first

admission (Häfner et al., 1995). Evidence of the concept of a prodrome began to develop with other researchers finding associations between social functioning and development of psychosis (Yung et al., 2004). This led to the development of criteria related to levels of social functioning being included in measurement instruments (i.e. the Comprehensive Assessment of At Risk Mental States: CAARMS) designed to identify people at risk for psychosis (Yung et al., 2005). In 2014, the measure of functioning included in the CAARMS assessment changed from the GAF (a global measure of functioning which includes symptoms as well as social and cognitive functioning difficulties) to the Social and Occupational Functioning Assessment Scale (SOFAS), a purer measure of social functioning. This suggests an increased recognition of the importance of social functioning in predicting psychosis.

Past research has also found that in an ARMS sample, those at highest risk of transitioning to psychosis are more likely to be unemployed (Valmaggia et al., 2013), with a transition rate of 41.2% compared to that of the lowest (4.9%), moderate (10.9%) and moderate to severe (11.4%) transition groups (Valmaggia et al., 2013). However, this study also found that all groups had low social functioning. Whilst the authors advise caution in interpreting these results because the sample size of the high transition was quite small, these results provide an indication that levels of functioning are associated.

Cotter et al. (2014) conducted a systematic review to investigate the factors contributing to poor functioning in people at-risk of psychosis (Cotter et al., 2014). This review found that various factors impacted on functioning, but to differing degrees. Of the factors identified in this review, negative symptoms (e.g. apathy, blunting or attentional difficulties) in cross-sectional studies, and negative and disorganised symptoms (e.g. disorganised speech) in longitudinal studies had the strongest effect.

1.4.2 Psychosis-spectrum and comorbidity

With regards to the tools used to measure social functioning in the aforementioned studies that investigated transition and the psychosis prodrome, two of the studies used the GAF to

measure social functioning (Valmaggia et al., 2013; Yung et al., 2004). As mentioned earlier, the GAF also includes symptoms in the overall score. Whilst there is overlap between symptoms and social functioning in the GAF, what the use of this tool does suggest is that comorbidity could also be a contributory factor on levels of social functioning. Valmaggia et al. (2013) also found in the aforementioned study on transition to psychosis, that the whole ARMS sample had high depression and anxiety scores (which would have contributed to the overall GAF score). Comorbid anxiety and/or depression in psychosis spectrum conditions have been found to adversely affect social functioning levels. One study found that in the early stages of psychosis, social functioning had stronger relationships to symptoms of anxiety and depression than positive symptoms, and no relationship was found with negative symptoms (Chudleigh et al., 2011). This study distinguished the social functioning measures, by having what they refer to as a quantitative measure of social functioning (SFS) and a qualitative measure, the World Organisation Disability Assessment Scale II (WHODAS: Üstün et al., 2009). Although, Chudleigh et al. (2011) found significant results between positive symptoms and social functioning, this association was only relevant to the WHODAS and not the SFS. Another study with people with an ARMS found that negative, depressive, disorganised and general symptoms were related to social functioning (Corcoran et al., 2011), whilst social anxiety has been implicated in worsening social functioning levels in first episode psychosis (Romm, Melle, Thoresen, Andreassen, & Rossberg, 2012; Voges & Addington, 2005).

1.4.3 Non-psychotic disorders (without psychotic symptomatology)

Depression has also been found to be associated with low levels of social functioning. A systematic review found that depression was associated with significant impairments to social functioning (Hirschfeld et al., 2000). Social anxiety has also been found to be associated with social functioning in children aged 6 to 11 years (Ginsburg, La Greca, & Silverman, 1998). Anxiety has also been found to be associated with poor social functioning in adults (Saris, Aghajani, van der Werff, van der Wee, & Penninx, 2017) as well as depression. Further, this study found that comorbid anxiety and depression led to more severe social functioning

problems (Saris et al., 2017). Another study found a similar finding, but instead both the anxiety and depression had to be severe to have significant impact on social functioning (Hecht, Zerssen, & Wittchen, 1990).

Evidence also exists around social functioning problems being present in those diagnosed with bipolar disorder. One study found that higher rates of bipolar depression led to lower social functioning (Depp et al., 2010). Another study found premorbid neuroticism and depressive symptoms to account for 33% of the variance in predicting social functioning in bipolar disorder (Pope, Dudley, & Scott, 2007).

Whilst there is evidence of social functioning problems in non-psychotic disorder, it appears that most of the research done is in the area of psychosis. What this section has also highlighted is that comorbidity appears to have a significant impact on social functioning levels, and this stresses the importance of acknowledging the effects of psychological disorders other than that under investigation so important findings do not get missed.

1.5 Non-symptomatic contributors to social functioning in psychosis

In order to better understand the concept of social functioning, researchers have investigated factors other than symptoms that could contribute to levels of social functioning. One study found that anxious (fearful) attachment had a significant, but small effect on social functioning in those at at-risk, first episode (FEP) and chronic (2 years or more) psychosis groups and a non-clinical sample (Palmier-Claus et al., 2016). Avoidant attachment was found to have no effect. At-risk and FEP groups were found to have significantly higher levels of anxious and avoidant attachment than controls. Anxious attachment was entered into a mediation model with other predictors (depression and paranoia) with childhood adversity as the main independent variable under investigation. Only depression was found to mediate the relationship between childhood adversity and social functioning. No direct relationship between childhood adversity and social functioning was found in this final model. This highlights the potential significance of depression on social functioning outcome in young

people, and arguably adds some clarity to the direction of causality problem between depression and functioning raised by Cotter et al. (2014). It is also possible that symptoms of depression overlap with social functioning factors (Cotter et al., 2014). This could contribute to the significant effect depression has in this and other studies.

Returning to childhood adversity, another study explored relationships between early trauma and social and role functioning in those at-risk for psychosis and non-clinical controls (Addington et al., 2013). In this study, trauma was measured using the Childhood Trauma and Abuse Scale (Janssen et al., 2004), which assesses trauma that occurred prior to age 16 years. The at-risk for psychosis group were found to have significantly more early traumatic experiences (across all 6 measures of trauma) than the controls. Spearman correlations found a small (-0.12), but significant ($p < 0.05$) negative relationship between physical bullying and social functioning. No other types of early trauma were related to social functioning. With regards to role functioning, psychological (-0.15, $p < 0.05$) and physical (-0.14, $p < 0.05$) bullying, total bullying (-0.16, $p < 0.01$) and total trauma (-0.16, $p < 0.01$) were all associated with this measure. Emotional neglect, psychological, physical and emotional abuse were not related to either measure of functioning in this study. Although this provides some indication of possible relationships between functioning and early trauma, the method used means causality cannot be drawn from this.

Family was another factor that was significantly related to better functioning. Caregiver warmth (e.g. expression of understanding and concern for children, caring tone of voice and level of enthusiasm and interest (O'Brien et al., 2006)) and 'constructive communication' (Cotter et al., 2014, p.273) (e.g. levels of affection, listening to others viewpoint and clarifying own opinions (O'Brien et al., 2006)) were found to lead to improved social functioning. Social functioning in this study was not explicitly defined, but frequency of meeting with friends was used to measure this construct.

This section has highlighted the complexity of establishing predictors of functioning. Past research has presented some ideas into possible contributors, however, numerous factors have been implicated making it difficult to establish main predictors. Another difficulty is the type of functioning being measured, which lacks consistency across studies.

1.6 When do social functioning problems begin?

Research has highlighted that 75 per cent of mental health problems begin between the ages of 15 and 25 years (Kessler et al., 2005; Kim-Cohen et al., 2003). The Princes Trust reported in their 2015 youth index report (Prince's Trust, 2015) that 10% of 16 to 25 year olds feel too anxious to leave their homes, and 46% of young people actively avoid meeting new people. The report states anxiety about leaving the house is twice as likely to occur in unemployed young people. In light of these statistics, it is not surprising that 43% of young people were reported to feel isolated (Prince's Trust, 2015). Low mood and depression was found to be present in around half of all unemployed young people. Whilst social functioning and mental health problems appear to begin in adolescence, past research has also found social functioning to be present in anxious children between 6 and 11 years (Ginsburg et al., 1998). Further, social anxiety in these children was also associated with levels of social functioning (Ginsburg et al., 1998).

1.6.1 Not in Employment Education or Training (NEET)

NEET refers to young people, aged between 15 and 29, not in employment, education or training for 6 months or longer (Eurofound, 2012). According to the Office for National Statistics (Office for National Statistics, 2016) and the House of Commons Library (Delebarre, 2016), NEETs are defined as young people aged between 16 and 24 years. It appears therefore that the UK government perceive NEETs to be of the latter age range, which also happens to be within the age range linked to the onset of social functioning and mental health difficulties (Kessler et al., 2005; Kim-Cohen et al., 2003).

The European Foundation for the Improvement of Living and Working Conditions (Eurofound) produced a detailed report about the problem of NEETs in Europe (Eurofound, 2012). The report states that heterogeneity exists in NEETs and diversity of this group is broken down as follows in the report: 1) Conventionally unemployed (largest subgroup); 2) Unavailable (e.g. young carers or those who are disabled); 3) Disengaged (e.g. choose to not engage in work or education because they are pursuing a criminal lifestyle); 4) Opportunity seekers (e.g. waiting for a job they perceive to be right for them); and 5) Voluntary NEETs (e.g. travellers) (Eurofound, 2012, p.24-25). The report argues that governments need to consider the diversity of this group when implementing policies to address the NEETs issue. It appears therefore, that governments recognise the complexity of the problem of low levels of social functioning.

The Eurofound report stipulates that the level of NEETs in Europe in 2011 was 7.5 million for 15-24 year olds and 6.5 million for those aged 25-29 (Eurofound, 2012, p.27). NEET figures were close to 1 million in the UK, France, Italy and Spain in the same year. Statistics estimate that the number of NEETs in the UK in the fourth quarter of 2015 was 853,000 (Delebarre, 2016, p.3). Although this figure was 5,000 less than the previous quarter, it still accounted for 11.8% of all young people between 16 and 24 years in the UK (Delebarre, 2016, p.3). The worst affected areas were the North East (16.1%), North West (14.1%) and Yorkshire and Humber (13.1%). More recent figures suggest some improvement with 784,000 of 16 to 24 year olds falling into the NEET category between April and June 2018 (Powell, 2018). However, this figure still accounted for 17% of all 16 to 24 year olds (Powell, 2018) illustrating NEET status is still a big problem in the UK.

A study investigating the levels of structured activity (a measure of social functioning using the Time Use Survey (TUS) (Short, 2006)) and depression in a sample of NEET young people and university students, found that those who were NEET reported significantly higher levels of depression compared to the students (Berry, Easterbrook, Empson, & Fowler, Under

review). Further, NEET status was found to have a strong association with low levels of structured activity (Berry et al., Under review). This illustrates how people who are NEET not only differ from non-NEETs in their level of activity, but also with regards to the presence or severity of mental health problems. This is an indicator that part of the problem with being NEET is associated mental health problems, although it is not clear which factor is the precursor.

This section highlights that a substantial problem exists with NEETs throughout the UK and Europe, and at least for some young people, is associated with mental health problems.

Targeting interventions and research in young samples therefore, is important in light of this evidence in order to prevent deterioration in social functioning, and mental health problems.

1.7 Consequences of social functioning problems

1.7.1 Long-term social disability

Those with an ARMS who are also NEET have been found to have very low levels of structured activity that mirror the level of activity found in those meeting criteria for more serious difficulties, such as first episode psychosis (FEP) (Hodgekins et al., 2015). Further, this study compared structured activity levels across the psychosis spectrum and identified cut-off points that were indicators of levels of social disability (Hodgekins et al., 2015). It was found that those with an ARMS and experiencing psychosis fell into the social disability categories identified (Hodgekins et al., 2015). Even those at-risk of psychosis who have experienced a reduction in their symptoms, still report poor outcome with regards to long-term functioning (Cotter et al., 2014).

With regards to depression, a study comparing depressed individuals to those with chronic illnesses (e.g. diabetes, hypertension) found that those with depression had more significant long-term reductions in social functioning levels (Hays, Wells, Sherbourne, Rogers, & Spritzer, 1995).

1.7.2 Psychological distress

In addition to past research highlighting the issue of poor social functional outcome in people experiencing psychosis or at-risk for psychosis, it has been found that those experiencing such difficulties find poor functioning distressing (Rapado-Castro, McGorry, Yung, Calvo, & Nelson, 2015). Rapado-Castro et al. (2015) conducted a study investigating the causes of distress in participants aged 15-24 years at-risk for psychosis. Social and functional difficulties (78.1%) were found to be more distressing than depressive (58.9%) and attenuated psychotic (58.5%) symptoms. Another study argued that psychosocial functioning difficulties (difficulties in social, interpersonal, occupational and role functioning in addition to living independently) ‘...is generally more enduring and devastating than the positive symptoms that define the onset of overt psychotic disorder.’ (Kim et al., 2013, p.762). This clearly illustrates how important improving social and functional outcome is to the young people experiencing psychological disorder.

1.7.3 Financial implications

The financial cost of NEETs to the European economy was 153 billion Euros in 2011 (Eurofound, 2012). In a 2017 report, the Centre for Mental Health reported that workers experiencing mental health problems in the UK cost employers around 35 billion pounds (Parsonage & Saini, 2017). This cost was due to sickness absence (£10.6 billion), reduced productivity (£21.2 billion), and replacing workers who leave their jobs due to mental health problems (£3.1 billion) (Parsonage & Saini, 2017). These financial costs give an indication of the knock-on effects mental health problems and the associated social functioning problems (in this case work) can have on society as well as the individual.

1.8 Metacognition

The preceding sections of this chapter have highlighted the prevalence of social functioning problems along with past research on possible contributors. As illustrated, a complex relationship exists between the possible factors involved in determining levels of social functioning, and there does not appear to be a clear causal factor. This section aims to describe the concept of metacognition in relation to its history, past research, and reasons why the S-REF model of metacognition may offer insights into possible contributors to levels of social functioning in people experiencing mental health problems.

1.8.1 Definitions of metacognition

1.8.1.1 John H. Flavell Model

Metacognition in its broadest and simplest terms is thinking about thinking. John H. Flavell (Flavell, 1979) was one of the earlier metacognition researchers. Flavell described 'A Model of Cognitive Monitoring' which, he argued, included 4 factors (Flavell, 1979). The first was 'metacognitive knowledge' described as existing knowledge a person has about others' thinking, actions, abilities, tasks and experiences. An example of this might be a person believing they are not as good at a task as their peers. 'Metacognitive experience' is another factor which relates to ones' thoughts about information observed or experienced, such as a person realising that they did not understand the information they just received during a lecture. Flavell (1979) argues that both metacognitive knowledge and experience can be inter-related. Using the above two examples, the person who believes that their peers are better at a task than they are may only realise this after observing that their peers appeared to understand the lecture as they were able to complete the in-lecture exercise, whilst they themselves struggled to. The final two aspects are 'goals (or tasks)' that refer to the aims of thinking processes, and 'actions (or strategies)' which are how a person plans to meet these goals. The person in the example above may have a goal of gaining more knowledge from the lecture to help complete an assignment and in deciding what level they are at compares themselves to others and

assesses their ability to complete the task. Following this they decide to take action to help increase their knowledge by speaking to the tutor after class and then doing further reading. As Flavell (1979) argues (and as the above example demonstrates), all factors in his Model of Cognitive Monitoring can inter-relate.

Flavell makes an important distinction between cognitive and metacognitive strategies. He states cognitive strategies are used to ‘*make* cognitive progress’ and that metacognitive strategies ‘*monitor*’ cognitive progress (Flavell, 1979, p.909). To provide further clarity about the differences between cognition and metacognition within the more learning and educational orientated research, Table 1 below distinguishes the two using information obtained from a paper published by Akturk and Sahin (2011).

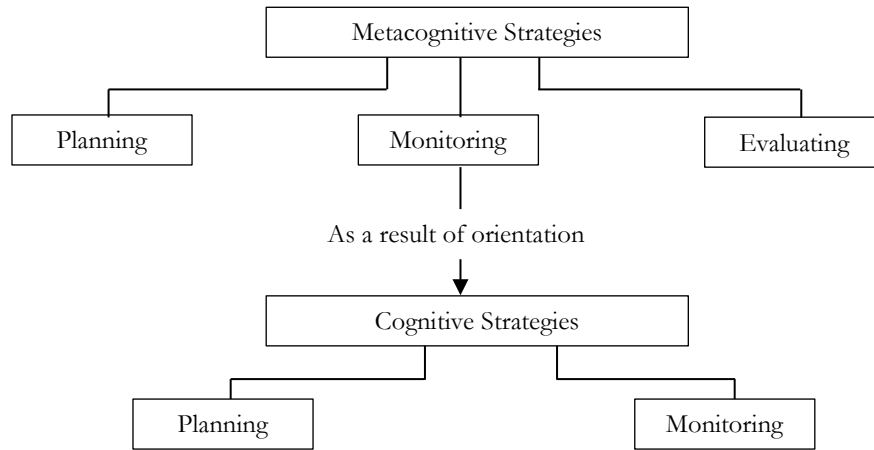
Table 1. Differences between cognition and metacognition (Akturk & Sahin, 2011)

COGNITION	METACOGNITION
Required to achieve a task (Schraw, 1998).	Needed to help to understand how to perform a task (Schraw, 1998).
Awareness and understanding of something (Senemoglu, 2005 as cited in Akturk and Sahin (2011)).	Awareness and knowing of how we learn as well as learning and understanding something (Senemoglu, 2005 as cited in Akturk and Sahin (2011)).
Needed to shape the learning process and information (Gourgey, 1998).	Necessary to allow one to observe, develop, and evaluate their processes and for the application of knowledge to novel circumstances (Gourgey, 1998). Hence, metacognition is a basic requirement if effective cognition is to be achieved (Akturk & Sahin, 2011).

Essentially, cognition and metacognition are argued to be different, but also related to one another (Akturk & Sahin, 2011). Metacognition happens prior to cognitive activities (planning), throughout activities (monitoring) or afterwards (evaluating) (Akturk & Sahin,

2011). Figure 1. below (Akturk & Sahin, 2011) shows how cognition and metacognition are related.

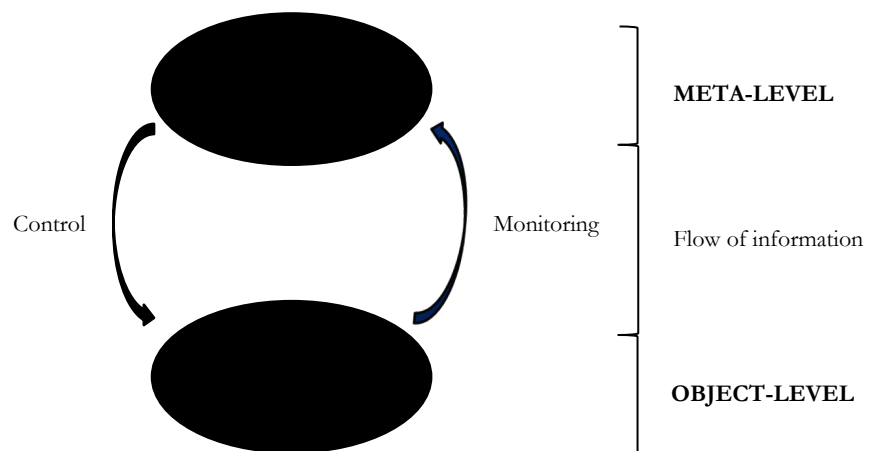
Figure 1. 'Relationship between cognition and metacognition' (Akturk & Sahin, 2011, p.3733)



1.8.1.2 Thomas O. Nelson and Louis Narens

Nelson and Narens (Nelson & Narens, 1990) describe what they term 3 principles of metacognition. The first principle states that cognitive processes involve at least 2 interconnected levels. Nelson and Narens describe a basic model which involves 2 such levels; the 'meta-level' (thinking about thinking or metacognitive level) and 'object-level' (where cognition occurs). Figure 2 below shows this basic structure.

Figure 2. Basic metacognitive structure (Nelson & Narens, 1990, p.126)



'The meta-level contains a dynamic model... of the object-level' (Nelson & Narens, 1990, p.126) is the second principle. It is argued this is needed if the aim is to control this process to change current mental states to alternative goal states. The third principle involves two major connecting factors *'control'* and *'monitoring'* (Nelson & Narens, 1990, p.127). As illustrated in Figure 2. above, these show how information flows between the meta and object levels. In an attempt to control, the meta-level changes the object –level in one of the following ways; 1) Initiates an action, 2) Resumes an action or 3) Stops an action completely.

A monitoring action is required in this process due to control not being able to provide any information from the object-level. During the monitoring process, the meta-level receives information from the object-level thus changing the meta-level view of the situation. This describes a bottom-up process of the flow of information in this metacognitive model.

It is suggested that introspection may be used as part of the input to change the behaviour of the system. Monitoring activity (according to this model) may lead to certain elements of the input being missed and/or include aspects that did not exist initially.

1.8.1.3 Synthetic metacognition

Paul Lysaker developed research in this area by investigating metacognition in mental health populations. Massé and Lecomte (2015) summarise the Lysaker et al. (Lysaker et al., 2011) definition of metacognition as:

'...an individual's awareness of their own and other's mental processes, including their subjectivity, and the extent to which they can use such knowledge to make sense of situations or manage psychological distress'. (p.1)

This definition appears to echo the theoretical model proposed by Flavell (1979) in the fact that it makes reference to one being aware of their own and others psychological processes to help understand situations. However, Lysaker et al. go further to include how knowledge is used to help manage 'psychological distress' thus making it applicable to those diagnosed with psychological disorders. Factors such as theory of mind (ToM) (understanding the thoughts

and/or feelings of others), self-reflection (ability to reflect on own mental processes) and mastery (ability to use knowledge of own mental state, that of others and situation to resolve psychological distress) are focussed on in this model. Synthetic metacognition is often used to describe these specific characteristics of metacognition (definition originates from the idea of ones' ability to synthesise complex ideas about others and the self) (Hillis et al., 2015; Lysaker et al., 2014), and will be the term used hereafter for this type of metacognition.

1.8.1.4 S-REF model of metacognition

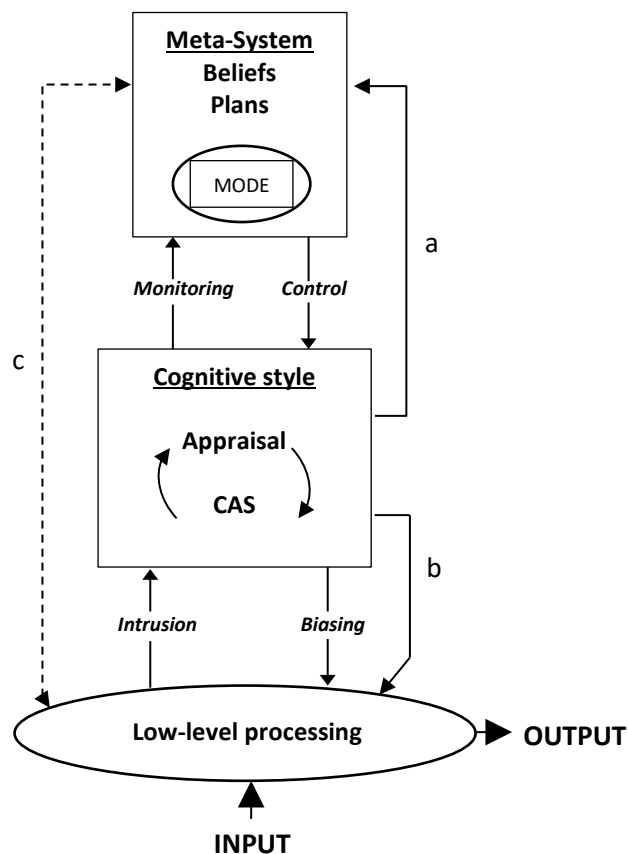
Wells and Matthews (Wells & Matthews, 1994, 1996) developed the Self-Regulatory Executive Function (S-REF) model, an influential metacognitive model that accounts for cognitive processes involved in emotional disorders. The S-REF model postulates that emotional disorder: 1) is guided by self-beliefs; 2) involves the personal appraisals of external and internal events in terms of significance given to such events; and 3) centrally involves metacognition in that appraising the significance of thoughts, strategies of mental regulation and beliefs about thoughts contribute to disorder. In this model much of psychological disorder is the result of 'voluntary' attention processes, such as allocation of attention to worrying and monitoring of threat. The term voluntary is not suggesting that individuals consciously choose to worry or monitor for threat, but refers to the idea that this is not an automatic process. The model proposes that people can flexibly control their attention to worry or threat once they are made aware this is possible, and with guidance (e.g. via therapy) if necessary. In this theory therefore, individuals are not necessarily aware of the metacognitive processes they are engaging in or the way in which these thinking processes cause emotional distress.

The Cognitive Attention Syndrome (CAS) forms part of the S-REF model. The CAS is a cyclic process involving worry, rumination, threat monitoring, self-focussed attention (e.g. bodily sensations) and unhelpful coping strategies (e.g. avoidance or substance use), that is found to be present in clinical and non-clinical populations. Those experiencing psychological disorders essentially become very entrenched in the CAS, which leads to clinically significant

symptoms and the development of psychological disorders. Whilst involved in the CAS, individuals are said to: be cognitively centred, have fixated attention, possess low meta-awareness, have high conceptual activity and goal oriented coping (Wells, 2009). The CAS has been found to adversely impact upon cognitive functioning due to excessive and fixated attention on internal self-processing (Wells & Matthews, 1996). This heavy involvement in the CAS reduces the amount of resources available for other cognitive functions.

Figure 3 below illustrates the S-REF model and how the CAS fits into this top-down processing (Wells, 2009). This original figure is taken from Wells (2009).

Figure 3. ‘The S-REF model of psychological disorder with metacognitions revealed. After Wells and Matthews (1994).’ (Wells, 2009, p.9)



The CAS is driven and maintained by metacognitive beliefs about thoughts. Wells and Cartwright-Hatton (2004) described 5 types of metacognitive beliefs : 1) Positive beliefs about worry (e.g. *I must worry to protect myself.*); 2) Negative beliefs about uncontrollability of thoughts

and danger; (e.g. *I cannot control my thoughts. My thoughts are dangerous.*); 3) Cognitive confidence (e.g. *I have a bad memory.*); 4) Negative beliefs about the consequences of not controlling thoughts (e.g. *If I don't control my thoughts I'll lose my mind.*); and 5) Cognitive self-consciousness (focussing attention on thought processes *I must monitor my thoughts.*). In maintaining the CAS, metacognitive beliefs are essentially contributing to refreshing emotions, which can ultimately lead to increased distress and psychological disorder. Past research exploring the S-REF model of metacognition will be discussed later in this report.

1.8.2 Metacognitive research in mental health and social functioning

1.8.2.1 Deficit models of metacognition

Past research has described 'deficits' in synthetic metacognition in people diagnosed with schizophrenia spectrum disorders (Hillis et al., 2015; Lysaker et al., 2014), and that such deficits can impact on severity of symptoms (Lysaker et al., 2005). Various studies have examined the impact of synthetic metacognition on social functioning in people experiencing psychotic disorders. Lysaker et al. (Lysaker et al., 2011; Lysaker et al., 2010) investigated mastery and found aptitude for mastery was significantly linked with social functioning. Further, mastery also mediated the effect neurocognition had on social functional outcome (Lysaker et al., 2010). Deficits in the ability to self-reflect on mental processes have been found to impact on a range of cognitive features (e.g. ones' ability to reason). Such factors are suggested to be the drivers of poor social functioning in those not in the acute phase of the disorder (Lysaker et al., 2014). Mastery has been found to impact on social functioning in a first episode psychosis (FEP) sample (Massé & Lecomte, 2015). However, in this same study, better ToM skills did not improve social functioning. Another study (Palmier-Claus et al., 2016) also found ToM not to have any significant effect on social functioning in those at-risk for psychosis, with FEP or more chronic (2 years or longer) psychosis. This finding appears to contradict other research conducted with those experiencing FEP that found a reduction in ToM abilities lead to an increase in social dysfunction (MacBeth et al., 2014). Two of these studies (MacBeth et al., 2014; Massé & Lecomte, 2015) used the same measure of ToM

(Metacognition Assessment Scale (MAS)), but yielded different results. It appears however, that one of the studies (MacBeth et al., 2014) used an adapted version of the same measure (Metacognition Assessment Scale-Revised (MAS-R). This could have impacted on the results.

Notwithstanding the deficit hypothesis it is possible that engagement in the CAS as specified in S-REF theory (Wells & Matthews, 1994) could explain the presence of perceived deficits in various types of synthetic metacognition found in those diagnosed with psychological disorders such as schizophrenia, psychosis, anxiety or depression. It could be argued that these deficits are the result of excessive involvement in the CAS or a result of metacognitive beliefs rather than individuals lacking the knowledge of how to carry out these functions. Further, in light of research on the effects on cognitive functioning, involvement in the CAS and/or metacognitive beliefs could be what drives poor social functioning in young people in the early stages of psychological disorders. This shifts the paradigm from being a deficit (broken brain) model (e.g. Lysaker et al., 2014) to one where individuals are seen as being stuck in a loop of worry-based processing and negative beliefs about thoughts and need to be freed from this (Wells, 2009; Wells & Matthews, 1994)

Psychotherapy is currently used to address synthetic metacognitive deficits in those experiencing psychotic disorders (Hillis et al., 2015). Hillis et al. (2015) report that such interventions have mainly been used with people in more chronic stages of the disorder, and highlights this as a limitation. In the same paper, a case is presented of a 20 year old man (Satie) with a FEP diagnosis in order to address this issue. Metacognitive Reflective and Insight Therapy (MERIT), a form of psychotherapy, is conducted with this case. MERIT comprises of 8 factors aimed at stimulating and enhancing synthetic metacognitive elements in the person. Hillis et al. (2015) describe MERIT:

MERIT seeks to promote synthetic metacognitive capacity and requires a focus on reflection itself and, as such, cannot rely on teaching skills or guiding patients toward predetermined or ostensibly more proper

understandings. It calls for a consultative and non-hierarchical process in which clinicians and patients think together and patients are stimulated to think about their ideas of themselves and others. In this way, it is a departure from many of the predominant skills-based approaches.' (p.125)

It is promising that there appears to be a move towards researching early mental health problems and a more co-operative, less teaching based interventions in this area. However, Satie was in treatment for 2 years, and as the authors themselves highlighted, it could be difficult to facilitate such a lengthy intervention within current NHS or similar mental health services. Further, although several positive clinical outcomes were noted (e.g. hallucinations stopped, delusions reduced, improved relationships with family and improved metacognitive capacity), the authors suggest he was in better position to go back to work and improve social functioning generally, but do not state that he actually did. It could prove difficult gaining approval for such an intervention that even in the early stages of a psychological disorder and after 2 years of treatment does not demonstrate improvement in functioning. The young person themselves might also expect more after such a time commitment. This was only a single case however, and it would be interesting to hear about further research in this area with larger samples. Exploration of other treatment options to improve social functioning in early mental health problems should be considered in the meantime. Synthetic metacognition might not be the answer at this time, though that does not rule out metacognition as an effective treatment option.

1.8.2.2 S-REF Model Research

The presence of maladaptive metacognitive beliefs have been identified in depression (Papageorgiou & Wells, 2001; Wells et al., 2009), a number of studies have identified such beliefs in the psychosis population (Austin et al., 2014; Morrison, French, & Wells, 2007; Morrison & Wells, 2007; Rachel Sellers, Gawęda, Wells, & Morrison, 2016; Rachel Sellers, Varese, Wells, & Morrison, 2016), and those with an ARMS (Barbato et al., 2014; Cotter, Yung, Carney, & Drake, 2017; Morrison et al., 2007; Welsh, Cartwright-Hatton, Wells, Snow,

& Tiffin, 2014). Wells developed Metacognitive Therapy (MCT) based on his theory (Wells, 2009), which has been found to improve symptomatic outcomes for those experiencing psychological disorders such as anxiety and depression (Callesen, Jensen, & Wells, 2014; Wells & King, 2006) and some promising outcomes for those experiencing psychotic disorders (Morrison et al., 2014; Valmaggia, Bouman, & Schuurman, 2007). A recent meta-analysis (Normann, van Emmerik, & Morina, 2014) showed that MCT was effective in treating anxiety and depression. In addition, MCT was found to be more effective than control groups and Cognitive Behavioural Therapy (CBT) (Normann et al., 2014). CBT involves helping people to reduce psychological distress and symptoms by highlighting to individuals that their thoughts (cognitions), feelings and behaviour are related (Kennerley, Kirk, & Westbrook, 2017). CBT works primarily on the content of cognition by suggesting different ways of thinking about a perceived issue, and helps people to change their behaviour (Kennerley et al., 2017). In contrast, MCT helps individuals experiencing emotional disorders or difficulties to become aware of the adverse effects of their thinking styles (the focus is on thought processes rather than content as in CBT). MCT helps people to realise that they already possess the ability to reduce emotional distress by changing the way in which they react to their thoughts. This involves working with those presenting with emotional disorders to help them see that they have *control* over the CAS (i.e. that engaging in worry or rumination in response to a thought is not an automatic process, but a voluntary one). The S-REF model of metacognition therefore differs from that of synthetic metacognition theorists as it is not a deficit model. Instead it suggests people already possess the skills required to function better, but that the metacognitive processes engaged in interfere with these tasks. In this model, individuals already have the power within themselves to overcome emotional distress, and MCT provides guidance to help them realise this as opposed to teaching them new skills that they do not currently possess (similar to the MERIT approach in the fact that it is guiding people rather than teaching, and is collaborative rather than hierarchical). Wells' MCT does not assume that paying attention to certain distressing thoughts in themselves is an issue and that this should

be stopped completely, but allows the person to recognise that they can *choose* when they want to pay attention to them (e.g. someone who has recently experienced a bereavement can choose when they want to grieve, rather than assuming they should not grieve at all as this would be too distressing). The goal is to develop flexible control over how one reacts to thoughts.

1.8.3 Differences between CBT and MCT

MCT differs from CBT in major respects. It will be useful at this point to describe some key differences between MCT and CBT. Table 2 below provides such a summary.

Table 2. CBT Vs MCT (Wells, 2009)

CBT	MCT
Focus on <u>content</u> .	Focus on <u>process</u> .
Deals with meanings people give to their experiences.	Deals with the way people think.
Assumes problem lies with incorrect and distorted views of self and the world.	Assumes problem lies with inflexible and re-occurring styles of thinking in response to negative thoughts, feelings and beliefs.
Change thought content, belief and validity in this content.	Focus on removing unhelpful thinking styles.
<i>'What's your evidence?'</i> (Wells, 2009, p.3)	<i>'What's the point in evaluating your worth?'</i> (Wells, 2009, p.3)

1.8.3.1. A single case illustrating the use of CBT and MCT in a young person diagnosed with schizophrenia

Valmaggia et al. (Valmaggia et al., 2007) present a single case study of a 25 year old male

('Mark') with a 4 year history of psychotic symptoms (schizophrenia diagnosis applied) and

who experienced treatment resistant auditory hallucinations. This case describes how Mark received the Attention Training Technique (ATT), an element of MCT that involves the use of auditory attentional tasks (selective and divided attention and switching attention) (Valmaggia et al., 2007). The aim of ATT is to help individuals become more externally focussed rather than focussed on internal events (such as engagement in the CAS), and develop the ability to flexibly switch their attention between events. Socratic questioning is also used to help people become aware that they can control what they pay attention to. ATT aims to reduce self-focussed attention, interrupting involvement in the CAS. Mark had previously received 16 sessions (weekly) of CBT plus 4 booster sessions. Mark reported to find CBT helped him understand how his voices came about, and that they are created by his own mind. However, Mark still experienced voices that make him anxious and worry about them being real and hurting him. These voices affected Mark's concentration at work and prevented him from socialising.

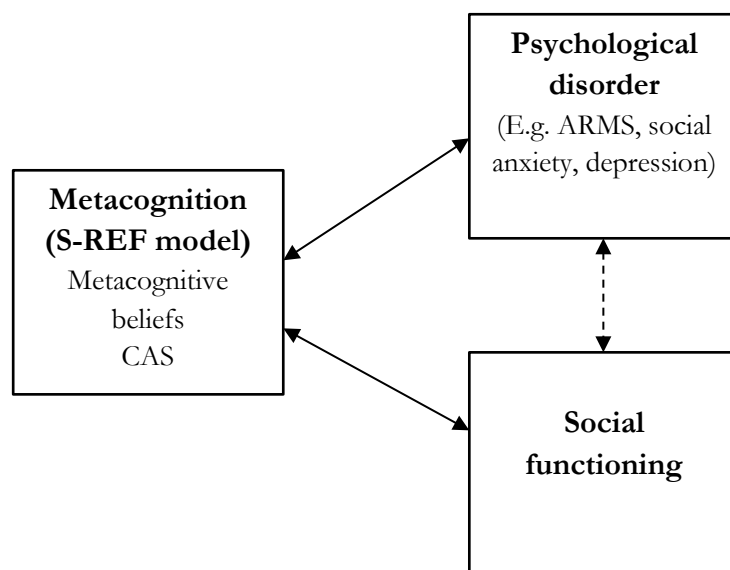
The therapist formulated that the attention Mark pays to the voices in addition to the '*dysfunctional beliefs*' (Valmaggia et al., 2007, p.129) about the source of the voices, is what leads to anxiety and distress he experiences. The intervention therefore aimed to reduce the amount of attention Mark focuses on the voices through ATT. Mark received 8 sessions of ATT. By session 4 Mark already experienced benefits of ATT providing an example of how he was able to switch his attention from loud voices to a conversation with his friends whilst socialising. Mark reported in sessions 6 and 7 that he felt confident about being able to switch his attention between different sounds and that there had been occasions when he '*turned off*' (Valmaggia et al., 2007, p.131) the voices. Mark had 2 and 6 month follow-ups. At 2 months voices had decreased and this was maintained at 6 months. Mark was still at work, was able to participate in more '*normal*' (Valmaggia et al., 2007, p.131) daily tasks and had a '*dramatic*' (Valmaggia et al., 2007, p.131) effect on his functioning generally.

Despite the fact that previous receipt of CBT clouds the true benefits of the ATT intervention, the above case example provides some indication that MCT may have some utility in improving social functioning in psychosis. At the present time there is little research looking at the Wells model of metacognition in relation to social functional outcomes in those experiencing early mental health problems (e.g. at-risk for psychosis or early depression or anxiety). However, past research suggests that this may be a worthwhile course of investigation because: the study reports Mark's social interactions improved as he was able to switch his attention to conversations from the voices he heard; an improvement of functioning generally was reported (this could include other social functioning elements); and this case study involved a young person with a more established mental health problem suggesting the intervention may have similar or better effects with those presenting with less pronounced symptoms (e.g. ARMS). Later work investigating the effects of MCT with people experiencing treatment resistant psychosis (Hutton, Morrison, Wardle, & Wells, 2014; Morrison et al., 2014) found clinical significant improvements on symptoms. Hutton et al. (2014) used the PSP to measure social functioning in their study, but found little improvement in this area. This study was a case series that included three participants, but specific changes in day-to-day interactions or activities are not reported in detail (as in the single case described above). This is likely be due to the design of the study (includes more participants and was a feasibility study). As discussed earlier in this chapter, the PSP uses a unidimensional scale providing a single score from 0 to 100 encompassing all aspects of social functioning. It is therefore difficult to establish if MCT is effective for specific elements of social functioning in the Hutton et al. (2014) study, or if any small changes occurred that are not picked up by the PSP. More recent research has found some early signs that metacognitive beliefs may be associated with work status (i.e. whether someone is working or not working) (Nordahl & Wells, 2018). Metacognitive belief the need to control thoughts was found to predict work status over and above psychiatric diagnoses and trait anxiety levels (Nordahl & Wells, 2018). Whilst there is little research that exists exploring the role of metacognition and social

functioning in those experiencing mental health problems, there is some indication that metacognition could contribute to social functioning levels. However, more research is required in this area as previous studies using MCT or investigating metacognitive beliefs have not focussed primarily on social functioning as an outcome.

Figure 4. below illustrates the relationship metacognition may have to psychological disorder and social functioning. In this model, metacognition is the main factor that leads to psychological disorder and social functioning (illustrated by the solid lines). Although a relationship may be present between psychological disorder and social functioning, it is possible that this relationship only appears to exist and that in reality, metacognition is the main contributory factor for both. The dashed line (in Figure 4.) represents this hypothesised relationship between psychological disorder and social functioning.

Figure 4. A diagrammatic representation of the hypothesised role of the S-REF model on psychological disorder and social functioning



1.9 Thesis rationale and objectives

The literature described in this chapter firstly illustrates the prevalence of social functioning problems in a range of mental health problems, and that a number of different factors have been associated with social functioning. However, it is difficult to be sure what the main contributors are to levels of social functioning. Examination of the literature brought to light important reasons for investigating social functioning in people experiencing mental health problems: 1) social functioning is a risk factor for the development of pathology; 2) understanding the mechanisms that underlie poor social functioning may improve understanding of vulnerability factors; and 3) it may provide insights into how poor social functioning is treated. The current thesis sets out to explore these issues with a primary focus on the role of the S-REF model of metacognition on social functioning in people experiencing mental health problems. However, in order to address and investigate some of the issues mentioned in this chapter (e.g. choice of social functioning measure, unclear concept) that have led to the interpretation of results being difficult when investigating contributory factors, more specific aims have been set in order to meet the overall objective. These are described below.

Firstly, there are a number of different instruments that are used to measure social functioning in mental health research. These measures have been shown to vary with regards to content (e.g. types and number of items included), and focus of attention (e.g. focus on quality of social functioning or quantity). This is understandable in light of the issue of researchers being unsure of what social functioning actually is, and with the need to focus on different aspects of the construct. However, if it is not known what elements make up social functioning, then this will inevitably make designing or choosing a tool to measure the construct more difficult. Further, it will increase bias in the measurement of social functioning and thus reduce confidence in study results. This thesis therefore aims to evaluate the methodological quality of social functioning measures used in mental health research, and thus the quality of measures by conducting a systematic review.

Secondly, the concept of social functioning appears somewhat nebulous with researchers having differing ideas about what this construct looks like. This is not surprising considering the broadness of the term 'social functioning' and the different terms used to describe it (Burns & Patrick, 2007). Due to this, one of the aims of this thesis is to help build a clearer picture of what social functioning is. To do this, a systematic review will be used.

The next aim is to validate the metacognitions questionnaire-30 (MCQ-30) in an ARMS sample to investigate if the 5-factor structure is a good fit for this group. Next, the MCQ-30 will be used in a separate study with an ARMS sample to investigate if metacognitive beliefs predict social functioning.

Another aim is to gain more in-depth knowledge about how the S-REF model of metacognition presents in a sample of young people with a history of mental health and social functioning problems. This was achieved using a qualitative methodology.

The final aim of this thesis is to examine the predictive validity of metacognitive beliefs on social functioning in a non-clinical sample.

Chapter 2: Methodology

2.1 Overview of studies included in this thesis

The overall aim of this thesis was to investigate the role of the S-REF model of metacognition on social functioning in people experiencing mental health problems. This thesis employed various research methods in order to address this overall aim. The current chapter will explain the research methodology utilised for each study along with a rationale as to why research methods were selected.

Study 1 used a systematic review to identify validation studies of social functioning measures, and assess the quality of these measures based on the methodology used to validate them. This study also used the systematic review to help construct and better understand the concept of social functioning, and make clear the definition for this thesis. Study 2 used factor analyses and other measurement properties to validate the metacognitions questionnaire-30 (MCQ-30) in an ARMS sample to assess if the current 5-factor structure applied to this group.

Having explored the quality of social functioning measures, clarified the definition of social functioning to be used throughout this thesis, and validating the MCQ-30 in an ARMS sample, the next steps in this thesis was to conduct studies to examine more closely the role of the S-REF model of metacognition on social functioning in mental health. Study 3 was an empirical study with an ARMS sample, which used correlation and regression analyses to investigate if metacognitive beliefs (as measured by the MCQ-30) were associated with or predicted social functioning in this group.

Next, study 4 was conducted in order to further explore how the S-REF model of metacognition presents in a sample of young people with a history of mental health and social functioning problems. A qualitative study was conducted to investigate this using thematic analysis methodology.

Finally, study 5 employed a questionnaire study design with the general population to investigate if metacognitive beliefs are predictors of social functioning in this sample.

2.2 Systematic reviewing

A systematic review involves searching for research articles in a systematic way in order to answer a specific research question. Systematic reviews can either be reported as a narrative synthesis (qualitative report), a meta-analysis (using data acquired from articles to quantitatively synthesise and report findings), or a combination of the two. The decision to conduct a qualitative or quantitative synthesis is dependent on the research question, and whether or not data across articles can be pooled (e.g. consistent measurement used across studies). Electronic databases are usually used to conduct such searches, and authors may also use other sources (e.g. existing knowledge, reference lists from papers found through a database search) to locate articles to be included in the review. Systematic reviews are considered to provide high quality evidence in comparison to other research methods such as RCTs, observational studies, or case studies (Murad, Asi, Alsawas, & Alahdab, 2016).

However, researchers have also argued that systematic reviews should also be used as a *'lens through which other types of studies should be seen'* (Murad et al., 2016, p.2).

The systematic way in which systematic reviews are conducted means that the results can be very comprehensive and robust. However, this is very much dependent on the number of databases researchers choose to use, and appropriate choice of key words used in these databases. It is recommended that at least two databases are searched for articles, and that at least two independent researchers review articles for eligibility (Mokkink et al., 2009).

The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRIMA) Statement (Moher, Liberati, Tetzlaff, & Altman, 2009) sets out best practice guidelines for conducting systematic reviews. The PRISMA Statement essentially consists of a checklist of areas to be covered in a systematic review, as well as a guide on how to construct a flow chart to be included in the review of database search results. This checklist includes the development and

registration of a protocol for the systematic review. The aim of this is to increase transparency and prevent researcher bias (e.g. changing the research question, aims or inclusion or exclusion criteria during the review). The checklist and flow chart can be accessed at <http://www.prisma-statement.org/>.

Whilst systematic reviews have a number of benefits, there are also limitations to their use. Firstly, because articles with positive results are often preferred by journals, any articles that are not published may not be identified in the review (especially where researchers choose to restrict their inclusion criteria to peer reviewed articles). This means that important evidence could be excluded from the synthesis in systematic reviews. Secondly, researchers may not include enough key words or use the right ones. This means that key papers could be missed and thus not included in the evidence synthesis, or irrelevant papers could be identified if the search terms are not appropriate which is a waste of resources. It is important therefore for researchers to conduct a lot of preliminary work prior to the execution of a systematic review. This should include identifying key terms (e.g. checking past research papers, getting assistance from an expert in the subject of interest and/or a librarian), and conducting practice searches and checking if key papers are identified. The research question should be refined throughout this process. Although the PRISMA checklist provides guidance on how to conduct and report a systematic review, these guidelines mainly refer to actions to be taken once the aforementioned steps have been taken (i.e. once a research question and all key terms are defined). It is possible that this a lack of guidance in the preliminary stages of systematic reviews could contribute to poor quality reviews being conducted (Mokkink et al., 2009).

2.2.1 Study 1: Systematic review

A systematic review was chosen as the research method for study 1. One single systematic review was conducted to answer two research questions. The primary aim of study 1 was to evaluate the methodological quality of studies that validated social functioning measures in mental health samples. An ancillary outcome was to explore how social functioning was

conceptualised in research studies including the same sample. As study 1 involved specifically searching for articles that had validated social functioning measures in mental health samples, it made methodological sense to use studies identified for this main outcome to answer the question for the secondary outcome.

2.2.1.1 Preliminary searches and key words development

Initial general searches on electronic databases PsychInfo, EMBASE and MEDLINE and Google Scholar for social functioning measures in various mental health problems was conducted to find key papers, and papers related to the area of interest. Key word lists were checked for key words related to mental health problems (e.g. psychosis, depression, personality disorder), validation terms, and terms used to describe measures. As there is a lack of guidance in this area, the author attended a systematic reviewing course at the University of Manchester to help with this process. Although this course was helpful in providing guidance in areas such as how to link terms, the importance of not making the research question too broad, and affirming that the PRISMA guidelines should be used, the author still felt more support was required in actually using the databases to search and the number of key words required. Due to this, the author also met with a librarian at the University of Manchester who provided guidance on how to search the database via OVID, and how to use Medical Subject Headings (MeSH) terms.

A final decision was made on key terms for each of the three databases used in this systematic review (PsychInfo, EMBASE and MEDLINE (this includes MEDLINE in-process)). The key terms for each database can be viewed in Appendix 1. Boolean logic was used to combine the terms in each database as follows: (1 OR 2) AND 3 AND 4 AND 5. Different MeSH terms (key terms under number '1', see Appendix 1) were used in each database because of the availability of terms. Key terms labelled '2' to '5' were exactly the same for each database. Only one term was selected for social functioning (i.e. 'social function*'). This was important in this study because the authors did not want to make assumptions about what social functioning

was by including terms that they believed to relate to the concept. Further, because study 1 aimed to use the review articles to investigate the definitions used to conceptualise social functioning, the authors did not want to contaminate the results by including terms that did not specifically relate to this concept.

2.2.1.2 Eligibility criteria

Inclusion criteria for study 1 is as follows:

Population

- a) Validation studies that include participants meeting criteria for one or more psychological disorder as defined by a validated measure (e.g. the Structured Clinical Interview for DSM III/IV/V Axis I Disorders (SCID), the International Statistical Classification of Diseases 10th revision (ICD-10), Comprehensive Assessment of At Risk Mental States (CAARMS), Positive and Negative Syndrome Scale (PANSS)). This includes samples taken from mental health services where an appropriate assessment would have been carried out for inclusion (e.g. PANSS used in early intervention service for first episode psychosis). Psychological disorders must fall under one of the following categories:
 - Anxiety disorders (e.g. general anxiety disorder, social phobia, obsessive compulsive disorder, agoraphobia.)
 - Mood disorders (e.g. major depressive episode or disorder, bipolar disorder, bipolar at risk, cyclothymia).
 - Psychosis spectrum disorders (e.g. at risk for psychosis: defined as at risk mental state, clinical high risk, ultra high risk, attenuated psychotic symptoms; psychosis; schizophrenia).
 - Eating disorders (e.g. anorexia, bulimia, body dysmorphia).

- Somatoform disorders (e.g. body dysmorphia, hypochondriasis).
 - Personality disorders (e.g. borderline personality disorder, schizotypal personality disorder, narcissistic personality disorder).
- b) Any age (no age restrictions for this review).

Study design

Validation studies (i.e. include psychometrics) of social functioning measures.

Other

- a) The measure being validated MUST be referred to as a measure of 'social functioning' or 'social function' at least once during the full article.
- Studies that state they measure multiple domains including social functioning (e.g. states it measures depression, self-esteem and social functioning), should not be included for analysis. This is to ensure consistency and clarity in selecting papers for analysis.
 - It may be unclear until full article level whether the measure is referred to as a social functioning measure, so articles can be included at title and article level that do not specify this and checked at full article level for final decision on whether or not to include for analysis.
- b) Written in English language. This is because some of the meaning (e.g. content of assessment tools used to measure this social functioning) may be lost in translation.

Exclusion criteria for study 1:

Population

Studies that include populations diagnosed with:

- a learning disability or difficulty (e.g. autism)
- behavioural problems (e.g. ADHD)
- neurological problems (e.g. brain damage, epilepsy);
- physical health conditions (e.g. diabetes, cancer, asthma).

Exclusion applies to the above because the measure of social functioning could be designed to measure the learning or physical disability for example, and items may not be relevant to those experiencing mental health problems.

Study design

- Studies that do not include populations meeting criteria for a psychological disorder (e.g. a study that only includes non-clinical populations). Comparison studies that include psychological disorder population(s) in addition to a non-clinical population sample can be included.
- Studies not written in the English language. This is because some of the meaning (e.g. definition of social functioning or content of assessment tools used to measure this construct) may be lost in translation.

Other

- Full article does not state that the assessment tool being validated is measure of 'social functioning' or 'social function'.

- Articles not written in English.

Additional inclusion criteria for Study 1: Secondary outcome

Once eligible articles were identified for the primary outcome of this systematic review, the following additional inclusion criteria was applied to these articles to identify eligible studies for the secondary outcome: .

- Studies had to provide a definition of social functioning at some point in the article to be included in the narrative synthesis for the secondary outcome.

2.2.1.3 Study 1: The Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) initiative

The COSMIN initiative is a set of consensus-based guidelines to be used to evaluate the methodological quality of studies validating measures (referred to as Patient-Reported Outcome Measures (PROMs) by COSMIN). The original checklist was developed following a Delphi study with 57 professionals (e.g. psychologists, clinicians, statisticians) internationally (Mokkink et al., 2010). The rationale behind the development of these guidelines is that it is important to have PROMs that have been developed using good quality methodological procedures to ensure that it is accurately measuring what it should (Mokkink et al., 2010). A systematic review found that in trials that recruited samples experiencing schizophrenia, positive results related to the effectiveness of treatment were more likely to be reported when an unpublished measure was used (Marshall et al., 2000). This highlights the potential knock on effects an inadequately validated measure could have results, and the importance of using guidelines such as those created by COSMIN to evaluate the methodological quality of PROMs.

As the aims of COSMIN were in line with the aims of study 1, the COSMIN guidelines were used to assess the methodological quality of social functioning PROMs in this systematic review. COSMIN updated their guidelines for systematic reviews of PROMs (Mokkink et al., 2018; Prinsen et al., 2018). These updates essentially involved changing the order of the measurement properties, and creating a completely separate manual for assessing content validity (Terwee et al., 2018) having identified that this was the most difficult to assess and the most important measurement property. These most recent COSMIN guidelines were used in study 1. At the time of conducting the analysis the following manuals were identified on the COSMIN website and used in study 1: *COSMIN methodology for systematic reviews of Patient-Reported Outcome Measures (PROMs) user manual, Version 1.0 dated February 2018* and the *COSMIN methodology for assessing the content validity of PROMs User manual, Version 1.0* (<https://www.cosmin.nl/>). The former updated manual is the updated version of the original checklist, but the updates are not consensus-based due to a lack of resources (Mokkink et al., 2018). However, feedback from systematic reviews that used COSMIN was used to create the new manual, and the authors believe that the new manual will lead to improvements in evaluations of validation studies (Mokkink et al., 2018). The latter content validity manual however, is consensus-based with 159 experts in 21 countries (Terwee et al., 2018). Considering the strong emphasis on content validity being the most important measurement property, it was decided that both manuals would still be used for the analysis.

2.2.1.4 Conducting the search

Once the research questions, eligibility criteria and key words were confirmed, a protocol was registered on the international prospective register of systematic reviews (PROSPERO) and is accessible at <http://www.crd.york.ac.uk/PROSPERO/> (registration number: CRD42018087952). A copy of the protocol can also be found in Appendix 2.

For the COSMIN analysis (part 1) two reviewers assessed articles for eligibility at each stage. The lead author conducted 100 per cent checks at title, abstract and full article level, and a

second reviewer conducted 30 per cent checks at title level, and 100 per cent checks at abstract and full article level. This was to check reliability between reviewers throughout and highlight any potential problems that could lead to the missing of articles in the review.

For part 2 of study 1, both authors did 100 per cent checks of the articles included in the systematic review for part 1 to identify eligible articles. Any discrepancies were resolved with two senior reviewers.

2.2.1.5 Data management and analysis

EndNote and Microsoft Excel (Excel) were used to manage the article references throughout. Excel was also used to record scores for the COSMIN analysis. IBM SPSS Statistics Version 22 (SPSS) was used to conduct Kappa analyses to check reliability between reviewers.

2.2.1.6 Reporting of the review

The PRISMA statement was used as a guide to reporting the systematic review in study 1. The *COSMIN methodology for systematic reviews of Patient-Reported Outcome Measures (PROMs) user manual, Version 1.0 dated February 2018* was also used as a guide as this provided additional information on how to report the results of the COSMIN analysis.

2.3 Quantitative methodology

There are a variety of different quantitative methods used in research, each with its own purpose. This section will discuss and explain the quantitative methods used in studies 2, 3 and 5, and the rationale for using each method.

2.3.1 Study 2: Psychometric testing

Study 2 aimed to validate the metacognitions questionnaire-30 (MCQ-30) in a sample of people at risk for psychosis. Measurement instruments are validated through the use of a variety of psychometric tests (Terwee et al., 2007). The purpose for validation is to ensure that instruments are measuring what they should and to reduce bias in research results. Terwee et al. (2007) recommended the use of eight key measurement properties: (1) Content validity (e.g. whether an instrument is understood by the target population); (2) internal consistency (e.g.

Cronbach's alpha calculations to test how related items are within a subscale); (3) criterion validity (comparison to a 'gold standard' measure to see if correlates highly); (4) construct validity (e.g. hypothesis testing); reproducibility (e.g. test-retest); (6) responsiveness (e.g. detecting change over time); (7) floor and ceiling effects; and (8) interpretability (p.35-38). Structural validity is also an important factor when validating measures (Mokkink et al., 2018), and is measured by conducting factor analyses (Hair, Black, Babin, & Anderson, 2014).

2.3.1.1 Confirmatory and exploratory factor analyses

Factor analysis is widely used in psychology (Kline, 1994), and its main purpose is to reduce items into meaningful categories or factors in order to establish the best structure for the measure being validated (Hair et al., 2014). Exploratory factor analysis should be used first when no existing structure is known or been tested a priori (e.g. new measure created). Some debate exists around the type of exploratory factor analytic technique to use as there is the option of using an exploratory factor analysis (EFA) or a principal components analysis (PCA) (Costello & Osborne, 2005; Velicer & Jackson, 1990). Costello & Osborne (2005) suggest that a PCA was merely created because it was cheaper to run at a time when computers were slow. The authors suggests a PCA does not take into account the underlying structure that is created by latent variables (Costello & Osborne, 2005). Other researchers however disagree stating that it does not matter if an EFA or PCA is used as the results will not differ much (Velicer & Jackson, 1990).

Confirmatory factor analyses (CFA) are also used to establish the structure of a measurement instrument. However, rather than being more exploratory and trying to build a structure like an EFA, a CFA is used to check the fit of a predetermined or hypothesised structure using various fit indices (Hair et al., 2014). The primary factor analytic technique used for Study 2 was a CFA. This is because the aim was to test if the original 5-factor structure of the MCQ-30 was a good fit for an ARMS sample. A decision was made to also conduct a PCA after

checking the fit of MCQ-30 in order to comprehensively check for any other possible structures that could be valid in this sample.

IBM SPSS AMOS Version 22 (AMOS) was used to run the CFA analyses. Several fit indices are recommended for use when interpreting the CFA results and all of these indices were used in Study 2 to allow for a thorough analysis: chi-square and degrees of freedom (DF); an absolute fit index (e.g. goodness of fit index (GFI)), standardised root mean residual (SRMR), root mean square error of approximation (RMSEA); one incremental fit index (e.g. Tucker-Lewis index (TLI), comparative fit index (CFI)); a goodness of fit index (e.g. GFI, TLI, CFI); and a badness of fit index (e.g. SRMR, RMSEA) (Hair et al., 2014).

SPSS was used to run the PCA and an oblique rotation (direct oblimin) was used allow for more flexibility in the position of factors (Kline, 1994) as past validation research on the MCQ-30 (Wells & Cartwright-Hatton, 2004) has shown items on this measure correlate. Eigenvalues above 1 were retained for the initial exploration of the measure, and the scree plot investigated to establish the number of factors to extract.

With regards to other psychometric tests, Cronbach alphas were calculated in SPSS to measure internal consistency. Convergent and discriminant validity (hypothesis testing to check relationships with known variables) were also tested using Pearson correlations. Some variables could not be tested because secondary data was used (e.g. test-retest because an intervention had been provided between time-points).

2.3.1.2 Sample

Data from 185 participants meeting criteria for an at risk mental state were used to conduct this study. This was a convenience sample where participants either took part in the Early Detection and Intervention Evaluation (EDIE) (Morrison et al., 2004) or the Early Detection and Intervention Evaluation 2 (EDIE-2) trial (Morrison et al., 2012). Both were randomised controlled trials testing the efficacy of cognitive therapy in preventing transition to psychosis.

2.3.2 Studies 3 and 5: Correlation and regression analyses

2.3.2.1 Sampling

Studies 3 and 5 used similar research methods in order to explore relationships and predictors of social functioning, but in different samples. Study 3 used data from the EDIE-2 trial described above, and Study 5 involved the recruitment of a non-clinical sample online. Study 5 was approved by the University of Manchester Research Ethics Committee (REF: Ref: 2017-2286-3683). Two-hundred and fifty four participants from the general population were recruited at time-point 1 of this study. Inclusion criteria: Aged 16 years or over (no upper age limit), currently living in the United Kingdom, and not be currently experiencing any psychological or neurological problems. Participants were recruited from a number of sources; social media (e.g. Twitter), poster advertisements (e.g. within the University of Manchester, libraries), leaflet distribution, via email, and by recruiting psychology undergraduates using a course credits system provided by the University of Manchester. This was an online study accessed by participants via a survey link. Participants consented online (see Appendix 3 for consent form) after reading the online participant information sheet (Appendix 4). Participants were asked to complete a set of questionnaires three times, four weeks apart on each occasion. A maximum of two email reminders were sent to participants when it was time for them to complete their next set of questionnaires

2.3.2.2 Correlation and regression analyses

Correlations test if two variables have a significant relationship with one another, but cannot be used to infer causality (Field, 2013). A Pearson correlation is used for normally distributed data, and a Spearman's for non-parametric (not normally distributed) data (Field, 2013).

Despite not being able to tell us if one variable causes another, correlations are useful for establishing early indicators of potential causal relationships. Correlations were used in Studies 3 and 5 for this purpose.

Regression analyses take correlations one step further by establishing whether variables can predict another variable. Regressions can be both cross-sectional or longitudinal, but causality

can only be inferred from longitudinal analyses. Study 3 used a mixed hierarchical regression. This involved both force entering variables (control variables), and using the stepwise option for metacognitive beliefs. This was because no previous research had been conducted and it is recommended that a stepwise approach is used in such circumstances (Field, 2013). Study 5 used forced entry at all levels because Study 3 had found that a metacognitive belief had predicted social functioning whereas this knowledge was not available when Study 3 was conducted.

Debate exists about what an appropriate sample size is for a regression. Suggestions include 10 participants per variable, or a variation in sample size from $N=77$ for up to 20 predictors (if a large effect is expected) and if there's few predictors an even smaller sample could be used, or $N=160$ if a medium effect is expected (up to 20 predictors) (Field, 2013). At a minimum however, a sample size of 55 is recommended for six or less predictors (Field, 2013). Sample sizes for Study 3 regressions ranged from 104 to 114 for the regressions, and Study 5 had larger samples of from 233 to 249 cross-sectionally, and 114 for the longitudinal analyses. This suggests the sample sizes were sufficient for the analyses.

2.4 Qualitative methodology

Qualitative research involves the use of semi-structured interviews to generate discourse around a particular area of interest to answer specific research questions. Simply put, qualitative research involves the use of *'words as data'* rather than *'numbers as data'* as in quantitative research (Braun & Clarke, 2013, p.3-4). Unlike quantitative research, qualitative research does not aim to test specific hypotheses, but instead aims to gather rich in-depth data, with an emphasis on understanding real life experiences (Braun & Clarke, 2013). Due to this, qualitative research is more subjective than quantitative research and thus can be interpreted in many different ways. It has been suggested however, that researchers not have a dichotomous view of being in either a quantitative or qualitative camp. Instead an appropriate

method should be chosen to fit with the research goals, and that this could include using both methods simultaneously (Richardson, 1996).

Two categories of qualitative research exists: Experiential qualitative research makes participant views a priority in the analysis; Critical qualitative research focusses more on the data and the interpretation of it from the researcher's perspective (Braun & Clarke, 2013). Further, the ontological assumptions of qualitative research tend to fall under relativism, which is the assumption that many different realities exist. In contrast, realism refers to the view that there is one reality to be discovered, which is more in keeping with a quantitative methodology. A mid-camp position also exists known as critical realism, which believes a true reality exists beneath the subjective reality (Braun & Clarke, 2013). Several qualitative research methods adopt this position such as grounded theory, Interpretative Phenomenological Analysis (IPA), and thematic analysis (Braun & Clarke, 2013). These will be discussed in more detail below.

A grounded theory approach refers to qualitative research '*grounded in*' a repetitive process of collecting data and analysis of data in a continuous way (Richardson, 1996, p.76). Throughout this continuous process, researchers should refine the topic guide to reflect the areas of interest that emerge from the data. No strong a priori theories should be present when conducting qualitative research using this method, as the aim is to generate theory from the data (Richardson, 1996). Due to this, grounded theory is an inductive approach (data driven analysis) rather than a deductive approach (underpinned by predefined theories through which analysis is conducted). Although this approach means grounded theory is a flexible approach applicable to various projects, this open approach can lead a lot of unstructured data, particularly in the early stages. This lack of structure can lead to a different outcome (e.g. analysis straying from grounded theory paradigm into another type of qualitative analysis) (Richardson, 1996).

IPA is a qualitative method often used in psychology and its purpose is to explore the ways people come to understand significant lived experience (Smith, Flowers, & Larkin, 2009). Similar to grounded theory, the aim is to allow individual experience to come through without the influence of predefined knowledge. IPA therefore is also an inductive driven approach to analysing data. As the aim of IPA is to obtain detailed accounts of lived experience, only small sample sizes are required (between three and ten) (Smith et al., 2009).

Thematic analysis is described as:

'...a method for identifying, analysing, and reporting patterns (themes) within data.' (Braun & Clarke, 2006, p.6)

Like the grounded theory and IPA, rich data is collected through interviews for analysis. Thematic analysis is viewed as a very flexible form of analysis, but has been argued to have little agreement as to what it should look like and how it should be done (Braun & Clarke, 2006). Braun and Clarke (2006) argue that although thematic analysis does not appear to be *'branded'* (Braun & Clarke, 2006, p.6) like the aforementioned qualitative methods, essentially all other methods employ some sort of thematic analysis. It is advised that researchers are clearer on how thematic analysis is conducted to reduce the perception of the *'passive'* (Braun & Clarke, 2006, p.7) researcher who is discovering themes (without talking about how they came to discover them) (Braun & Clarke, 2006). Further, they argue that increased transparency will allow for studies to be compared. The flexibility of thematic analysis means that any ontological assumptions can be made, and it can be deductive or inductive.

2.4.1 Selected qualitative method for Study 4

Due to the flexibility of thematic analysis in that it allows for deductive and inductive perspectives to be occupied, this was the qualitative method chosen for study 4. This is because the aims of this study required the use of a qualitative method that allowed for deductive and inductive approaches to the data. The theoretical (deductive driven) element related to exploring how the S-REF model of metacognition was represented in a sample of

young people with a history of mental health and social functioning problems. The inductive element driven by the data was the perceived effects of these metacognitions on social functioning.

2.4.1.1 Topic guide and descriptive measures

The topic guide was developed by pooling questions from the Metacognitive Profiling Interview Schedule (Wells and Matthews, 1994) with questions relating to social functioning (Appendix 5). This was to allow for the generation of discourse about metacognitions and social functioning in order to answer the research question. The topic guide was semi-structured in nature to allow for more open discussion to occur. One-to-one interviews were conducted. The aim was for interviews to last 30 to 60 minutes.

Descriptive data was collected by use of self-report and one administered measure used to assess for levels of activity. The aim of using these measures is to describe the sample in terms of their reported metacognitions, social functioning and perceived social support. This will aid in the interpretation of the qualitative data collected.

Self-report measures:

1. Updated **Demographic** information to be obtained from participants.
2. **Metacognitions Questionnaire-30 (MCQ-30: Wells & Cartwright-Hatton, 2004)** is a 30 item self-report questionnaire. It measures current metacognitive beliefs about worry and thoughts as well as judgements about thinking. Five factors of metacognition are measured using this questionnaire, and it has been found to have good reliability and validity (Wells and Cartwright-Hatton, 2004).
3. **Cognitive Attentional Syndrome Scale-I (CAS-I: Wells, 2009, p.268)** is self-report measure which looks at frequency of worrying, strategies used to cope with negative thoughts and feelings and beliefs people have about worry, thoughts, feelings and threats. Metacognitive beliefs (as measured in the MCQ-30 above) are theorised to

drive the Cognitive Attention Syndrome (rumination) hence the use of this questionnaire in conjunction with the MCQ-30.

4. **Multidimensional Scale of Perceived Social Support (MSPSS: Gregory D.**

Zimet, Dahlem, Zimet, & Farley, 1988) is a 12 item self-report questionnaire to be completed to ascertain perceived level of support participants feel they have.

Administered measure

The **Time Use Survey (Short, 2006)** (Appendix 6) will be administered to assess social functioning score. This is to ensure an up-to-date social functioning record is obtained to assist in describing the sample in terms of their current social functioning. The Time Use Survey is estimated to take around 15-20 minutes to administer.

2.4.1.2 Method of analysis

In keeping with the recommendations of Braun and Clarke (2006) of ensuring there is transparency in what type of thematic analysis was conducted, a decision was made to use framework analysis to analyse the data. Framework analysis is a form of thematic analysis that allows for the systematic reduction of data for analysis (Gale, Heath, Cameron, Rashid, & Redwood, 2013). Data is managed in a matrix which includes rows (for each participant), columns for the development of codes, and the cells can be used as a space to comment on data (e.g. quotes or interpretation of quotes) (Gale et al., 2013). Excel was used to conduct this analysis because this has been recommended as suitable software for framework analysis (Swallow, Newton, & Van Lottum, 2003). For the deductive element of the analysis, predefined areas related to the S-REF model were input into Excel so that any discourse relating to this in line with the research question could be recorded. If there were any specific elements to the model for this sample, additional columns would be added. With regards to the inductive element of the research question, columns were added as new subjects or potential themes were identified through the initial coding of the transcripts (pen and paper).

2.4.2 Ethical approval

Prior to recruiting participants for study 4, ethical approval was sought and approved by South Yorkshire Research Ethics Committee (REC reference: 16/YH/0199). Participants were recruited from a sample of young people who had taken part in the pilot phase of a randomised controlled trial (RCT) designed to test the effectiveness of a modified form of CBT known as Social Recovery Therapy on social functioning. The current trial is still underway (*Prevention and treatment of long-term social disability amongst young people with emerging severe mental illness: A definitive randomised controlled trial*) (PRODIGY) (Fowler et al., 2017). The PRODIGY study pilot was approved by the England Cambridgeshire and Hertfordshire National Research Ethics Service Committee (REC reference: 12/EE/0311). This ethical committee has now been disbanded. Participant data related to mental health problems experienced throughout their participation in the PRODIGY pilot was used from the pilot study (with permission from the study leads Professors David Fowler and Paul French) to describe the sample.

2.4.3 Participants and recruitment

The sample sizes in qualitative research tend to be much smaller than that of quantitative studies with sample sizes as low as one being found in past research (Braun & Clarke, 2013). This is because the aim is to gain rich in-depth data from each participant taking part. Thematic analysis sample sizes can be set at around 6 to 10 individuals (Braun & Clarke, 2006). However, Braun & Clarke (2013) advise that a number between 15 and 30 participants is typical if patterns are to be found in the data. Due to this, the aim was to recruit between 15 and 20 participants for Study 4.

All participants recruited into the PRODIGY pilot study were potentially suitable for this study. Those who had specifically stated that they do not wish to be contacted about further research were not approached. Participants who gave consent to be contacted about future research were sent an opt-out letter (Appendix 7) and a Participant Information Sheet (PIS) (Appendix 8) via email or by post (dependent on preferred method of contact recorded). The

letter reminded them that the reason for writing is because they previously expressed an interest at their last follow-up, made it clear that they do not have to take part, and provided the option of opting out of being contacted by phone about this research.

The opt-out process was aimed to be as simple as possible by providing several possible options to opt-out (i.e. via phone, text message, email or post using a freepost envelope). For email and text options, the participant was provided with a code (combination of PRODIGY study ID and the words 'OPT-OUT') to text to the candidate's phone number (e.g. **M001 OPT-OUT**). Participants were not be contacted again about this research if they opted-out. The postal option allowed participants to provide amended contact details by post should they wish to take part in the research. Participants also had the option to send amended contact details via text, email or over the phone. Participants were not called until at least 1 week had passed from the date of the letter.

All participants were met face-to-face in a location that was best for them. Post consent (see Appendix 9 for consent form), the qualitative interview was conducted using the semi-structured topic guide described earlier. The self-report measures and the Time Use Survey (TUS) were administered after the interview in all cases. This was to ensure that the questions in the self-reports or TUS did not influence the discourse generated in the qualitative interview.

The time taken to complete all the self-report measures (demographics, MCQ-30, CAS and MSPSS) was approximately 15 minutes plus an additional 15-20 minutes to administer the Time Use Survey.

2.4.3.1 Obtaining qualitative data

Semi-structured one-to one interviews were conducted with participants in a location convenient for them (e.g. home or community venue). Questions were asked around metacognitive beliefs and processes in relation to social interactions and functioning.

Interviews were audio recorded and transcribed verbatim keeping personal identifiable information anonymised (pseudo names were used). Interviews were 30 to 60 minutes long.

Chapter 3: Study 1 - Evaluating the psychometric properties of social functioning measures using the COSMIN checklist: A systematic review in populations experiencing mental health problems

Evaluating the psychometric properties of social functioning measures using the
COSMIN checklist: A systematic review in populations experiencing mental
health problems

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3.1 Abstract

Objectives: With social functioning problems being such a prominent issue for people experiencing mental health problems, there has been an increased focus on research in this area. Accurate measurement of this construct is important, so this systematic review aims to evaluate the methodological quality of validation studies for social functioning measures. An ancillary outcome of this study is to clarify the concept of social functioning and construct a definition based on the literature.

Method: PsychINFO, EMBASE and MEDLINE (including MEDLINE in-process) were searched for validation studies of social functioning measures used in samples experiencing mental health problems. Two reviewers assessed articles for eligibility. The COnsensus-based Standards for the selection of health Measurement Instruments (COSMIN) guidelines were used to evaluate the articles for methodological quality. COSMIN consider content validity to be the most important measurement property, so this was assessed for first, followed by structural validity. Articles were evaluated for all the other measurement properties where tested. A content analysis was used to construct the definition of social functioning using items or phrases provided in the definitions of the construct in eligible articles.

Results: Thirty-eight validation studies were identified for the COSMIN analysis and 19 different measures. Only five measures included the target population of interest in the development of social functioning measures (BJ-PERFECT, HSFQ, SFS: Spanish, SIS and SOFS). Researchers were better at testing for structural validity than content validity, but analyses were still not optimal according to the COSMIN checklist. Eleven articles were identified for the content analysis. Social functioning was found to be a multifaceted concept, which included one overarching concept and four sub-concepts.

Conclusion: Content validity needs to be a priority when developing and validating social functioning measurement instruments. Further, the involvement of service users and professionals in the development of such tools is paramount in ensuring the construct is being measured adequately. Measures were found to include items that fit with the definition of social functioning constructed in this review. Future work should aim to broaden the inclusion criteria to construct a more comprehensive analysis of social functioning definitions in the future.

3.2 Introduction

The level and quality of social functioning has been documented as being a widely shared concern amongst mental health clinicians and researchers, and a primary source of distress for those experiencing mental health problems (Rapado-Castro et al., 2015). A reduction in or low levels of social functioning is used as criteria for identifying those at risk for psychosis (Yung et al., 2005) as well as schizophrenia and other mental health problems such as mood and anxiety disorders (American Psychiatric Association, 2013). Further, past research has found that those who convert to psychosis had a gradual reduction in levels of social functioning in line with incremental symptomatology (Jang et al., 2011). In addition to this, the presence of social anxiety and depression has been found to lead to more severe social functioning difficulties (Chudleigh et al., 2011; Saris et al., 2017). It is therefore important that the measurement instruments used to assess social functioning do so sufficiently and accurately in order to progress research knowledge in this area. If social functioning tools do not include relevant items or if participants do not understand the questions or do not feel the tool is relevant to them, this could bias results. A review of schizophrenia trials, found that use of unpublished measures led to researchers being more likely to report significant positive results of treatment than when published measures were used (Marshall et al., 2000). This is an example a possible adverse effect of the use of inadequate measures in mental health research.

There are numerous different measures that assess social functioning in mental health, each with different modes of administration. The Social Functioning Scale (SFS) (Birchwood et al., 1990), and the Performance and Social Performance Scale (PSP) (Morosini et al., 2000) for example, are both commonly used social functioning measures. These were both originally designed to assess social functioning in psychosis spectrum conditions and are often used in research involving such samples. However, the way in which they measure social functioning differs greatly. The SFS is a self-report measure that can either be completed by a participant or carer. It has 76-items over seven subscales covering a wide range of areas including the frequency of leisure, sports, and work activity as well as the quality of interactions with others.

The PSP however is completed by a clinician or researcher and a single score between 0-100 is given on a unidimensional scale based on questions asked or information gathered by the clinician. The perceived benefit of the PSP is its quick administration. However, the fact that it encompasses all social functioning areas in one scale with a single score raises the question as to whether it is a sufficient measure of social functioning. Previous research has highlighted potential issues with social functioning tools not measuring what they should. The Global Assessment of Functioning Scale (GAF) for example, has been criticised for including symptoms as part of the measurement of social functioning (Goldman, Skodol, & Lave, 1992). Although researchers have attempted to address this issue by finding alternative measures to the GAF (Goldman et al., 1992).

To our knowledge there has not been a systematic review of social functioning measurement tools across psychological disorders that use rigorous guidelines to conduct the evaluation of the methodological quality of psychometric studies in order to identify the best measure(s) of social functioning. The COnsensus-based Standards for the selection of health Measurement Instruments (COSMIN) initiative is a team of researchers who have developed guidelines for assessing the methodological quality of Patient-Reported Outcome Measures (PROMs) (the operational term used by COSMIN for measurement instruments). COSMIN developed a checklist (following an international Delphi study involving 57 experts) to be used to assess the methodological quality of psychometric studies of PROMs (Mokkink et al., 2010). This checklist provided guidance on how to assess the quality of various psychometric tests (e.g. content validity, structural validity, construct validity), with a rating system. An updated checklist was created specifically related to systematic reviews of PROMs (Mokkink et al., 2018; Prinsen et al., 2018), which was developed using the feedback from systematic reviews in the COSMIN database that had used the initial checklist (Mokkink et al., 2018). One of the main updates was the development of a separate manual specifically for use in assessing content validity of PROMs (Terwee et al., 2018) because content validity was identified as

being the most important measurement property. The separate content validity manual was also consensus based by 159 experts in 21 countries (Terwee et al., 2018).

The current study aims to conduct a systematic review of social functioning PROMs using the most recent COSMIN guidelines (Mokkink et al., 2018; Prinsen et al., 2018). The current study has three main aims: i) Identify studies that have validated social functioning measures in mental health samples, and thus identify social functioning measures used in this population; ii) Evaluate the methodological quality of these studies and the PROM evaluated; and iii) Establish which is currently the best supported measure to assess the construct.

One of the problems identified in social functioning research is the number of different terms used by researchers to describe the concept. As one study puts it:

“Social functioning’ is often used interchangeably with ‘social performance’ and a variety of similar and overlapping concepts such as ‘social adjustment’ (how a person conforms to social expectations), ‘social dysfunction’ (an impaired ability to get along with others and function in society), ‘social adaptation’ (one’s ability to live in accordance with interpersonal, social and cultural norms) and ‘social competence’ (the overall ability of a person to impact favourably on his or her social environment).’ (Burns & Patrick, 2007, p.414)

As the above quote illustrates, there are a number of ways in which social functioning can be described. This can make it difficult to compare research results and develop knowledge in this important area. Further, it is possible that this uncertainty around what social functioning actually is could result in difficulties in its measurement (Brissos et al., 2011). As an ancillary outcome, this study aims therefore, to explore the concept of social functioning using articles identified for the COSMIN review described above. The aim is to build a construct to assist in clarifying the concept and get a sense of how social functioning is being measured in comparison to the definitions provided.

3.3 Method

3.3.1 Registration and reporting

A protocol for this systematic review was registered on the international prospective register of systematic reviews (PROSPERO) and can be accessed at:

<http://www.crd.york.ac.uk/PROSPERO/> (registration number: CRD42018087952).

Registration occurred prior to completing the formal screening of database search results for eligibility. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) Statement (Moher et al., 2009) was used to guide the systematic reviewing process and reporting of the current study.

3.3.2 Eligibility criteria

4.3.2.1 Primary outcome (Part One): The COSMIN analysis

To be included in this systematic review, studies had to be validation studies of social functioning measures, and only measure social functioning (the measure should not measure some other factor such as symptoms). Further, studies had to include participants meeting criteria for one or more mental health problem as defined by a validated measure (e.g. the Structured Clinical Interview for DSM III/IV/V Axis I Disorders (SCID), the ICD-10, Comprehensive Assessment of At Risk Mental States (CAARMS), Positive and Negative Syndrome Scale (PANSS)). This also includes studies that report participants were recruited from mental health services as it is assumed that an appropriate method for inclusion in that service has been used (e.g. PANSS used in early intervention for first episode psychosis service). Psychological disorders must fall under one of the following categories: Anxiety disorders (e.g. general anxiety disorder, social phobia); Mood disorders (e.g. major depressive episode, bipolar disorder); Psychosis spectrum disorders (e.g. at risk for psychosis, psychosis, schizophrenia); Eating disorders (e.g. anorexia, bulimia); Somataform disorders (e.g. body dysmorphia, hypochondriasis); or Personality disorders (e.g. borderline personality disorder, schizotypal personality disorder).

In addition to the above inclusion criteria, the study had to specifically refer to the measure as a social functioning measure at least once in the manuscript. This is to ensure consistency in selection of appropriate papers. It also ensured that the authors were aiming to measure this construct, in light of some of the aforementioned problems in clarifying what is meant by this concept. The study also had to be written in English. No age restrictions were applied to this review.

Exclusion criteria were studies that include populations of people diagnosed with a learning disability or difficulty, behavioural (e.g. Attention deficit hyperactivity disorder) or neurological problems or physical health condition. This is because the measure could be constructed to specifically measure social functioning for people experiencing a learning difficulty for example, rather than a population experiencing mental health problems.

4.3.2.2 Secondary outcome (Part Two): Conceptualising social functioning

Articles included in this review were selected from eligible articles identified for the COSMIN review (for which the eligibility criteria is described above). Additional inclusion criteria for the current study was that articles had to provide a definition of social functioning in the article (i.e. this additional inclusion criteria only applied to this element of the study not the articles identified for the COSMIN review).

3.3.3 Data sources and search strategy

3.3.3.1 Part One: COSMIN analysis

Three electronic databases, PsychInfo, EMBASE and MEDLINE (including MEDLINE in-process), were searched on 10 September 2017 using OVID. No date restrictions were applied to the search with regards to the start or end date (i.e. search was from inception up to and including 10 September 2017). Table 3 shows an example of the search terms used in the PsychInfo database. Appendix 1 provides details of the full search strategy. The exact same terms were used for search terms labelled 2 to 5. However, as ‘mental disorder’ (labelled number 1 in each table) had different Medical Subject Headings (MeSH) terms associated with

it in each database, the search terms selected differed in each database due to the availability of terms. Terms that were relevant to the inclusion criteria were selected from each database. Boolean logic was used to combine the terms labelled 1 to 5 in the following manner: (1 OR 2) AND 3 AND 4 AND 5.

Table 3. PsycINFO search terms

<i>CONCEPT</i>	<i>SPECIFIC SEARCH TERMS SELECTED IN DATABASE</i>
1. 'Mental disorder' (MeSH) – Selected words to prevent exploding in unnecessary areas	1. Mental disorders/ or affective disorders/ or anxiety disorders/ or eating disorders/ or hoarding disorder/ or personality disorders/ or psychosis/ or schizoaffective disorder/ or borderline states/ or narcissism/
2. Psychological disorder – General key words	Psychological disorder* OR emotional disorder* OR mental health problem* OR mental disorder* OR mental illness* OR psychiatric disorder*
3. Social functioning	Social function*
4. Validation study terms	Validation stud* OR psychometric* OR reproducibility of results OR valid* OR reliab* OR unreliab* OR coefficient OR internal consist* OR alpha* OR cronbach* OR cronbach* alpha OR correlation* OR inter-rater OR interrater OR intrarater OR intrarater OR kappa* OR general* OR correlation* OR measurement* OR measurement error OR construct validity OR content validity OR face validity OR structural validity OR IRT OR rasch analyses OR cross-cultural validity OR cross cultural validity OR criterion validity OR responsiveness OR factor analysis OR exploratory factor analysis OR confirmatory factor analysis
5. Measures	Self-report* OR self report* OR measur* OR question* OR inventor* OR scale* OR assess* OR survey* OR outcome* OR interview* OR test* OR tool*

Studies were assessed for eligibility initially by title, then abstract and full article. Authors were contacted via email or ResearchGate to request full-texts or copies of measures where the authors were unable to obtain these. The University of Manchester library service was used to obtain full-texts where papers could not be obtained from authors. Eligible study reference lists were checked for relevant validation studies not found in the search of the aforementioned databases.

Two authors MB and EJ reviewed papers for eligibility. MB completed 100 per cent checks at title, abstract and full article level. EJ completed 30 per cent checks at title level, 100 percent at abstract level, and 100 per cent at full article level. Any discrepancies that were not resolved between MB and EJ were resolved between SP and/or AW.

Kappa scores were calculated to assess the inter-rater reliability between MB and EJ. At title level, reviewer agreement was at 0.75 demonstrating 'substantial' (Landis & Koch, 1977) reliability. At abstract level inter-rater reliability was lower at 0.39 indicating 'fair' (Landis & Koch, 1977; Fleiss, 1981) reliability between reviewers. Further investigation on consensus at abstract level highlighted that the reason for discrepancies between MB and EJ was that one reviewer had more accepted papers than the other. A decision was made to include all papers accepted by both MB and EJ at abstract level for review at full article level (N=147 as illustrated in the PRISMA flow chart). Further examination of the papers highlighted that MB had been over-inclusive as all the papers she had accepted at abstract level were rejected at full article level. Due to this, the reviewers did not have any concerns about any articles being missed. Consensus at full article level was 0.89 suggesting an 'almost perfect' (Landis & Koch, 1977) agreement between reviewers. Discrepancies were discussed and a joint final decision made about inclusion. Reference lists of accepted articles were checked for eligible papers. Any papers found that were not already reviewed were assessed for eligibility. Only one was

found to be eligible providing confidence that the initial search had been sufficient in identifying eligible papers.

4.3.3.2 Part Two: Conceptualisation of social functioning

Papers identified in part one were assessed for eligibility by MB and EJ using the single additional inclusion criteria (i.e. articles that provided a definition of social functioning). Microsoft Excel (Excel) was used to extract the following data from the articles during this process: whether or not a definition of social functioning was provided; the definition provided; the measure used to assess social functioning; the items included in the measure to assess social functioning; and whether it was believed (from the reviewers assessment) that the items used to measure social functioning were in line with the definition provided by the authors. Kappa scores were conducted to assess level of agreement on: 1) Whether or not a definition of social functioning was provided; and 2) Whether this definition was in line with the items used to measure social functioning. With regards to the latter, this was defined as at least 85 per cent of items relating to the social functioning definition. This figure was chosen to be in line with the COSMIN guidelines (Mokkink et al., 2018; Prinsen et al., 2018) used in part one. The COSMIN guidelines for assessing content validity specifically (Terwee et al., 2018) stipulate that at least 85 per cent of items in a PROM should be deemed relevant to the construct for which the measure has been developed to assess. There was 100 per cent agreement between the reviewers with regards to the articles selected (i.e. both reviewers selected the same articles for inclusion as they both identified that definitions of social functioning were provided).

3.3.4 Analyses

3.3.4.1 Part One: COSMIN analysis of methodological quality of validation studies

The COnsensus-based Standards for the selection of health Measurement Instruments (COSMIN) methodology for systematic reviews of Patient-Reported Outcome Measures (PROMs) user manual, Version 1.0 (Mokkink et al., 2018; Prinsen et al., 2018) was used to assess the methodological quality and risk of bias of the social functioning measures included

in this study. First and foremost, these guidelines consider content validity to be the most important measurement property, to the extent that a completely separate manual (COSMIN methodology for assessing the content validity of PROMs User manual Version 1.0) was created for the purpose of assessing the quality of content validity studies (Terwee et al., 2018). Structural validity is considered to be the next most important measurement property according to COSMIN, followed by all the other measurement properties (internal consistency, cross-cultural validity/measurement invariance, reliability, measurement error, criterion validity, construct validity, and responsiveness). Further information about the COSMIN initiative and manuals can be found at <https://www.cosmin.nl/>.

The COSMIN manual recommends assessing studies for content validity prior to the assessment of any other measurement property. The methodological quality of each PROM development study is assessed first, followed by any content validity studies conducted in the areas of relevance, comprehensiveness and comprehensibility. COSMIN recommends assessing if the PROM development study and/or content validity studies are conducted in the target population and/or with professionals. Each item is rated on a 4-point scale: 'Very good', 'Adequate', 'Doubtful' or 'Inadequate'. A 'Not applicable' option is also available where no content validity studies exist, for example. A 'worst score counts' method is recommended for each subsection (e.g. if four items were rated as 'very good' and one as 'inadequate', the overall score for the content validity study would be 'inadequate').

The next step involves assessing the overall quality of each PROM separately taking all the individual studies (for each PROM) into account. An overall rating of 'sufficient (+)', 'insufficient (-)', 'inconsistent (\pm)' or 'indeterminate (?)' is given. The final step is grading the quality of evidence using a 'modified GRADE approach', which is based on risk of bias, inconsistency, and indirectness. Quality of evidence is graded as either; 'High', 'Moderate', 'Low', or 'Very low'.

The above steps are essentially repeated for structural validity and then the other measurement properties using the COSMIN methodology for systematic reviews of Patient-Reported Outcome Measures (PROMs) user manual Version 1.0, but for areas relevant to the specific measurement property. COSMIN recommends not proceeding to the subsequent measurement properties if there is 'high' quality evidence that the content validity of a PROM is insufficient, and that these PROMs should not be recommended for use. All papers that were identified based on the aforementioned eligibility criteria were assessed using the COSMIN standards. This was to allow an analysis of the use of measurement properties across PROMs as well as the methodological quality of the studies conducted.

4.3.4.2 Part Two: Content analysis to construct social functioning concept

Content analysis is a qualitative research method that involves the reduction of qualitative or quantitative data into meaningful categories to answer specific research questions (Elo & Kyngäs, 2008). It is a method that is suitable for analysing documents (Elo & Kyngäs, 2008), and thus was selected as a suitable method for the current study because research articles are used to extract data. Further, an inductive (data driven) or deductive (theory driven) approach can be adopted when using content analysis (Elo & Kyngäs, 2008). The current study will use an inductive approach as qualitative data from articles will be used to construct the concept of social functioning in mental health research. In addition to this, a quantitative element will apply with frequencies of occurrences being used in addition to the value of the qualitative meaning of the statements.

It is recommended that either the term 'category' or 'concept' is used (rather than the word 'theme' more commonly associated with qualitative research), and that the decision is based on whether or not the study aims to build a theory or concept ('concept' should be used in this case) (Elo & Kyngäs, 2008). Due to this, the term 'concept' will be adopted for the current study and used throughout this manuscript.

Excel was used to manage data throughout the analysis. The first step involved breaking down each definition of social functioning found into its constituent parts. A list of all items extracted from the social functioning definitions was input into a column in Excel. Next, a second column was created grouping all items that shared the same name and adding frequencies in another column displaying how often a particular word or phrase arose. Analysis then involved converting items into standardised categories (e.g. if one study used the term ‘work’ and another ‘employment’, the standardised description for both would be ‘employment’). These standardised categories were reduced further to create the final categories that made up the concept of social functioning.

3.4 Results

3.4.1 Database search and eligibility results

3.4.1.1 Part One: COSMIN analysis

A total of 38 papers were included for analysis in this study. Figure 5 illustrates the database search results at each stage. Nineteen PROMs were identified across all included articles.

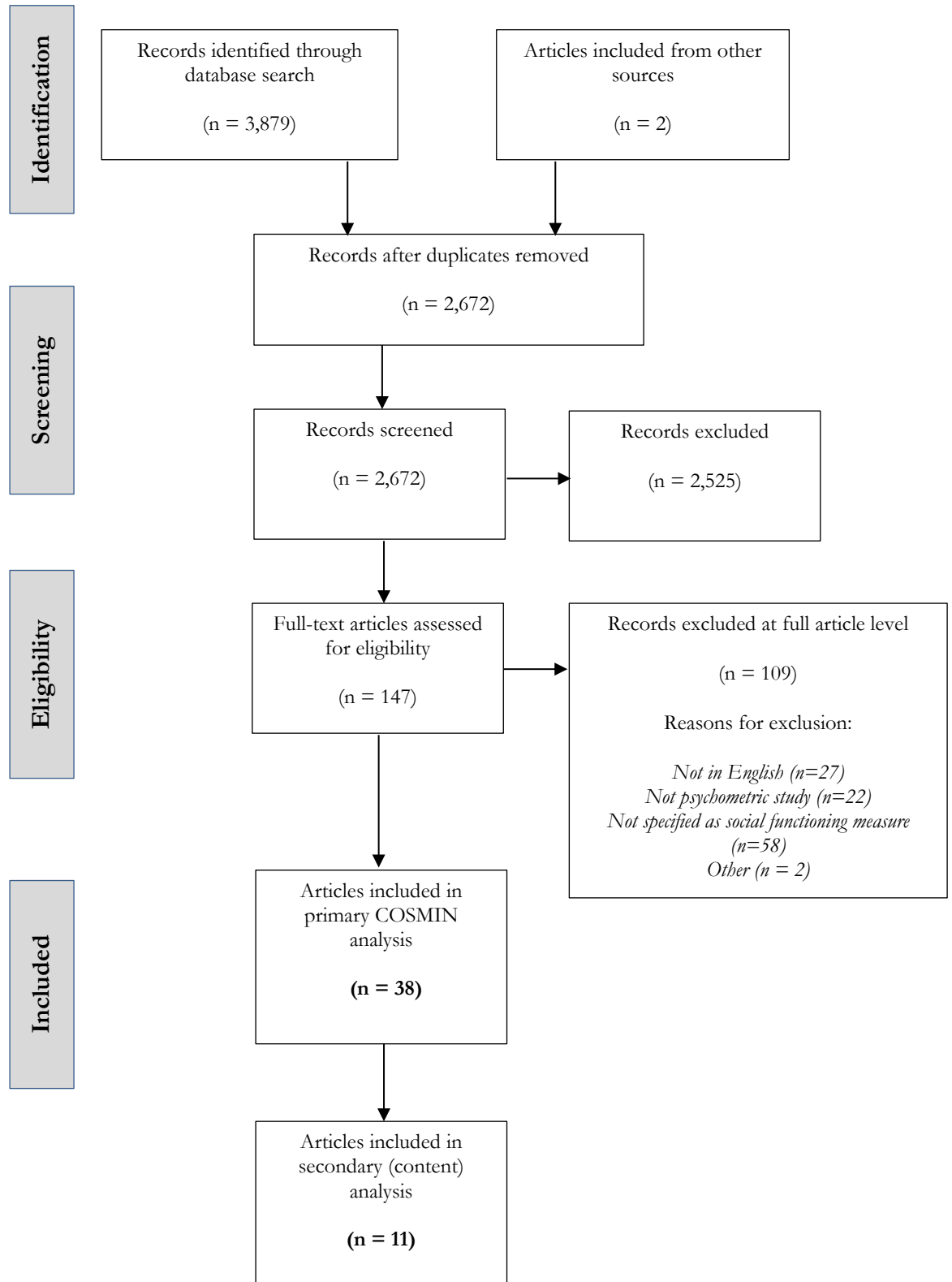
Multiple validation articles were found for six PROMs: the Personal and Social Performance scale (PSP) (Apiquian et al., 2009; Brissos et al., 2012; Juckel et al., 2008; Kawata & Revicki, 2008a; Menezes, Macedo, Mattos, de Sa Junior, & Louza, 2012; Morosini et al., 2000; Nafees et al., 2012; Nasrallah et al., 2008; Patrick et al., 2009; Tianmei et al., 2011; Ulloa et al., 2015; Wu et al., 2013); the Social Functioning Scale (SFS) (Birchwood et al., 1990; Hellvin et al., 2010; Iffland et al., 2015; Vazquez Morejon & G-Boveda, 2000); the Social Adaptation Self-evaluation Scale (SASS) (Akkaya et al., 2008; Bech, Lunde, & Uden, 2002; Bosc, Dubini, & Polin, 1997; Ueda et al., 2011); the Time Budget measure (TB) (Jolley et al., 2005; Jolley et al., 2006); the Self-report Social Adjustment Scale (SAS-SR) (Gorenstein et al., 2002; Weissman et al., 1978); and the Global Functioning: Social (GFS) (Cornblatt et al., 2007; Lo Cascio et al., 2017).

The remaining 13 PROMs all had one article that met inclusion criteria: The First Episode Social Functioning Scale (FESFS) (Lecomte et al., 2014); the Specific Levels of Functioning Scale (SLOF) (Mucci et al., 2014); the Social Occupational Functioning scale (SOFS) (Saraswat, Rao, Subbakrishna, & Gangadhar, 2006); Hospital Social Functioning Questionnaire (HSFQ) (Willmot & McMurrin, 2015); the Social Functioning Schedule (SFS) (Remington & Tyrer, 1979) referred to as the SFSchedule hereafter to distinguish it from the aforementioned Social Functioning Scale (SFS); the Questionnaire de Fonctionnement Social (QFS) (Zanello, Weber Rouget, Gex-Fabry, Maercker, & Guimon, 2004); the Social Integration Survey (SIS) (Kawata & Revicki, 2008b); the Social Dysfunction Index (SDI) (Munroe-Blum, Collins, McCleary, & Nuttall, 1996); the Beijing Performance-based Functional Ecological Test (BJ-PERFECT) (Shi, He, Cheung, Yu, & Chan, 2013); the Social Behaviour Schedule (SBS) (Cella et al., 2014); the Social Adjustment Scale – Self-report Short (SAS-SR: Short) and the Social Adjustment Scale – Self-report Screener (SAS-SR: Screener) (Gameroff, Wickramaratne, & Weissman, 2012); and the Time Use Survey (TUS) (Hodgekins et al., 2015).

The majority of PROMs (14 PROMS across 30 articles) were validated in populations experiencing a psychosis spectrum condition (e.g. psychosis, schizophrenia). These PROMs were as follows: BJ-PERFECT, FESFS, GFS, PSP, QFS, SAS-SR, SBS, SDI, SFS, SIS, SOFS, SLOF, TB and TUS). Six PROMs were validated in depressed samples (GFS: Italian, QFS, SASS, SAS-SR, SAS-SR: Short and SAS-SR: Screener) over 10 articles. Three PROMs used anxiety samples (QFS, SFSchedule and SAS-SR: Brazilian) across three articles, and personality disorder was validated in two PROMs (HSFQ and QFS) in two articles. Just one PROM used a bipolar disorder sample (SFS: Norwegian), and one PROM an eating disorder sample (SAS-SR Brazilian used a sample diagnosed with Bulimia). Appendix 10 provides more details on the characteristics of the PROMs as well as the populations, sample size and demographics.

With regards to the age range the studies were validated in, three PROMs were validated in populations restricted to adolescents and young adults (range from 12 to 29 years). The PSP: Spanish version (Ulloa et al., 2015) included adolescents aged from 12 to 17 years (mean age 15 years, SD 1.4 years), and the GFS: Italian was validated in a sample aged 12 to 21 years (mean age 15.2 years, SD 2.1 years). The GFS included participants aged from 12 to 29 years, and the mean ages for each of the ARMS samples in this validation study were 15.96 (SD 1.98) and 17.28 (SD 3.80) years. With the exception of the FESFS which was validated in a sample aged 18 to 35 years (mean 24.5, SD 4.25), the remaining 15 PROMs were validated in samples with a much broader age ranges. The collective age range for these PROMs was 14 to 89 years, with mean ages that ranged from 25.8 (SD 4.5) to 50.3 (SD 9.9) years.

Figure 5. PRISMA flow Chart of database search results



3.4.2 Part One: Content validity

3.4.2.1 Quality of PROM development studies

Table 4 shows the results for the quality of the PROM development studies. This includes information relating to the clarity of the construct description and origin, the target population for which the PROM was developed, and the context in which the PROM should be used. The table also illustrates whether or not a PROM development study, cognitive interview (CI) or pilot test was conducted in the target population (i.e. whether people experiencing the mental health problem of interest were asked about features of the PROM). If the target population was included in the development phase, the quality of the study is rated as well as the comprehensibility and comprehensiveness. A total score provided (based on ‘worst score counts’ method) of the PROM development.

Fifteen PROMs had development studies that were deemed ‘inadequate’. All of these PROMs did not conduct the development study or a CI or pilot test in the target population. For the SFS, although the original PROM development study (Birchwood et al., 1990) did not involve the target population, the development study for the Spanish version (Vazquez Morejon & G-Boveda, 2000) did. The rating for the PROM development study being performed in a target population was ‘adequate’, meaning that from the information provided in the article it could be assumed that the study was conducted with the target population. However, the overall score for the PROM development study was ‘doubtful’, which essentially means that not enough information was provided in the manuscript to be sure that the PROM development study was conducted at an ‘adequate’ or ‘very good’ standard. The remaining four PROMs (BJ-PERFECT, HSFQ, SIS and SOFS) that also conducted studies with target populations were also found to be of ‘doubtful’ quality.

3.2.2. Quality of content validity studies

Six PROMs had content validity studies conducted with professionals (BJ-PERFECT, GFS, PSP, SIS, SLOF, and SOFS). For one PROM (SFSchedule), it was unclear if a study had been

conducted with professionals because the article just stated that ‘pilot studies’ were conducted, but not who with or how. All these studies had overall quality scores of ‘doubtful’ for both relevance and comprehensibility.

4.4.2.2 Summary of evidence for content validity

Table 5 shows the summary of evidence for content validity for each PROM. The ratings are based on a combination of evidence from articles (as described above) in addition to the reviewers rating of the content validity of the PROM. Nine PROMs (BJ-PERFECT, FESFS, GFS, HSFQ, PSP, SASS,SFS, TB and TUS) received ‘sufficient’ ratings for all three areas of content validity (relevance, comprehensiveness and comprehensibility). The quality of evidence were either ‘very low’ (which essentially means the score is based on reviewer ratings because no content validity studies were conducted or if they were they were of inadequate quality), or ‘moderate’ (either only content validity studies of ‘doubtful’ qualities existed, or PROM development study very good or adequate and no content validity studies conducted). The BJ-PERFECT and the HSFQ had the highest quality of evidence scores of ‘moderate’ for relevance, comprehensiveness and comprehensibility. The other seven PROMs either had a mix of ‘moderate’ and ‘very low’ quality of evidence scores (GFS, PSP and SFS) or all three areas were ‘very low’ (FESFS, SASS, TB and TUS). The SBS, SIS, SLOF and SOFS had a mix of ‘sufficient’ and ‘inconsistent’ results ranging from ‘very low’ to ‘high’ quality of evidence.

Six PROMs (QFS, SAS-SR, SAS-SR: Short, SAS-SR: Screener, SDI, and SFSchedule) received ‘indeterminate’ ratings for all three content validity areas. This was due to the PROM development or content validity studies being rated as either ‘inadequate’ or not conducted, and the reviewers not being able to get hold of a copy of the PROMs to rate them.

None of the PROMs had ‘high’ quality evidence of being ‘insufficient’. Due to this, all PROMs were assessed for the subsequent stages of analysis (structural validity and other measurement properties).

3.4.3 Part One: Structural validity risk of bias checklist

Structural validity was assessed in ten of the 19 PROMs (FESFS, SASS, SBS, SDI, SFS, SFSchedule, SIS, SLOF, SOFS and the PSP). One PROM (SLOF) used a confirmatory factor analysis (CFA) and thus received a ‘very good’ rating for structural validity. The remaining nine PROMs conducted exploratory factor analyses (EFA) and received ‘adequate’ ratings because the COSMIN guidelines consider CFA to be the optimal measurement of structural validity. The remaining nine PROMs (BJ-PERFECT, GFS, HSFQ, QFS, SAS-SR, SAS-SR: Short, SAS-SR: Screener, TB and TUS) did not conduct structural validity analyses, so were not rated.

4.4.3.1. Summary of evidence for structural validity

The summary of evidence for structural validity can also be found in Table 5. The SLOF was the only PROM to receive a ‘sufficient’ rating for structural validity, and this was based on ‘high’ quality evidence (because the study was of ‘very good’ quality due to using a CFA to measure structural validity). The other nine PROMs received ‘indeterminate’ ratings because EFAs were conducted rather than CFAs. The COSMIN standards provide criteria based on model fit indices for the CFA output, and studies that meet these criteria are considered ‘sufficient’. Studies that do not meet all criteria are considered ‘indeterminate’, and studies where criteria is not met ‘insufficient’. COSMIN state that although they consider CFA as the preferred method to measure structural validity, reviewers can make alternative criteria for EFA. A decision was made to rate studies that conduct EFAs (but not CFAs) as ‘indeterminate’, and use the ‘insufficient’ rating for studies that report fit indices for the CFA that are outside of the parameters set out in the COSMIN criteria.

Nine studies received ‘indeterminate’ ratings because EFAs were conducted rather than CFAs. The quality of evidence ranged from ‘very low’ to ‘high’. Nine studies were not rated because structural validity studies were not conducted. For some PROMs, this would be because structural validity is not relevant.

4.4.3.2. Part One: Other measurement properties

In order to receive a 'sufficient' rating for internal consistency, PROMs must have at least low evidence of 'sufficient' structural validity plus Cronbach's alpha(s) of ≥ 0.70 for each unidimensional scale or subscale. Only the SLOF had 'sufficient' internal consistency because it was the only PROM to have 'sufficient' structural validity. Thirteen PROMs had 'indeterminate' ratings, and the quality of evidence for all but two was 'high' (SAS-SR and SOFS rated 'low').

Cross-cultural validity (e.g. comparing PROMs in different languages or groups) was rated in six PROMs. Most (four) were 'indeterminate', one 'sufficient' with 'low evidence' (GFS) and one 'insufficient' with 'low' evidence (SASS).

Measurement invariance was only identified as being measured in the SLOF. The rating was 'indeterminate' with low quality of evidence.

Reliability (e.g. test retest, inter-rater reliability) was rated in 12 PROMs. Three PROMs (GFS, PSP and SLOF) were rated highest with 'sufficient' ratings and 'high' quality evidence. Three others had 'sufficient' ratings with 'moderate' evidence (SBS, SOFS and TB), and one 'sufficient' with low evidence (SDI). Two studies were found to be 'insufficient' with 'high' (SFSchedule) and 'moderate' (SIS) quality of evidence. The remaining three were 'indeterminate' with either 'low' (HSFQ) or 'moderate' (SASS and SFS) evidence.

Construct validity is assessed in this study where discriminant or known group validity studies have been conducted or where a social functioning PROM has been compared to another social functioning PROM (non-gold standard as this is measured separately under criterion validity). Sixteen PROMs had construct validity studies conducted, 15 of which were 'sufficient' and had 'moderate' (BJ-PERFECT, GFS, HSFQ, and QFS) to 'high' (FESFS, PSP, SASS, SAS-SR, SBS, SFS, SOFS, TB and TUS) quality of evidence.

Criterion validity is when PROMs are compared to the gold standard. The COSMIN standards consider true gold standard measures to only be those that are original longer versions of validated short versions. The COSMIN guidelines state that authors can choose to allocate PROMs that they consider to be appropriate gold standards. However, due to the lack of consensus on what an appropriate gold standard social functioning PROM is, a decision was made to stick with the official definition of a gold standard measure for the current study. Just two PROMs were shortened versions of an original, the SAS-SR: Short and the SAS-SR: Screener. Both of these measures received 'very good' ratings for criterion validity, and as a result were rated as having 'high' quality evidence of 'sufficient' criterion validity.

Table 4. Quality of the PROM development

PROM	PROM design							Cognitive interview (CI) study ²				TOTAL PROM DEVELOPMENT
	General design requirements					Concept elicitation ¹	Total PROM design	General design requirements CI study or other pilot test performed in sample representing the target population	Comprehensibility	Comprehensiveness	Total CI/pilot study	
	Clear construct	Clear origin of construct	Clear target population for which the PROM was developed	Clear context of use	PROM developed in sample representing the target population							
BJ-PERFECT	V	V	V	V	D	D	D	A	D	D	D	D
FESFS	V	V	V	V	I	NA	I				I	I
GFS	V	V	V	V	I	NA	I				I	I
HSFQ	V	V	V	V	V	D	D	V	D		D	D
PSP*	V	V	V	V	I	NA	I				I	I
QFS	V	V	V	V	I	NA	I				I	I
SASS	V	V	V	V	I	NA	I				I	I
SAS-SR	V	V	V	V	I	NA	I				I	I
SAS-SR: Screener	V	V	V	V	I	NA	I				I	I
SAS-SR: Short	V	V	V	V	I	NA	I				I	I
SBS	V	V	V	V	I	NA	I				I	I
SDI	V	V	V	V	I	NA	I				I	I
SFS*	V	V	V	V	I	NA	I				I	I
SFS Spanish	V	V	V	V	A	D	D	A	D	D	D	D
SFSchedule	V	V	I	V	I	NA	I	D	D	D	D	I
SIS	V	V	V	V	V	D	D	V	D	D	D	D
SLOF	V	V	V	V	I	NA	I				I	I
SOFS	V	V	V	V	A	D	D	A	D	D	D	D
TB*	V	V	V	V	I	NA	I				I	I
TUS	V	V	V	V	I	NA	I				I	I

Abbreviations: V = Very good; A = Adequate; D = Doubtful; I = Inadequate; N/A = Not applicable

¹When the PROM was not developed in a sample representing the target population, the concept elicitation was not further rated

²Empty cells indicate that a concept elicitation or CI study (or part of it) was not performed

*Multiple papers exist for PROM. Only results for original PROM development study displayed unless additional papers conduct PROM development study that are not inadequate

Table 5. COSMIN ratings of content and structural validity of social functioning PROMs in samples experiencing mental health problems

PROM	Content validity						Structural validity	
	Relevance		Comprehensiveness		Comprehensibility		Rating	Quality of evidence
	Rating	Quality of evidence	Rating	Quality of evidence	Rating	Quality of evidence		
BJ-PERFECT	+	Moderate	+	Moderate	+	Moderate	N/A	
FESFS	+	Very low	+	Very low	+	Very low	?	Moderate
GFS*	+	Moderate	+	Moderate	+	Very low	N/A	
HSFQ	+	Moderate	+	Moderate	+	Moderate	N/A	
PSP*	+	Moderate	+	Moderate	+	Very low	?	High
QFS	?	Very low	?	Very low	?	Very low	N/A	
SASS*	+	Very low	+	Very low	+	Very low	?	Moderate
SAS-SR*	?	Very low	?	Very low	?	Very low	N/A	
SAS-SR: Short	?	Very low	?	Very low	?	Very low	N/A	
SAS-SR: Screener	?	Very low	?	Very low	?	Very low	N/A	
SBS	±	Very low	+	Very low	+	Very low	?	Moderate
SDI	?	Very low	?	Very low	?	Very low	?	Very low
SFS*	+	Very low	+	Moderate	+	Moderate	?	Moderate
SFSchedule	?	Very low	?	Very low	?	Very low	?	Moderate
SIS	±	High	+	High	±	High	?	Low
SLOF	+	Moderate	+	Moderate	±	Moderate	+	High
SOFS	+	Moderate	+	Moderate	±	Moderate	?	Low
TB*	+	Very low	+	Very low	+	Very low	N/A	
TUS	+	Very low	+	Very low	+	Very low	N/A	

Key: + = Sufficient, - = Insufficient, ± = Inconsistent, ? = Indeterminate, N/A = No studies conducted

*Multiple papers exist for PROM (including studies conducting PROM in other languages), but results pooled as reviewer ratings considered and reviewers only able to read English versions of PROMs

Table 6. COSMIN ratings of all other reliability and validity measurement properties for social functioning PROMs

PROM	Internal consistency		Cross-cultural validity		Measurement invariance		Reliability	
	Rating	Quality of evidence	Rating	Quality of evidence	Rating	Quality of evidence	Rating	Quality of evidence
BJ-PERFECT								
FESEFS	?	High						
GFS			+	Low			+	High
HSFQ	?	High					?	Low
PSP	?	High	?	Very low			+	High
QFS	?	High						
SASS	?	High	-	Low			?	Moderate
SAS-SR	?	Low	?	Low				
SAS-SR: Screener	?	High						
SAS-SR: Short	?	High						
SBS	?	High					+	Moderate
SDI	?	High					+	Low
SFScale	?	High	?	Moderate			?	Moderate
SFSchedule							-	High
SIS	?	High					-	Moderate
SLOF	+	High	?	Low	?	Low	+	High
SOFS	?	Low					+	Moderate
TB							+	Moderate
TUS								

Key: + = Sufficient, - = Insufficient, + = Inconsistent, ? = Indeterminate, N/A = No studies conducted

Blank cells = No studies conducted

Table 6. COSMIN ratings of all other reliability and validity measurement properties for social functioning PROMs (continued)

PROM	Measurement error		Criterion validity		Construct validity		Responsiveness	
	Rating	Quality of evidence	Rating	Quality of evidence	Rating	Quality of evidence	Rating	Quality of evidence
BJ-PERFECT					+	Moderate		
FESFS					+	High	+	High
GFS					+	Moderate	+	High
HSFQ					+	Moderate	+	High
PSP	?	Moderate			+	High	+	High
QFS					+	Moderate	?	Low
SASS					+	High	+	High
SAS-SR					+	High		
SAS-SR: Screener			+	High			+	High
SAS-SR: Short	?	Low	+	High			+	High
SBS					+	High		
SDI					+	Low	+	Low
SFS	?	Low			+	High		
SFSchedule					+	Low		
SIS					?	High	?	High
SLOF								
SOFS					+	High	+	High
TB					+	High		
TUS					+	High		

Key: + = Sufficient, - = Insufficient, + = Inconsistent, ? = Indeterminate, N/A = No studies conducted
 Blank cells = No studies conducted

3.4.4 Part Two: Conceptualisation of social functioning

A total of 11 of the 38 articles identified for the primary outcome (COSMIN analysis) were identified as being suitable for inclusion in the content analysis aimed at constructing a concept of social functioning (Figure 6). Appendix 11 provides further details about these studies including the definition of social functioning provided by each article, and the mental health problem of the sample.

3.4.4.1 Overarching concept

The overarching concept that resulted from the content analysis was '*Ability to perform different societal roles and activities*'. This category was constructed with a combination of repeated statements relating to the ability to perform roles or activities (n=6) (e.g. '*Ability to perform activities*' (Akkaya et al., 2008, p.1)), and statements that referred to social functioning as consisting of different 'societal roles' (n=3) (e.g. '*Heterogeneous concept comprising differential societal roles*' (Iffland et al., 2015, p.2)). As well as being a concept in and of itself, it was identified that the combination of these items adequately captured the description of the individual sub-concepts described below and illustrated in Figure 6. This was another reason why the latter element of the overall concept was included (i.e. 'different societal roles'). Although the number of occurrences was half, its meaning carried additional weight in relation to its association with the other concepts.

4.4.4.2 General concepts and sub-concepts of social functioning

Data was reduced to four general concepts (described below), which provided more information about what the overarching concept encapsulates.

General concept 1: Interpersonal relationships and interactions with others

This general concept included the most words and sentences with a total of 26 items. This general concept relates to the various interactions individuals have with others and relationships. Four sub-concepts were identified. '*General interpersonal interactions*' related to generic interactions people have such as:

'Reciprocal interactions with others' (Willmot and McMurran , 2015).

'Difficulties engaging in meaningful relationships' (Hodgekins et al., 2015).

'Socialising' was another sub-concept which included items related to *'Social life'* (Akkaya et al., 2008) and *'Social skills'* (Lecomte et al., 2014).

'Intimate relationships' was the third sub-concept and related to ones' role as a spouse or partner, for example.

Finally, *'Role as family member and friend'* was the fourth sub-concept, and included items related to an individual's family and social roles such as a friend or a parent, for example.

General concept 2: Employment and education

This general concept essentially consisted of two sub-concepts, *'Employment'* and *'Education'*.

These concepts related to ones' ability to work or be in education. Work accounted for more items than education (n=7 and n=4 respectively).

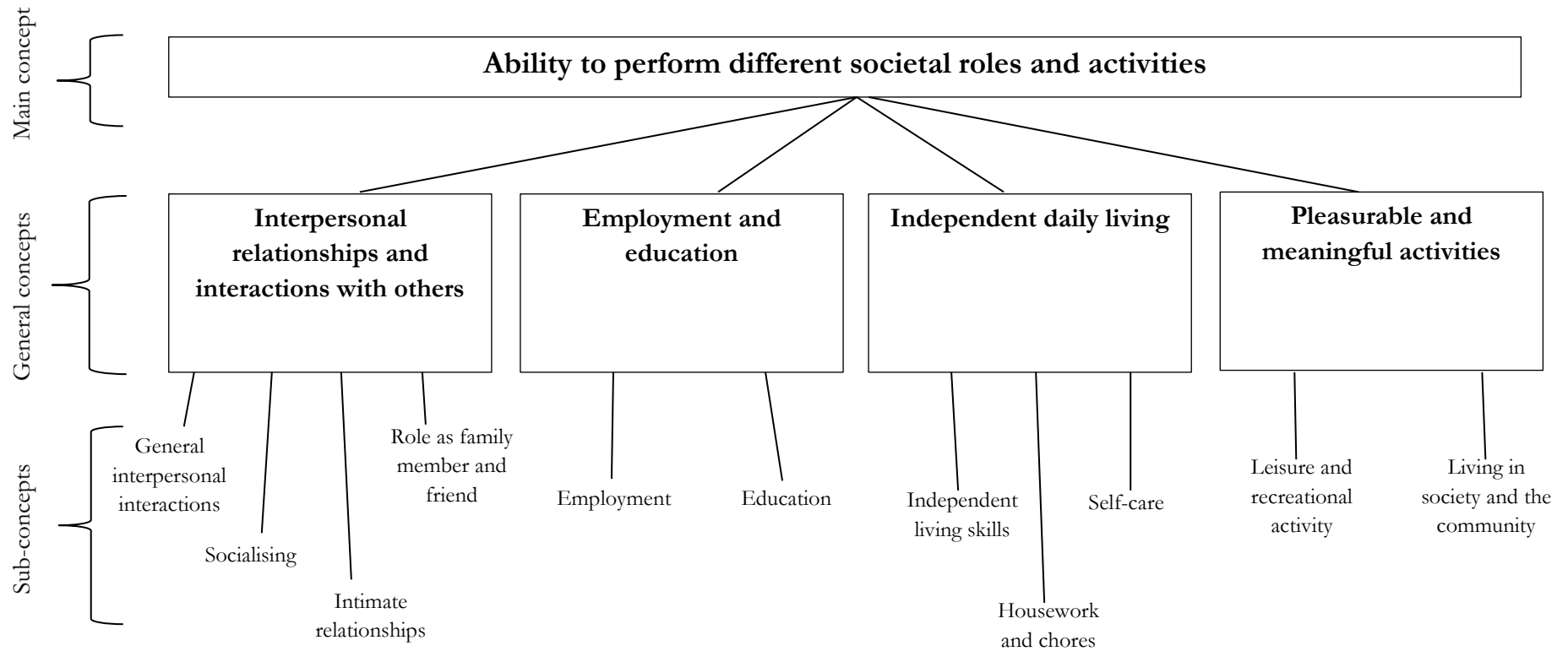
General concept 3: Independent daily living

'Independent daily living' refers to an individual's ability to engage in everyday activities related to sub-concepts *'Independent living skills'*, *'self-care'* (e.g. personal hygiene) and *'Housework and chores'* (e.g. cooking, cleaning).

General concept 4: Pleasurable and meaningful activities

The final general concept is *'Pleasurable and meaningful activities'*. This involves sub-concepts: *'Leisure and recreational activity'*, which includes activities such as going to the cinema or sports; and *'Living in society and the community'* referring to roles in society and engagement in community activities.

Figure 6. Social functioning construct



3.5 Discussion

Thirty eight studies were identified as being eligible for this systematic review, and 19 social functioning PROMs found amongst them. A large proportion of the PROMs (n=14) were validated in psychosis spectrum conditions illustrating how social functioning still appears to be a prioritised measure in this group as compared to other samples experiencing mental health problems. Depression was validated in six PROMs, which is understandable considering its strong association with reduced levels of motivation and decreased activity. Considering that social functioning problems are used as criteria for receiving a diagnosis of other mental health problems such as anxiety or personality disorder, these psychological disorders are under-represented with regards using them in validation studies of social functioning measures. A lack of available PROMs validated in such samples means that there is an increased risk of bias in any research studies that choose to use social functioning measures that have not been validated in these populations.

Examination of the use of PROM development and content validity studies in social functioning PROMs revealed that most PROMs (78.95%) have not been developed with the target population for which it has been created. Further, 68.42% of PROMs were not developed with professionals. Where PROM development and content validity studies had been reported in articles, they were generally of 'doubtful' quality. This was primarily due to insufficient reporting of detail (e.g. how comprehensiveness, relevance and comprehensibility were assessed or even mentioning specifically if they have been assessed at all) as this meant that reviewers could not give 'adequate' or 'very good' ratings. The COSMIN standards consider content validity to be the most important measurement property because it is important that the target population understand the questions and response options. Further, it is essential that the PROM is actually measuring what it should. If at least 'adequate' content validity cannot be assured, then there is an increased risk of bias in results where these PROMs are used. It seems therefore that as well as broadening the target population the

PROMs are measured in, future research needs to also ensure these samples are involved in the development of the PROMs.

A lack of reporting of detail or the complete absence of content validity studies does not necessarily mean that social functioning PROMs are not fit for purpose. It does however mean that currently we do not know if these PROMs have good content and face validity and therefore we cannot be assured that PROMs are measuring social functioning adequately.

With regards to structural validity, only one PROM (SLOF) was found to sufficiently measure this using a CFA. The remaining nine studies used EFA to measure structural validity. The COSMIN standards still consider an EFA to be 'adequate' with regards to the study, but for the PROM overall this led to 'indeterminate' scores for these eight measures. If discrepancies occur with regards to structural validity, this could lead to increased bias and erroneous results. With regards to the COSMIN guidelines provided in the manual (Version 1.0 dated February 2018) to assess for structural validity, there were areas that could have benefited from more detail to assist in the assessment of this measurement property. The instructions for scoring structural validity of the PROM (p.28) only provide rating criteria for a CFA. The authors state that reviewers can create their own 'alternative criteria' for an EFA for example (p.29), however whilst it is not expected that the manual provides criteria for every possible analysis for testing, with the wide use of EFAs in the development of PROMs (illustrated in the findings for the current study) it would have been useful for COSMIN to include some criteria related to scoring reported EFA results. This would also be of benefit for future researchers conducting validation studies to have as a guide.

Internal consistency was generally measured well across social functioning measures with 73.68% of PROMs measuring this psychometric property, and getting good results (≥ 0.70). However, because only one study was found to have 'sufficient' structural validity, the summary of evidence was 'indeterminate' for most. Despite this, having high internal

consistency is arguably a good indication at least that the unidimensional subscales of these PROMs include items that correlate sufficiently enough to justify being included in the same subscale.

Construct validity was another measurement property that was commonly measured in social functioning PROMs (84.21%). Most studies were found to be 'sufficient' (93.75%) and of 'moderate' to 'high' quality. This could be perceived as another indication that PROMs are measuring social functioning adequately. However, as well as discriminant validity, construct validity in COSMIN also refers to studies that compare the PROM of interest to another social functioning PROM. As a number of studies compared PROMs to other PROMs included in this review, it could be argued that due to the insufficient use and reporting of PROM development and content validity studies in addition to the fact that structural validity of most PROMs is not done using CFA, that the construct validity results for the current study are questionable.

Overall five PROMs conducted a content validity study with the target population of interest (BJ-PERFECT, HSFQ, SFS: Spanish, SIS and SOFS), and all but one of these (HSFQ) also conducted a content validity study with professionals. The BJ-PERFECT and the HSFQ were the most consistently scoring PROMs with 'moderate' quality reported for all three areas of content validity (relevance, comprehensiveness and comprehensibility), and so scored highest with regards to content validity. Both of these PROMs were designed for very specific populations. The BJ-PERFECT measured social functioning through role plays designed for people with a diagnosis of schizophrenia living in the Chinese culture (e.g. role playing purchases from a shop, setting a table). Whilst more ecologically valid than other measures of social functioning in the sense that it measures the construct using similar situations one might find socially, it is very specific to a particular culture and thus results arguably not as generalisable internationally, but could be a useful way to measure social functioning within China or in very similar cultures. Further, it may be difficult to facilitate such a measure for

very large RCTs for example. However, for smaller studies, an adapted form of this measure could be used to enhance knowledge in the area of social functioning in mental health after it has been validated using development and/or content validity studies. The HSFQ was designed for use with an inpatient forensic population (diagnosed with personality disorder), so questions were designed around their interactions within the hospital as well as outside the hospital. The PROM development included inpatients of a high security forensic psychiatric hospital, so could be useful for assessing social functioning in similar samples as items in the measure are designed to reflect the living environment of such samples. However, only male respondents were involved in the validation study, so results arguably cannot be generalised to females. It is possible that the reason the PROMs rated best for the quality of content validity were ones for very specific populations, is that researchers might be more inclined to investigate with those populations because they have been identified as being different, or a unique method is employed that they feel needs to be tested first. To learn more, the researcher may feel the need to involve the population of interest to ensure they best reflect their situation. Perhaps developers of other measures make more assumptions about what should be included in samples that are more generic (e.g. when they validate a measure with people experiencing personality disorder, but not specific to those in forensic institutions).

Not all measures that scored 'moderate' and 'sufficient' ratings were for very unique populations or employed unique methods. The PSP did not include a target population in its development (or the reporting of this was unclear and so could not be rated), but did include professionals in the development of the measure. Due to this, the PSP was rated as 'sufficient' with 'moderate' quality evidence on the relevance and comprehensiveness elements of content validity, and 'sufficient' with 'very low' quality of evidence on comprehensibility. This measure has been validated in 12 separate studies all of which included schizophrenia samples, so could be a good choice of measure for studies that want a quick measure of social functioning in this population, for example. However, the PSP rates social functioning on one unidimensional

scale with a single score. It could be argued that based on the multi-component structure of the concept of social functioning, that providing a single score to reflect an individuals' overall functioning is insufficient. Further, despite being validated 12 times, there is little evidence of involvement from the target of interest (i.e. people diagnosed with schizophrenia) with regards to their views on whether the measure captures their level of activity. However, what the validation studies do include are professionals and inter-rater reliability checks between professionals, which is important considering it is a clinician rated measure.

The COSMIN manual used in this study to assess the methodological quality of content validity studies was consensus-based, but the most recent manual for assessing risk of bias in systematic reviews of PROMs was not (although the earlier version of this manual was (Mokkink et al., 2010) and the current manual builds on this by using feedback from systematic reviews that use the COSMIN checklist). Due to this, readers should be aware that this initiative may be subject to changes, and should consider this when interpreting results of the current study. Further, the COSMIN guidelines are a relatively new initiative (in particular the manuals used in the current studies), so inevitably older validation studies that may have been considered very good quality at the time of writing may not be so now according to these standards. It should also be taken into consideration that there has been a lack of detailed guidance up until the development of the COSMIN guidelines on how researchers should conduct validation studies of measurement instruments, particularly in relation to content validity. The fact that only English articles were included is another limitation to the current study, as good quality social functioning measures could have been missed. Further, the specificity of the inclusion criteria with regards to authors having to refer to the PROM as a measure of social functioning, could also have led to the exclusion of recommendable PROMs. However, it was important to ensure that authors were intending to measure this construct in order to have confidence that the PROMs included in this review were measuring social functioning. The PROMs identified in this review used items that were in line with the

definition of social functioning constructed as a result of the initial data search. It could be argued that this is to be expected with the definitions coming from some of the papers identified in this review. However, only eleven out of the 38 papers identified in this review provided an explicit definition of social functioning. This illustrates that authors validating social functioning measures appear to have a consistent idea about what social functioning is when developing or validating PROMs designed to measure this construct.

The secondary aim of this review was to construct a definition of social functioning by analysing social functioning definitions provided in 11 of the 38 articles. This systematic review and content analysis revealed that the concept of social functioning overall refers to the ability to perform different roles and activities in society. Breaking this broad concept down illustrates that based on the definitions provided, the social functioning construct consists of: Interpersonal relationships and interactions with others (i.e. general interactions, socialising, intimate relationships, role as family member and friend); Employment and education; Independent living (independent living skills, housework and chores, self-care); and Pleasurable and meaningful activities (leisure and recreational, living in society and the community). The focus for most of the definitions was on an individual's ability in these areas hence the focus of this context in the overall concept description. Two authors included definitions related to 'satisfaction with' roles or activities (Akkaya et al., 2008; Brissos et al., 2012), but this was not included in the definition as this was a small number compared to the six occurrences relating to ability (Akkaya et al., 2008; Apiquian et al., 2009; Brissos et al., 2012; Gorenstein et al., 2002; Lecomte et al., 2014). Further, in the definitions the term 'satisfaction with' appeared to be secondary to terms related to ability.

The PROMs identified in this review used items that were in line with the definition of social functioning constructed as a result of the initial data search. It could be argued that this is to be expected with the definitions coming from some of the papers identified in this review. However, only eleven out of the 38 papers identified in this review provided an explicit

definition of social functioning. This illustrates that authors validating social functioning measures appear to have a consistent idea about what social functioning is when developing or validating PROMs designed to measure this construct.

A limitation of this element of the study was that it included 11 articles, which arguably is a small number to use to build a construct as evidently complex as social functioning.

Restricting the search to studies that only included definitions of social functioning and the limits of the type of papers that could be included (i.e. validation studies of social functioning measures) could also be considered a limitation. However, it was important to ensure that researchers aimed to study social functioning for a more accurate definition to be constructed. Future work should aim to broaden the search to help refine the definition in the current study.

3.6 Conclusion

This study highlights some important areas for improving the development of PROMs designed to measure social functioning. Most significantly, there is a lack of use and adequate reporting of content validity studies. In particular, service users and participants representing the target population intended for PROMs need to be more involved in the development stages. This is important not only to ensure that the content (e.g. items used to represent social functioning) is relevant for the target population, but also to ensure that the questions and response options asked are clearly understood. Researchers were better at conducting studies for structural validity, but most were still not 'very good' according to the COSMIN standards due to the lack of use of CFAs. The results of the other measurement properties were mixed, and the result of this could be in part due to the improvements required in the aforementioned areas. Authors did however use items that were in line with the definition of social functioning constructed as part of this review. This is a good indication that researchers in this area have a shared idea of what social functioning actually is, which is important in the development of new PROMs or the validation of existing ones. It appears that the BJ-

PERFECT and the HSFQ score better than all other measures on all three areas of content validity, but these are very specific to populations and more general PROMs for mental health problems are also required. The PSP may be a good option for psychosis spectrum conditions, but the lack of involvement of service users in the development of this PROM means we cannot be sure if it is measuring social functioning adequately. Like the PSP, there are other measures that score similarly to the BJ-PERFECT and HSFQ (e.g. GFS and SOFS) as the scores do not differ greatly between the highest scoring measures. However, at this time there is no one social functioning measure that can be recommended as 'gold standard', and conversely no measures that we would not recommend for use. What is recommended is that when new social functioning PROMs are developed in the future, or if existing measures are validated, that the target population of interest as well as professionals are involved in this process. Further, content validity studies (e.g. cognitive interviews, pilot tests) should be used to facilitate this process, and researchers should use comprehensive guidelines such as the COSMIN standards to guide them through the research process and reporting of results. In the meantime, researchers or clinicians should ensure that when choosing a social functioning PROM that it has been validated in the population of interest. Further, systematic reviews such as this, or other related research articles could help with this.

The concept of social functioning captures a wide range of activities and is thus multifaceted. Results from this study provide a good indication of the elements that make up the social functioning construct. Further, it also indicates that researchers are using items that match the definition in this review. Whilst this study provides a good indication of what social functioning is made up of, more research is required to support or build on the construct herein.

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None

**Chapter 4: Study 2 - Assessment of metacognitive beliefs in an at risk
mental state for psychosis: A validation study of the Metacognitions
Questionnaire-30**

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Assessment of metacognitive beliefs in an at risk mental state for psychosis: A
validation study of the Metacognitions Questionnaire-30

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4.1 Abstract

Aim: The Metacognitions Questionnaire-30 (MCQ-30) has been used to assess metacognitive beliefs in a range of mental health problems. The aim of this study is to assess the validity of the MCQ-30 in people at risk for psychosis.

Methods: One hundred and eighty-five participants meeting criteria for an at risk mental state (ARMS) completed the MCQ-30 as part of their involvement in a randomised controlled trial. Confirmatory and exploratory factor analyses were conducted to assess factor structure and construct validity.

Results: Confirmatory factor analyses confirmed the original 5-factor structure of the MCQ-30. Examination of principal component analysis and parallel analysis outputs also suggested a 5-factor structure. Correlation analyses including measures of depression, social anxiety and beliefs about paranoia showed evidence of convergent validity. Discriminant validity was supported using the normalising subscale of the beliefs about paranoia tool.

Conclusions: The MCQ-30 demonstrated good fit using the original 5-factor model, acceptable to very good internal consistency of items was evident and clinical usefulness in those at risk for psychosis was demonstrated.

Key practitioner message

- Multicomponent 5-factor structure of MCQ-30 was confirmed in an ARMS sample.
- Principal components analysis and parallel analysis suggested retaining a 5-factor solution.
- Internal consistency of the MCQ-30 in ARMS was very good overall.
- The MCQ-30 correlated meaningfully with related concepts.

Keywords: Metacognitive beliefs; MCQ-30; ARMS; At risk for psychosis; Psychosis; Validity

4.2 Introduction

Metacognition is loosely defined as cognition about cognition or thinking about thinking (Flavell, 1979). For example, in the field of memory research a distinction can be made between cognition (e.g. what can be retained) and the processes of using rehearsal strategies to enhance memory, which requires metacognitive knowledge of what can improve memory. Nelson and Narens (1990) stipulated metacognition involved two levels: the object level where cognition occurs; and a meta-level where metacognitive processes occur (Nelson & Narens, 1990) with monitoring and control operations representing the flow of information between these levels.

The importance of a distinction between cognition and metacognitions has been developed in the Self-Regulatory Executive Function (S-REF) model (Wells and Matthews, 1994) of psychopathology. In this model a syndrome of perseverative thinking is thought to cause most types of psychological disorder. This cognitive attention syndrome (CAS) is a process of worry, rumination, fixating attention on threat and unhelpful coping behaviours (e.g. avoidance, trying to control thoughts, substance use) and leads to the maintenance of distressing emotions or cognitions. The CAS is linked to underlying metacognitive knowledge (beliefs) that compromise flexible control of the syndrome (Wells, 2009).

In the S-REF model, metacognitive beliefs principally relate to a subset of positive and negative beliefs people hold about their thoughts. In order to test the model Wells and colleagues developed a range of measures of metacognitions and the CAS. The gold standard measure of metacognitive beliefs is the Metacognitions Questionnaire (Wells & Cartwright-Hatton, 2004). In a recent meta-analysis of MCQ studies, metacognitive beliefs were confirmed as transdiagnostic factors across psychopathologies (Sun, Zhu, & So, 2017). Robust and reliable positive associations have been demonstrated between MCQ metacognition domains and symptoms of anxiety (Wells, 2005) and mood disorders (Papageorgiou & Wells,

2003), and more recently this has been extended to psychotic symptoms (Morrison et al., 2007; Rachel Sellers, Gawęda, et al., 2016). However, whilst the psychometric properties and the construct validity of the MCQ is reasonably well established in non-patients and those with emotional disorder, relatively little is known about its properties in patients with psychosis or at risk of psychosis and further advances in this area depend on the interpretability of the measure in psychosis groups. Although the subscales of the MCQ relate to positive and negative beliefs about worry and this measure should be relevant to those experiencing psychosis or who are at risk for psychosis in keeping with the S-REF model, the latent structure should be confirmed. Paranoia for example, can be conceptualised as a type of worry with those experiencing such thoughts having positive beliefs about the benefits of worrying (e.g. to protect oneself from harm). Engaging in such thoughts could lead to unhelpful ways of coping (e.g. avoidance of social situations to protect the self). An important step in testing the metacognitive model and treatment applied to psychosis is to determine the properties of the MCQ as an appropriate tool that can be interpreted in the usual way.

The MCQ (Cartwright-Hatton & Wells, 1997) was originally constructed as a 65-item measure of metacognitive beliefs and monitoring. The MCQ was developed using data obtained from individuals with general anxiety disorder, obsessive compulsive disorder, hypochondriasis and panic disorder (Cartwright-Hatton & Wells, 1997). The MCQ has five subscales: positive beliefs about worry (e.g. *Worrying helps me avoid problems in the future.*); negative beliefs about uncontrollability and danger of worry (e.g. *My worrying is dangerous for me.*); negative beliefs about thoughts in general including items relating to superstition, punishment and responsibility (e.g. *If a bad thing happens which I have not worried about, I feel responsible.*); cognitive self-consciousness (e.g. *I am constantly aware of my thinking.*); and cognitive confidence (e.g. *I have a poor memory.*).

The original MCQ had limited use due to its length and some items were found to be unclear to participants (Wells & Cartwright-Hatton, 2004). The Metacognitions Questionnaire-30

(MCQ-30) (Wells & Cartwright-Hatton, 2004), a shortened 30-item version of the MCQ, was developed as a result. The number of items was reduced by removing any items that participants questioned on the original MCQ and by keeping the highest loading items for each subscale (Wells & Cartwright-Hatton, 2004). The MCQ-30 was found to have subscales consistent with the original MCQ. (Wells & Cartwright-Hatton, 2004). Internal consistency for the MCQ-30 subscales was better overall than the original MCQ. MCQ and MCQ-30 Cronbach alphas (respectively) were as follows: Cognitive confidence = 0.84:0.93; Positive beliefs = 0.87:0.92; Cognitive self-consciousness = 0.72:0.92; Negative beliefs about uncontrollability and danger = 0.89:0.91; and Negative beliefs about thoughts in general/Negative beliefs about the need to control thoughts = 0.74:0.72. Both the MCQ and MCQ-30 have sufficient internal consistency as scores are above 0.70 and less than 0.95 (Terwee et al., 2007). The improved internal consistency combined with the more efficient length makes the MCQ-30 the measure of choice for metacognitive beliefs.

At risk mental state (ARMS) refers to people who are at risk for psychosis. Enhanced interest in the presence of metacognitive beliefs in the early stages of psychosis, has led to increased use of the MCQ-30 in research (Cotter et al., 2017; Morrison et al., 2014; Palmier-Claus, Dunn, Taylor, Morrison, & Lewis, 2013; Welsh et al., 2014). A systematic review and meta-analysis of metacognitive beliefs in those with an ARMS (Cotter et al., 2017) found those at risk of psychosis have significantly higher scores compared to healthy controls on all metacognitive belief domains. No significant differences were found between ARMS and those experiencing psychosis on any of the metacognitive belief subscales. Research in this area is helpful in building a picture of the presence of metacognitive beliefs in ARMS and established psychosis, which could help clinicians and researchers work out improved targets for intervention. It is important therefore that the tool used to measure metacognitive beliefs is appropriate for the population in which it is being used.

Although the MCQ-30 has been validated in non-clinical (Spada, Mohiyeddini, & Wells, 2008; Wells & Cartwright-Hatton, 2004), obsessive-compulsive disorder (Grøtte et al., 2016), and physical health (Cook, Salmon, Dunn, & Fisher, 2014; Fisher, Cook, & Noble, 2016) populations, no studies have validated the MCQ-30 in those at risk for psychosis. With the increased use of this measure with those at risk for psychosis, it is important to explore the validity the MCQ-30 in this population. This study aims to do so by examining the construct validity via the factor structure of the MCQ-30 and its internal consistency in those with an ARMS.

To examine convergent and discriminant validity, correlations with related measures are useful (DeVon et al., 2007). Whilst the MCQ measures beliefs about repetitive negative thinking in the form of worry, other forms of similar thinking have been identified in psychosis, such as paranoid ideation, that would be conceptualised as a type of worry in the metacognitive (S-REF) model. Therefore, negative and positive beliefs about worry (MCQ-30) should correlate with negative and positive beliefs about paranoia in the current sample, thus providing a means of evaluating convergent validity. It is predicted therefore that significant positive correlations will exist between negative beliefs subscales of the MCQ-30 and the negative beliefs about paranoia subscale of the Beliefs About Paranoia Scale (BAPS) (Gumley, Gillan, Morrison, & Schwannauer, 2011). Further, it was hypothesised that significant positive correlations would exist between the BAPS survival subscale (includes items related to positive beliefs about paranoia) and the positive beliefs about worry subscale of the MCQ-30. It is expected that the BAPS normalizing subscale will have no significant relationships with any of the MCQ-30 subscales. Due to past research on the relationship between metacognitive beliefs and depression (Brett, Johns, Peters, & McGuire, 2009; McEvoy, Mahoney, Perini, & Kingsep, 2009; Wells, 2009) and social anxiety (Gkika, Wittkowski, & Wells, 2017; Wells, 2009), it is predicted that significant positive relationships will exist between the MCQ-30 and

these areas of emotion measured using the Social Interaction Anxiety Scale (SIAS) and Beck Depression Inventory-7 (BDI-7).

4.3 Methods

4.3.1 Participants

Data from 185 participants meeting criteria for an at risk mental state were used to conduct this study. Participants were taking part in either the Early Detection and Intervention Evaluation (EDIE) (Morrison et al., 2004) or the Early Detection and Intervention Evaluation 2 (EDIE-2) trial (Morrison et al., 2012). Both were randomised controlled trials testing the efficacy of cognitive therapy in preventing transition to psychosis. Participants who took part in the EDIE-2 trial were a completely separate sample to those who took part in EDIE (i.e. checks at entry to the EDIE-2 trial ensured that there was no chance any EDIE participants also took part in EDIE-2). Participants were recruited from primary (e.g. psychological services, general practitioners) and secondary (e.g. early intervention for psychosis or community mental health teams) care services, as well as other non-NHS services such as university counselling services or voluntary agencies. Research assistants trained in administering all measures collected data for both studies. Thirty two participants were drawn from the EDIE trial and 153 from EDIE-2. The male to female ratio was 112:73.

Ethical approval for EDIE and EDIE-2 was sought from UK based ethical committees. Please refer to the full texts for EDIE and EDIE-2 for more information (Morrison et al., 2012; Morrison et al., 2004). All participants voluntarily consented to take part in the studies and for anonymous data to be collected and used in publications. Research procedures in both trials were in accordance with the Declaration of Helsinki and Good Clinical Practice guidelines.

4.3.2 Measures and procedures

The current study utilised data from two separate samples (EDIE and EDIE-2). In EDIE-2 the MCQ-30 (Wells & Cartwright-Hatton, 2004) was used, whilst in EDIE the 65-item MCQ

was used (Cartwright-Hatton & Wells, 1997). For the purposes of this study, only the 30-items of the MCQ-30 were extracted for analysis. It is possible EDIE participants could have been influenced by the additional items in the MCQ when completing the MCQ-30 items leading to a bias in responses. Separate means and standard deviations (SD) were therefore calculated for all five subscales of the MCQ-30 as well as the total measure (Table 7.) Means and SDs were found to be similar in both the EDIE and EDIE-2 samples. A one-way MANOVA found no significant differences between the means on any of the subscales or total measure. It appeared therefore that completing the 30-items of the MCQ-30 within the larger MCQ item set did not bias EDIE participant responses to these items or the content and face validity of the MCQ-30.

Table 7. Comparison of MCQ-30 means and SDs for EDIE and EDIE-2 data

MCQ-30 Subscale	EDIE (n=32)	EDIE-2 (n=153)
Cognitive confidence	11.78 (5.17)	12.76 (4.91)
Positive beliefs about worry	10.25 (3.12)	10.46 (4.18)
Cognitive self-consciousness	14.41 (4.29)	15.96 (4.33)
Negative beliefs about uncontrollability and danger	14.34 (4.05)	15.17 (4.98)
Negative beliefs about the need to control thoughts	11.72 (3.42)	13.24 (4.35)
Total Score	62.50 (12.95)	67.59 (16.17)

Note: SD in parentheses.

Respondents on these measures are required to select a number ranging from 1 ‘*Do not agree*’ to 4 ‘*Agree very much*’ for each of the items in the measure. A score is calculated for each of the five subscales as well as a total score for the whole measure. Internal consistency (as measured by Cronbach’s alpha) for the original 5-factor structure in the current study was as follows: Cognitive confidence $\alpha = 0.88$; positive beliefs about worry $\alpha = 0.85$; cognitive self-consciousness $\alpha = 0.82$; negative beliefs about uncontrollability and danger $\alpha = 0.83$; negative

beliefs about the need to control thoughts $\alpha = 0.75$; and for the full measure $\alpha = 0.90$. These results demonstrate that the internal consistency for the original 5-factors in an ARMS sample was acceptable to high.

The Comprehensive Assessment of At Risk Mental States (CAARMS: Yung et al., 2005) was administered in the EDIE-2 trial to assess for at risk for psychosis status. Four of the six subscales in the CAARMS are used to determine ARMS status: Unusual thought content (e.g. thought insertion, feeling controlled by something other than self); Non bizarre ideas (e.g. paranoid thoughts, feeling that one does not exist or is dead); Perceptual abnormalities (e.g. visual, auditory or sensory hallucinations); and Disorganised speech (e.g. trouble finding the right word, tangential speech). In the version of the CAARMS used in EDIE-2 (Yung et al., 2005), a Global Assessment of Functioning (GAF) score was also calculated as problems with functioning was part of the criteria for ARMS. This version of the CAARMS was found to have very good validity and reliability (Yung et al., 2005). Further, inter-rater reliability checks were conducted eight times throughout the EDIE-2 trial with good reliability found between raters (intraclass correlation coefficient = 0.90, SD = 0.03) (Morrison et al., 2012).

The positive and negative symptoms scale (PANSS: Kay et al., 1987) was used in the EDIE trial to assess for at risk for psychosis status. Scores on the hallucinations, delusions, suspiciousness, and conceptual disorganisation subscales of the PANSS were used to determine if participants met criteria for an ARMS. This measure has been found to be reliable and valid (Kay, Fiszbein, & Opler, 1987).

The Beliefs About Paranoia Scale (BAPS) is an 18-item self-report assessment tool used in the EDIE-2 trial to assess metacognitive beliefs about paranoia. The initial version of the BAPS had four subscales (Morrison et al., 2005). The revised three subscale version of this measure (Gumley et al., 2011) was used with participants included in this study. Internal consistency for

the current sample for each subscale were: Negative beliefs about paranoia $\alpha = 0.88$; Survival beliefs about paranoia $\alpha = 0.87$; and Normalizing beliefs about paranoia $\alpha = 0.88$.

The Social Inventory Anxiety Scale (SIAS) is a 20-item self-report questionnaire used to measure social anxiety (Mattick & Clarke, 1998). The SIAS was used for measurement of social anxiety in the EDIE-2 trial. The Cronbach's alpha for the current sample was $\alpha = 0.90$ demonstrating high reliability.

The Becks Depression Inventory-7 (BDI-7) includes seven self-report items designed to measure depression (Beck, Guth, Steer, & Ball, 1997) and was the depression measure used in EDIE-2. Internal consistency for this study was very good: $\alpha = 0.86$.

4.3.3 Data analyses

IBM SPSS AMOS Version 22 (AMOS) was used to run confirmatory factor analysis (CFA) to assess the goodness of fit of the original 5-factor structure of the MCQ-30 and explore alternative solutions suggested by other analyses. A CFA was conducted first because the MCQ-30 had an existing structure established in past research and we aimed to test the hypothesis that the same 5-factor structure would be a good model fit for those with an ARMS (i.e. test construct validity).

It is recommended that several fit indices are used to assess model fit and should consist of the following: chi-square and degrees of freedom (DF); an absolute fit index (e.g. goodness of fit index (GFI), standardised root mean residual (SRMR), root mean square error of approximation (RMSEA)); one incremental fit index (e.g. Tucker-Lewis index (TLI), comparative fit index (CFI)); a goodness of fit index (e.g. GFI, TLI, CFI); and a badness of fit index (e.g. SRMR, RMSEA) (Hair et al., 2014). We used each of these indices to assess model fit allowing for a comprehensive analysis of fit, and to reduce the risk of selection bias of fit indices that indicate a better fit.

Principal components analysis (PCA) was conducted in IBM SPSS Statistics Version 22 (SPSS) after completing the CFA. PCA is a factor analytic technique used to reduce data into meaningful groups or factors. In this study, it was used to explore potential alternative solutions of the MCQ-30 and their factor loadings. Oblique rotation (direct oblimin) was used to allow for more flexibility in the position of factors (Kline, 1994) because past validation research on the MCQ-30 (Wells & Cartwright-Hatton, 2004) has demonstrated items on this measure correlate. Eigenvalues above 1 were retained for the initial exploration of the measure. We examined the Scree plot (Cattell, 1966) to determine the number of factors to extract.

Parallel analysis is an alternative statistical method to determine the optimal number of factors to extract. It is recommended this method is used in addition to the scree plot (O'Connor, 2000). Parallel analysis compares the eigenvalues of raw data to randomly selected data. Random data matches raw data in terms of the number of variables and observations (O'Connor, 2000). O'Connor (2000) suggests that random data is generated using the 95th percentile of the distribution of these randomly generated eigenvalues. Where the eigenvalue for the raw data is larger than the eigenvalue of the randomly generated data, the factor or component can be retained. A parallel analysis was run in SPSS using the O'Connor (2000) syntax; number of data sets input as 1000, percentile set at 95, option '1' for PCA, and option '1' for normally distributed random data generation parallel analysis.

A further CFA was conducted in AMOS to test the model fit of an alternative factor structure identified by the parallel analysis to allow us to compare the results to the original 5-factor structure. Only participants that did not have any missing data in the MCQ-30 (or MCQ-30 items extracted from the MCQ) were included in factor analyses (i.e. no estimates were created for missing data).

SPSS was also used to calculate means and standard deviations of measures, and to conduct one-way Multivariate Analysis of Variance (MANOVA) analyses to check if any statistical differences existed between males and females on the MCQ-30 subscales and total scores.

Cronbach alphas are calculated in SPSS to measure internal consistency of measures (i.e. how correlated items are in a subscale to assess how much items measure the same construct).

SPSS was used to run Pearson correlations to test for convergent and discriminant validity. Only EDIE-2 data (N=153) was used for correlation analyses as the EDIE data did not have these measures. Correlations were generated using the pairwise option in SPSS to prevent complete exclusion of participants from correlation analyses where they had missing data from only some measures.

4.4 Results

4.4.1 Sample

The mean age of the combined EDIE and EDIE-2 sample (N=185) was 20.54 years, minimum 14 years, maximum 34 years, and standard deviation 4.06 years.

4.4.2 Confirmatory factor analysis

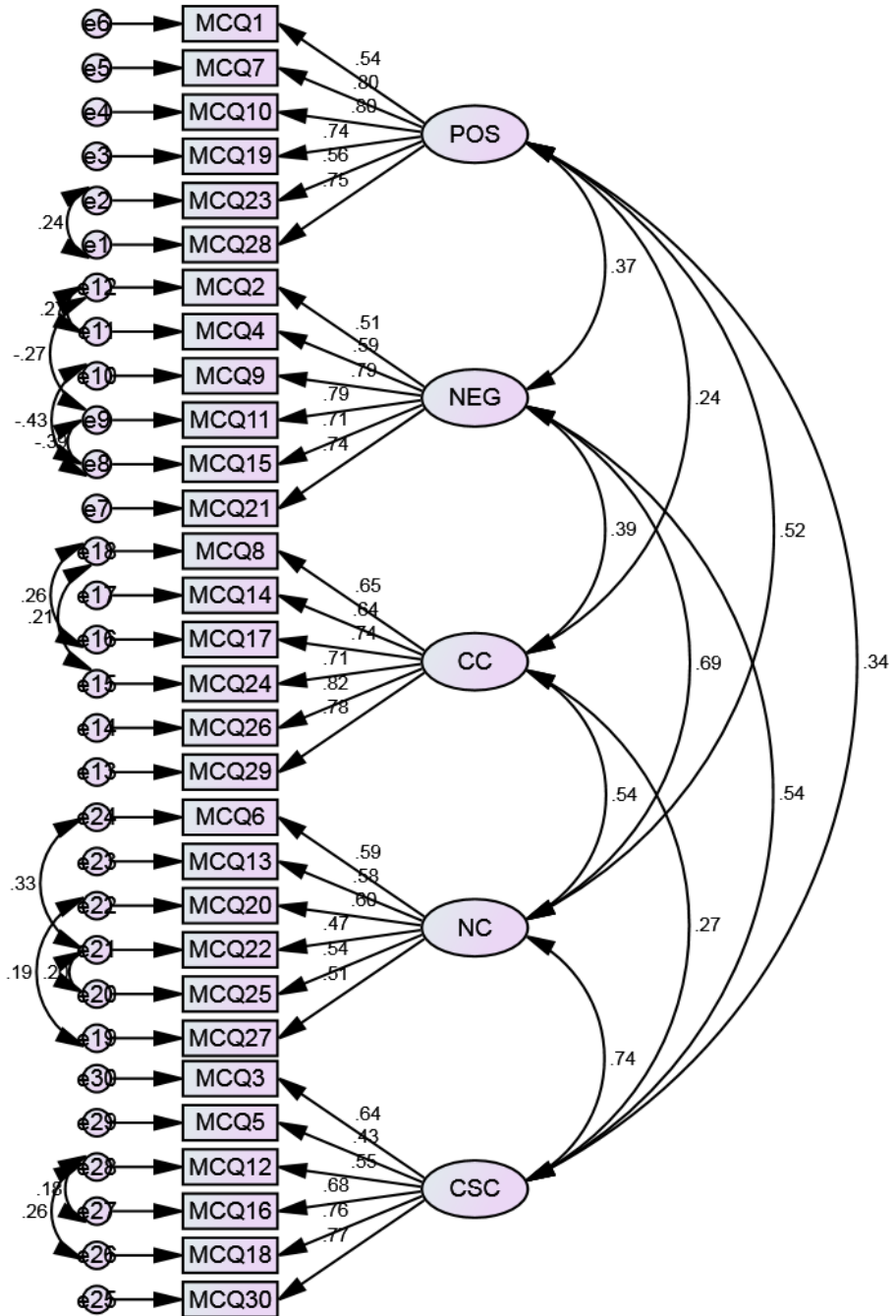
The chi-square was found to be significant $X^2(395) = 683.45, p < 0.001$, which indicates a poor fitting model. However, the chi-square statistic is very sensitive to sample sizes (Garver & Mentzer, 1999; Hair et al., 2014) and models with larger number of observed variables (individual items) (Hair et al., 2014). The CMIN/DF score for this analysis was 1.73, well below the threshold of < 3 (Hoe, 2008). A score of < 2 on this statistic indicates a very good fitting model (Hair et al., 2014). The RMSEA was also found to be within acceptable parameters at 0.06, as it was < 0.08 (Garver & Mentzer, 1999). On the CFI, GFI and TLI, a score of more than 0.90 indicates a good fitting model (Garver & Mentzer, 1999). Scores on these indicators were; CFI 0.87, TLI 0.86 and GFI 0.81. CFI and TLI scores were just below the cut-off indicating a fair fitting model, whilst the GFI was further below the cut-off.

Finally, the SRMR score is recommended to be below 0.08 to indicate good fit (Hu & Bentler, 1999) and this was achieved with a value of 0.07.

In this model most of the standardised regression weights were above the recommended cut-off of 0.50 (Hair et al., 2014) with a range from 0.50 to 0.79. Only one item was found to be less than 0.50 from the cognitive self-consciousness subscale ('I am aware of the way my mind works when I am thinking through a problem' = 0.44). Small to moderate correlations existed between most of the latent factors (ranges between 0.24 and 0.52). Larger correlations were found for the following subscales; need to control thoughts and cognitive self-consciousness (0.66), and need to control thoughts and negative beliefs about uncontrollability and danger (0.68).

Modification indices suggested the correlation of a number of errors within the same subscale. This improved the model as follows: $X^2(383) = 582.72, p < 0.001$; CMIN/DF was 1.52; RMSEA = 0.05; CFI = 0.91; TLI = 0.90; GFI = 0.84; and SRMR = 0.07. Figure 7 shows the final model with correlated errors.

Figure 7. Final model for 5-factor confirmatory factor analysis with all errors correlated (standardised estimates). N=185.



Key: Ovals represent MCQ-30 subscales (POS = Positive beliefs about worry; NEG = Negative beliefs about uncontrollability and danger; CC = Cognitive confidence; NC = Negative beliefs about the need to control thoughts; CSC = Cognitive self-consciousness). Boxes represent MCQ-30 items (e.g. MCQ1 = Question 1 of MCQ-30 measure). Circles = errors. Double headed curved arrows = correlations. Straight arrows from subscales to items = regression weights.

4.4.3 Principal component analysis

The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) score for the sample was 0.85, which is considered to be very good. A score above 0.80 suggests that the sample size is sufficient for a PCA (Kaiser, 1974). Bartlett's test of Sphericity $X^2 = 2535.902$ was very significant at the $p < 0.0001$ level, adding further support for the suitability of PCA for this sample.

Examination of the scree plot suggested a 5-factor model of the MCQ-30 in the ARMS population. The PCA was re-run setting the fixed number of factors to 5. Loadings on the pattern and structure matrices were checked. Where an item loaded on more than one factor and the difference between the loadings was equal to or more than 0.20, the highest loading item was retained on the factor it loaded highest on. Loadings at 0.40 or above were retained on each factor (Hair et al., 2014). Table 8 shows the structure matrix for all five factors.

Factors 1, 2 and 3 of the analysis included all the items that matched exactly the original MCQ-30 subscales: negative beliefs about uncontrollability and danger; cognitive confidence; and positive beliefs about worry respectively. Where double loadings (i.e. items loading on another factor) were present on these three factors, the differences between the loadings was ≥ 0.20 , and the higher loading was always on the original subscale. In this circumstance, the higher scoring item was retained and the lower scoring item ignored.

Factors 4 and 5 related to subscales: cognitive self-consciousness; and negative beliefs about the need to control thoughts respectively. All items related to the original subscale of the MCQ-30 loaded on these two factors. However, three variables (questions 3, 13 and 27) loaded on two factors of the MCQ-30. The differences between the two loadings in each case was < 0.20 . Loadings for questions 3 and 27 were slightly higher for the original subscale, and for question 13 it was slightly higher for the factor that did not relate to the original subscale.

Table 8. Principal component analysis structure matrix (5-factor structure)

	1	2	3	4	5
Factor 1: Negative beliefs about uncontrollability and danger					
4. I could make myself sick with worrying	0.784	0.116	0.188	0.227	-0.134
21. When I start worrying, I cannot stop	0.769	0.211	0.191	0.186	-0.427
9. My worrying thoughts persist, no matter how I try to stop them	0.714	0.231	0.257	0.361	-0.409
2. My worrying is dangerous for me	0.693	0.160	0.049	0.256	-0.066
11. I cannot ignore my worrying thoughts	0.672	0.198	0.281	0.305	-0.441
15. My worrying could make me go mad	0.635	0.307	0.202	0.247	-0.357
Factor 2: Cognitive confidence					
17. I have a poor memory	0.107	0.833	0.071	0.054	-0.184
8. I have little confidence in my memory for words and names	0.077	0.806	0.105	0.143	-0.121
24. I have little confidence in my memory for places	0.229	0.797	0.161	0.090	-0.164
26. I do not trust my memory	0.171	0.796	0.132	0.149	-0.425
29. I have little confidence in my memory for actions	0.269	0.791	0.188	0.086	-0.275
14. My memory can mislead me at times	0.244	0.647	0.327	0.360	-0.348
Factor 3: Positive beliefs					
28. I need to worry in order to work well	0.100	0.189	0.821	0.157	-0.233
10. Worrying helps me to get things sorted out in my mind	0.124	0.081	0.819	0.231	-0.298
7. I need to worry in order to remain organized	0.293	0.132	0.808	0.270	-0.231
19. Worrying helps me cope	0.215	0.099	0.777	0.301	-0.174
23. Worrying helps me to solve problems	-0.023	0.223	0.687	0.112	-0.213
1. Worrying helps me to avoid problems in the future	0.261	0.124	0.612	0.250	-0.031
Factor 4: Cognitive self-consciousness					
18. I pay close attention to the way my mind works	0.341	0.143	0.277	0.825	-0.174
16. I am constantly aware of my thinking	0.208	0.137	0.204	0.776	-0.265

30. I constantly examine my thoughts	0.338	0.245	0.094	0.760	-0.337
12. I monitor my thoughts	0.134	0.097	0.312	0.720	-0.125
3. I think a lot about my thoughts	0.504	0.164	0.131	<u>0.599</u>	-0.286
13. I should be in control of my thoughts all of the time	0.088	0.290	0.205	<u>0.579</u>	-0.520†
5. I am aware of the way my mind works when I am thinking through a problem	0.199	-0.089	0.212	0.520	-0.181
Factor 5: Negative beliefs about the need to control thoughts					
22. I will be punished for not controlling certain thoughts	0.281	0.259	0.211	0.154	-0.741
6. If I did not control a worrying thought, and then it happened, it would be my fault	0.404	0.202	0.304	0.286	-0.688
20. Not being able to control my thoughts is a sign of weakness	0.323	0.318	0.102	0.369	-0.647
25. It is bad to think certain thoughts	0.333	0.166	0.376	0.299	-0.560
27. If I could not control my thoughts, I would not be able to function	0.123	0.251	0.255	0.416	<u>-0.534</u>

Key: Bold = loadings > 0.40. Underscore = higher scoring loading where a loading > 0.40 loads on more than 1 factor. † = loadings that score lower on their original subscale than another factor.

Further investigation into the content of these questions and where they were loading suggested that the double loadings were logical and made theoretic sense. Question 13 (*I should be in control of my thoughts all of the time*) for example, loaded slightly higher on factor 4 (cognitive self-consciousness) rather than its original subscale negative beliefs about the need to control thoughts (factor 5). This double loading is consistent with the high correlation between the need to control thoughts and cognitive self-consciousness latent factors in the CFA. It makes sense that if someone believes they should be in control of their thoughts they are likely to constantly monitor them so that this may be achieved.

4.4.4 Parallel analysis

The parallel analysis output suggested a 4-factor solution. Due to this, a PCA was re-run in SPSS using oblique rotation, setting the fixed number of factors to 4. Factors 2 and 3 included items that matched exactly the original subscales for cognitive confidence, and positive beliefs about worry respectively. No additional items were included on these two factors. Factor 1 included all items in the original MCQ-30 for the negative beliefs about uncontrollability and danger of worry subscale. Factor 4 included all items for the cognitive self-consciousness subscale. However, one of the items under factor 4 (question 3: *I think a lot about my thoughts*) also loaded on factor 1. This loaded higher on factor 4 (its original subscale), but the difference between the items was <0.20 . Again this loading appeared logical because if a belief exists that thoughts are uncontrollable and dangerous, then an increase in the amount of time thinking about thoughts is likely.

The subscale need to control thoughts did not emerge as a factor in its own right. Instead, the items for this subscale were split between factors 1 (negative beliefs about uncontrollability and danger) and 4 (cognitive self-consciousness). Factor 1 had 4 items loaded (questions 6, 20, 22 and 25) and factor 4 had 2 items loaded (questions 13 and 27). The loading of items onto these two factors is reflected in the high correlations (0.69 and 0.74 respectively) generated in the CFA model (Figure 7) between these subscales. Overall, the PCA showed very few cross

loadings existed. Where cross-loadings were present, they were minor and seemed theoretically coherent.

Although the parallel analysis suggests a 4-factor structure, examination of the loading of the items did not suggest an alternative structure that was theoretically coherent. However, as a final test, a further CFA was run to examine the construct validity of this 4-factor structure. The chi-square was found to be significant $X^2(399) = 740.16, p < 0.001$; CMIN/DF was 1.86; RMSEA = 0.07; CFI = 0.85; TLI = 0.84; GFI = 0.79; and SRMR = 0.08. Modification indices improved the model as follows: $X^2(385) = 606.83, p < 0.001$; CMIN/DF was 1.58; RMSEA = 0.06; CFI = 0.90; TLI = 0.89; GFI = 0.83; and SRMR = 0.07. However, the results illustrate the 4-factor structure had a poorer model fit than the original 5-factor structure.

4.4.5 MCQ-30 descriptive statistics for original 5-factor structure

Means and standard deviations (SD) were calculated for the five original MCQ-30 subscales.

Table 9 shows the results of this analysis for the total sample, and split across males and females. A one-way MANOVA found no significant differences between males and females on any of the five MCQ-30 subscales or the MCQ-30 total score.

The highest scoring subscale for the total sample was cognitive self-consciousness followed by negative beliefs about uncontrollability and danger. This is in line with past ARMS research using the MCQ-30 (Palmier-Claus et al., 2013). Females however, scored highest on negative beliefs about uncontrollability and danger followed by cognitive self-consciousness. Past ARMS research found negative beliefs about uncontrollability and danger to be the highest scoring subscale followed by cognitive self-consciousness in the total sample (Welsh et al., 2014).

Table 9. MCQ-30 means and SDs for combined EDIE and EDIE-2 data

MCQ30 Subscale	Mean total sample (N=185)	Mean male (n=112)	Mean female (n=73)
Cognitive confidence	12.59 (4.96)	12.46 (4.96)	12.79 (4.98)
Positive beliefs about worry	10.43 (4.01)	10.55 (3.82)	10.23 (4.30)
Cognitive self-consciousness	15.69 (4.35)	15.79 (4.39)	15.53 (4.31)
Negative beliefs about uncontrollability and danger	15.03 (4.83)	14.44 (4.71)	15.93 (4.92)
Negative beliefs about the need to control thoughts	12.97 (4.24)	12.74 (4.01)	13.33 (4.58)
MCQ-30 Total score	66.71 (15.75)	65.99 (14.78)	67.82 (17.17)

Note: SD in parentheses.

4.4.6 Internal consistency

Cronbach's alphas for the MCQ-30 in this sample (reported in the measures section) ranged from acceptable to high in this ARMS sample. Separate Cronbach's Alphas were also calculated for males (m: n=112) and females (f: n=73) for all subscales and the full MCQ-30: positive beliefs about worry $\alpha = 0.82$ (m) and 0.89 (f); negative beliefs about uncontrollability and danger $\alpha = 0.82$ (m) and 0.84 (f); cognitive confidence $\alpha = 0.88$ (m) and 0.88 (f); need to control thoughts $\alpha = 0.70$ (m) and 0.81 (f); cognitive self-consciousness $\alpha = 0.82$ (m) and 0.81 (f); and for the full MCQ-30 $\alpha = 0.89$ (m) and 0.92 (f). Most of the scores represented good to excellent internal consistency, and in all but one subscale (need to control thoughts) males and females had similar scores. The male score for need to control thoughts was at 0.70 , which was an acceptable level. The female score had a higher internal consistency (0.81).

4.4.7 Convergent and discriminant validity

Convergent validity of the MCQ-30 was tested by correlating the subscales and total score with related concepts; the BAPS, BDI7 and SIAS. The mean age for this EDIE-2 subsample was 20.17 years, minimum 14 years, maximum 34 years, standard deviation 3.96 years, and the male to female ratio 88:65. The ethnicity distribution for this sample was as follows: White: n=136 (88.9%); Black Caribbean: n=1 (0.7%); Black African: n=4 (2.6%); Indian: n=1 (0.7%);

Pakistani: n=3 (2%); Chinese: n=1 (0.7%); Other: n=3 (2%); and Not known: n=4 (2.6%).

Descriptives for measures are shown in Table 10. The correlation results are shown in Table 11.

A significant large positive relationship was found between negative beliefs about uncontrollability and danger of worry subscale of the MCQ-30 and the BAPS negative subscale (N=153). Further, a moderate to large positive relationship was found between the negative beliefs about the need to control thoughts MCQ-30 subscale and the BAPS negative subscale (N=153). A moderate correlation was found between the positive beliefs about worry subscale and the BAPS survival subscale (N=153). Significant large positive effects were found between the total MCQ-30 scores and the SIAS (N=142) and BDI-7 (N=152).

Discriminant validity was tested by correlating the MCQ-30 with the BAPS normalizing beliefs subscales. No significant relationships were found between any of the MCQ-30 subscales and this measure as predicted.

Table 10. Means and SDs for EDIE-2 measures

Measure	Mean	Minimum	Maximum
BDI7 Total	7.48 (5.01)	0	19
SIAS Total	37.49 (17.26)	5	73
BAPS Negative beliefs	14.37 (5.70)	0	24
BAPS Survival strategy	10.15 (4.67)	0	24
BAPS Normalizing beliefs	15.20 (5.71)	0	24

Note: SD in parentheses.

Table 11. Correlation matrix for EDIE-2 data

1. Cognitive confidence	0.26**	0.21**	0.32**	0.46**	0.65**	0.20*	0.15	0.01	0.40**	0.40**
2. Positive beliefs about worry	-	0.31**	0.28**	0.42**	0.62**	0.26**	0.38**	0.13	0.19*	0.35**
3. Cognitive self-consciousness		-	0.46**	0.55**	0.70**	0.30**	0.27**	0.11	0.34**	0.30**
4. Negative beliefs about uncontrollability and danger			-	0.55**	0.75**	0.53**	0.05	-0.04	0.56**	0.38**
5. Need to control thoughts				-	0.83**	0.44**	0.21*	0.13	0.50**	0.35**
6. MCQ30 Total score					-	0.49**	0.29**	0.09	0.56**	0.51**
7. BAPS Negative beliefs						-	0.38**	0.27**	0.46**	0.51**
8. BAPS Survival strategy							-	0.39**	0.26**	0.38**
9. BAPS Normalizing beliefs								-	-0.03	-0.01
10. BDI7 Total									-	0.55**
11. SIAS Total										-

Significance levels:

*0.05 level

**0.01 level

4.5 Discussion

With the increased use of the MCQ-30 measure in at-risk for psychosis research, it is important to examine the validity of this measure in this sample. The fit and structure of the original five factor model was tested using CFA. Although the chi-square result indicated a poor fitting model, the chi-square is very sensitive to sample size (Garver & Mentzer, 1999; Hair et al., 2014), with larger samples leading to the increased likelihood of a significant chi-square. Further, the chances of the chi-square being significant is increased the more observed variables (i.e. individual items that make up each subscale or overall measure) there are in a model (Hair et al., 2014). It is therefore recommended that a range of fit indices are interpreted. The CMIN/DF (modified chi-square) was used in addition to assess model fit, and suggested a very good fit as it was well below the cut-off. Further, the RMSEA was used in this study because it corrects for both sample size and complexity of model issues of the chi-square, and better shows how well a model fits a sample (Hair et al., 2014). The RMSEA fit index also demonstrated a good model fit for this sample. The TLI is not as sensitive to changes in sample size, and the CFI less sensitive to the complexity of models (Hair et al., 2014). Initially, both these indices were just below the cut-off indicating a fair fitting model. However, after correlating the errors both were within the cut-off indicating a good model. Overall, the majority of the CFA output indicated a good fit of the original 5-factor structure of the MCQ-30 in this ARMS sample using the most commonly used and recommended indices (Hair et al., 2014; Hoe, 2008; Hu & Bentler, 1999).

To explore other possible latent structures for the MCQ-30, a PCA was run with a 5-factor solution suggested by the scree plot, which was almost identical to the original solution. However, a four factor solution was suggested by the results of parallel analysis. A 4-factor solution was therefore specified and the PCA re-run. All items loaded under their original subscales except the negative beliefs about the need to control thoughts subscale. The items for this measure were split between factor 1, negative beliefs about uncontrollability and danger of thoughts (4 items) and factor 4, cognitive self-consciousness (2 items). However,

these loadings made theoretical sense (e.g. if someone is feeling the need to control thoughts they will likely increase monitoring of their thoughts hence the loading of negative items on the cognitive self-consciousness subscale). Further, the CFA results established that the original 5-factor model had a better fit than the 4-factor model recommended by the parallel analysis. All fit indices for the 5-factor model showed a better fit including the SRMR which is the statistic that is recommended for comparing models (Hair et al., 2014).

Convergent validity was tested by correlating the MCQ-30 with depression, social anxiety, and beliefs about paranoia. Consistent with our hypotheses, significant positive relationships were found between the MCQ-30 and depression and social anxiety, which fit with the findings of past research. Moderate to large positive relationships between the negative subscales of the MCQ-30 and the negative beliefs subscale of the BAPS were also found. Positive beliefs about worry subscale of the MCQ-30 and the survival subscale of the BAPS were significantly positively correlated. This would be expected as these subscales both concern beliefs about the usefulness of such worrying and paranoid thoughts (respectively). In line with our hypothesis, no significant correlation existed between the MCQ-30 and the BAPS normalizing beliefs subscale. Negative beliefs about uncontrollability and danger and cognitive self-consciousness subscales were the two highest scoring subscales of the MCQ-30, a finding which fits with past ARMS research.

Despite the good fit illustrated by the comprehensive examination of various tests of validity and reliability, some limitations exist for this study. The use of secondary data meant that other tests of validity and reliability could not be run. Test-retest reliability for example, was not examined because the study involved a psychological intervention that lasted for six months. This could have led to different responses at the 6-month time-point from participants who received treatment. With regards to criterion validity, which is described as how much scores on a measure relate to the gold standard (Terwee et al., 2007), as the MCQ-30 is considered to be the gold standard measure of metacognitive beliefs this test could not

be carried out. Although measures that assess some related concepts such as the Thought Control Questionnaire (Wells & Davies, 1994) could have been utilised instead, the use of secondary data meant that this could not be tested in the current study.

Although the internal consistency scores for all MCQ-30 subscales were between acceptable and very good, and males and females had similar Cronbach's alpha scores on four out of five of the subscales, there was a noticeable difference on the negative beliefs about the need to control thoughts subscale. Females scored higher on this subscale than males. It is not possible to determine the reasons for this from this study, however past research has found that females tend to ruminate more than males (Bahrami & Yousefi, 2011; Johnson & Whisman, 2013). Due to this, it is possible that females may feel the need to control their thoughts more than males. The male internal consistency score was still within acceptable parameters, so it seems the difference does not have an effect on the overall reliability of the subscale in the context of this study. However, it would be worth exploring this difference in future studies to better understand the variance.

In summary, psychometric analysis appears to confirm that the original 5-factor structure of the MCQ-30 is valid for measuring metacognitive beliefs in those with an ARMS. The MCQ-30 with ARMS samples can be interpreted in the same way as in other psychological disorders. Future studies might find it useful to validate the MCQ-30 in other samples across the psychosis spectrum (e.g. first episode psychosis), and consider testing theoretical models using this tool. Further tests of reliability and validity that could not be conducted in the current study should also be examined in future work. It might also be useful for CFA analyses to be conducted in larger samples to better establish the latent structure of the instrument, and for closer examination of any gender differences on individual subscales of the measure.

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Conflict of interest

None.

Chapter 5: Study 3 - Metacognitive beliefs as psychological predictors of social functioning: An investigation with young people at risk of psychosis

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Metacognitive beliefs as psychological predictors of social functioning: An investigation with young people at risk of psychosis

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5.1 Abstract

Poor social functioning has been found to be present in those at risk for psychosis. This study aimed to examine metacognitive beliefs as potential predictors of structured activity (measure of social functioning) in those with an At Risk Mental State (ARMS). Regression and correlation analyses were conducted. The sample included 109 young people. Age was found to be positively correlated to structured activity. Metacognitive beliefs concerning uncontrollability and danger of worry were found to negatively predict structured activity. This was after controlling for age, gender, treatment allocation, cognitive schemas, positive symptom severity, social anxiety, and depression. Metacognitive danger items were most important. Age was the only control variable found to be an independent predictor of structured activity in the regression model, despite negative bi-variate relationships with structured activity found across three cognitive schema subscales and social anxiety. This is the first study to find that higher negative metacognitive beliefs about uncontrollability and danger predict lower social functioning in an ARMS sample, and that the perception of thoughts being dangerous was of particular importance. Psychological interventions should consider targeting this metacognitive dimension to increase social functioning. Future longitudinal research is required to strengthen findings in this area.

Keywords: Metacognition; Structured activity; Cognitive; ARMS; Schemas; Positive symptoms; Social anxiety; Depression

5.2 Introduction

Poor functioning has been found to be present prior to the onset of psychosis and as such, is included in the criteria for identifying those with an 'At Risk Mental State' (ARMS) (Cannon, Cadenhead, Cornblatt, & et al., 2008; Yung et al., 2004; Yung et al., 2005). Social functioning specifically has received increased attention in at risk for psychosis research. The definition of social functioning varies across research in this area. Based on the measures used to assess social functioning in past research with young people with an ARMS, this construct tends to relate to occupational and educational performance, relationships with peers and family members, engagement in leisure and sports activities, level of independence and interpersonal and communication abilities (Addington, Penn, Woods, Addington, & Perkins, 2008; Addington et al., 2013; Ballon, Kaur, Marks, & Cadenhead, 2007; Cornblatt et al., 2007; Hodgekins et al., 2015; O'Brien et al., 2006; Palmier-Claus et al., 2016; Rapado-Castro et al., 2015).

Social functioning (measured with the Time Use Survey) has been found to be significantly lower in those with an ARMS and those experiencing psychosis than in the non-clinical population (Hodgekins et al., 2015). The Time Use Survey measures structured activity (i.e. education, employment, leisure and sports activity, childcare and housework and chores). Hodgekins et al. (2015) identified that 50% of those with an ARMS engaged in 30 hours or less of structured activity per week. Participants scoring 45 hours or less per week on this measure were considered to be 'socially disabled' (significantly lower social functioning scores than the non-clinical population) and scoring within clinical parameters.

Past research has identified social functioning to be both a 'trait' and 'state' factor in those at risk of schizophrenia (Shim et al., 2008). However, Shim et al. (2008) found that positive and negative symptoms did not have significant relationships with social functioning. However, significant relationships between social functioning and depressive, negative and disorganised symptoms, but not positive symptoms in young people at risk for psychosis have been

reported (Corcoran et al., 2011). Chudleigh et al. (2011) in a study of the early stages of psychosis found significant relationships between positive symptoms and qualitative (but not quantitative) measures of social functioning in those at risk for and experiencing a first episode psychosis. No significant relationships were found between social functioning and negative symptoms. They also reported large significant associations between depression and quantitative and qualitative measures of social functioning in those at risk for psychosis. Social anxiety did not have any relation to social functioning in those at risk for psychosis, but large correlations were found between these variables in the first episode psychosis group (Chudleigh et al., 2011). It appears that the relationship between social functioning and symptomatology is a complex one in those experiencing early psychosis. Social functioning difficulties are known to be a source of distress for young people experiencing them, above and beyond psychotic and depressive symptoms (Rapado-Castro et al., 2015). More work needs to be done to establish the factors related to social functioning in those experiencing psychosis.

From the perspective of psychological research and intervention, cognitive therapy approaches have focused on negative beliefs (cognitive schemas) as a key area of investigation and are an integral element in some cognitive models of psychosis (Garety, Bebbington, Fowler, Freeman, & Kuipers, 2007). Negative beliefs about the self and others were found to be significantly higher in clinical groups (ARMS, first episode psychosis and a help-seeking psychosis group) than in non-clinical controls (Taylor et al., 2014). Another study found high ratings of the same negative schemas to be significantly related to lack of trust and social isolation, whilst positive beliefs about the self and others were significantly linked to reduced levels of social isolation (Addington & Tran, 2009). This indicates a potential relationship between negative schemas and social functioning.

However, recent work has begun to question the primacy of cognitive schemas in psychopathology, and metacognition (broadly defined as thinking about thinking) has become

a focus of investigation (Wells, 2009). In the Self-Regulatory Executive Function (S-REF) model, (Wells & Matthews, 1994, 1996), a metacognitive model of psychological disorders, dysfunction is thought to be caused by repetitive negative thinking that is difficult to bring under control as well as increased self-focussed attention. This Cognitive Attentional Syndrome (CAS) consists of rumination, worry, threat monitoring and engagement in unhelpful coping strategies (e.g. avoidance of others, thought suppression, substance misuse). The CAS is hypothesised to be linked to underlying knowledge about cognition (i.e. metacognitive beliefs) and therefore metacognitive beliefs rather than cognitive schemas are considered to be predominant contributors to the development and maintenance of psychological disorder. According to the model there are two main types of metacognitive beliefs, positive beliefs and negative beliefs. Measures have been developed to assess such metacognitive beliefs, the primary one being the metacognitions questionnaire-30 (MCQ-30) (Wells & Cartwright-Hatton, 2004). This measure assesses five dimensions of metacognitive beliefs. Positive beliefs about worry which concerns the benefits to engaging in worry (e.g. *Worrying helps me cope.*); negative beliefs about uncontrollability of thoughts and danger which relate to the perceived dangerousness of thoughts (e.g. *I could make myself sick with worrying.*); cognitive confidence (e.g. *I have a poor memory.*); negative beliefs about the need to control thoughts (e.g. *If I did not control a worrying thought, and then it happened, it would be my fault.*); and cognitive self-consciousness (e.g. *I monitor my thoughts.*).

Consistent with this theory, past research has identified unhelpful metacognitions to be present in those experiencing depression (Papageorgiou & Wells, 2001; Wells et al., 2009), anxiety (Wells & King, 2006), and psychosis (Austin et al., 2014; Morrison et al., 2007; Morrison & Wells, 2007; Rachel Sellers, Varese, et al., 2016). A related concept of meta-worry (Wells 1994), which consists of worry about worry has also been found to be positively associated with delusional distress (Freeman & Garety, 1999). Also change in meta-worry appears to correlate with symptom change in people undergoing cognitive therapy for

psychosis (Parker, Wells, & Morrison, 2014). Unhelpful metacognitions have also been identified as being present in those at risk for psychosis (Barbato et al., 2014; Cotter et al., 2017; Morrison et al., 2007; Welsh et al., 2014). Cotter et al. (2017) conducted a systematic review and meta-analysis of metacognitive beliefs in those at risk for psychosis and found that those with an ARMS had significantly elevated scores ($p < 0.001$) on measures of metacognitive beliefs than healthy controls. This was true for all metacognitive subscales except positive beliefs about worry ($p = 0.053$). No significant differences were found between those with an ARMS and those experiencing psychosis. This past research provides evidence of the presence of unhelpful metacognitive beliefs in those at risk for psychosis. However, no research to date has explored how these metacognitions, as described by the Wells and Matthews model, affect social functioning in young people with ARMS. This is an important area because metacognitions, especially those related to uncontrollability or danger of thinking, might impact on activity levels and represent a common factor contributing to both risk and reduced activity.

This study aims to explore the role of metacognitive beliefs in predicting social functioning in those at risk for psychosis. Although there is no past research on the effects of metacognitive beliefs on social functioning specifically, there is an increasing amount of research identifying the presence of maladaptive metacognitions in a range of psychological disorders including ARMS. Further, the S-REF model suggests that metacognitive beliefs are linked to unhelpful coping strategies as typified by the CAS, such as increased worry and avoidance. Coping in this way is likely to lead to reduced social contact, and if persistent over time social isolation. It was predicted, therefore, that metacognitive beliefs will be negatively related to social functioning. However, the paucity of research in this specific area means that it is difficult to make specific predictions about which metacognitions might be involved. Due to this, we kept our hypothesis broad and investigated all of the metacognitive beliefs as measured by the

MCQ-30. This study controlled for age, gender, cognitive schemas and symptoms to assess the contribution of metacognitive beliefs in predicting structured activity.

5.3 Methods

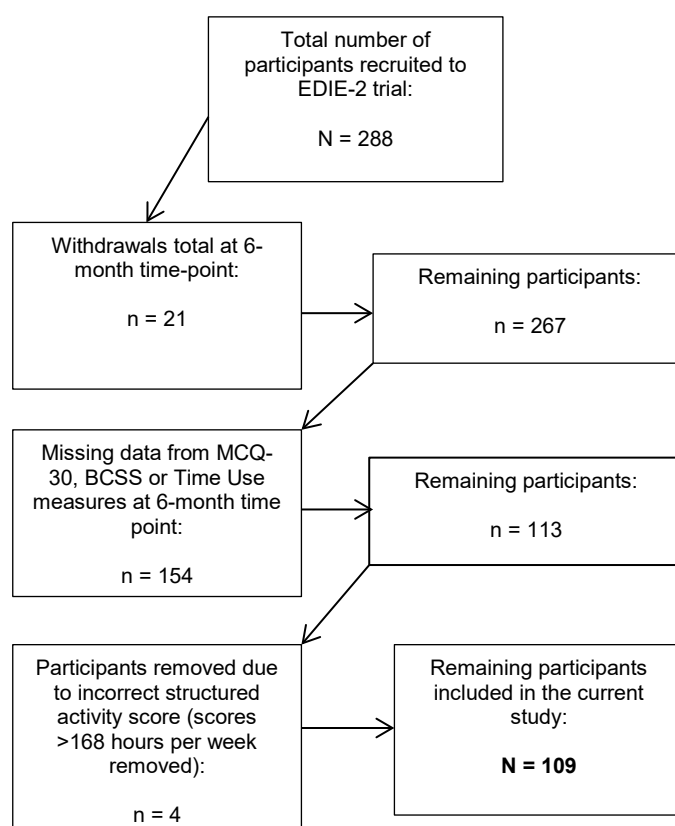
5.3.1 Participants

Data used for this study were drawn from measures administered with participants identified as being at risk for psychosis in the Early Detection and Intervention Evaluation 2 (EDIE-2) trial (Morrison et al., 2012). EDIE-2 was a multi-site randomised controlled trial with young people at risk for psychosis investigating the efficacy of Cognitive Therapy (CT) on reducing transition to psychosis. Participants were recruited from 5 UK sites: Manchester, Birmingham/Worcestershire, Glasgow, Cambridgeshire and Norfolk. The study recruited 288 participants (144 in each arm) aged 14-35 years. Participants were allocated to receive CT plus monitoring or monitoring alone. Monitoring involved signposting where symptoms worsened, providing helpline telephone numbers and checking participants were registered with their GP. Monitoring in both arms was conducted on a monthly basis for the first 6 months, and then once every 3 months thereafter. More detailed follow-ups were conducted at 6, 12, 18 and 24 months. CT was found not to significantly reduce transition to psychosis, but did reduce the severity of symptoms in those at risk for psychosis.

Data for this study were drawn from measures administered at the 6 month time-point because this was the only time-point both of the key measures required for analysis (i.e. metacognitive beliefs and social functioning measures) were administered. The total sample size for the primary analysis in this study was 109 participants rather than all 288 recruited into EDIE-2. Figure 8 shows how the number of participants included in this study was arrived at. Participants allocated to the treatment arm of the EDIE-2 trial would have received therapy prior to completing these measures as CT was provided over the first 6 months. There was a relatively even split for those who received CT (n=56) and those allocated to treatment as usual (n=53). The male to female ratio was 63:46. Sixty seven per cent of those recruited into

the EDIE-2 study were found to meet criteria for at least one other psychological disorder, as defined by the Structured Clinical Interview of DSM-IV Axis I Disorders (SCID). Depression (31.5%) was the most common co-morbid disorder followed by panic disorder without agoraphobia (12.5%), and then social phobia (10.42%).

Figure 8. Illustration of how the participant number (N = 109) is arrived at in this study



5.3.2 Design and analyses

This study is cross-sectional in nature using data collected at the 6-month time-point.

Bi-variate (Pearson) correlation analyses were conducted to examine relationships between cognitive and metacognitive subscales, symptoms and structured activity. Hierarchical multiple linear regression analyses were performed testing metacognitive beliefs as predictors of structured activity, whilst controlling for age, gender, treatment allocation, positive symptoms,

social anxiety, depression and cognitive schemas. All analyses were performed using IBM SPSS Statistics Version 22 (SPSS).

5.3.3 Measures and procedures

The Comprehensive Assessment of At Risk Mental States (CAARMS) is a semi-structured interview, developed by Yung et al. (2005), that assesses for psychotic symptoms and determines if individuals are at risk for psychosis. This measure can also detect if individuals meet criteria for psychosis. ARMS status is determined if participants fall into any of the following groups within the preceding 12 months of the CAARMS assessment being administered: 1) Genetic risk in a first degree relative; 2) Attenuated psychotic symptoms; or 3) Brief Limited Intermittent Psychotic Symptoms (BLIPS) that resolve within a week without antipsychotic medication. Individuals will also have to score 50 or less (1 = very poor general functioning (e.g. severe attempts on ending own life) and 100 = excellent general functioning (e.g. involved in a variety of activities) on the Global Assessment of Functioning scale (GAF) in the past month or have a drop in functioning by 30% or more in the last 12 months. It is worth noting that the version of the CAARMS in the EDIE-2 trial used the GAF to measure general functioning, rather than the updated 2014 version that uses the Social and Occupational Functioning Assessment Scale (SOFAS) which is a purer measure of social functioning as it does not include symptomology (e.g. anxiety or mood) in the scoring. The CAARMS used in the current study has been found to have ‘good to excellent reliability’ (Yung et al., 2005, p.964).

The Time Use Survey (created by the Office for National Statistics for a study exploring the Time Use of the general population (Lader, Short, & Gershuny, 2005)) was used to measure social functioning in the form of structured activity in the EDIE-2 trial. Structured activity in this measure is defined as time spent in paid employment, education, voluntary work, leisure and sports activities, child care, and housework and chores. The Time Use Survey covers several of the areas earlier identified as being measures of social functioning in past research.

Weekly hourly scores were calculated for each participant in the EDIE-2 trial by asking about structured activity in the last 3 months. This quantitative measurement of structured activity allows social functioning to be measured across participants. Structured activity at the 6 month time point will be the focus of this investigation.

The Meta-Cognitions Questionnaire-30 (MCQ-30) (Wells & Cartwright-Hatton, 2004) is a 30-item self-report questionnaire. It measures five dimensions of metacognitive beliefs about worry and thoughts as well as judgements about thinking and it has been found to have good reliability and validity (Wells & Cartwright-Hatton, 2004). Cronbach alphas were calculated for the MCQ-30 in the current study and all sub-scales had high reliability with Cronbach alphas in excess of 0.8. Positive beliefs about worry $\alpha = 0.93$; negative beliefs about uncontrollability and danger $\alpha = 0.90$; cognitive confidence $\alpha = 0.89$; negative beliefs about the need to control thoughts $\alpha = 0.81$; and cognitive self-confidence $\alpha = 0.88$.

The Beliefs about the Self and Others (BCSS) (Fowler et al., 2006) is a 24-item self-report questionnaire that was designed to measure cognitive schemas in psychosis. Four schemas are measured: positive beliefs about the self; negative beliefs about the self; positive beliefs about others; and negative beliefs about others. Internal consistency has been found to be reliable (Fowler et al., 2006) and appropriate (Addington & Tran, 2009) in the ARMS population. Cronbach alphas for the current study were more than 0.8 illustrating high reliability. Negative beliefs about self $\alpha = 0.86$; negative beliefs about others $\alpha = 0.92$; positive beliefs about self $\alpha = 0.88$; and positive beliefs about others $\alpha = 0.94$.

The Beck Depression Inventory-7 (BDI7) is a brief 7-item self-report measure used to assess level of depression. Past research has found this measure to be highly reliable and valid (Beck et al., 1997). Reliability was also high for the data in this study with a Cronbach alpha of 0.91.

The Social Interaction Anxiety Scale (SIAS) 20-item self-report measure of social anxiety found to be reliable and valid (Mattick & Clarke, 1998). The SIAS measures worries about

general social interactions, and items are linked to the DSM-III-R criteria for social phobia (Mattick & Clarke, 1998). Cronbach alpha of 0.93 showed high reliability in this study,

Research assistants who were fully trained in administering all the measures collected the data in the EDIE-2 trial. A more comprehensive description of the study procedures can be found in Morrison et al. (2012).

5.4 Results

5.4.1 Descriptive statistics

Descriptive statistics for age, structured activity, GAF, CAARMS symptom severity, SIAS, BDI, BCSS and MCQ-30 scores at 6 month time point are shown in Table 12. The number of participants included in the analyses with an ARMS was 106, as defined by the CAARMS criteria (symptoms met within 12 months). The other three participants met criteria for psychosis. Forty-five of the ARMS participants were experiencing current (within last month) ARMS symptoms at the 6 month time-point.

Table 12. Descriptive statistics

Factor	N	Minimum	Maximum	Mean	Standard Deviation
Age	109	14.00	34.00	20.71	4.34
Structured activity	109	0.08	126.31	39.21	27.94
GAF	109	10	90.00	60.19	15.92
<i>CAARMS symptom severity:</i>					
Unusual thought content (UTC)	109	0	6.00	1.43	1.86
Non-bizarre ideas (NBI)	109	0	6.00	1.75	1.73
Perceptual abnormalities (PA)	109	0	5.00	1.39	1.66
Disorganised speech (DS)	109	0	4.00	1.08	1.25
BDI Total	105	0	18.00	5.36	4.68
SIAS Total	104	0	73.00	30.75	18.07
<i>Schemas:</i>					
BCSS Negative self	109	0	22.00	5.63	5.60
BCSS Negative other	109	0	24.00	7.57	6.36
BCSS Positive self	109	0	24.00	8.07	6.10
BCSS Positive other	109	0	24.00	9.44	6.39
<i>Metabeliefs:</i>					
Cognitive confidence	109	6	24.00	11.92	4.70
Positive beliefs about worry	109	6	24.00	10.40	4.67
Cognitive self-consciousness	109	6	24.00	14.98	4.90
Negative uncontrollability and danger	109	6	24.00	14.30	5.47
Beliefs about thought control	109	6	23.00	11.79	4.27
MCQ-30 Total	109	30.00	105.00	63.39	17.27
Danger Total	109	3.00	12.00	6.72	2.87
Uncontrollability Total	109	3.00	12.00	7.58	3.02

5.4.2 An examination of the relationship between metacognitive beliefs, cognitive schemas, age, gender, symptoms and structured activity.

Pearson correlations were conducted to examine the inter-relationship between measures. The coefficients are presented in Table 14. There was a moderate positive relationship between age and structured activity. Small negative relationships existed between both negative cognitive schema subscales and structured activity. A small positive correlation was present between the positive beliefs about self cognitive schema subscale and structured activity. No significant relationship was found between positive beliefs about others and structured activity. No significant relationships existed between any of the CAARMS symptom severity subscales or the BDI-7 and structured activity. A small negative relationship was found between the SIAS score and structured activity. One metacognitive belief subscale, negative beliefs about uncontrollability and danger, had a small negative relationship to structured activity. This subscale was broken down into its two parts (danger and uncontrollability). Danger and uncontrollability each had small negative relationships with structured activity.

5.4.3 Do metacognitive beliefs predict structured activity after controlling for age, gender, treatment allocation and cognitive schemas?

A mixed hierarchical multiple regression was run to establish whether metacognitive beliefs predicted social functioning outcome in those at risk for psychosis, controlling for the following variables: age, gender, treatment allocation and cognitive schemas (N=109). Age and gender were entered at step 1 of the model using forced entry. Age but not gender significantly predicted structured activity, multiple R was 0.09 $F(2,106) = 5.28, p < 0.01$. The adjusted R^2 was 0.07 indicating a small amount of variance could be explained by these predictor variables. Treatment factors were entered at step 2 and cognitive schemas at step 3 using forced entry. No significant relationships to structured activity were found for any of these variables with only age remaining significant at each step. Metacognitive beliefs were specified at step 4 and as there is a lack of past research in the area of metacognition and social functioning, the forward selection option was chosen to determine the strongest

Table 13. Correlation matrix for structured activity at 6 months, cognitive and metacognitive beliefs, age and gender (N=100)

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Structured activity 6 months	0.34**	-0.02	0.11	-0.06	-0.19	-0.08	-0.06	-0.11	-0.21*	-0.22*	-0.24*	0.21*	0.11	-0.11	-0.08	-0.10	-0.22*	-0.13	-0.20*	-0.21*
2. Age	-	-0.03	0.15	-0.06	0.08	0.08	-0.12	0.23*	-0.12	0.12	-0.11	0.11	0.06	-0.13	-0.13	0.09	0.11	0.02	0.13	0.08
3. Gender		-	-0.08	-0.07	0.05	0.12	-0.17	-0.09	-0.02	0.11	-0.03	0.08	0.11	0.08	-0.03	-0.03	0.25*	-0.01	0.19	0.27**
4. Treatment allocation			-	-0.07	0.01	-0.12	0.02	0.05	0.00	0.04	0.05	-0.11	-0.05	-0.01	0.21*	0.10	0.02	0.05	-0.04	0.08
5. Unusual thought content severity				-	0.51**	0.47**	0.34**	0.30**	0.18	0.27**	0.16	0.04	0.02	0.18	0.07	0.15	0.26*	0.30**	0.28**	0.20*
6. Non-bizarre ideas severity					-	0.32**	0.20*	0.43**	0.33**	0.41**	0.22*	-0.08	0.02	0.24*	0.19	0.33**	0.36**	0.43**	0.33**	0.34**
7. Perceptual abnormalities severity						-	0.08	0.17	0.12	0.22*	0.00	0.05	-0.07	0.07	-0.10	0.06	0.05	0.26**	0.00	0.10
8. Disorganised speech severity							-	0.05	0.20*	0.13	0.18	0.06	0.00	0.12	0.03	0.00	0.01	0.08	0.06	-0.04
9. BDI-7 Total								-	0.33**	0.63**	0.38**	-0.23*	-0.24*	0.27**	0.19	0.44**	0.48**	0.43**	0.43**	0.48**
10. SIAS Total									-	0.52**	0.35**	-0.36**	-0.33**	0.46**	0.36**	0.30**	0.38**	0.40**	0.35**	0.35**
11. BCSS Negative self										-	0.43**	-0.37**	-0.24*	0.36**	0.23*	0.36**	0.45**	0.41**	0.43**	0.41**
12. BCSS Negative other											-	-0.15	-0.24*	0.33**	0.30**	0.25*	0.35**	0.46**	0.31**	0.34**
13. BCSS Positive self												-	0.65**	-0.28**	-0.08	-0.07	-0.12	-0.23*	-0.05	-0.16
14. BCSS Positive other													-	-0.18	-0.21*	-0.18	-0.19	-0.24*	-0.15	-0.21*
15. Cognitive confidence														-	0.31**	0.33**	0.19	0.40**	0.16	0.18
16. Positive beliefs about worry															-	0.52**	0.32**	0.54**	0.25*	0.34**
17. Cognitive self-consciousness																-	0.55**	0.53**	0.54**	0.49**
18. Negative beliefs uncontrollability and danger																	-	0.46**	0.93**	0.93**
19. Beliefs about thought control																		-	0.04**	0.46**
20. Danger total																			-	0.73**
21. Uncontrollability total																				-

Correlation significance levels:

*0.05 level

**0.01 level

individual predictors. Negative beliefs about uncontrollability and danger was found to be a negative predictor of structured activity, R square change = 0.04, F change = 4.51, $p = 0.04$.

As negative beliefs about uncontrollability and danger of thoughts entered the model, uncontrollability and danger items that constitute this factor were examined separately to extract more data on specific predictors of structured activity. The regression was run again exactly as described above, but instead of including all metacognitive belief subscales at step 4, the danger and uncontrollability sub-sets of items were entered instead. Danger, but not uncontrollability was found to be a negative predictor of structured activity, R square change = 0.03, F change = 4.11, $p = 0.045$. The summary statistics for each step in the equation of this model are displayed in Table 14.

5.4.4 Do metacognitive beliefs still continue to contribute to structured activity when also controlling for CAARMS symptom severity, social anxiety and depression?

A further mixed hierarchical regression was run to test if metacognitive beliefs continued to contribute to structured activity when also controlling for symptoms ($N=100$). Age and gender were entered at step 1, treatment allocation at step 2, CAARMS symptom severity at step 3, SIAS and BDI-7 at step 4 and cognitive schemas at step 5 all using forced entry. Metacognitive beliefs were entered at the final step (step 6) using forward entry. Age continued to significantly predict SA, multiple R was 0.12 $F(2,97) = 6.52$, $p < 0.01$. The adjusted R^2 was 0.10. Negative beliefs about uncontrollability and danger also continued to contribute to structured activity when controlling for symptoms, R square change = 0.03, F change = 4.05, $p = 0.047$. Danger remained a predictor when re-running this analysis as described above, but including danger and uncontrollability sub-subscales instead of metacognitive beliefs in the model at step 6 ($N=104$). The R square change was 0.03, F change = 4.17, $p = 0.044$.

Multicollinearity was not an issue in any of the regression models. None of the inter-correlation coefficients were higher than 0.80 suggesting none of the variables in the models measured the same construct. Further, the Variance Inflation Factor (VIF) statistics for all

variables were less than 10 (highest VIF out of all models = 2.56) and all Tolerance figures more than 0.20 (lowest Tolerance figure = 0.39) providing additional confirmation that multicollinearity was not present between any of the variables. The Durbin-Watson values were within acceptable parameters (ranging between 2.02 and 2.56 across all models) indicating that no autocorrelations were made to the residuals in the models. Normality of residuals was tested using a histogram and normal P-P plot. The residuals were normally distributed. Scatter plots showed the assumptions of homoscedasticity to be met.

Table 14. Output for all steps of the regression model predicting structured activity using separate danger and uncontrollability totals in step 4 controlling for cognitive schemas, age, gender and treatment allocation (N=114)

	ΔR	ΔF	p	β	t	\bar{p}
<i>Step 1</i>	0.09	5.62	0.005			
Age				0.30	3.353	0.001
Gender				0.02	0.17	0.864
<i>Step 2</i>	0.00	0.05	0.821			
Age				0.30	3.30	0.001
Gender				0.02	0.18	0.861
Treatment allocation				0.02	0.23	0.821
<i>Step 3</i>	0.07	2.25	0.069			
Age				0.25	2.70	0.008
Gender				0.03	0.34	0.738
Treatment allocation				0.07	0.74	0.462
BCSS Negative beliefs about others				-0.08	-0.70	0.487
BCSS Positive beliefs about self				-0.15	-1.40	0.166
BCSS Negative beliefs about self				0.17	1.33	0.185
BCSS Positive beliefs about others				-0.03	-0.26	0.797
<i>Step 4</i>	0.03	4.11	0.045			
Age				0.28	2.96	0.004
Gender				0.06	0.69	0.493
Treatment allocation				0.06	0.66	0.510
BCSS Negative beliefs about others				-0.01	-0.06	0.956
BCSS Positive beliefs about self				-0.12	-1.08	0.282
BCSS Negative beliefs about self				0.19	1.54	0.127
BCSS Positive beliefs about others				-0.06	-0.48	0.634
MCQ-30 Danger				-0.21	-2.03	0.045

5.5 Discussion

Examination of the psychological predictors of structured activity could provide a useful step forward in understanding variation in structured activity and provide a means of linking it meaningfully with risk. In this study we examined the role of metacognitive beliefs, whilst controlling for other factors that could also contribute to social functioning outcome.

Consistent with our predictions, metacognitive belief was found to be a negative correlate of structured activity. A single metacognitive belief subscale, negative beliefs about uncontrollability of thoughts and danger, predicted structured activity over and above control variables. The findings show that the higher the score on this subscale, the lower the social functioning. This was the case after controlling for age, gender, treatment allocation, positive symptom severity, social anxiety, depression and cognitive schemas. Due to the lack of past research exploring the effects of metacognitive beliefs on social functioning, we were unsure which subscales would be predictors in the regression model. These results give us a better idea of specifically which metacognitive beliefs may need to be targeted and examined further.

Although three of the four cognitive schemas correlated with social functioning, when added to the regression model none of the cognitive schema subscales predicted social functioning. Social anxiety was the only symptom to correlate with structured activity. None of the symptoms included in the regression model were found to predict structured activity.

These data are consistent with the idea that structured activity is a marker for maladaptive metacognitive beliefs concerning the dangerousness and (possible) uncontrollability of one's thoughts. Such metacognitions have been causally linked to the development of psychological disorder (Wells, 2009). Therefore, an important possibility is that specific metacognitions could account for both greater at risk status and reduced social activities. Why should someone with such metacognitions show reduced social functioning? It is likely that believing that one's thoughts are dangerous leads to avoidance of situations that may provoke negative thoughts in an attempt to keep oneself and other's safe. Reduced social functioning releases

the individual from having to constantly monitor and control thinking to prevent threat. However, this must remain highly speculation as the design of this study does not allow for the testing of causal relationships.

Age was found to significantly predict social functioning with younger people experiencing poorer social functioning than older people. This finding suggests the importance of controlling for age in examining relationships between psychological factors and levels of social functioning, and provides further support to the notion that mental health and social functioning problems begin during youth (Singh et al., 2010) and specifically in those with an ARMS (Cannon et al., 2008; Yung et al., 2004; Yung et al., 2005). However, whether the strength of the relationship varies with age cannot be determined from the study.

There are substantial limitations in this study. First, the data are cross-sectional in nature and, therefore, causality cannot be determined. Furthermore, the measures used were administered at post-treatment, and although we controlled for treatment we have no way of knowing how this might have affected the relationships observed. Further, the CT model used in EDIE-2 (French & Morrison, 2004) permits the targeting of metacognitive beliefs as well as cognitive schemas. The main aim of EDIE-2 was to reduce transition to psychosis, so it is expected that symptom severity would also be affected by the intervention. Therapists work with participants on identifying core beliefs (e.g. 'I am worthless'), and metacognitive beliefs (e.g. 'If I keep thinking in this way I will go mad.'). Beliefs were addressed using CT strategies such as, creating alternative reasons for events, examining evidence, advantages and disadvantages analysis or through use of behavioural experiments (French & Morrison, 2004). Working with beliefs may have contributed to reducing the presence or impact of such cognitive and metacognitive beliefs as well as symptoms, affecting the results of this study.

Finally, the proportion of unique variance explained by metacognitions was very small, which questions the clinical significance of the findings. It should however be acknowledged that the

current test is quite stringent as metacognitions emerged after the control of several factors including the provision of treatment that might impact directly on social functioning

Despite these limitations, this study provides a preliminary indication that metacognitive beliefs about the uncontrollability and dangerousness of thoughts could be a predictor of social functioning in young people at risk for psychosis. Deconstructing this metacognitive belief by breaking it down into its constituent parts revealed that beliefs about the dangerousness of thoughts was of particular significance. Interventions for improving social functioning in those at risk for psychosis could consider targeting this metacognitive dimension. However, future longitudinal research should be conducted ensuring measures are administered in the pre-treatment phase. In doing this, we can perhaps come closer to understanding which psychological factors increase or reduce vulnerability to psychosis and poor social functioning as well as improving social recovery in an ARMS.

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Conflict of interest

None.

Chapter 6: Study 4 - An exploration of how the S-REF model of metacognition emerges in accounts from young adults at risk of long-term social disability and perceived effects on social functioning: A framework analysis

This paper has been submitted for publication and is currently under review

An exploration of how the S-REF model of metacognition emerges in accounts
from young adults at risk of long-term social disability and perceived effects on
social functioning: A framework analysis

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6.1 Abstract

Young people experiencing mental health problems often experience comorbid social functioning difficulties. This qualitative study aimed to explore how the self-regulatory executive functioning (S-REF) model of metacognition is represented in a sample of young people identified as being at-risk of long-term social disability, and the perceived effects of this model on social functioning from the perspective of this sample. Nineteen participants took part in this study. A framework analysis firstly identified several elements related to the S-REF model for this group across three overarching themes. The first overarching theme was related to the cognitive attentional syndrome (CAS): (1) CAS strategies and processes. Subthemes related to worry and rumination were primarily centred around social interactions, performance and past adverse events. Threat monitoring that focussed on the body language of others was another subtheme, as well as reassurance seeking and self-soothing. The second overarching theme was related to metacognitive beliefs: (2) Metacognitive beliefs about uncontrollability, danger and being prepared. Subthemes related to uncontrollability of thoughts, negative beliefs about the dangerousness of thoughts to mental health, and leading to adverse interactions or harm to others, and positive beliefs about being prepared. (3) A third overarching theme related to the consequence of metacognitive processing, which in this sample was exhaustion. Participants perceived the effects of engaging in unhelpful metacognitive processes and beliefs as either leading to an increase or decrease in social functioning. As a result a fourth overarching theme of: (4) Adjustments to levels of social functioning was developed as a result. Themes were found to have meaningful interrelatedness. This study highlights potential areas of vulnerability in this group with regards to long-term social functioning problems, which requires further investigation.

6.2 Introduction

It has been identified that around 75% of mental health problems begin in adolescence and early adulthood (Kessler et al., 2005; Kim-Cohen et al., 2003). Associated social functioning difficulties are also found in young people experiencing mental health problems. In the

current study, social functioning is defined as engagement in any occupational, educational, sports or leisure activity. The concept also extends to include childcare, housework and chores, interactions with others and hobbies.

A study that compared social functioning scores of participants across the psychosis spectrum to a non-clinical population, found that those with an at risk mental state (ARMS) for psychosis and those experiencing psychosis engaged in significantly less structured activity than a non-clinical sample (Hodgekins et al., 2015). A brief version of the original Office for National Statistics Time Use Survey (Short, 2006) was used in this study to measure levels of structured activity (i.e. employment, education, voluntary work, leisure, sports, childcare, housework and chores, and hobbies) amongst participant groups. The study identified weekly scores for various levels of social disability as follows: ≥ 45 hours = non-clinical range ('*No social disability*'); > 30 and < 45 hours per week = '*At risk of social disability*' (clinical range); ≥ 15 and ≤ 30 hours = '*Social disability*' (clinical range); and ≤ 15 hours = '*Severe social disability*' (clinical range) (Hodgekins et al., 2015, p.191). Another study with young people who were help seeking for mental health difficulties (e.g. anxiety and depression), found that 19% of participants were not in education, employment or training (NEET) (O'Dea et al., 2014). This study also found that those who were NEET had more complex mental health problems emphasising the importance of early intervention in this group. Further, the authors found that those who were NEET were more likely to be male, aged between 20 and 25, be involved in criminal activity, use cannabis and be depressed (O'Dea et al., 2014). However, these factors only accounted for 10% of the variance in this study (O'Dea et al., 2014), suggesting other factors contribute to NEET status. Other examples of factors found to be associated with social functioning in past research include negative symptoms and statements about self (Voges & Addington, 2005), comorbid severe depression and severe anxiety (Hecht et al., 1990), and bullying (Addington et al., 2013). More research needs to be conducted however to

learn more about the development of social functioning difficulties in early mental health problems.

One factor that may be linked to social functioning is metacognition. Metacognition in broad terms refers to thinking about thinking (Flavell, 1979). Different models of metacognition exist. For example, theory of mind (ToM) is a metacognitive dimension involving the ability to understand other peoples' thoughts and intentions (Frith, 2012), and deficits have been linked to social functioning difficulties in psychosis (MacBeth et al., 2014). In a parallel area, metacognitions concerning ones' own thoughts are considered central to psychological dysfunction in the self-regulatory executive function (S-REF) model (Wells & Matthews, 1994).

The S-REF model of metacognition refers to a perseverative thinking style that is theorised to be linked to the development of psychological disorder (Wells, 2009; Wells & Matthews, 1994). According to Wells and Matthews (1994), the S-REF model involves the Cognitive Attention Syndrome (CAS). The CAS is a cyclic thinking process involving worry (future focussed), rumination (past focussed), threat monitoring, increased self-focussed attention, and unhelpful coping behaviours (e.g. avoidance, thought suppression, substance use or reassurance seeking) (Wells, 2009; Wells & Matthews, 1994). Engaging in the CAS is considered unhelpful because it maintains a sense of threat and inflexibility in response to negative thoughts and emotions. Further, the S-REF model suggests that such engagement in the CAS drains individuals of mental resources that they might otherwise use to cope in a more helpful way (Wells, 2009).

Metacognitive beliefs are thought to drive the CAS and are measured with the Metacognitions Questionnaire-30 (MCQ-30: Wells and Cartwright-Hatton, 2004). This measure has five subscales: Positive beliefs relating to the benefits of engaging in worry (e.g. *Worrying helps me to avoid problems in the future.*); Negative beliefs referring to beliefs about the uncontrollability and

dangerousness of thoughts (e.g. *My worrying thoughts persist, no matter how I try to stop them.*, *My worrying is dangerous for me.*); Cognitive confidence (e.g. *My memory can mislead me at times.*); Negative beliefs about the need to control thoughts (e.g. *Not being able to control my thoughts is a sign of weakness.*); and Cognitive self-consciousness (e.g. *I am constantly aware of my thinking.*).

A large body of research has accumulated in support of the presence of aspects of the S-REF model in a range of mental health problems. This includes psychosis spectrum conditions (Morrison et al., 2007; Rachel Sellers, Varese, et al., 2016; Rachel Sellers, Wells, Parker, & Morrison, 2018; Welsh et al., 2014), and anxiety and depression (Callesen et al., 2014; Cartwright-Hatton & Wells, 1997; Spada et al., 2008; Wells, 2005; Wells & Cartwright-Hatton, 2004; Wells & Papageorgiou, 1998).

Recent research has emerged suggesting a contribution of metacognitive beliefs to social functioning. Bright et al. (2017) found negative beliefs about uncontrollability and danger to be a predictor of social functioning (structured activity) in young people at risk for psychosis. The authors found that beliefs relating to the dangerousness of thoughts were of particular significance in this group (Bright et al., 2017). Another study found metacognitive beliefs related to the need to control thoughts predicted work status in people with trait anxiety (Nordahl & Wells, 2018). Despite the preliminary evidence that metacognitive beliefs are associated with social functioning levels, more research needs to be conducted to determine how these beliefs present in a population of young people experiencing mental health and social functioning difficulties. Furthermore, little is known about the effects of the CAS on social functioning, which is important considering it is such an integral part of the S-REF model.

The aim of this study was to answer the following research question: *How are metacognitive processes and beliefs, as defined by the S-REF model, represented in young people with a history of mental health and social functioning problems, and what are the perceived effects as described by this sample?* This

overarching research question is broken down into two parts: 1) *Are particular elements of the S-REF model important for this sample? If so, what are they?* 2) *How do young people with a history of low levels of social functioning and mental health difficulties perceive the effects that these metacognitive processes have on their social functioning?*

A qualitative method was chosen for this study to allow for an in-depth exploration of how the S-REF model of metacognition presents in a sample of young people with a history of mental health and social functioning difficulties. Further, this method was deemed appropriate because there is little prior knowledge in this area, so gaining rich preliminary data is important and a qualitative method allows for this.

6.3 Methods

6.3.1 Participants and recruitment

Participants identified as having experienced mental health problems and low levels of social functioning as a result of these psychological difficulties, were recruited for this study. The *Prevention and treatment of long-term social disability amongst young people with emerging severe mental illness: A definitive randomised controlled trial* (PRODIGY) study is a current research trial, with young people aged 16 to 25 years experiencing mental health and social functioning difficulties (Fowler et al., 2017). In addition to being aged between 16 and 25 years, additional inclusion criteria for PRODIGY was experiencing a mental health problem (e.g. having an at risk mental state (ARMS) for psychosis, anxiety or depression); be experiencing low levels of social functioning as a result of these difficulties; and mental health and social functioning difficulties had to be present for at least six months. Current or historical psychosis excluded participants from the PRODIGY study, as well as being diagnosed as having a severe learning disability. In the PRODIGY study, participants were randomised to either a social recovery cognitive behavioural therapy (SRCBT) or treatment as usual (TAU) arm of the study. Participants were in the study for two years and had four assessments throughout; a baseline assessment, and

three follow-ups at, 9, 15 and 24-months. See the PRODIGY trial protocol for further details (Fowler et al., 2017).

Engagement in structured activity was the primary outcome in the PRODIGY study, and the brief version of the Time Use Survey (described earlier) was used to measure this. Time spent interacting with others in a less structured way via direct (socialising face-to-face at home or in the homes of others), and indirect (e.g. gaming, phone, texts, social media) were also assessed by the Time Use Survey. Participants were asked about their activity levels over the past month, and only those engaging in less than 30 hours per week in structured activity were included in the PRODIGY study.

The Comprehensive Assessment of At-Risk Mental States (CAARMS: Yung et al., 2005) was used to identify people with an ARMS. The CAARMS can also identify those experiencing psychosis (Yung et al., 2005). The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID) was used to assess for any other psychological difficulties.

Only participants who took part in the pilot phase of the PRODIGY trial in Manchester (England, UK), had mental capacity to provide informed consent, and who were not currently receiving inpatient treatment were eligible to take part in the current study. Participants were only approached after their involvement in the PRODIGY pilot study had ended.

As the only exclusion to the mental health problem experienced at entry to the PRODIGY study was current or historical psychosis (although an ARMS was acceptable), this meant the sample in the current study experienced a range of mental health problems. Almost all participants (n=18, 94.74%) experienced an anxiety disorder at some point during their participation in PRODIGY. Seventeen participants (89.47%) had at least one major depressive episode, and just over half (n=10, 52.63%) met criteria for an ARMS. Fifteen participants (78.95%) experienced co-morbid mental health problems at some point.

Fifty participants were recruited into the PRODIGY study at the Manchester site, and of these 32 agreed to be contacted about future research. Participants were randomly selected to be approached about the current study. Two participants refused to take part, one was ineligible, two unsuitable (meets eligibility criteria, but study not suitable for participant at the time (e.g. one participant was a psychiatric inpatient and their parent contacted to advise they were too unwell to take part)), and eight were uncontactable. The remaining 19 participants agreed to take part in the study. Nine participants had received SRCBT and 10 did not (TAU).

Participants were aged between 19 and 29 years (mean age 23.84 years, standard deviation (SD) 2.85 years). Fifteen participants (78.95%) described themselves as White British, three as Asian or Asian British Pakistani (15.79%), and one as Black or Black British Caribbean (5.26%).

Selected participants were sent an opt-out letter (Appendix 7), stamped addressed envelope, and participant information sheet by post (Appendix 8), and given at least 1 week to reply before being contacted via telephone about the study. Participants were provided with several ways to opt-out of being contacted (i.e. texting code provided in the opt-out letter, which in this case was their PRODIGY study ID, email, telephone call or by post using the stamped addressed envelope provided), so as to make this process as easy as possible. The reply slip provided with the opt-out letter allowed participants to provide up-to-date contact details allowing the researcher to contact them successfully. When contacted by phone, participants were given the opportunity to ask any questions they had about the study, a summary of the study procedure, and the option of being seen at home, in a community venue, at the research University or NHS sites.

6.3.2 Data collection

Semi-structured interviews were conducted with all participants by the lead author, with the aim of lasting between 30 and 60 minutes. The mean interview length was 38.89 minutes (SD: 14.04, minimum: 19.53, maximum: 72.12 minutes). Interviews were audio recorded and

transcribed verbatim. The Metacognitive Profiling Interview Schedule (Wells & Matthews, 1994) is a semi-structured interview, which asks questions related to the S-REF model of metacognition to elicit information about metacognitive processing. A topic guide pooled questions from the Metacognitive Profiling Interview Schedule (Wells & Matthews, 1994) along with additional questions relating to social functioning. The topic guide was adapted after the second interview to include a question about the advantages and disadvantages of worrying. This final version (Appendix 5) was used in all subsequent interviews.

In addition to the semi-structured interview, several measures were completed by participants in order to describe the sample. The same shortened version of the Time Use Survey used with participants during their participation PRODIGY (described earlier), was administered. Participants were asked about activity over the past month, and a weekly score calculated and reported in hours.

In addition to the Time Use Survey, four self-report measures were given to participants to complete. A demographics form gathered general demographic data (e.g. age, gender, ethnicity) as well as information about who participants lived with.

The MCQ-30 (Wells & Cartwright-Hatton, 2004) a 30 item self-report questionnaire, which measures current metacognitive beliefs about worry and thoughts as well as judgements about thinking. Five metacognitive beliefs are measured using this questionnaire: Positive beliefs about worry; Negative beliefs about uncontrollability and danger; Need to control thoughts; Cognitive self-consciousness; and Cognitive confidence. A four point likert scale is used to rate each statement (1 = Do not agree to 4 = Agree very much). The MCQ-30 has been found to have good reliability and validity in clinical and non-clinical samples (Bright et al., 2018; Grøtte et al., 2016; Wells & Cartwright-Hatton, 2004).

The Cognitive Attention Syndrome-I (CAS-I: Wells, 2009, p.268) is a 16-item self-report measure that assesses the frequency of worrying, strategies used to cope with negative thoughts and feelings, and beliefs people have about worry and thoughts. Metacognitive beliefs are theorised to drive the CAS hence the use of this questionnaire in conjunction with the MCQ-30.

Multidimensional Scale of Perceived Social Support (MSPSS: Gregory D. Zimet et al., 1988) is a 12 item self-report questionnaire which determines the perceived level of support participants feel they have from others such as, friends or family members (Gregory D. Zimet et al., 1988). A higher score denotes more perceived support. The MSPSS has been found to be reliable and valid in clinical and non-clinical samples (Wongpakaran, Wongpakaran, & Ruktrakul, 2011; G. D. Zimet, Powell, Farley, Werkman, & Berkoff, 1990).

The semi-structured interview was always conducted prior to the completion of the five aforementioned measures, so as not to bias the discourse provided by participants during the semi-structured interview. Participants were paid £10.00 cash to reimburse them their time in taking part in this study. All participants completed the study in full and there were no withdrawals.

6.3.3 Data analysis

Data was analysed using framework analysis, a type of thematic analysis. This method was chosen because it has been identified as suitable for deductive driven qualitative studies due to the systematic nature of this method (Gale et al, 2013). As this study analysed data based on the S-REF model of metacognition, specific headings relating to this model were used to categorise the data. Further, as framework analysis also allows for the analysis of unexpected (inductive) themes (Gale et al., 2013; Parkinson, Eatough, Holmes, Stapley, & Midgley, 2016), we were able to use this procedure to identify such themes related to perceived effects of metacognitive processes on social functioning in this sample. Microsoft Excel was used to

manage the data as past research has identified this as a suitable software package for conducting framework analysis (Swallow et al., 2003).

The five stage procedure of framework analysis described by Swallow et al. (2003) was used to guide the analysis of the interviews. A process of familiarisation with each audio recording was done by firstly listening to the audio recording, transcribing the recording, and then reading through the transcript to get a sense for each interview. First order coding was then conducted by hand on paper copies of the interviews. This was then transferred to the Microsoft Excel spreadsheet under the predetermined headings directed by the S-REF model of metacognition. Additional headings were added for themes related to effects of metacognitive processes on social functioning as they arose. The social functioning themes/headings were more guided by the data rather than the S-REF model of metacognition. A final column entitled 'other' was added to allow for unexpected themes to be recorded and potentially included in the analysis. Indexing (applying numeric and/or abbreviated codes, themes and sub-themes) was applied to the Microsoft Excel spreadsheet. Final analysis of the data was conducted by the lead author by comparing participant accounts and drawing conclusions. Coding and themes were checked by authors SP and AW throughout the analysis. This was done by each author coding the same transcript, and discussing key items they felt fit with the research questions and the theory underpinning it. MB also reviewed any emerging themes generated with AW and SP by examining the framework in Microsoft Excel. Any discrepancies were discussed and a final decision made on relevance. MB met with AD throughout the study to receive support and guidance on qualitative methodology.

6.3.4 Descriptive information

Table 15 shows some general characteristics for each participant. Seven participants described their gender as female, 11 as male, and one as fluid. Thirty-two per cent were in paid work, 5% in voluntary work, 11% were students, and 53% unemployed. With regards to living

arrangements, 32% of participants lived alone, whilst the remainder of the sample lived with either family or friends.

Table 15. Participant descriptive and demographic information

Participant ID	Pseudonym	Other non-PRODIGY support or treatment	Age	Gender	Marital Status	Employment Status	Number of people lives with	Who Lives With
P01	Zara	Primary Care Psychology	26	Female	Partner	Unemployed	0	N/A
P02	Alex	CMHT - DBT	26	Male	Single	Employed Paid work	1	Friend
P03	Harry	N/R	19	Male	Single	Unemployed	1	Family
P04	Evan	University counselling service	24	Male	Partner	Student	1	Family
P05	Ruby	N/R	21	Female	Partner	Employed Paid work	1	Family
P06	Ben	N/R	26	Male	Single	Unemployed	3	Family
P07	Dom	N/R	24	Male	Single	Employed Voluntary	0	N/A
P08	Sophia	Prescribed medication for anxiety and depression	25	Female	Partner	Unemployed	0	N/A
P09	Oscar	N/R	29	Male	Single	Employed Paid work	8	Housemates
P10	Lily	Current participant in research trial for people with an ARMS	27	Female	Single	Unemployed	0	N/A
P11	Jacob	N/R	21	Male	Single	Employed Paid work	2	Family
P12	Aria	N/R	21	Female	Single	Unemployed	3	Family
P13	Megan	Seeking support from GP for anxiety	21	Female	Single	Employed Paid work	1	Family
P14	Riley	N/R	21	Female	Partner	Employed Paid work	3	Family
P15	Gavin	Regular visits to GP to increase medication for psychotic symptoms	26	Male	Single	Unemployed	0	N/A

P16	Luca	N/R	27	Fluid	Single	Unemployed	0	N/A
P17	Blake	Referral made to EDIT service	20	Male	Single	Unemployed	5	Family
P18	Leo	N/R	24	Male	Married	Unemployed	2	Family
P19	Eli	N/R	25	Male	Single	Student	1	Family

Key: DBT = Dialectical Behaviour Therapy; CMHT = Community Mental Health Team; EDIT = Early Detection and Intervention Team (for people at risk for psychosis); N/R = No additional service support or treatment reported (not explicitly asked about in interview, so only naturally occurring discourse around this is recorded); Family = Living with parents, siblings, partner, children and/or other extended family members (e.g. aunt)

NOTE: Pseudonyms were used throughout this study to protect participants' identities and confidentiality.

Examination of individual mean structured activity scores highlighted that the majority of the sample (74%) were scoring in the clinical range, as defined by Hodgekins et al. (2015). Table 16 displays these scores, along with separate scores for each activity type, and direct and indirect unstructured interactions. Descriptives for the MCQ-30, CAS-I and MSPSS can also be viewed in Table 17.

Table 16. Time Use Scores (Hours per week)

Participant ID	Employment	Education	Voluntary	Leisure	Sports	Childcare	Housework	SA Total	Direct unstructured socialising	Non-Direct unstructured socialising
P01	0	0	8.77	7.52	3.73	0	30.69	<i>50.71</i>	30.31	1.33
P02	39.69	0	3.63	3	3.96	0	14	<i>64.28</i>	11	1.75
P03***	0	0	2.45	4.73	0.23	0	0.81	<i>8.22</i>	1.65	0.08
P04*	1.38	16.15	0	4.3	1.9	0	8.38	<i>32.11</i>	33	4.82
P05*	26.88	0	0	6.65	0.23	0	3.82	<i>37.58</i>	42.42	33.53
P06***	0	0.69	0	2.08	4.04	0	6.08	<i>12.89</i>	8.48	17.5
P07*	0.92	1.85	24.15	3.75	0	0	7.71	<i>38.38</i>	7.83	4.08
P08*	0	0	2.31	3.23	9.35	0	17.31	<i>32.2</i>	30.27	4.25
P09	42	0	5	4.62	5	0	6.67	<i>63.29</i>	18.08	14
P10*	0	0	0	38.87	0.92	0	1.81	<i>41.6</i>	0	0.35
P11	30.15	0	0	2.13	4	28	9.5	<i>73.78</i>	15	14.1
P12**	0	0	0.92	3.46	5.77	0	15.75	<i>25.9</i>	14.29	28
P13**	11.31	0	0	6.4	0	0	5.04	<i>22.75</i>	79.81	30.47
P14	37.5	0	0	7.38	0	0	0.92	<i>45.8</i>	37.96	62
P15***	0	0	2.33	0.54	2.12	0	0.85	<i>5.84</i>	19.71	10.5
P16***	0	0	0	1.67	0	0	3.2	<i>4.87</i>	15	26.24
P17***	0	0	0	5	0.08	0	1	<i>6.08</i>	0.19	1.9
P18***	0	0	0	0.38	0.17	0	0.35	<i>0.9</i>	34.63	0.2
P19**	0	0	8.08	18	2.54	0	1.08	<i>29.7</i>	75.81	37.94
Mean	9.99	0.98	3.03	6.51	2.32	1.47	7.10	31.41	25.02	15.42

Key: *= At risk of social disability; **= Social disability; ***=Severe social disability

No asterix = No social disability (Terms and criteria used to rate social disability status obtained from Hodgekins et al. (2015), p.191)

Table 17. Descriptive statistics for measures (N=19)

Factor	Min	Max	Mean	SD
MCQ-30 Positive beliefs	6.00	18.00	11.42	3.66
MCQ-30 Negative beliefs about uncontrollability and danger	7.00	24.00	15.32	4.75
MCQ-30 Cognitive confidence	6.00	18.00	12.00	3.71
MCQ-30 Negative beliefs about the need to control thoughts	6.00	20.00	12.42	4.40
MCQ-30 Cognitive self-consciousness	12.00	22.00	16.74	3.33
MCQ-30 TOTAL	45.00	88.00	67.89	14.44
CAS Processing Total	7.00	56.00	28.11	15.69
MSPSS Significant Other Total	1.00	7.00	4.78	1.79
MSPSS Family Total	1.00	7.00	4.03	2.20
MSPSS Friends Total	1.00	7.00	4.21	1.57
MSPSS Total	1.92	6.08	4.36	1.46

6.4 Results

6.4.1 Framework analysis results for Part 1: The representation of the S-REF model of metacognition

Metacognitive processes in line with the S-REF model of metacognition were clearly present within the data. In particular, prominent discourse around the CAS related to worry, rumination, unhelpful coping strategies, and threat monitoring were found. Two metacognitive beliefs were particularly important: uncontrollability and dangerousness of thoughts; and positive beliefs about worry. The consequence of engaging in metacognitive processing (i.e. exhaustion) also had a strong presence. Figure 9 illustrates these three overarching themes along with associated subthemes and perceived effects on social functioning (described later). What follows is a description of the three overarching themes related to how the S-REF model is represented in this sample.

6.4.2 Overarching Theme 1: CAS processing and strategies

This theme centred around worry and rumination about future or past interactions with others or activities. There was a strong sense from some of the discourse of concern about how participants come across to others and that they were potentially being judged in some negative way. In some cases, this negative undertone had roots in past events. Three subthemes emerged and are described below.

Subtheme 1.1. Worry related to social functioning

With respect to the CAS, there was a strong theme of the presence of persistent worry about social functioning. This included occupational worries about work or education:

'Erm, submission of my dissertation was a major one I mean I know I everyone worries about that but erm you see other people they reach a point where, close to submission they just think right that'll do that's, I could submit this and then they go and enjoy themselves, for me it was not (unclear) I would just worry myself sick up to it and keep keep worrying about it erm and any positive feedback

I'd get from my supervisor, I'd be trying to look for something that they might have said trying to read too much into what they've said.' ('Evan', lines 126-131).

Participants also reported worry about interactions with others or about performance. One participant talks about his account of worries he has about how he comes across to people during conversations, and how engaging in internal thought processes contributes to this:

Erm, yeah I, I've noticed that when, when I'm talking to, sort of outside socially and you know, I tend to come across quite nervous even when I'm not because me brain's sort of strugglin' to find the right words and the right sentences and the right subjects to speak about or to sort of converse with. Erm, so that I don't embarrass meself, and so I don't look stupid in front of people and you know an' but, in that sort of struggle of tryin' to find the right words, that just makes it worse.' ('Alex' lines 228-231).

Subtheme 1.2. Rumination about past performance and conversations

This subtheme relates to brooding on past performance and past conversations. There was a sense of persistence and intensity in these thoughts in participant reports.

'Erm, other things like if I make a mistake in something, then I won't stop thinking about it for days afterwards.' ('Evan', lines 119-120)

'And I kind of fixate on it and erm, I beat myself up over it, I go through a horrible cycle of arguments actually (laughs). I'll kind of I'll be really angry and I'll leave the room and I'll feel completely justified in the anger that I feel it's like no he said something that upset me, I should be this angry, any normal person would be this angry it's fine. And then I'll start to feel guilty after I've started to calm down, I'll feel really bad if I've said something mean to him or erm I feel really bad for shouting at him and then it kind of slips into me being angry at myself for feeling guilty.' ('Sophia', lines 433-438)

Subtheme 1.3. Rumination about past adverse events or trauma

This subtheme relates to participant accounts of rumination about past negative experiences or trauma.

'Erm, just erm, thoughts about how things were back in school and how they would affect me in the future.' ('Leo', lines 23-24) *'Erm like how people used to bully me, some used to take the micky out of me, about how I look.'* ('Leo', lines 27-28)

Subtheme 1.4. Threat monitoring by focussing on body language

Discourse related to threat monitoring primarily included accounts of how participants monitored the body language of others to either make judgements about what others were thinking or feeling about them, or to make judgements about the character of others.

'Erm, I would just look, if there's a group of them and they were talking, er, with each other and then looking at me, I would think that it was it is about me.' ('Leo', lines 190-191) *'I would, I would think that I was 100% sure that they were talking about me.'* ('Leo', line 210)

'Body language, er I don't know it's just I can think I can tell what people think you know I can I can just read and (unclear) you know. I know when someone's a bad I know when someone's a bad fish, you know.' ('Gavin', lines 331-333)

Subtheme 1.5 Reassurance seeking or self-soothing

Firstly, this subtheme relates to how participants sought reassurance from others in order to cope with the negative effects of engaging in the CAS.

'...because I said 'cause someone was upset an' I thought I'd done somethin' to upset them. I'm not friends with them anymore it was back in college, but I've always bin kind of like this so it could happen anytime. Erm and I said 'Are you upset? Have I done somethin'?'.' ('Megan', lines 564-566) *'God everythin's not about you' and I'm like 'Ok' and they got quite mad at me, I was like*

'Whatever you're dealin' with I am sorry, I didn't mean for it to sound like it's all about me I was just concerned about yer' because I just assume ahead that I've done something wrong to people.'

(‘Megan’, lines 568-570)

This sample also talked about reassuring themselves via strategies such as self-talk, for example. However, participant reports illustrate how this strategy is not particularly helpful.

'Erm, 'cause sometimes I'll feel really rational and I'll be like, you know what I'm 25 and I've graduated and I'm (unclear) hard time finding a job that's completely normal, this is a lovely house that I'm in, erm I'm totally employable, I'll find a job soon, it'll be fine.' (‘Sophia’, lines 381-383)
'And then 10 minutes later I'm like, what were you talking about (laughs out loud), everything's horrible you haven't got any money, you can't pay rent next month you know.' (‘Sophia’, lines 385-386)

6.4.3 Overarching Theme 2: Metacognitive beliefs about uncontrollability, danger and being prepared

This overarching theme related to negative metacognitive beliefs participants had around the uncontrollability and dangerousness of thoughts, and positive metacognitive beliefs relating to preparedness.

Subtheme 2.1. Negative beliefs about uncontrollability of thoughts

This theme relates to how participants believed that thoughts were uncontrollable.

'Instead of switchin' from one thing to the next on me own it starts doin' it by itself.' (‘Ben’, line 133)

'...worrying is just one of those things that happens, you can't switch it off, you can try, but you can't...' (‘Luca’, lines 691-692)

Subtheme 2.2. Negative beliefs about the dangerousness of thoughts worsening mental health

Participants talked about the dangerousness of thoughts with regards to concerns that they could lead to worsening their mental health in some way. Discourse centred around some sort of return to a previous undesired mental state.

'...I worry sometimes if it's for an extended period of time if I'm slipping back into, even if it's just one time, it scares me to think that I could end up like I was three four years ago.' ('Sophia', lines 113-115)

'Aw I don't know I just keep thinking that aw I'm gunna slip back into like this deep depression thing cos I'm doing alright at the moment and I'm not that bad but it it just it still freaks me out cos I know it could happen anytime soon and I'm just (sighs).' ('Aria', lines 85-87)

There was also evidence of how participants believed some of the thoughts around dangerousness were also uncontrollable:

'...when sort of things like that happen I can be, sort of like totally out of control an' they can just sort of like any negative thoughts can just drag me down wherever you know an' take me wherever they wanna take me there . An' then it, it's just recover it from that then (unclear) I have to try an' bring meself back to sort of normal again from that yeah.' ('Alex', lines 540-544).

Subtheme 2.3. Negative beliefs about the dangerousness of thoughts leading to adverse interactions with or harm to others

This subtheme relates to the belief that thoughts could lead to adverse interactions with or harm to others.

'Cos I just feel like I'm gunna snap at 'em and I won't be be nice to 'em.' ('Riley', line 241)

'...whether I have to punch a wall or it's punch a wall or they're gunna end up six feet under. They're the options (laugh). If you got problem with me it's not gunna be right, it will be errr ye errr it just wouldn't be pretty, it's more me reacting in that I still now even though I'm more older I still would

react how I would back then in those scenarios and I know there is that there's always that potential that it could happen, I've learnt that since I was little.' ('Luca', lines 150-155)

Subtheme 2.4. Positive beliefs about being prepared

With regards to positive beliefs about worry, participants mainly believed the benefits to worry or thinking a lot about things was to be prepared.

'A healthy amount of worrying yes 'cause it makes you think things through properly, erm plan in advance, that sort of stuff...' ('Sophia', lines 138-139)

'Cause he was unwell sorry. Because she said he would be fine I was like 'No no no, I know in my heart there's somethings wrong' so I was worried about him but I think it was good 'cause I think I prepared myself a bit more.' ('Megan', lines 343-345) *'Cause I I could just tell by the way he was actin' 'cause he wasn't well.'* ('Megan', line 350) *'Cause I saw it coming sort of thing. If I would have thought 'Oh he'll be fine', I would've been more upset I think.'* ('Megan', lines 354-355)

6.4.4 Overarching Theme 3: Consequence of engaging in metacognitive processing: Exhaustion

There was a strong reoccurring discourse around how tiring engaging in the CAS was for participants, with many referring to this thinking process as being exhausting or draining.

'Erm, it was exhausting. I find it difficult to stop the thoughts. Erm I can fixate on it, so often my main worry's been money.' ('Sophia', lines 86-87)

'Erm, I don't know it's just it's quite stressful as well worryin' all the time. I feel tired all the time. Like I sleep fine, but when I wake up I just always feel tired an' just a bit drained.' ('Megan', lines 368-369)

7.4.5. Framework analysis results for Part 2: Perceived effect on social functioning

The next step in the analysis (Part 2) involved an examination of how participants perceived the effect of engagement in metacognitive processes and beliefs on social functioning. One overarching theme was identified, which had two associated themes (each with two related subthemes). These themes are described below.

6.4.6 Overarching Theme 4. Adjustments to levels of social functioning

This overarching theme related to participant accounts of how their level of social functioning either increased or decreased as a result of engagement in metacognitive processes. The two related themes, reduced social functioning and increased social functioning, and associated subthemes are discussed in more detail below.

6.4.6.1 Theme 4.1. Reduced social functioning

Participants talked about ways in which the frequency or quality of social functioning was reduced as a result of the negative effects of engaging in metacognitive processes. Accounts also gave a sense that reduced social functioning was not just a conscious decision, but at times resulted from participants being entrenched in metacognitive processing.

Subtheme 4.1.1. Not engaging or difficulties engaging in structured activity

Participants gave accounts of how they found it hard to engage in structured activity whilst absorbed in internal thought processes, which led to reduced activity.

'Erm and erm I just wasn't really going out doing much, got quite insular and just, an' and that doesn't help because you're left with negative thinking (unclear) thought patterns and then it just kind of intensifies and you kind of become more of a hermit, it just spiralled out of control really.'

(*'Oscar'*, lines 53-55)

The indirect effect of tiredness resulting from engaging in metacognitive processing was also identified by participants as decreasing social functioning levels.

'Er say I do do that I try well sometimes on the weekend I'll just not leave the house, not speak to anyone that kind of stuff.' ('Dom', lines 123-124) *'Er, sometimes say I'm just kind of mentally exhausted from the week, I just want the rest.'* ('Dom', line 126)

Subtheme 4.1.2. Adverse effects on interactions

Discourse about the negative effects of engagement in unhelpful metacognitive processing on social interactions emerged as a subtheme. Anger and irritability and people getting frustrated were negative aspects talked about.

'Er well if I'm worrying a lot about somethin' I guess I'll kind of have a shorter temper, I'll not want to speak to as many people in any social situation. I might be a bit more quiet than usual.' ('Dom', lines 202-203)

'Erm, no I think it pisses people off I mean (laugh) I don't think, they might not understand and I'll just like I won't like explain or anything I'll just they'll just be like where you've gone like I might have not replied for like five day or something and I'll just say like hi or something.' ('Blake', lines 227-230)

There was also evidence of how engaging in metacognitive processes can lead to participants not being as fully engaged in conversations.

Engaging in CAS affected interaction during interview:

'Sorry I was thinking in my own head then can you ask the question again?' ('Harry', line 597)

7.4.6.2 Theme 4.2.: Increased social functioning

This theme relates to how participants increase social functioning to cope with the effects of engaging in metacognitive processes. It involves both the increase in activity and direct contact with others.

Subtheme 4.2.1. Increased engagement in activities

Participants talked about increasing activity levels through either structured activity or hobbies to cope.

'Ye, ye, ye or watching TV maybe I don't know, going on the laptop probably I mean or maybe tryna get some time to end up going to the gym but it depends if I've already been in the day or not (laughs).'

(Eli', lines 216-218)

'Erm I think sometimes er erm, I would make a plan to go somewhere, go watch a film , go for a coffee' (Zara', lines 169-170)

There was a general sense that participants were trying to avoid their thoughts by distracting themselves with activity.

'Erm, tryin' to think, I'd say it's more when I've had like an interaction from someone else it'll kind of take my mind off it like when I'm in work I try and stay as positive as possible 'cause I've got to that's the good thing about bein' in work it like takes my mind off it.' (Megan', lines 657-659)

Subtheme 4.2.2. Increased contact with others

Participants talked about how increasing direct (face-to-face) or non-direct (e.g. phone) contact with other people was another perceived effect of engagement in metacognitive processing.

'Er, I do try to talk to some friends about it to kind of get it off my chest and maybe see if they have advice or a better way to deal with each issue.' (Dom', lines 100-101)

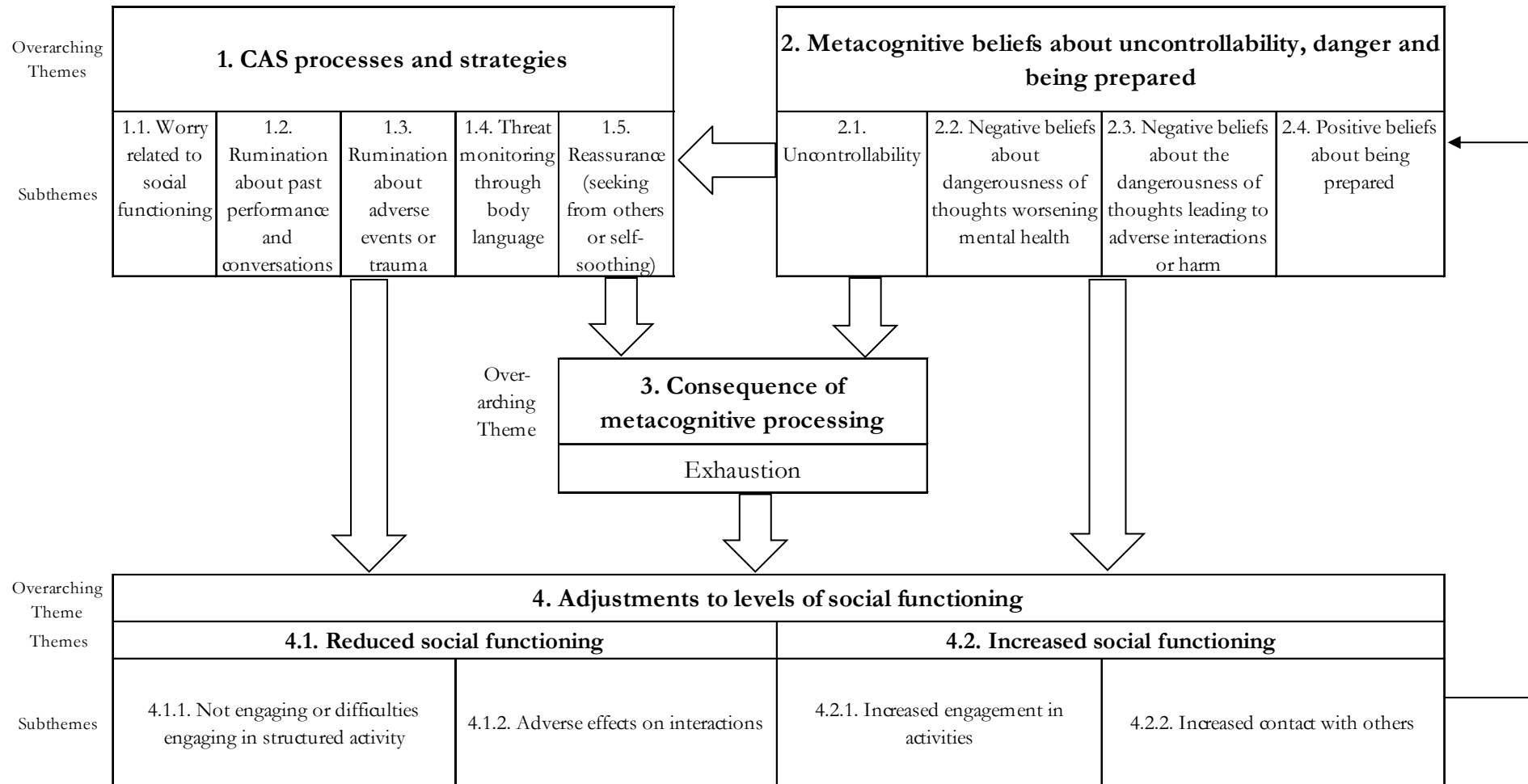
Accounts included discourse around the perceived positive effects of this on their mental state.

'Or if not I'll be like 'Oh I'll ring someone' and like an' I'll try an' get like, 'cause if someone's like havin' a good day they'll like it'll like rub off on me kind of thing. Erm, so I try an' just like if I can feel it comin' on most of the time I do.' ('Megan', lines 459-461)

Participant reports include discourse around how they only finding contact with certain people helpful.

'Yeah sometimes I just don't want to just do anything like yesterday I was just so pissed off like with work and stuff and my friend was like come up and see us we're in (name of town) and blab blab blab blab blab and do you know what I didn't even go and see them. I just went up to see me partner, I just what that's all I just need I just need a bug. That's that's all that I just wanted to do. I thought I don't want to see me friends I just want to see the person I'm with and cos makes me feel a bit more eased and stuff.' ('Riley', lines 232-237)

Figure 9. Visual representation of themes related to the S-REF model (Overarching Themes 1 to 3) and its perceived effects on social functioning (Overarching Theme 4)



6.5 Discussion

Part one of this study used a deductive driven framework analysis methodology to explore how the S-REF model of metacognition is represented in a sample of young people with a history of mental health and social functioning difficulties. There was a clear presence of themes related to the CAS and metacognitive beliefs as described by the model, which arguably is to be expected based on the strong evidence base. However, this study was more interested in unique and particularly important elements of the model for the study population.

Of the four overarching themes identified in this study, three were associated with part one. One overarching theme related to the CAS emerged, CAS processing and strategies, which had five subthemes. The first was worry related to social functioning, which might be anticipated in a sample experiencing social functioning difficulties. This subtheme had a flavour of the characteristics associated with social anxiety with some participants reporting fears of being judged negatively in interactions with others or behaving in a way that may be embarrassing. Further, this subtheme highlighted participant concerns about their own performance. It could be argued that this theme represents symptoms of social phobia, which may be the case. However, because worry is part of the CAS there will inevitably be some overlap across anxiety disorders (and this has been identified as an anxious group). Despite the fact that 18 of the 19 participants had at least one anxiety disorder during their participation in the PRODIGY study, only four had met criteria for social phobia. This provides an indication that the presence of this subtheme is more than just the symptoms of social anxiety. The important finding here is that the type of worry experienced by this sample is related to the performance and fear of negative evaluation from others. This can give clinicians a better idea of how to target worry in this population, and thus potentially reduce the risk of long-term social functioning problems.

The second subtheme was rumination about past performance and past conversations. This makes sense considering worries in this sample related to performance and interactions with others. In the context of the operational definition of social functioning used in this study and throughout this thesis, this focus on performance can help contextualise some of the reasons behind this sample's ability to perform various aspects of this construct. Further, this does not just apply to reduced activity, but also reasons for increased social functioning. A third subtheme related to rumination about past adverse experiences involving others or trauma (e.g. bullying, past abuse). There was some evidence that this subtheme spilled over into other aspects of the CAS (e.g. fourth subtheme threat monitoring by focussing on the body language of others to determine possible threat to self). A possible explanation for the presence of subthemes three and four is a concept known as interpersonal sensitivity. This relates to individuals who are particularly sensitive to social interactions, which leads them to monitor the behaviour of others for signs of potential negative evaluation (Boyce & Parker, 1989). As well as bullying being found to be linked to the development of paranoid ideation in those with an ARMS (Valmaggia et al., 2015), it has also been found to be associated with the development of interpersonal sensitivity in this group (Masillo et al., 2012). Further, a help seeking sample which included those experiencing anxiety and depression were also found to possess this personality trait (Masillo et al., 2017). It is possible that engagement in the CAS in relation to thoughts about past traumas and interactions with others may serve to maintain interpersonal sensitivity, which in turn could have negative effects on social functioning.

The fifth subtheme related to the CAS was reassurance seeking and self-soothing. This was in response to negative effects of metacognitive processing (e.g. the CAS and/or metacognitive beliefs) in an attempt to cope. Participants were found to seek reassurance from family members, partners or friends in an attempt to reduce distress. With regards to soothing themselves, there was a sense from the accounts that this was a way participants were self-regulating by using positivity or rationalising to reduce worry and/or distress. However, this

was not always helpful or had short-term effects. One explanation for the presence of this subtheme is that participants could be using techniques learned from engagement in therapy. However, not everyone that reported using this technique received therapy from the PRODIGY trial or elsewhere.

The second overarching theme for part one, metacognitive beliefs about uncontrollability, danger and being prepared, had four subthemes related to two metacognitive beliefs. The first was negative beliefs about the uncontrollability of thoughts where participants held beliefs that thoughts or worry was not in their control. The second subtheme was related to the dangerousness of thoughts in relation to them worsening mental health. In particular, participants had a fear that they may return to a past mental state associated with negative experiences and there was a sense of not being in control of this with terms such as ‘slipping back’ (‘Sophia’) or ‘slip back’ (‘Aria’) being used. This echoes the subtheme related to rumination about past adverse events, further illustrating the interconnectedness of the S-REF model, and building a picture of what preservative thinking might look like in this sample. The third subtheme also related to negative beliefs about the dangerousness of thoughts, but specifically in relation to thoughts leading to adverse events or harm to others. One of the perceived effects on social functioning identified was adverse effects on interactions (subtheme 4.2). Some of the adverse effects reported could be due to this metacognitive belief.

The presence of the negative beliefs about uncontrollability and danger metacognitive belief supports the findings in earlier research, which found this metacognitive belief to be the only one of the five to predict social functioning (Bright et al., 2017). Further, it could help better understand why the dangerousness of thoughts was found to be particularly important. However, the aforementioned study was conducted with an ARMS sample only, whereas the current study includes those with and without an ARMS. Participants with and without an ARMS reported uncontrollability and danger beliefs in the current study. It could be argued

therefore that the heterogeneity of the sample with regards to the psychological difficulty they are experiencing may not be of importance when establishing factors that contribute to social functioning. Instead what may be more important is the homogeneity of the group in the fact that they all have a history of social functioning difficulties, and are at risk of long term social disability.

Positive beliefs about being prepared was the third subtheme related to metacognitive beliefs. As this sample were found to reassure themselves and self-soothe to reduce or avoid negative thoughts or feelings, one possible explanation for this emerging as a theme is that participants were trying to protect themselves from future negative events and associated thoughts and feelings. This is illustrated in the earlier quote from 'Megan' in describing how she prepared herself mentally for her pet dying by monitoring its behaviour. In her preparation, 'Megan' also uses past memories of a pet dying (body language and behaviour) to conclude that her current pet was going to die. 'Megan' believed that in doing this she was protecting herself from negative feelings by mentally preparing herself for her pet's death. However, this strategy does not allow participants to learn to manage negative thoughts or feelings which they are unable to prepare for. This might explain 'Megan's' heavy reliance on contact with others (and resulting increased contact with others) to help her cope with negative thoughts and feelings. Further, the fact that 'Megan' talks about how her mum tried to reassure her by telling her that her pet would be fine, but she did not take this view on-board because she felt she knew the signs better, illustrates that despite receiving reassurance from her mum, 'Megan' chose to continue to engage in worry about her pet's death. In this case, 'Megan' was right in the fact that her pet did die. However, situations such as these serve to reinforce beliefs that threat monitoring (in this case looking for signs that her pet may die) is required and that beliefs that individuals have around what they think may happen are in fact true, when the reality may be that a lot of the time beliefs about potential threat are erroneous. This is in keeping with the S-REF model and the negative effects of engagement in the CAS (Wells, 2009).

The third overarching theme related to the consequence of engaging in metacognitive processing, namely exhaustion. According to the S-REF model, this could lead to participants finding it more difficult to respond in more helpful ways to their experiences thus maintaining habitual ways of thinking. This was included as a distinctive theme because of its strong presence in the data, and its reported perceived indirect effects on social functioning. Further, although this is mentioned in the S-REF model, there does not appear to be much focus of this element in research. This could be an important aspect of the CAS, particularly in relation to levels of social functioning in samples experiencing mental health problems.

Part two of the framework analysis in this study was more inductive with few preconceptions about what we might expect to find. The aim of part two was to investigate the perceived effects of engagement in the CAS and metacognitive beliefs on social functioning. The overarching theme for this part of the study was adjustments to the levels of social functioning, which related to participants making conscious decisions to decrease or increase their levels of activity or interactions with others. This theme also captured reduced activity that was not consciously decided upon, but a side effect of engagement in metacognitive processing. As past research has primarily focussed on poor or low levels of social functioning, it might be expected that the result of engaging in unhelpful metacognitive processes in a sample experiencing mental health problems is reduced social functioning. However, the increase in social functioning resulting from metacognitive processing may arguably be less expected. This finding could be important as it highlights that engagement in activity in and of itself does not necessarily mean that participants were not experiencing distress or clinical symptoms. 'Alex' for example, scored well within the non-clinical range for structured activity, but reported some of the most intense engagement in the CAS and negative and positive beliefs in comparison to other participants (including those scoring within clinical range). Participants were found to be increasing activity as a coping strategy to avoid or attempt to stop negative thoughts and feelings, and this was certainly the case for

'Alex'. It is possible that the unhelpful way in which participants respond to negative thoughts and emotions could open them up to becoming vulnerable to slipping back into low levels of activity when their coping strategies fail to work. It is possible the way in which participants respond to their thoughts could relate to the psychological difficulty they are experiencing at the time. However, it is also possible that because this sample has a history of difficulties with social interactions, some participants may have found it more difficult to articulate their internal thought processes. Further, as can be seen in the quote from 'Harry' (under results section subtheme 4.1.2), other participants could also have been engaging in the CAS during the interview thus affecting the depth of content. This could explain reasons behind perceived cognitive deficits observed by researchers and clinicians when working with individuals experiencing mental health problems. According to the S-REF model, individuals do not typically possess deficits in cognition, but instead are heavily engaged in metacognitive thought processes.

There is some evidence of the use of more helpful ways of coping used by participants where they have discovered that just doing something anyway made them realise that their worries were unfounded. 'Zara' for example, talked about worries she had about not being able to cope on her own when moving from supported accommodation to live independently. 'Zara' decided to move anyway and in doing so discovered that she could cope on her own:

'I thought maybe it wasn't the right time to move because I was still in therapy from the eating disorder.' ('Zara', 95-96) *But at the same time I was still in recovery and I was really worried that there's not, nobody around during the day and what if I have, have a bad day or something, two bad days in a week and then, I was worried that I'd get ill, but erm I saw it through to the end and it really helped and I managed to get better.'* ('Zara', 101-104)

This is in keeping with the S-REF model which posits that in avoiding situations participants do not discover the reality of the situation, thus re-enforcing erroneous beliefs. It is unclear

how or why 'Zara' came to this point as it is beyond the scope of this study. However, it does raise questions about the potential usefulness of certain psychological interventions. For example, in Metacognitive Therapy (MCT) detached mindfulness is one of the strategies used to help participants to not engage with their thoughts. The concept behind it is that participants discover that in leaving their thoughts alone and just doing things anyway, negative thoughts will naturally fade away. Individuals will then discover that their worrying was unnecessary. MCT could potentially be a useful intervention for this group with regards to reducing engagement in unhelpful metacognitive processes, and thus reducing distress. Further, it could allow participants to engage in social functioning in more meaningful ways (e.g. instead increasing activity or interactions to cope, individuals can choose to do this for enjoyment or to build meaningful relationships with others).

Potential limitations exist for the current study. Firstly, it is possible that those who did not take part in this study were predominantly a lower functioning sample who found social interactions more difficult. Conversely, it is also possible that those who were uncontactable or who did not wish to take part in future research were a higher functioning sample who perceived research as help seeking which they felt they no longer required. Either way, this could have biased the results. Secondly, the interviewer also worked on the PRODIGY study pilot as a research assistant collecting data at baseline and follow-ups. The interviewer had met all participants of the current study on at least one occasion and for most, more than once. This pre-existing relationship with participants could have led participants to feel they were able to talk more freely about their experiences allowing for the collection of rich data. However, other researchers who wished to replicate this study may find varying levels of disclosure. Participants in the treatment arm of the PRODIGY study may have felt reluctant to disclose any difficulties they were experiencing should this come across as a failure on the part of the PRODIGY study with regards to the effectiveness of SRCBT. This pre-existing relationship could have led the interviewer to unconsciously use pre-existing knowledge of the

participant in the questioning. However, the use of a structured topic guide and regular meetings with co-authors with no involvement in the PRODIGY study (AW and AD) and with qualitative expertise (AD), may have mitigated any negative impact this pre-existing relationship could have had. Inter-rater reliability checks with co-authors may also have controlled any potential impact this pre-existing relationship may have had on analysis. This study may have benefited from also using validation procedures such as ‘member checking’ (Birt, Scott, Cavers, Campbell, & Walter, 2016), which is a method that assesses for trustworthiness of qualitative study results by checking with participants that the interpretation of their interviews was correct. However, inter-rater reliability checks and the involvement of a qualitative researcher who was able to view the study from different theoretical perspectives (other than the S-REF model of metacognition) contributed to enhancing the trustworthiness of this study. Finally, although we feel that the use of a deductive approach in answering part one of this study was an appropriate method to use, doing so could have limited other possible findings from coming through that could be important. For example, this study included participants who previously participated in a research trial investigating the effectiveness of a psychological intervention (SRCBT) on social functioning levels. The focus on the S-REF model could have led to important factors associated with treatment allocation outcome being missed. This is an inevitable limitation of deductive qualitative research, countered by the rigour and transparency with which this study was carried out. Further, a more inductive driven analysis was conducted for part two, which was more suitable as this was the area we wanted to learn more about because there were little pre-existing ideas about what we might find.

To conclude, there is a clear presence of distinctive components of the S-REF model in this sample. This study highlights how this model presents in a sample with a history of mental health and social functioning problems, and its perceived effects as described by participants. Findings from the current study illustrate that examination of metacognitive processes and

beliefs (as described by the S-REF model), and individual responses to them, may also be a good indicator of how participants are coping and the potential long term risk of social functioning problems. It may also serve to highlight potential areas of vulnerability that may lead individuals to experience long-term social disability, and thus future targets for intervention. This study brings to the fore the need for clinicians to explore the purpose or function of increased activity when working with service users. Future studies should consider examining the content of psychological interventions to establish its usefulness in addressing potential areas of vulnerability in this group. Further, potential associations between the S-REF model of metacognition and social functioning should be explored, taking into consideration other possible factors that may be involved in this relationship.

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Ethical approval

The current study was approved by South Yorkshire Research Ethics Committee (REC reference: 16/YH/0199). The pilot phase of the PRODIGY study was approved by the England Cambridgeshire and Hertfordshire National Research Ethics Service Committee (REC reference: 12/EE/0311).

Conflict of interest

None.

Chapter 7: Study 5 - Metacognitive beliefs as predictors of social functioning in a non-clinical sample: A longitudinal and cross-sectional investigation

Metacognitive beliefs as predictors of social functioning in a non-clinical sample:
A longitudinal and cross-sectional investigation

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7.1 Abstract

Aims: Social functioning difficulties have been identified as an issue in a range of mental health problems. This study aimed to investigate predictors of social functioning in a non-clinical sample to learn more about potential early indicators of social functioning problems.

Methods: Two social functioning measures were used in the current study, the Social Functioning Scale (SFS) and the Time Use Survey (TUS). Measures of metacognitive beliefs, cognitive schemas, depression, social anxiety and psychotic-like experiences were also included in this study. The sample included 254 people from the general population. Correlational analyses and cross-sectional and longitudinal regressions were conducted. There was an eight week interval between the baseline and follow-up assessments used in the current study.

Results: Age, social anxiety, depression and negative schemas predicted social functioning in a cross-sectional regression with the SFS as an outcome variable, but not with the TUS as the outcome. Positive beliefs about worry and negative beliefs about uncontrollability and danger were found to predict SFS in a cross-sectional regression after controlling for the aforementioned variables, and this relationship was positive. Cognitive confidence was found to predict SFS scores and this relationship was negative. Social anxiety was found to be of particular importance as it was the only variable to predict social functioning (TUS) longitudinally (with the exception of the TUS Time 1 control variable) with higher levels of social anxiety predicting lower social functioning. None of the variables predicted SFS longitudinally but variability in social functioning over time was small.

Conclusion: Metacognitive beliefs contributed to social functioning in correlational analyses, with higher positive and negative beliefs about worry associated with lower functioning. The positive relationship identified by the regression between these beliefs and the SFS requires further investigation. Higher cognitive confidence was associated with greater functioning. Social anxiety also appears to be important in this construct. Future research should investigate these relationships further ensuring that at least two measures of social functioning

are used to capture the different relationships associated with different aspects of this construct, and studies must consider the impact of associated constructs such as social anxiety.

7.2 Introduction

Social functioning can be operationally defined in various ways (Brissos et al., 2011) but can be usefully considered as, the ability to perform different societal roles and activities in relation to interpersonal relationships and interactions with others; employment and education; independent living; and pleasurable and meaningful activities (Bright et al., Chapter 3). It has been a focus of research due to the prevalence of difficulties experienced in this area across a range of psychological disorders. Due to the evidence that exists in relation to the association between social functioning problems and mental health, a number of psychological disorders have social functioning problems as part of the diagnosis criteria. The Comprehensive Assessment of At-Risk Mental States (CAARMS) (Yung et al., 2005), used to identify people with an ARMS, is one such example. Furthermore, social functioning levels not only reflect symptoms of disorder they can be a source of additional distress. In a sample of people with an ARMS, social functioning was a source of distress over and above positive symptoms and depression (Rapado-Castro et al., 2015).

Past research has explored potential contributory factors to the development and maintenance of social functioning problems. One study found that in early psychosis significant relationships existed between positive symptoms and qualitative (measured by the World Health Organisation Disability Assessment Scale II: WHODAS), but not quantitative (measured by the Social Functioning Scale: SFS (Birchwood et al., 1990)) measures of social functioning (Chudleigh et al., 2011). No significant relationships were found between social functioning and negative symptoms. Chudleigh et al. (2011) also found large and significant relationships between depression and in quantitative and qualitative measures of social functioning. Social anxiety had no association with social functioning in an ARMS sample, but

did in the first episode (FEP) sample (SFS and WHODAS) (Chudleigh et al., 2011). An Association between social anxiety and social functioning (SFS) in FEP was also observed by Voges & Addington (2005). Correlations were conducted in this study, so causation cannot be inferred from this. However, it does provide some indication of possible factors associated with social functioning. Another study found that poor social functioning (measured by the Social Adjustment Scale-Self Report: SAS-R) was associated with depressive, negative, and general symptoms, but was mainly associated with negative symptoms (Corcoran et al., 2011). Contrary to some of these findings, another study reported that neither positive or negative symptoms were associated with social functioning (measured with the SFS) (GeumSook Shim et al., 2008). However, upon closer examination these studies used a range of different measures of social functioning. In addition to the already complex interrelationships found between different factors and social functioning in past research, another layer of complexity is the fact that there are many different measures to assess this construct. It is important therefore that researchers consider this when interpreting and conducting research.

As well as symptoms being a source of investigation in relation to social functioning, cognitive schemas have also been considered a contributor. In a study that used the SFS and the Quality of Life Scale (QLS) (Heinrichs, Hanlon, & Carpenter, 1984) to assess social functioning in people experiencing first episode psychosis, as well as negative symptoms, negative self-statements predicted social functioning (SFS) (Voges & Addington, 2005). Further, negative schemas about the self and others were found to be associated with reduced trust and social isolation, whilst positive beliefs about self and others reduced social isolation (Addington & Tran, 2009).

In addition to cognitive schemas being a possible contributor to social functioning, there has been an increased interest in metacognition as a factor that not only contributes to psychopathology, but as a contributor to social functioning. Generally, metacognition refers to thinking about thinking and different models exist. The S-REF model of metacognition refers

to a cyclic thought process known as the cognitive attentional syndrome (CAS) which consists of worry, rumination, threat monitoring and unhelpful coping behaviours (e.g. avoidance) (Wells & Matthews, 1994). This perseverative process is theorised to lead to the development and maintenance of psychological disorder (Wells, 2009; Wells & Matthews, 1994).

Metacognitive beliefs are said to drive the CAS and are measured by the Metacognitions Questionnaire-30 (MCQ-30: Wells and Cartwright-Hatton, 2004). The MCQ-30 assesses Positive beliefs about worry (e.g. *Worrying helps me to avoid problems in the future*); Negative beliefs about uncontrollability and danger (e.g. *My worrying is dangerous for me*); Negative beliefs about the need to control thoughts (e.g. *If I did not control a worrying thought, and then it happened, it would be my fault*); Cognitive confidence (e.g. *I have little confidence in my memory for words and names*); and Cognitive self-consciousness (e.g. *I monitor my thoughts*) (Wells & Cartwright-Hatton, 2004).

There is a strong evidence base for the presence of metacognitive beliefs in psychological disorders such as anxiety and depression (Callesen et al., 2014; Cartwright-Hatton & Wells, 1997; Spada et al., 2008; Wells & Papageorgiou, 1998) and the psychosis spectrum (Cotter et al., 2017; Morrison et al., 2007; Rachel Sellers, Varese, et al., 2016). Metacognitive beliefs have also been found to be present in non-clinical samples. One non-clinical study for example, found negative beliefs about uncontrollability and danger, positive beliefs about worry and the need to control thoughts to predict paranoia (Varese, Barkus, & Bentall, 2011). Another study found that metacognitive beliefs moderated the effect between non-clinical paranoia and state depression, anxiety and stress (Rachel. Sellers, Emsley, Wells, & Morrison, 2018). More recent research has also found early indicators of associations with social functioning. In a study with an ARMS sample, negative beliefs about uncontrollability and danger was found to negatively predict social functioning (as measured by the Time Use Survey (TUS: Short, 2006) a measure of structured activity (e.g. work, education, leisure)) (Bright et al., 2017). Further, another study found that the need to control thoughts metacognitive belief (as well as trait anxiety)

had predictive validity to work status (in a sample that were either working or on sick leave) (Nordahl & Wells, 2018). This study also found that those out of work scored significantly higher on all metacognitive beliefs than those who worked (Nordahl & Wells, 2018). Although there are some early indicators that metacognitive beliefs may contribute to social functioning, more work needs to be done to explore these potential relationships further. To do this, a non-clinical sample will be used.

Past research has suggested a continuum exists between clinical and non-clinical populations in psychological experiences such as paranoia (Barreto Carvalho, Pinto-Gouveia, Peixoto, & Motta, 2014; Freeman, Pugh, Vorontsova, Antley, & Slater, 2010), and psychosis (DeRosse & Karlsgodt, 2015; Nuevo et al., 2012). Poor social functioning has been found to be present before more complex mental health problems begin (Berry et al., Under review; Fowler et al., 2010). Those Not in Education, Employment or Training (NEET) are an example of such a group (Berry et al., Under review). Due to this, the current study is assuming a continuum approach with the assumed level of social functioning, and the factors behind it varying across non-clinical groups on a common continuum.

This study aims to examine the predictive validity of metacognitive beliefs on social functioning in a non-clinical sample. The primary question this study aims to address is: *Do metacognitive beliefs predict social functioning in a non-clinical sample after controlling for age, gender, symptoms and cognitive schemas?* Hypotheses for this study are: 1) Metacognitive beliefs will predict social functioning in a non-clinical sample. Past research has identified negative beliefs about uncontrollability and danger as a predictor of social functioning in an ARMS sample. Despite there being significant differences between ARMS and non-clinical samples on this metacognitive belief (with ARMS samples scoring significantly higher) (Cotter et al., 2017), it is possible that this metacognitive belief is also a predictor in non-clinical samples. Further, the presence of this belief has been identified in a qualitative study (Bright et al., Chapter 6) with young people with a history of mental health problems and social functioning difficulties, to

contribute to levels of social functioning. It is predicted therefore that negative beliefs about uncontrollability and danger will predict social functioning whilst controlling for demographics and variables past research has identified as being associated with construct (i.e. age, gender, social anxiety, depression and cognitive schemas). Further, the qualitative study in chapter 6 also found positive beliefs to be associated with social functioning (Bright et al., Chapter 6), and this is the only metacognitive belief that non-clinical samples score similarly to clinical samples (Cotter et al., 2017). It is also predicted that positive beliefs about worry will predict social functioning. It is possible other metacognitive beliefs may be predictors, but there's not sufficient evidence to make further predictions at this time. 2) There will be significant negative relationships between metacognitive beliefs and social functioning.

7.3 Methods

7.3.1 Participants

Data from two hundred and fifty-four participants from the general population are included in this study. Participants had to be aged 16 years or over (no upper age limit), be currently living in the United Kingdom, and not be currently experiencing any psychological or neurological problems. Participants who took part in this study were aged between 16 and 74 years.

7.3.2 Design and analyses

7.3.2.1 Design

This study adopted a survey method using an online questionnaire. Data from this study was obtained via a longitudinal online questionnaire study that consisted of three time points, each four weeks apart. Time-points one (baseline) and three were used for analyses in the current study resulting in a time-lag of eight weeks between the two time points. Both longitudinal and cross-sectional analyses were performed.

7.3.2.2 Study procedures

Participants were recruited from a number of sources; social media (e.g. Twitter), poster advertisements (e.g. within the University of Manchester, libraries), leaflet distribution, via email, and by recruiting psychology undergraduates using a course credits system provided by the University of Manchester. This was an online study accessed by participants via a survey link. Participants were required to consent online after reading the online participant information sheet. Participants were asked to complete a set of questionnaires three times, four weeks apart on each occasion. The questionnaire took approximately 45 minutes to complete per time-point. A maximum of two email reminders were sent to participants when it was time for them to complete their next set of questionnaires. Participants who were not recruited via the course credits pathway and who completed all three time-points, were entered into a prize draw to win a £50 gift voucher. A winner was chosen at random after the study was closed.

Ethical approval for this study was obtained from the University of Manchester Research Ethics Committee (Ref: 2017-2286-3683).

7.3.2.3 Analyses

Pearson correlations were conducted to explore the relationships between the social functioning measures, metacognitive beliefs, cognitive schemas, depression, social anxiety, psychotic-like experiences, age and gender. Bonferroni corrections were conducted for these correlations due to multiple comparisons (Field, 2013). Multiple regressions analyses were conducted to examine if metacognitive beliefs were predictors of social functioning cross-sectionally and longitudinally, controlling for age, gender, psychotic-like experiences, social anxiety, depression and cognitive schemas.

IBM SPSS Statistics Version 22 (SPSS) was used to conduct descriptive statistics, bivariate Pearson correlations and hierarchical multiple regression analyses with the data. Microsoft Excel 2010 was used to manage data and assist in the scoring of measures.

7.3.3 Measures

The Social Functioning Scale (SFS; Birchwood et al., 1990) (Appendix 12) was used in this study to measure social functioning. The SFS is a self-report questionnaire with seven subscales: Social engagement/withdrawal; Interpersonal communication; Independence performance; Recreation; Prosocial; Independence competence; and Occupation/employment. Most questions in the SFS are scored using a likert scale from 0 to 3. The occupation/employment subscale is scored differently by either allocating a score between 7 and 10 depending on whether participants are working or in education full-time or part time, if they have become unemployed within the last 6 months and are actively looking for work, or if they are in rehabilitation. If none of the aforementioned occupational statuses apply, participants are scored using their reported capability to find employment and attempts to find a job. The time period asked about is the past three months. As well as capturing the frequency of activity, the SFS also obtains information about the quality of interactions (e.g. *How often are you able to carry out a sensible or rational conversation?*) and perceived ability to carry out different roles related to day-to-day life (e.g. cooking, shopping, hygiene). The original validation study for the SFS (Birchwood et al., 1990) was conducted in a sample diagnosed with schizophrenia and a non-clinical sample. This study found that the SFS could discriminate between clinical and none clinical groups and was sensitive to change. Total subscale scores are calculated by first adding all scores for each item related to the subscale. A scaled score equivalent of the raw score is standardised using a mean of 100 and SD of 15, and the total score is the mean of all the standardised subscales (Birchwood et al., 1990).

The Time Use Survey (TUS) was originally created by the Office for National Statistics to measure structured activity levels in the general population (Office for National Statistics, 2003). A shorter version of the TUS (Short, 2006) as used in previous studies (Berry et al., Under review; Hodgekins et al., 2015) was used in the current study to measure social functioning (in the form of structured activity). This version was adapted to be used online by adding additional instructions on what information is required (e.g. requesting time is

provided in hours), and pre-calculated conversions from minutes to hours of times expected to be more commonly used or that would be more likely to require a calculator to work out (e.g. 10 minutes, 20 minutes, 30 minutes, 40 minutes) were provided in the online self-report version. Preliminary pilot work was conducted to test the reliability of the online self-report version by comparing same session interview scores with that of self-reports (i.e. the TUS interview and self-report was conducted with non-clinical volunteers on the same day and reliability calculated). There was an average discrepancy of 2.18 hours (2.79%) when comparing the online self-report version to the administered semi-structured interview (Berry et al., In preparation). Structured activity is measured by asking participants to provide the amount time spent (in hours) doing the following structured activities in the past month: Employment (paid work); Voluntary work; Education; Leisure activities; Sports activities, Childcare; and Housework and chores. A total structured activity score is calculated, but the TUS also allows for individual subscale scores (e.g. Sports activities) to be calculated.

In addition to measuring structured activity, the TUS also allows for the reporting of time spent socialising (e.g. with family and friends) inside individual's homes or the homes of others (direct socialising), as well as indirect socialising which covers mediums such as social media use, phone calls and text messaging. Direct and indirect socialising scores are calculated and reported separately, and are not included in the overall structured activity score. The TUS was chosen as a measure of social functioning in this study because it provides more specific information about the amount of time spent doing each activity, whilst the SFS uses a likert scale to assess frequency of such activities (i.e. 0=Never, 1=Rarely, 2=Sometimes, 3=Often) which is more subjective. Further, the TUS asks about education, and allows for the reporting of more culturally relevant methods of communication (e.g. social media and text messaging) not covered by the SFS. However, whilst the TUS collects quantitative information, this tells us little about how social individuals are whilst engaging in structured activity. Using the SFS

in addition complements the TUS and arguably allows for a broader assessment of social functioning in the sample.

The Metacognitions Questionnaire-30 (MCQ-30: Wells and Cartwright-Hatton, 2004) is a 30-item self-report questionnaire that assesses metacognitive beliefs using a four-point likert scale (1=Do not agree, 2=Agree slightly, 3=Agree moderately, 4=Agree very much). Five metacognitive beliefs are measured in the MCQ-30: Positive beliefs about worry (e.g. *Worrying helps me to avoid problems in the future*); Negative beliefs about uncontrollability and danger (e.g. *My worrying is dangerous for me*); Negative beliefs about the need to control thoughts (e.g. *If I did not control a worrying thought, and then it happened, it would be my fault*); Cognitive confidence (e.g. *I have little confidence in my memory for words and names*); and Cognitive self-consciousness (e.g. *I monitor my thoughts*) (Wells & Cartwright-Hatton, 2004). The original MCQ-30 validation study (Wells & Cartwright-Hatton, 2004) included a non-clinical population. The MCQ-30 has also been validated in at risk for psychosis (Bright et al., 2018), obsessive compulsive disorder (Grøtte et al., 2016), and physical health (Cook et al., 2014; Fisher et al., 2016) samples.

Cronbach's alphas for the five subscales across time-points 1, 2 and 3 respectively were:

Positive beliefs about worry $\alpha = 0.91, 0.90, 0.93$; Negative beliefs about uncontrollability and danger $\alpha = 0.90, 0.90, 0.90$; Cognitive confidence $\alpha = 0.88, 0.91, 0.91$; Negative beliefs about the need to control thoughts $\alpha = 0.77, 0.80, 0.84$; and Cognitive self-consciousness $\alpha = 0.81, 0.87, 0.89$ (N=254). Internal consistency for all subscales and across all time points was good to excellent.

The Beliefs About the Self and Others (BCSS: Fowler et al., 2006) is a 24-item self-report questionnaire measuring positive and negative schemas about the self and others. The BCSS consists of four subscales each with 6-items: Positive beliefs about the self (e.g. *I am good*); Negative beliefs about the self (e.g. *I am bad*); Positive beliefs about others (e.g. *Other people are supportive*); and Negative beliefs about others (e.g. *Other people are nasty*). Participants respond to each question by stating whether or not they agree with each statement. Where a

respondent selects 'Yes', they are asked to stipulate how much they agree with the statement using a 4-point likert scale (1 = 'Believe it slightly' to 4 = 'Believe it totally'). The BCSS has been validated in non-clinical and psychosis populations, and found to be reliable and valid (Fowler et al., 2006).

The Community Assessment of Psychic Experiences (CAPE: Stefanis et al, 2002) is a 42-item self-report measure of psychotic-like experiences (PLEs) suitable for use in non-clinical samples. The CAPE measures positive, negative and depressive symptoms along with associated distress. Respondents are asked to rate the frequency of an experience on a 4-point likert scale ('Never' to 'Nearly always'). If an experience is endorsed, a distress score is also rated from 'Not distressed' to 'Very distressed'. The CAPE has been found to be a reliable and valid instrument for measuring PLEs in the non-clinical and clinical populations (Mossaheb et al., 2012; Stefanis et al., 2002).

The Hospital Anxiety and Depression Scale (HADS: Zigmond & Snaith, 1983) is a 14-item self-report used to measure anxiety and depression in the current study. Anxiety and depression are measured on two separate subscales using various 4-point likert scales with responses related to each item. Total scores can also be used. It has found to be reliable and valid in clinical and non-clinical populations (Mykletun, Stordal, & Dahl, 2001; Spinhoven et al., 1997; Zigmond & Snaith, 1983).

The Social Interaction Anxiety Scale (SIAS: Mattick & Clarke, 1998) is a 20-item self-report measure of social anxiety. Included items cover those used to assess for social phobia in the DSM-III R. This tool measures general areas related to social interactions, and has been found to be reliable and valid (Mattick & Clarke, 1998). Responses are collected using a 5-point likert scale (0 = 'Not at all' to 4 = 'Extremely').

7.4 Results

7.4.1 Sample

The mean age of the sample (N=254 recruited at time 1) was 27.7 years, minimum 16, maximum 74, and SD 12.19; Time 2 (N=150) was 29.45 years, minimum 16, maximum 74, SD 14.04; Time 3 (N=126) was 30.11 years, minimum 16, maximum 74, SD 14.36. The majority of the total time 1 sample were young people aged 16 to 25 years (61%), which was reflected in the fact that the same percentage of participants were students. The least represented group were people aged 36 to 45 years with a participation rate of just 5.5%. The majority of the sample were from White backgrounds (79.92%), with the remainder of the sample representing Black (4.33%), Asian (7.87%) and other mixed or ethnic (7.88%) backgrounds. Table 18 shows all demographic information.

7.4.2 Descriptive statistics

Descriptive statistics for all measures included in the analyses are shown in Table 19. As can be seen from Table 19, social functioning scores differ little across all three time-points. This is particularly the case for the SFS, which has constant scores at each measurement. The MCQ-30 means were similar to those found in other non-clinical samples (Rachel Sellers, Gawęda, et al., 2016), similarly with the BCSS (Fowler et al., 2006).

7.4.3 Data screening: All time 1 data and SFS and TUS time 3

Variables were tested for normality using the Kolmogorov–Smirnov (KS) test. All variables were found to be significant on this statistic, which suggest data is not normally distributed. However, this test is very sensitive to large sample sizes (Field, 2013). Due to this, P-P plots and histograms with normal distribution curves were examined. With regards to the dependent variables, the SFS (times 1 and 3) had a right skew and the TUS (times 1 and 3) left skew. With exception for the SIAS, BCSS positive self and the MCQ-30 cognitive self-consciousness, all other independent variables appeared to deviate from normality. In particular, both of the BCSS negative belief subscales had a very flat bell curve, and further examination revealed that most scores were at the lower end for these variables. However, as

this study had a large sample size, normality has less of an effect on results (Field, 2013). Parametric testing was therefore used for the correlation analyses (i.e. Pearson's correlations).

One outlier existed for the demographic relating to the number of people each participant lived with. This item was excluded from the analysis as it was far in excess of all other scores (i.e. score was 1000), and was creating an artificial mean score in excess of the true mean (mean reduced from 6.89 to 2.97 people after removal). No missing data existed for any of the symptoms, BCSS or MCQ-30. This was because the survey was designed to prevent participants progressing to the next questionnaire unless a response to all questions was provided. Participants had the option to not continue with the study to the end should they choose to. Participants who did not complete the survey in full at time-point one were not included in the study (i.e. they were not counted as a participant at time-point one and therefore not contacted four weeks later to complete the survey again). It was assumed they did not wish to take part as they did not complete the assessment battery in full. Participants who completed time-point one in full but did not complete time-point two, were still contacted by email requesting them to complete time-point three. Missing data did exist for a small proportion of the SFS (n=5), and more for the TUS (n=21). This is because these fields had free text, which made them more prone to user error. This was particularly the case for the TUS as this had more free text fields. These cases were excluded from the analyses. This is reflected in the adjusted sample sizes in the analysis output.

Table 18. Demographic information

Factor	Frequency	%	Mean	SD	Minimum	Maximum
Age (Years):			27.7	12.19	16	74
16-25	154	60.63				
26-35	58	22.83				
36-45	14	5.51				
46-74	28	11.02				
Gender:						
Female	199	78.35				
Male	54	21.26				
Other	1	0.39				
Ethnicity:						
White British	165	64.96				
White Irish	5	1.97				
White Other	33	12.99				
Black/Black British Caribbean	9	3.54				
Black/Black British African	2	0.79				
Asian Indian	4	1.57				
Asian Pakistani	5	1.97				
Asian Bangladeshi	3	1.18				
Asian Chinese	8	3.15				
Any other Asian background	6	2.36				
Mixed White/Black Caribbean	7	2.76				
Mixed White/Asian	3	1.18				
Any other Mixed background	1	0.39				
Any other ethnic groups	3	1.18				
Marital status:						
Single	142	55.91				
Partner	74	29.13				
Married/Civil partnership	28	11.02				
Separated	1	0.39				
Divorced	8	3.15				
Widowed	1	0.39				
No. people lives with:			2.97	3.08	0	24
Employment status:						
Employed (Paid)	82	32.28				
Employed (Voluntary)	3	1.18				
Unemployed	8	3.15				
Student	155	61.02				
Retired	6	2.36				

SD = Standard deviation

Table 19. Descriptive statistics for social functioning, metacognitive beliefs, schemas and symptoms

Factor	N	Minimum	Maximum	Mean	Standard Deviation
SFS Total (Time 1)	249	95.43	131.71	118.93	6.79
SFS Total (Time 2)	148	91.86	130.64	118.26	7.20
SFS Total (Time 3)	124	98.71	129.71	118.28	6.21
TUS Total (Time 1)	233	0	167.31	67.78	35.12
TUS Total (Time 2)	136	0	167.83	61.86	33.40
TUS Total (Time 3)	120	0	145.42	58.34	31.24
CAPE Positive symptoms	254	0	2.95	1.04	0.57
CAPE Negative symptoms	254	0.07	3.43	1.41	0.67
SIAS	254	0	78.00	30.68	18.31
HADS Depression	254	0	14.00	3.58	3.38
BCSS Negative Self	254	0	16	2.25	3.59
BCSS Positive Self	254	0	24	10.88	6.02
BCSS Negative Other	254	0	19	2.83	3.83
BCSS Positive Other	254	0	24	10.20	5.31
MCQ30 Positive beliefs	254	6	24	10.78	4.36
MCQ30 Negative beliefs about uncontrollability and danger	254	6	24	12.05	4.96
MCQ30 Cognitive confidence	254	6	23	10.59	4.21
MCQ30 Negative beliefs about the need to control thoughts	254	6	24	11.03	3.85
MCQ30 Cognitive self-consciousness	254	6	24	14.95	4.16
MCQ30 TOTAL	254	31	104	59.41	15.69

Note: Time 1 variables unless otherwise specified

7.4.4 What are the relationships between metacognitive beliefs, cognitive schemas, symptoms, age, gender and the social functioning measures?

Pearson correlations were conducted to examine relationships between predictor variables and social functioning. Results for all correlations can be found in Table 20, and are described below.

7.4.5 Relationships with demographic and symptom variables

A Pearson's correlation was conducted to examine relationships between variables (Table 20).

Age had a significant small to moderate positive relationship between the SFS at Time 1.

There was no relationship between age and these measures at Time 3. Gender had no significant relationships between any of the social functioning measures at any time point.

CAPE positive symptoms also had no significant relationships with any of the social functioning variables, whilst CAPE negative symptoms had a moderate significant negative relationship with SFS Time 1. Social anxiety as measured by the SIAS had a moderate negative relationship with SFS Time 1 and Time 3. The HADS depression subscale had significant moderate negative relationships with the SFS Time 1 and Time 3. No significant relationships existed between depression and the TUS Time 1 or Time 3.

7.4.6 Relationships with cognitive and metacognitive beliefs

BCSS negative self subscale had a significant moderate relationship with SFS Time 1 and Time 3, but did not have any significant relationships with the TUS Time 1 or Time 3. The BCSS negative other subscale had a moderate negative relationship to SFS Time 1 only, and no relationship with the TUS at any time-point. BCSS positive self subscale had a moderate positive relationship to SFS Time 1. No other significant relationships applied. BCSS positive other subscale had a moderate positive relationship to SFS Time 1 only, and no relationship with the TUS at any time-point.

With regards to the MCQ-30 subscales, positive beliefs about worry did not have any significant associations to the SFS or TUS at time-points 1 or 3. Negative beliefs about uncontrollability and danger had a moderate negative relationship with the SFS Time 1, but

had no significant associations with SFS Time 3 or TUS Times 1 or 3. The cognitive confidence metacognitive belief had a significant moderate negative relationship to SFS at Time 1. No association existed with any of the TUS time-points. The need to control thoughts metacognitive belief had moderate negative relationships with SFS Times 1 and 3. No significant relationships existed for TUS Times 1 and 3. Finally, cognitive self-consciousness had a small negative relationship to SFS Time 1, but no significant relationships with SFS Time 3 or TUS Times 1 and 3.

Table 20. Correlation matrix for Time 1 variables

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Age	-0.02	-0.05	-0.15*	-0.28**	-0.14*	-0.19**	0.15*	-0.04	0.17**	-0.15*	-0.19**	-0.20**	-0.21**	-0.13*	0.26**	0.15	0.15*	0.05
2. Gender	-	-0.09	-0.05	0.13*	-0.02	0.00	-0.02	0.04	0.03	-0.01	0.09	-0.03	-0.09	-0.04	0.08	0.08	0.00	-0.01
3. CAPE Positive symptoms		-	0.77**	0.14*	0.15*	0.22**	-0.16*	0.21**	-0.22**	0.11	0.19**	0.21**	0.24**	0.20**	-0.16*	-0.06	-0.07	0.02
4. CAPE Negative symptoms			-	0.42**	0.34**	0.44**	-0.38**	0.23**	-0.32**	0.18**	0.37**	0.35**	0.31**	0.24**	-0.35**	-0.26**	-0.13*	-0.03
5. SIAS Total				-	0.55**	0.46**	-0.50**	0.27**	-0.34**	0.36**	0.57**	0.43**	0.45**	0.37**	-0.49**	-0.32**	-0.15*	-0.20*
6. HADS Depression					-	0.49**	-0.48**	0.35**	-0.44**	0.32**	0.49**	0.51**	0.50**	0.26**	-0.52**	-0.44**	-0.08	0.05
7. BCSS Negative Self						-	-0.48**	0.52**	-0.27**	0.22**	0.49**	0.33**	0.43**	0.20**	-0.49**	-0.29**	-0.08	-0.06
8. BCSS Positive Self							-	-0.17**	0.52**	-0.19**	-0.42**	-0.35**	-0.28**	-0.10	0.36**	0.08	0.01	-0.06
9. BCSS Negative Other								-	-0.18**	0.20**	0.30**	0.25**	0.33**	0.20**	-0.39**	-0.21*	-0.12	-0.18
10. BCSS Positive Other									-	-0.16*	-0.31**	-0.25**	-0.28**	-0.27**	0.30**	0.25**	0.14*	0.03
11. Positive beliefs										-	0.38**	0.33**	0.38**	0.38**	-0.14*	-0.02	-0.04	0.06
12. Negative beliefs about uncontrollability and danger											-	0.42**	0.58**	0.48**	-0.33**	-0.11	-0.05	-0.02
13. Cognitive confidence												-	0.38**	0.29**	-0.36**	-0.27**	0.03	0.08
14. Need to control thoughts													-	0.50**	-0.40**	-0.31**	-0.11	-0.07
15. Cognitive self-consciousness														-	-0.22**	-0.10	0.00	-0.04
16. SFS Total															-	0.82**	0.38**	0.15
17. SFS Total (Time 3)																-	0.21*	0.23*
18. TUS Total																	-	0.31**
19. TUS Total (Time 3)																		-

Correlation significance levels: *0.05 level, **0.01 level.

Bonferroni correction applied using the following formula: $p\text{-value} \times 19$ (Number of variables). **Bold** = Coefficients still significant after applying Bonferroni correction.

7.4.7 Do metacognitive beliefs predict social functioning when controlling for age, gender, symptoms and cognitive schemas in cross-sectional analyses?

To investigate whether metacognitive beliefs predicted social functioning in a non-clinical population cross-sectionally, hierarchical regressions were conducted using predictor and dependent variables at time 1 only. Age, gender, symptoms and cognitive schemas were controlled for in this model. Variables were entered at each step using forced entry. Procedure and results for the SFS and TUS measures of social functioning are explained below.

7.4.8 SFS cross-sectional (at time 1) regression results (N=249)

At step 1, age and gender variables were forced entered. Age, but not gender was found to predict social functioning, $R^2 = 0.07$, $F(2, 246) = 9.63$, $p < 0.001$, accounting for 7% of the variance in the model. CAPE positive and negative symptoms frequency scores were entered at step 2 and found to be significant predictors of social functioning, R^2 change = 0.12, $F(2, 244) = 18.52$, $p < 0.001$, accounting for 12% of the variance. Both positive and negative symptoms were found to be significant predictors, but negative beliefs in particular had a stronger effect. SIAS and HADS depression variables were entered at step 3 and both found to significantly predict social functioning, R^2 change = 0.17, $F(2, 242) = 32.46$, $p < 0.001$, accounting for 17% of variance. HADS depression was found to have more of an effect. CAPE positive and negative symptoms lost their effect at this step no longer being significant predictors. At step 4, all four BCSS schema subscales were entered and the negative beliefs about others subscale found to be a significant predictor of social functioning, R^2 change = 0.05, $F(4, 238) = 5.40$, $p < 0.001$, accounting for 5% of the variance. The three other BCSS subscales did not have significant effects. At the final step (step 5), all five metacognitive belief subscales were entered into the model. The positive beliefs about worry subscale was found to be a significant predictor of social functioning, R^2 change = 0.03, $F(5, 233) = 2.36$, $p = 0.04$, accounting for 3% of variance in the model. Negative beliefs about uncontrollability and danger metacognitive belief was also found to be a significant predictor after positive beliefs. Further, these two metacognitive beliefs were found to have a positive relationship

(coefficients) in the regression model compared with the negative relationship found in the correlations. It is possible that this finding is due to another variable in the model suppressing the effects of these metacognitive beliefs on social functioning outcome. Table 21 shows the regression results for this model.

7.4.9 TUS cross-sectional (at time 1) regression results (N=233)

The cross-sectional regression with TUS time 1 as the output variable was run exactly the same as the cross-sectional regression for SFS time 1 as described above. None of the predictor variables at any of the steps were found to predict social functioning at time 1. Table 22 shows the results for this model.

Multicollinearity was not an issue in any of the cross-sectional models. All Tolerance figures were more than 0.20 for both models (lowest Tolerance 0.26 and 0.27 for the SFS and TUS models respectively). The VIF statistics were all less than 10 (highest VIF 3.81 and 3.68). The Durbin-Watson figure was within acceptable limits (<3) at 2.07 (SFS) and 2.16 (TUS) suggesting no autocorrelations were made to the residuals in the model. A histogram and P-P plot were examined for normality of the residuals. Residuals looked normally distributed on the histogram for both the SFS and TUS time 1 variables. P-P plot from the regression line for the SFS was almost perfectly on the line the TUS only slightly off. There were no concerns regarding the normality of the residuals, particularly as the sample for this analysis was large. Scatter plots showed that the assumption of homoscedasticity had been met.

Table 21. Cross-sectional (time 1) multiple hierarchical regression model with metacognitive beliefs as predictors of social functioning (SFS) controlling for age, gender, symptoms and schemas (N=249)

	ΔR	ΔF	p	β	t	P
Step 1	0.07	9.63	<0.001			
Age				0.26	4.19	0.001
Gender				0.08	1.38	0.169
Step 2	0.12	18.52	<0.001			
Age				0.19	3.28	0.001
Gender				0.08	1.38	0.169
CAPE Positive symptoms				0.26	2.81	0.005
CAPE Negative symptoms				-0.51	-5.61	0.000
Step 3	0.17	32.46	<0.001			
Age				0.12	2.27	0.024
Gender				0.10	1.86	0.064
CAPE Positive symptoms				0.07	0.83	0.408
CAPE Negative symptoms				-0.18	-1.88	0.061
SIAS				-0.22	-3.13	0.002
HADS Depression				-0.33	-5.20	0.000
Step 4	0.05	5.4	<0.001			
Age				0.12	2.28	0.024
Gender				0.11	2.09	0.037
CAPE Positive symptoms				0.10	1.16	0.247
CAPE Negative symptoms				-0.14	-1.48	0.141
SIAS				-0.18	-2.56	0.011
HADS Depression				-0.23	-3.39	0.001
BCSS Negative self				-0.12	-1.76	0.080
BCSS Positive self				0.00	0.07	0.942
BCSS Negative other				-0.18	-3.02	0.003
BCSS Positive other				0.02	0.31	0.754
Step 5	0.03	2.36	0.041			
Age				0.11	2.18	0.030
Gender				0.09	1.75	0.081
CAPE Positive symptoms				0.11	1.34	0.181
CAPE Negative symptoms				-0.15	-1.55	0.121
SIAS				-0.21	-2.91	0.004
HADS Depression				-0.22	-3.11	0.002
BCSS Negative self				-0.13	-1.86	0.064
BCSS Positive self				0.02	0.35	0.729
BCSS Negative other				-0.19	-3.06	0.002
BCSS Positive other				0.01	0.22	0.828
Positive beliefs				0.14	2.49	0.014
Negative beliefs about uncontrollability and danger				0.14	1.97	0.050
Cognitive confidence				-0.05	-0.83	0.407
Need to control thoughts				-0.11	-1.67	0.095
Cognitive self-consciousness				-0.04	-0.57	0.569

Note: **Bold** = Significant p-values.

Table 22. Cross-sectional (time 1) multiple hierarchical regression model with metacognitive beliefs as predictors of social functioning (TUS) controlling for age, gender, symptoms and schemas (N=233)

	ΔR	ΔF	p	β	t	P
Step 1	0.02	2.6	0.077			
Age				0.15	2.28	0.02
Gender				0.00	0.01	0.99
Step 2	0.01	1.63	0.199			
Age				0.13	1.95	0.05
Gender				0.00	0.05	0.96
CAPE Positive symptoms				0.06	0.62	0.54
CAPE Negative symptoms				-0.16	-1.56	0.12
Step 3	0.01	0.58	0.559			
Age				0.11	1.65	0.10
Gender				0.01	0.22	0.83
CAPE Positive symptoms				0.03	0.29	0.77
CAPE Negative symptoms				-0.10	-0.89	0.37
SIAS				-0.09	-1.00	0.32
HADS Depression				0.01	0.08	0.94
Step 4	0.03	1.93	0.107			
Age				0.11	1.58	0.12
Gender				0.02	0.31	0.76
CAPE Positive symptoms				0.10	0.91	0.37
CAPE Negative symptoms				-0.17	-1.37	0.17
SIAS				-0.10	-1.17	0.24
HADS Depression				0.03	0.35	0.72
BCSS Negative self				0.05	0.56	0.58
BCSS Positive self				-0.15	-1.78	0.08
BCSS Negative other				-0.12	-1.43	0.15
BCSS Positive other				0.14	1.77	0.08
Step 5	0.04	1.69	0.139			
Age				0.12	1.72	0.09
Gender				0.02	0.30	0.76
CAPE Positive symptoms				0.09	0.85	0.40
CAPE Negative symptoms				-0.20	-1.59	0.11
SIAS				-0.15	-1.64	0.10
HADS Depression				0.00	0.01	0.99
BCSS Negative self				0.07	0.74	0.46
BCSS Positive self				-0.16	-1.84	0.07
BCSS Negative other				-0.13	-1.59	0.11
BCSS Positive other				0.16	2.01	0.05
Positive beliefs				-0.01	-0.17	0.86
Negative beliefs about uncontrollability and danger				0.03	0.27	0.79
Cognitive confidence				0.15	1.92	0.06
Need to control thoughts				-0.10	-1.16	0.25
Cognitive self-consciousness				0.15	1.76	0.08

Note: **Bold** = Significant p-values.

7.4.10 Do metacognitive beliefs predict social functioning (SFS time 1) when also controlling for TUS time 1 as well as age, gender, symptoms and cognitive schemas in cross-sectional analyses?

As none of the independent variables were found to predict TUS time 1 in a cross-sectional design, it is possible that the SFS is measuring elements of social functioning that are more associated with predictors that the TUS does not measure. Due to this, another cross-sectional regression was run including all the same variables in the same order as illustrated in Table 21, except an additional step was added to control for TUS time 1 at step 2 (increasing the total steps from 5 to 6). The results are shown in Appendix 13 and described below.

At step 1, age, but not gender was found to predict social functioning, $R^2 = 0.07$, $F(2, 225) = 7.92$, $p < 0.001$, accounting for 7% of the variance in the model. The TUS time 1 variable was added at step 2 accounting for 12% variance, R^2 change = 0.12, $F(1, 224) = 32.32$, $p < 0.001$. CAPE positive and negative symptoms frequency scores were entered at step 3 and both continued to be significant predictors of SFS time 1, R^2 change = 0.11, $F(2, 222) = 16.32$, $p < 0.001$, accounting for 11% of the variance with negative symptoms continuing to be most important. At step 4 SIAS and HADS depression variables were entered and both found to significantly predict social functioning, R^2 change = 0.16, $F(2, 220) = 31.07$, $p < 0.001$, accounting for 16% of variance. However, the SIAS was found to have more of an effect than HADS depression in this model (the other way around to the model described in section 3.6.1 above, Table 21). Further, at this step age stopped being a significant predictor whilst gender became significant, and CAPE positive symptoms were no longer significant, but CAPE negative beliefs continued to be. All four BCSS schema subscales were entered at step 5. Whilst the BCSS negative other subscale continued to significantly contribute to the model, the negative self subscale was also a significant predictor of SFS time 1 scores in this model and had more of an effect than the negative other subscale, R^2 change = 0.06, $F(4, 216) = 5.99$, $p < 0.001$, accounting for 6% of the variance. CAPE negative symptoms lost its significance at this step. At the final step (step 6), all five metacognitive belief subscales were

entered into the model. The positive beliefs about worry subscale continued to be the strongest predictor of SFS time 1 in the model, R^2 change = 0.03, $F(5, 211) = 2.68$, $p=0.02$, accounting for 3% of variance in the model. However, negative beliefs about uncontrollability and danger was no longer found to be a significant predictor of social functioning, instead this was replaced by cognitive confidence as a significant predictor. Cognitive confidence had a negative relationship to social functioning in this model, whilst positive beliefs continued to have a positive relationship. Gender was no longer a significant predictor in this step.

7.4.11 Do metacognitive beliefs predict social functioning over time when controlling for age, gender, symptoms and cognitive schemas?

To examine whether metacognitive beliefs predicted social functioning over time, longitudinal hierarchical regressions were conducted using data collected at time 1 (predictor variables) and time 3 (dependent variable, i.e. social functioning as measured by the SFS and TUS). Age, gender, symptoms and cognitive schemas were controlled for in this model. Procedure and results for the SFS and TUS measures of social functioning are described below.

7.4.12 SFS longitudinal regression results (N=122)

At step 1, age and gender time 1 variables were forced entered. None of these variables were found to predict social functioning (SFS) at time 3. At step 2 SFS time 1 was force entered as a control variable to account for the overlap in variance. This factor significantly predicted SFS at time 3, R^2 change = 0.64, $F(1, 118) = 229.61$, $p < 0.001$, accounting for 64% of the variance. At step 3 CAPE positive and negative symptoms were entered, step 4 HADS depression and SIAS, step 5 all cognitive schema subscales and in the final step 6 all metacognitive belief subscales. None of the variables entered from step 3 to step 6 were found to be significant predictors of social functioning as measured by the SFS Time 3. Table 23 shows the results of this longitudinal regression.

7.4.13 TUS longitudinal regression results (N=114)

The exact same regression described above was re-run, the only changes were replacing the SFS time 1 and time 3 variables with the TUS time 1 and time 3 respectively. As with the SFS,

at step 1 age (time 1) did not predict TUS at time 3. At step 2 TUS at time 1 was found to be a significant predictor of TUS at time 3, R^2 change = 0.09, $F(1, 110) = 11.34$, $p = 0.01$, accounting for 9% of the variance. At step 3, CAPE positive and negative symptoms did not predict TUS at time 3. At step 4, social anxiety as measured by the SIAS was found to be a significant predictor of social functioning (TUS time 3), R^2 change = 0.07, $F(2, 106) = 4.34$, $p = 0.02$, accounting for 7% of the variance. Table 24 shows the results of this longitudinal regression.

Multicollinearity was not an issue in any of the longitudinal models. Only the SFS time 1 and time 3 correlated at >0.80 (0.82), which is expected as they're measuring the same construct and there was no change over time in the scores of the SFS. This is why SFS time 1 was controlled for at step 2. The correlation between the TUS time 1 and 3 was much less at 0.31, but this was still controlled for in step 2 to account for any overlap in variance. All Tolerance figures were more than 0.20 for both models (lowest Tolerance 0.27 and 0.28 for the SFS and TUS models respectively) further confirming multicollinearity was not an issue. The Variation Inflation Factor (VIF) statistics were all less than 10 (highest VIF 3.74 and 3.79). The Durbin-Watson was within acceptable parameters (<3) at 2.05 (SFS) and 2.22 (TUS) suggesting no autocorrelations were made to the residuals in the model. A histogram and P-P plot were examined for normality of the residuals. Residuals looked fairly normally distributed on the histogram for the SFS and a little less so for the TUS (slight kurtosis), and there was a slight deviation on the P-P plot from the regression line for the SFS and a little more for the TUS. Scatter plots showed that the assumption of homoscedasticity had been met. As the sample size for both of the above longitudinal analyses had slight deviations from normality for some of the variables, to prevent any type I errors the Bootstrap function was used for both longitudinal regressions. Bootstrapped figures are reported, and it was found that the results did not differ from non-Bootstrapped figures.

Table 23. Longitudinal multiple hierarchical regression model as metacognitive beliefs as predictors of social functioning (SFS) controlling for age, gender, SFS at time 1, symptoms and schemas (N=122)

	ΔR	ΔF	p	β	t	P
Step 1	0.04	2.27	0.108			
Age				0.18	1.93	0.081
Gender				0.11	1.19	0.121
Step 2	0.64	229.61	0.000			
Age				0.07	1.31	0.231
Gender				0.07	1.27	0.182
SFS Time 1				0.80	15.15	0.001
Step 3	0.003	0.50	0.610			
Age				0.07	1.19	0.285
Gender				0.06	1.07	0.270
SFS Time 1				0.80	14.20	0.001
CAPE Positive symptoms				-0.04	-0.54	0.607
CAPE Negative symptoms				-0.02	-0.19	0.859
Step 4	0.01	1.19	0.308			
Age				0.06	1.14	0.314
Gender				0.06	1.09	0.249
SFS Time 1				0.77	12.82	0.001
CAPE Positive symptoms				-0.08	-0.96	0.346
CAPE Negative symptoms				0.05	0.55	0.631
SIAS				-0.04	-0.63	0.543
HADS Depression				-0.08	-1.16	0.202
Step 5	0.01	0.70	0.590			
Age				0.05	0.95	0.383
Gender				0.06	1.06	0.281
SFS Time 1				0.77	12.43	0.001
CAPE Positive symptoms				-0.05	-0.60	0.568
CAPE Negative symptoms				0.02	0.23	0.860
SIAS				-0.06	-0.84	0.422
HADS Depression				-0.08	-1.06	0.274
BCSS Negative self				0.06	0.80	0.387
BCSS Positive self				-0.06	-0.92	0.354
BCSS Negative other				0.00	-0.06	0.961
BCSS Positive other				0.07	1.03	0.338
Step 6	0.01	0.39	0.852			
Age				0.05	0.84	0.459
Gender				0.05	0.81	0.395
SFS Time 1				0.76	11.52	0.001
CAPE Positive symptoms				-0.06	-0.64	0.559
CAPE Negative symptoms				0.03	0.29	0.826
SIAS				-0.08	-0.98	0.358
HADS Depression				-0.07	-0.90	0.341
BCSS Negative self				0.06	0.73	0.469
BCSS Positive self				-0.08	-1.11	0.264
BCSS Negative other				-0.01	-0.08	0.952
BCSS Positive other				0.08	1.23	0.249
Positive beliefs				0.02	0.38	0.703
Negative beliefs about uncontrollability and danger				0.00	-0.05	0.974
Cognitive confidence				-0.04	-0.54	0.603
Need to control thoughts				-0.03	-0.46	0.662

Cognitive self-consciousness	0.08	1.18	0.216
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Note: **Bold** = Significant p-values.
Bootstrapped Beta significance values reported

Table 24. Longitudinal multiple hierarchical regression model as metacognitive beliefs as predictors of social functioning (TUS) controlling for age, gender, TUS at time 1, symptoms and schemas (N=114)

	ΔR	ΔF	p	β	t	P
Step 1	0.002	0.10	0.902			
Age				0.04	0.42	0.612
Gender				-0.01	-0.10	0.917
Step 2	0.09	11.34	0.001			
Age				0.04	0.44	0.567
Gender				0.02	0.18	0.843
TUS Time 1				0.31	3.37	0.012
Step 3	0.003	0.16	0.856			
Age				0.03	0.33	0.692
Gender				0.01	0.14	0.870
TUS Time 1				0.31	3.33	0.008
CAPE Positive symptoms				0.01	0.09	0.924
CAPE Negative symptoms				-0.06	-0.46	0.682
Step 4	0.07	4.34	0.015			
Age				0.00	-0.03	0.981
Gender				0.06	0.63	0.534
TUS Time 1				0.30	3.34	0.010
CAPE Positive symptoms				-0.06	-0.42	0.674
CAPE Negative symptoms				0.06	0.40	0.686
SIAS				-0.32	-2.87	0.007
HADS Depression				0.16	1.52	0.223
Step 5	0.04	1.16	0.333			
Age				0.00	-0.02	0.978
Gender				0.08	0.87	0.408
TUS Time 1				0.26	2.75	0.029
CAPE Positive symptoms				0.06	0.37	0.724
CAPE Negative symptoms				-0.05	-0.31	0.789
SIAS				-0.32	-2.77	0.016
HADS Depression				0.23	1.92	0.073
BCSS Negative self				0.01	0.05	0.956
BCSS Positive self				-0.14	-1.23	0.244
BCSS Negative other				-0.17	-1.52	0.098
BCSS Positive other				0.05	0.45	0.687
Step 6	0.03	0.84	0.527			
Age				0.02	0.24	0.806
Gender				0.10	1.04	0.325
TUS Time 1				0.23	2.31	0.073
CAPE Positive symptoms				0.06	0.39	0.694
CAPE Negative symptoms				-0.10	-0.60	0.616
SIAS				-0.38	-3.06	0.007
HADS Depression				0.22	1.81	0.094
BCSS Negative self				0.03	0.24	0.829
BCSS Positive self				-0.12	-1.02	0.329
BCSS Negative other				-0.22	-1.89	0.056
BCSS Positive other				0.04	0.36	0.758
Positive beliefs				0.17	1.64	0.076
Negative beliefs about uncontrollability and danger				0.00	0.02	0.986
Cognitive confidence				0.09	0.76	0.411
Need to control thoughts				0.02	0.14	0.888

Cognitive self-consciousness	0.00	-0.02	0.979
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Note: **Bold** = Significant p-values.

Bootstrapped Beta significance values reported

7.5 Discussion

Consistent with hypotheses, negative beliefs about uncontrollability and danger, cognitive confidence, the need to control thoughts and cognitive self-consciousness were found to have significant negative relationships with at least one measure of social functioning. Positive beliefs about worry had a small negative effect to SFS Time 1, but this significance was lost following a Bonferroni correction. Both positive beliefs about worry and negative beliefs about uncontrollability and danger were found to be significant predictors of social functioning as measured by the SFS at Time 1 in a cross-sectional regression analysis. This was also in keeping with expectations. Of these two metacognitive beliefs, positive beliefs about worry had a more significant p-value, suggesting it is more important in a non-clinical sample. This was after controlling for age, gender, social anxiety, depression and cognitive schemas. Age was found to be a significant predictor of social functioning (as measured by the SFS) at all steps of the model in keeping with past research that found age to predict social functioning in an ARMS (older people having higher levels of social functioning) (Bright et al., 2017). Whilst positive and negative symptoms as measured by the CAPE were found to significantly predict social functioning (SFS) when entered into the model at step 2 (Table 21), this was no longer the case after entering social anxiety and depression into model at step 3. This indicates that positive and negative symptoms are not as important as social anxiety and depression in relation to predicting social functioning. This makes sense considering past research has found anxiety and depression to have a stronger association to social functioning than positive and negative symptoms in psychosis samples (Chudleigh et al., 2011). What this finding indicates is that depression and social anxiety could be early markers for social functioning problems prior to the onset of psychotic like experiences, and stresses the importance of considering the effects of comorbid mental health problems. However, as these findings are cross-sectional, causality cannot be inferred.

With regards to the finding that positive and negative beliefs positively predicted social functioning in the cross-sectional regression, (whilst cognitive confidence had a negative relationship), is potentially an important finding. A qualitative study found both negative beliefs about uncontrollability and danger and positive beliefs to be particularly important in a sample of young people at risk of long term social disability (Bright et al., Under review, Chapter 7). What this study also found was that as well as reducing social functioning to cope with the negative effects of engaging in metacognitive processing (i.e. the CAS and associated metacognitive beliefs), participants also reported increasing their levels of social functioning to cope. It is possible that this is the reason for the positive relationship found in the current study between these two metacognitive beliefs and social functioning as measured by the SFS. Perhaps a non-clinical sample is more likely to increase their social interactions in order to cope with any negative effects of perseverative processing, and positive beliefs in particular could be more important at this early stage. Another possibility is that this may just be what makes them a non-clinical sample as they may adapt to metacognitive processes in a different way to a clinical population. A possible reason why no significant difference is found in scores on positive beliefs about worry between psychosis and non-clinical populations (Cotter et al., 2017) is because this positive belief is elevated in the early stages. Other metacognitive beliefs could be more important in the later stages of mental health problems, which is why negative beliefs about danger is secondary to positive beliefs about worry in this study, but in past research with an ARMS sample negative beliefs about uncontrollability and danger are more important and were negatively related to social functioning in a cross-sectional regression model (Bright et al., 2017). The presence of positive beliefs could be an early indicator of potential social functioning difficulties in the future. Alternatively, the fact that the correlations for negative beliefs about uncontrollability and danger and positive beliefs about worry show the expected direction in relationships, but in the regression the direction of the relationships changed, may be due to the regression model not being reliable. It is also possible that another variable in the model is acting to suppress or modify the relationship

observed in the bi-variate correlations. Suppressor variables usually do not have a relationship with the outcome variable, could be associated with other predictor variables in the model, and tend to cause increases to the variance score. (Horst, Guttman, Wallin, Burgess, & Social Science Research Council. Committee on social adjustment, 1941). Examination of the relationships in the correlation matrix does not appear to highlight any particular factors that are clear suppressors based on this definition. The only variable to meet the first criteria (i.e. having no relationship to the outcome variable) is gender, but this variable only has a relationship with one other predictor variable (SIAS). Further, the variance score does not appear to be elevated (only 3% variance is accounted for by positive beliefs and negative beliefs about uncontrollability and danger). Hair et al. (2014) suggests that suppression effects indicate the *'true'* (p.199) relationship between predictor and outcome variables are concealed in bivariate correlations, and that the reversal of direction is *'expected and desirable'* (p.199). Hair et al. (2014) also propose that adding more predictor variables increases multicollinearity and *'unwanted shared variance is accounted for'* (p.199). This is argued to lead to the variance that is remaining to shift coefficients in the anticipated direction (Hair et al., 2014). Whilst the explanation provided by Hair et al. (2014) suggests that the change in direction may be desired, multicollinearity was found not to be an issue in the current study. As a result, this explanation for the reverse direction may not apply to this study. Due to this, the regression results may not be meaningfully interpreted and further research is required.

Although metacognitive beliefs, age, social anxiety, depression and negative beliefs about others were found to predict social functioning as measured by the SFS in cross-sectional analyses, no variables were found to significantly predict TUS in a cross-sectional regression. It is important to acknowledge that although the SFS and TUS are both designed to measure social functioning and that some areas do cross over (e.g. they both measure leisure and sports activities, as well as housework), there are important differences in the way in which this is measured. As discussed earlier in the methodology section, the SFS captures the quality of

interactions (e.g. *How often are you able to carry out a sensible or rational conversation?*), whilst the TUS focuses on the quantity of them (i.e. asks about amount of time having conversations with others). Further, the TUS does not include unstructured activity (e.g. face-to-face conversations at home) into the overall structured activity score, whereas the SFS does include such interactions in the total score, which could explain some of the differences in the results. These are different measures of ability, but are both important in their own way. Further, although it has been validated in a non-clinical population, the SFS was originally designed with people experiencing chronic schizophrenia in mind and the rationale was that such individuals are less likely to be engage in certain activities (e.g. work) (Birchwood et al., 1990). Due to this, a different focus of attention was required that was sensitive enough to pick up on more subtle changes in interactions, for example.

The fact that predictors remained in a regression that controlled for the TUS whilst the SFS was an outcome variable suggests that the SFS is picking up more on the quality of interaction rather than the quantity. Further, this could suggest that more subtle characteristics associated with interactions and interpersonal relationships may not just be relevant to measure in clinical samples, but be early vulnerability markers prior to the onset of more long-term social functioning and/or mental health problems. In addition to this, whilst the metacognitive belief positive beliefs about worry remained the most significant predictor out of the metacognitive beliefs, negative beliefs about uncontrollability and danger were no longer significant. This is a further indication that the SFS is detecting more quality related elements of social functioning, and that cognitive confidence might be more associated with these features whilst negative beliefs about uncontrollability and danger may be more relevant to structured activity. The fact that this metacognitive belief was found to be a predictor of structured activity in an ARMS is further support to this possibility (Bright et al., 2017). This emphasises the importance of using more than one measure of social functioning in research studies to enhance knowledge in this area.

To check for causal predictors of social functioning, longitudinal regression analyses were run. Despite significant results being found in cross-sectional analyses including the SFS, metacognitive beliefs were not found to be significant predictors over time with SFS Time 3 as an outcome. With the exception of SFS Time 1, none of the other variables were found to predict SFS at Time 3 either. A possible explanation for this is the fact that the SFS asks respondents to provide information over the past three months. As Time 3 was conducted eight weeks (around two months) later, it is likely that there would not be enough change in social functioning over that time to be able to detect an effect. This is further illustrated in Table X which shows how the mean SFS scores at all three time-points do not change, and in the fact that SFS Time 1 accounted for 64% of the variance in this regression model.

With regards to the longitudinal analysis conducted for the TUS (TUS Time 3 as outcome variable), once again metacognitive beliefs did not predict social functioning over time nor did age, gender, positive or negative symptoms, depression or cognitive schemas. Social anxiety as measured by the SIAS, did however predict social functioning longitudinally as measured by the TUS accounting for 7% of the variance in the model. It is possible that the specific way the TUS collects data about social functioning (i.e. structured activity) allows it to be more sensitive to picking up changes in structured activity (e.g. work, education, leisure) than the SFS (hence why social anxiety did not predict SFS over time, but did the TUS), which uses a scale and thus arguably more subjective than the TUS. Further, the fact that the recall period is shorter for the TUS (past month) means that not only can participants have better recall of activities, but there is no overlap in the recording of social functioning since the last time-point. This is further reflected in the fact that TUS Time 1 only accounted for 9% variance in the model, and the scores on the TUS are a little more variable over time. Alternatively, it may be that social anxiety is more relevant to structured activity than the quality of interactions. However, the SIAS measures social anxiety with items focussed on social interactions. Due to this, it could be argued that one might expect it to predict SFS, so perhaps the lack in change

in scores over time is a contributory factor to the lack of significant results. Furthermore, social anxiety became a stronger and more significant predictor than depression after the TUS Time 1 was controlled for in the cross-sectional regression model with the SFS Time 1 as the outcome variable, suggesting a stronger association with social functioning quality elements. As mentioned earlier, past research found social functioning to be a significant factor in relation to social functioning. The qualitative study conducted in chapter 8 (Bright et al., Under review), found that some themes relating to worries about future or past performance to be present in a sample of young people at risk of long-term social disability. As concerns about performance and being judged negatively by others are characteristics associated with social anxiety, perhaps the presence of social anxiety in this sample could explain some of the discourse found relating to metacognitive processing as well as the poor social functioning they experience.

There are some limitations that exist for the current study. Firstly, the use of a social functioning measure that assesses social functioning over the past three months (SFS) in a study that uses time-points eight weeks apart could have led to little change in scores over time, potentially leading to the non-significant results found in the longitudinal analyses. However, it is not known whether this is the reason for the non-significant results. As this is a non-clinical sample that comprised of predominantly young students (61%), it could be that the lack of change in SFS scores was due to the routine that students will often have that arguably will change little over a period of eight weeks. In either case, the current study could have benefited from longer periods between assessments to allow for change to be detected in the scores. Further to the point that the sample clustered around younger population, this could be because study conducted online only. Perhaps also having the option of conducting the study face-to-face may have encouraged people from other older age groups to take part. What the current study does show however, is that an online questionnaire can engage young people if this is a desired sample.

The potential of selection bias can also be considered a limitation of this study because only participants who completed the survey in full were included in the analyses. This could have meant that people who were less motivated and with potentially lower social functioning scores, were excluded from this study. The restriction of the number of times a participant could be sent a reminder email (maximum of two) meant that people who find it more difficult to motivate themselves may have not been encouraged enough to complete the assessment battery in full.

Whilst the variance is small, the current study adds a little more weight to previous findings that negative beliefs about uncontrollability and danger have associations to social functioning, even when controlling for demographics, symptoms and cognitive schemas. Further, this study adds to this evidence by identifying positive beliefs about worry as being particularly important to a non-clinical sample, thus highlighting a possible vulnerability marker for the emergence of mental health problems in the future or social disability. In addition to these findings, cognitive confidence emerged as a metacognitive belief that is potentially more associated with the quality of interactions and interpersonal relationships, whilst negative beliefs about uncontrollability and danger may be more linked to structured activity. These findings however were cross-sectional, and thus causality cannot be inferred from this.

Social anxiety was found to be of particular importance as it was the only factor to predict social functioning, as measured by the TUS (structured activity), longitudinally. Social anxiety therefore can be interpreted as having a more causal effect on this construct than all other factors. It also appears to be an important factor in relation to the quality of social functioning as identified by cross-sectional analyses. It is possible therefore, that social anxiety problems could be a key factor in detecting future social functioning problems.

To conclude, three metacognitive beliefs are found to be associated with social functioning in a non-clinical population. However, other factors were also found to be of importance, in

particular social anxiety. Future research should aim to explore these relationships further taking into consideration the limitations of the current study. In addition, at least two social functioning measures should be used to allow for associations to be more comprehensively assessed. Whilst the correlations show the expected direction in relationships, in the regression the direction of the relationships changed. Further research is required in this area.

Chapter 8: Discussion and overall conclusions

8.1 Summary of thesis aims and key findings

The overall goal of this thesis was to investigate social functioning in mental health and to explore if concepts of the S-REF model are associated with levels of social functioning. To do this, it was important to conduct a comprehensive evaluation of the quality of existing measurement instruments used to measure social functioning in people experiencing mental health problems to allow for a better assessment of the results found in this thesis and for interpreting past research. Further, gaining some clarity on the construct of social functioning was important because it is conceptualised in different ways in mental health research and there is no single agreed consensus. It was hoped that this would allow for better interpretation of results, and ensure that the construct being investigated in the thesis was clarified from the start. The next step was to begin to investigate the potential relationship between the S-REF model of metacognition by conducting a study examining metacognitive beliefs as predictors of social functioning in people with an ARMS. First it was necessary to examine the construct validity of the MCQ30 in an ARMS sample, before moving on to a study testing the association between metacognitions and levels of social functioning. Progressing on from these studies was a qualitative study with young adults identified as being at risk of long-term social disability. The aim of this study was to explore how the S-REF model of metacognition was represented in a sample with a history of mental health and social functioning problems, and its perceived effects on social functioning. Finally, another quantitative study was conducted examining predictors of social functioning in a non-clinical sample in order to try to better understand potential early markers for social functioning problems. What follows is a more detailed discussion of each of these six studies.

8.1.2 Study 1: Evaluating the psychometric properties of social functioning measures using the COSMIN checklist: A systematic review in populations experiencing mental health problems

Part One: The COSMIN analysis

Thirty-eight studies were included in this review and 19 different social functioning measures.

The COSMIN checklist was used to evaluate the methodological quality of the validation studies included in this review, and the quality of the measurement instruments. The most important psychometric property according to COSMIN is content validity; ensuring the instrument measures the construct (in this case social functioning), and the measure can be understood by the target population to enable as accurate completion as possible (e.g. items written clearly, response options and recall period are appropriate). This study found that most measures did not have PROM development or content validity studies conducted with the target population of interest or professionals, which is key to ensuring that items included are appropriate and understood. Where studies did include the target population and/or professionals, most failed to adequately report the results of these studies to the stringent standards set out by COSMIN. None of the PROMs were identified as *not* being recommendable (i.e. as defined by an 'insufficient' rating for content validity with 'high' quality evidence), because the reviewers rating was also taken into account. However, content validity could only be rated for PROMs to which the reviewers had access.

Researchers were found to be better at assessing structural validity (considered the second most important psychometric property) with just over half conducting some form of factor analysis. Only one PROM, the SLOF, was found to conduct a CFA, which was considered the optimal analysis for structural validity by COSMIN. However, running of an EFA was still considered to be 'adequate' according to the standards, and over half of the PROMs had met this requirement. Internal consistency was conducted in most studies, and Cronbach's alphas were ≥ 0.70 (good to very good) for each unidimensional subscale. However, there was not additional criteria to assess EFAs for structural validity, therefore 'indeterminate' ratings were

given to all PROMs (except the SLOF) for internal consistency. Construct validity was the most commonly assessed psychometric property, and almost all PROMs received 'sufficient' ratings with generally moderate to high quality of evidence suggesting PROMs perform well in this area.

The main findings from this study was that researchers need to improve the development and content validity studies for social functioning measures by including the target population (e.g. service users, carers) or professionals in the process. Further, researchers need to increase the use of CFAs in the validation process. Whilst the BJ-PERFECT and the HSFQ measures performed best with reference to content validity, other instruments' scores were not too far removed from these measures (e.g. SFS, GFS, SOFS). Further, these measures were designed for very specific populations, so could not be recommended for use outside of these mental health samples. Due to this, there was no single social functioning measure considered to be the 'gold standard'. Finally, it was found that the items used in the measures identified in this review were in line with the definition social functioning constructed in part two (content analysis), providing a further indication that researchers are including relevant items for the social functioning. What appears to differ however is the way in which this is measured (e.g. focus on quality or quantity, unidimensional or multidimensional scale). Study 5 illustrates this in its use of two measures of social functioning.

Part two: Content analysis

To address the aim of clarifying the concept of social functioning in mental health, articles identified in part one that provided a definition of social functioning were included in a content analysis. Eleven studies were found to have definitions of social functioning in the full-text article. These definitions were extracted from the articles, and then broken down into separate statements or words. Sixty different sentences or words were found across all definitions. A content analysis was conducted to identify the most frequent terms used, and to

group the data into meaningful categories. A definition was constructed as a result of this analysis:

'The ability to perform different societal roles and activities in the areas of: Interpersonal relationships and interactions with others (e.g. socialising, intimate relationships, roles as family member or friend); Employment and education; Independent daily living (e.g. housework, self-care); and Pleasurable and meaningful activities (e.g. leisure and recreational activity, community living).' (Bright et al., Chapter 3)

As illustrated, the concept of social functioning is multifaceted capturing a wide range of elements. This gave an indication of why the measurement of the concept has been found to be so complex (Brissos et al., 2011) and why researchers may struggle to agree on the best way to measure it. However, what this analysis also highlighted was that researchers did use measures that reflected the definition they had provided in all cases. This suggested that despite the perception that social functioning is a nebulous concept that is being measured in many different ways, researchers were very good at actually selecting measures in line with the definition they provide in their studies.

As can be seen from the definition provided, the focus was primarily on the *ability* of individuals to engage in or conduct roles and activities. Although *satisfaction* was mentioned in two definitions, this was secondary to ability in both cases and did not occur frequently enough to be included in the overall definition. It is possible that the restrictive criteria used to identify studies could have prevented more terms related to the satisfaction of activities being identified. However, it was important to identify studies that aimed to measure this construct, and that social functioning was a primary focus of investigation. The use of studies validating social functioning measures therefore was identified as a way to access such studies. The results of this study provided an indication of how social functioning is conceptualised, which is an important first step in clarifying the concept.

8.1.3 Study 2: Assessment of metacognitive beliefs in an at risk mental state for psychosis: A validation study of the Metacognitions Questionnaire-30

The aim of this study was to validate the MCQ-30 measure in an ARMS sample. Whilst the MCQ30 has been well validated and widely used in clinical and non-clinical samples it has not been validated in this population. This study found the original 5-factor structure of the MCQ-30 to be relevant for those with an ARMS. As a convenience sample was used, some psychometric tests could not be conducted (e.g. test-retest). However, this study used a comprehensive procedure to rigorously investigate the psychometrics, which also included the use of a CFA, EFA and parallel analysis thus exceeding the optimal standards set by COSMIN for structural validity. Finally, assessment of convergent and discriminant validity illustrated that the MCQ-30 had meaningful associations with other variables (i.e. BAPS, BDI-7 and SIAS) in keeping with study hypotheses.

8.1.4 Study 3: Metacognitive beliefs as psychological predictors of social functioning: an investigation with young people at risk of psychosis

The primary aim of this quantitative study was to assess whether metacognitive beliefs predicted social functioning in an ARMS sample. This was to address one of the overall thesis aims of establishing if any associations exist between the metacognitions implicated in the S-REF model and social functioning. Due to past research finding that symptoms and cognitive schemas may contribute to social functioning outcomes, in addition to demographic variables and treatment allocation, these factors were controlled for in the regression model. Negative beliefs about uncontrollability and dangerousness of thoughts was found to negatively predict social functioning in an ARMS. That is, higher (i.e. more dysfunctional) metacognitions in this domain were associated with lower social functioning. Further, the dangerousness of thoughts was found to be of particular importance in this group. Age was the only other factor to predict social functioning with younger people having lower levels of functioning.

The TUS uses structured activity (i.e. employment, education, leisure, sports, childcare, housework) to measure social functioning, and was the measure used in the current study. The TUS has been validated in an ARMS and non-clinical samples, but content validity studies are

lacking. However, the items used to measure social functioning are in keeping with the definition of social functioning identified in Study 1. Due to this, it is considered to be a suitable measure for this study.

This study used a cross-sectional design, and although such a design is useful in getting an indication of potential predictors, causality cannot be inferred. Negative beliefs about uncontrollability and danger accounted for a small amount of variance suggesting other factors are involved in this relationship. This study was conducted using data from the 6-month time-point of a randomised controlled trial (EDIE-2). As this was post therapy, the results could have been impacted by the treatment. However, to account for this, treatment allocation was controlled for in the model.

8.1.5 Study 4: An exploration of how the S-REF model of metacognition emerges in accounts from young adults at risk of long-term social disability and perceived effects on social functioning: A framework analysis

This qualitative study was designed to explore how components of the S-REF model present in a sample of young people with a history of mental health and social functioning problems (at-risk of long-term social disability). It also examined the perceived effects of the cognitive attentional syndrome and metacognitive beliefs implicated in the S-REF model on social functioning. It was conducted to gain further knowledge about the role of metacognitive processes on social functioning. A framework analysis (type of thematic analysis) was conducted using both deductive and inductive approaches to address both parts of the overall research question.

Four overarching themes were identified, three relating to how the S-REF model is represented in this sample (i.e. CAS processes and strategies; Metacognitive beliefs about uncontrollability, danger and being prepared; and Consequence of metacognitive processing), and one relating to the perceived effects of social functioning (i.e. Adjustments to levels of social functioning). With respect to CAS processes and strategies, participants reported worrying about social functioning and rumination was found to be related to past

performance and conversations and past adverse events or trauma. Furthermore, participants reported threat monitoring via body language, and the use of reassurance (from others or self-soothing) to cope with the negative effects of metacognitive processing. Some of these elements had characteristics of social anxiety (e.g. worries and rumination related to performance and concerns about being judged negatively by others), but the presence of other themes suggested that it was wider than this.

The most prominent metacognitive beliefs were related to negative beliefs about uncontrollability and danger, and positive beliefs about being prepared. The results of this study could possibly explain why negative beliefs about uncontrollability and danger predicted social functioning in an ARMS sample (Study 3), and the reasons danger was found to be more important. Whilst not all participants had ARMS, more than half of participants did (52.63%). Further, this sample of young people also had low levels of social functioning, a characteristic also shared by those with an ARMS. Due to this, it could be argued that the results of this study could be generalised to the sample in Study 3.

A strong theme related to the consequence of engaging in metacognitive processing being mentally exhausting was also found. This theme had knock-on effects on social functioning leading to a reduction in activity for some participants. With respect to the perceived effects on social functioning, participants reported both the reduction and increase in social functioning as a result of engaging in metacognitive processes. This study illustrated that specific metacognitive processes are present in this sample, and highlight potential areas of vulnerability in this group that could lead to long-term social disability. Further, it also highlighted that engagement in activity or social interactions does not mean that individuals are not experiencing distress or psychological difficulties. Due to this, researchers and clinicians should consider this when interpreting treatment outcome or research results.

8.1.6 Study 5: Metacognitive beliefs as predictors of social functioning in a non-clinical sample: A longitudinal and cross-sectional investigation

This final study was conducted in a non-clinical population. It was assumed that social functioning in non-clinical populations and those with an ARMS can be viewed on the same continuum of underlying contributory processes, which would be consistent with the S-REF model. In addition to cross-sectional analyses, longitudinal analyses were also conducted to address the limitation of being unable to infer causality from the results in Study 3 (because of its cross-sectional design). This study linked to the overall aim of gaining knowledge on the mechanisms underlying social functioning and the role of metacognitive beliefs as specified in the S-REF model.

Two social functioning measures were used, one with a greater focus on the quality (SFS) of functioning that was more subjective, and the other quantity (TUS) which was more objective. In cross-sectional analyses using the SFS, two metacognitive beliefs, positive beliefs about worry and negative beliefs about uncontrollability and danger, were found to be predictors of social functioning (with the former being the strongest predictor of the two). Further, these metacognitive beliefs were found to be positive predictors suggesting that higher scores on these subscales lead to higher levels of social functioning. The fact that participants reported to increase levels of social functioning in response to the negative effects of metacognitive processing in the qualitative study discussed earlier (Study 4), could possibly explain this finding. However, the correlations between positive beliefs about worry and negative beliefs about uncontrollability and danger and the SFS Time 1 show the expected negative direction in relationships, whilst in the regression the direction of the relationships changed. This could be an indicator that the regression model is not reliable or that another variable in the model is affecting the relationship observed in the bi-variate correlations. Further research is required to investigate this further. Age was also found to positively predict SFS scores in the final step of this model (mirroring the findings in Study 3), in addition to social anxiety, depression, and negative schemas about others.

None of the independent variables were found to be predictors of TUS in a cross-sectional regression model. This finding illustrated that it is possible that metacognitive beliefs (as well as the other predictors) are more related to the quality of social functioning in a non-clinical population when controlling for TUS Time 1 in the SFS Time 1 cross-sectional regression. Most predictors remained significant in this latter model. The main differences were that negative beliefs about uncontrollability and danger was no longer significant, but instead cognitive confidence became a significant negative predictor of SFS Time 1 (the higher the score on this subscale means lower cognitive confidence, which was shown to predict lower levels of social functioning). This finding suggest that: 1) Cognitive confidence is more associated with the quality of social functioning (e.g. perceived quality of interactions); and 2) Negative beliefs about uncontrollability and danger may be more associated with the quantity of structured activity (especially in light of the fact that the TUS was also used in Study 3 and this metacognitive belief was found to be a predictor, but in this case a negative relationship existed). Perhaps with low levels of social functioning difficulties characteristic of non-clinical samples, people are more inclined to try to cope by increasing activity, but find it more difficult to do so as symptoms increase leading to different relationships with metacognition.

In longitudinal analyses social anxiety was the only variable to significantly predict social functioning (for the TUS Time 3 only), over and above TUS Time 1 which lost its effect in the final step. This illustrates that social anxiety should be considered in testing relationships between variables and social functioning outcomes. In the cross-sectional regression with the SFS, the results suggest it may be important to both the quantity and quality of social functioning. None of the variables predicted SFS longitudinally.

This study highlighted the importance of using more than one measure of social functioning to help build a clearer picture of the different factors associated with this construct.

8.2 Thesis strengths and limitations

8.2.1 Strengths

A number of strengths of the current thesis have been identified. Firstly, the use of different research methodologies allowed for a comprehensive investigation of the thesis aims and objectives. The systematic review conducted allowed the author to address two of the thesis aims of conceptualising social functioning and evaluating the quality of measurement tools used to measure this construct. Regarding the former, whilst there were just eleven articles included in the review, the definition constructed was compared to PROM items and it was found that this definition matched the items used to measure the construct. This provided additional information about the appropriate use of instruments to measure this construct. Further, in relation to the latter, the decision to use the most recent and comprehensive COSMIN checklist meant that the evaluation of the measures was conducted using the most up-to-date guidelines and recommendations. This led to the discovery that researchers validating social functioning measures need to improve the way in which they conduct validation studies, particularly in relation to PROM development and content validity. This discovery would not have occurred had the most recent manual for content validity not been used.

Validation of the MCQ-30 in an ARMS sample in Study 2 is considered a strength in this thesis as it allowed the author to have confidence in the results found in the subsequent Study 4. Further, the process of conducting this psychometric study was comprehensive and stringent using a variety of factor analytic methods (i.e. CFA, EFA, parallel analysis) to thoroughly investigate the validity of the 5-factor structure of the MCQ-30 in an ARMS.

The cross-sectional regression analyses conducted in Studies 3 and 5 included several factors identified in past research to be related to social functioning outcomes to test the contribution of metacognitive beliefs. Whilst the variance was small, the fact that metacognitive beliefs were still contributing to the model after all other variables were entered was an important

finding, and cause for further investigation. Further, the use of longitudinal regression analyses in Study 5 helped address the limitation of cross-sectional analyses (i.e. not being able to infer causality), and provided additional knowledge about the relationships between metacognitive beliefs and social functioning, as well as highlighting social anxiety as being a predictor of social functioning that should be accounted for in future studies.

The qualitative study allowed for a more in-depth analysis of the contribution of metacognitive processing to social functioning as themes related to both metacognitive beliefs and the CAS were found. This study built on the earlier Study 3 by providing possible explanations for the finding that negative beliefs about uncontrollability and danger (and in particular danger) were most important in relation to social functioning. The results of the qualitative study also provided a possible explanation for the finding in Study 5 that positive beliefs about worry and negative beliefs about uncontrollability and danger were positive predictors of social functioning in a non-clinical sample (i.e. that this sample could be increasing activity in order to cope with the negative effects of metacognitive processing).

Finally, the use of two social functioning measures in Study 5 allowed the author to gain more knowledge about potential relationships to different elements and foci of social functioning measures. This highlighted the importance of using multiple instruments to measure this construct in order to better understand how different factors might contribute to different aspects of social functioning. This makes sense however, considering social functioning was found in Study 1 to be a multifaceted and complex construct including a number of different areas. To try and measure the whole construct with one measure may be an unrealistic pursuit.

8.2.2 Limitations

In addition to the aforementioned strengths, this thesis also includes significant limitations.

Firstly, whilst the COSMIN checklist is very comprehensive, the most up-to-date manual for conducting systematic reviews was not consensus based (although its predecessor was and feedback was used from systematic reviews to create the current manual). This meant that the

content was subject to change, which could limit the interpretation of the results. The content validity manual was consensus based however, and this is considered to be the most important measurement property.

Although a systematic review was used to identify relevant papers from which to extract social functioning definitions, just eleven of the thirty-eight articles identified in this study included definitions of the construct. Due to this, it could be argued that this is not a sufficient number of articles to build a construct as complex as social functioning.

The use of secondary data at the 6-month time-point for Study 3 could have had an effect on the results of the study. Although treatment allocation was controlled for in this study, the fact that this time-point was post therapy meant that scores on measures could have been affected by the cognitive therapy provided, particularly as the model used allowed for the modification of both cognitive schemas and metacognitive beliefs.

Whilst the use of a deductive approach was deemed appropriate for part 1 of the qualitative study (Study 4), a limitation of its use could be that it prevented other potentially important findings from being identified. For example, half of the sample included in this study had received social recovery CBT, and the use of discourse around this could have provided additional knowledge to its usefulness in relation to social functioning.

Study 5 used the SFS as a measure of social functioning across three time-points, four weeks apart. The fact that the recall period for the SFS is three months, and time-points 1 and 3 (used in Study 5) were around two months apart, likely led to the finding that there was no change in the mean scores on this measure between time-points. This could have been the reason for the fact that metacognitive beliefs and other predictors were found not to be significant predictors of the SFS longitudinally, but were in a cross-sectional regression. This flaw in design of Study 5, could have meant that important findings were missed as we were not able to replicate the findings of the cross-sectional regression in the longitudinal

regression. The use of the TUS (recall period was the past month) in addition to this measure helped to remedy this, but whilst both measures cover similar areas of social functioning, the foci on the quality and quantity (SFS) versus quantity (TUS) meant that results may have been different if a longer time period was used between time-points.

8.3 Future research and directions

As illustrated in the previous section, whilst there are a number of strengths to this thesis, limitations also exist. This section will discuss ways in which these limitations could be addressed in future research, whilst also making suggestions on how future research could build on the knowledge gained from the studies conducted in this thesis.

Firstly, in order to further explore the concept of social functioning, future work in this area could expand the inclusion criteria of similar systematic reviews, to allow for more studies to be included (e.g. not just validation studies; could extend to include studies that use social functioning measures in RCTs). Further, involving service users and professionals (e.g. researchers, clinicians) in this process could help refine this definition further and make it more meaningful to the target population. Despite the importance of this, it may not be possible to validate every measure using a content validity study, and where a researcher lacks knowledge in a particular area of focus (e.g. a construct or theory), this may not be appropriate. However, what would be useful where possible and if known, is for researchers to acknowledge in their limitations that a content validity study has not been conducted and that results should be interpreted in light of this.

To address the limitations from Studies 3 and 5, future research should aim to conduct studies in clinical and non-clinical populations longitudinally to investigate the contributions of metacognitive beliefs, symptoms, cognitive schemas and demographics. A longer gap between administrations (e.g. three months) should be used to ensure that any change in social

functioning levels can be captured, and increase the chances of detecting an effect if one exists. Further, at least two measures of social functioning should be used, as Study 5 identified that it is possible that associations may be linked to different aspects of social functioning ability.

With respect to the qualitative study there are areas in which further knowledge could be gained. Linking some of the results of this study (e.g. including the prominent metacognitive beliefs and the CAS elements) with more quantitative longitudinal research designs (such as that described above) to obtain more information about relationships and predictors, could help develop knowledge in the area. In addition, the finding in the qualitative study that individuals reported both increasing and decreasing social functioning to cope with the negative effects of the engaging in metacognitive processing (that seemed to be supported by findings in Study 5), could also be explored. Metacognitive processing appears to effect social functioning in both directions, increasing it in some and decreasing it in others. At this time we have insufficient data to determine factors that impact on the direction of these relationships. However, correlations with the MCQ-30 suggest that beliefs about danger in ARMs may reduce social functioning. Where there is a larger gap between administrations in these studies, a Structural Equation Modelling (SEM) analyses could help build a better picture of what appears to be a very complex relationship. SEM will allow researchers to establish both direct and indirect relationships between factors, and findings from this thesis could help build theoretical models. It is also possible that the qualitative data and results could be used to develop a measure designed to assess for vulnerability factors of long-term social disability.

8.4 Clinical implications

8.4.1 Overview

The clinical implications of the present studies fall in the areas of assessment and treatment of poor social functioning. It is recommended that social functioning measures are used in the clinical assessment of cases and of treatment outcomes. Such measures should not only aim to

assess the quantity of activity, but also subjective quality. Reduced social activity may be indicative of elevated underlying levels of social anxiety and this may direct further clinical assessment to a variety of underlying problems that impact on social functioning.

With increased recognition of the importance of social functioning in those experiencing mental health problems, it is important to identify relevant vulnerability factors to allow for effective treatment. This thesis highlighted that negative beliefs about uncontrollability and danger and positive beliefs about worry may be involved, and as such interventions should aim to target these metacognitions. Further, the qualitative study also highlighted that engagement in activity in and of itself is not a sign that individuals are not experiencing distress or clinical significant symptomatology.

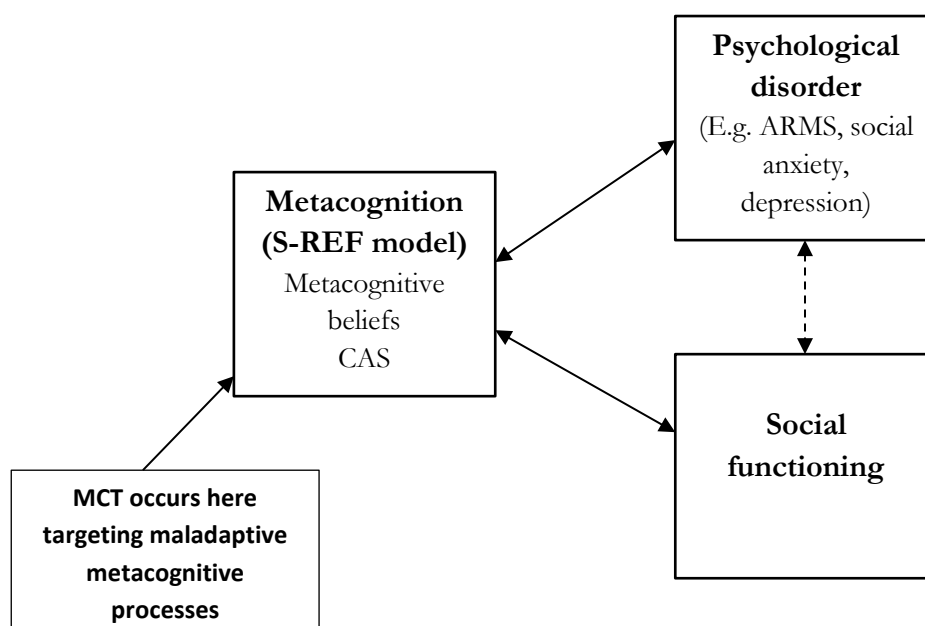
Whilst the current data is preliminary, the identification of the CAS and metacognitions in participants with a history of mental health and social functioning problems, and the relationship between negative metacognitive beliefs and reduced functioning in particular has implications for treatment. It would seem that the S-REF model and the metacognitive therapy that is grounded in it might provide a means of treating low levels of social functioning. Because this treatment is transdiagnostic, it is possible that social functioning and co-morbidities might be treated by targeting common underlying metacognitions.

8.4.2 Metacognitive therapy (MCT)

MCT was developed to target unhelpful metacognitions initially in anxiety and depression (Wells, 2009), but research has also found it to be useful in psychosis-spectrum conditions (Morrison et al., 2014; Valmaggia et al., 2007). MCT targets unhelpful metacognitions by using strategies such as increasing an individual's awareness of the presence of metacognitive beliefs and their engagement in the CAS as well as the control they have over how they respond to negative thoughts and feelings. Further, MCT uses detached mindfulness to help individuals to relate to their thoughts in more helpful ways (e.g. leaving thoughts alone rather than engaging in thoughts and observing that this leads to thoughts going away on their own). As

this thesis has found metacognitive beliefs and the CAS to be present in clinical and non-clinical samples, and social anxiety is involved in this relationship, it is possible that MCT could have some utility for people experiencing comorbid mental health and social functioning problems. Figure 10 below (an adapted version of Figure 4) illustrates the hypothesised role of the S-REF model in the samples included in this thesis with the addition of where MCT fits into this model.

Figure 10. A diagrammatic representation of the hypothesised role of the S-REF model on psychological disorder and social functioning with the addition of MCT



The dashed line (in Figure 10.) represents the hypothesised relationship between psychological disorder and social functioning. The potential for MCT to be a transdiagnostic approach to psychological disorder means that it may prove to be an effective intervention for a heterogeneous cohort of people experiencing various mental health and social functioning problems (e.g. PRODIGY sample).

8.5 Thesis overall conclusions

Social functioning appears to be multidimensional and researchers appear to be measuring the construct using items related to those set out in the definitions identified in the systematic

review of validation studies. The main difference between measurement seems to be related to *how* ability is rated rather than the content of the items in the measure (e.g. whether the focus is on the amount of time spent conducting activities or a participant's perceived ability to do the activity). As discovered from the evaluation of social functioning measures, service users and professionals also need to be more involved in their development. This is to ensure that the measure captures social functioning adequately, and to have confidence that the measure has meaning and is relevant to the people it has been designed for. Without this there is an increased risk of bias, which could have adverse effects on outcomes of studies and the development of accurate knowledge in the area.

The psychological processes and metacognitions identified in the S-REF model appear to be associated with social functioning. More specifically, there are some early indicators that metacognitive beliefs and the CAS are associated with social functioning in people with an ARMS, at risk of long-term social disability, and a non-clinical sample. However, there were some different patterns of relationships observed across the clinical and non-clinical samples which need to be substantiated in future studies. The uncontrollability and dangerousness of thoughts was found to be of particular importance in those with an ARMS, and positive beliefs about worry in clinical and non-clinical samples. Low levels of cognitive confidence were found to be related to lower levels of social functioning in a non-clinical group.

Whilst metacognitive beliefs have been found in this study to have some association with social functioning, this thesis has highlighted that this relationship also involves other factors such as social anxiety and negative schemas. These relationships need to be explored further to gain a clearer picture of their inter-relationship, and to refine early interventions to help target vulnerability factors related to long-term social disability.

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Appendices

Appendix 1. Database searches for systematic review

PsycINFO search terms.

<i>CONCEPT</i>	<i>SPECIFIC SEARCH TERMS SELECTED IN DATABASE</i>
1. Mental disorder (MeSH) – Selected words to prevent exploding in unnecessary areas	Mental disorders/ or affective disorders/ or anxiety disorders/ or eating disorders/ or hoarding disorder/ or personality disorders/ or psychosis/ or schizoaffective disorder/ or borderline states/ or narcissism/
2. Psychological disorder – General key words	Psychological disorder* OR emotional disorder* OR mental health problem* OR mental disorder* OR mental illness* OR psychiatric disorder*
3. Social functioning	Social function*
4. Validation study terms	Validation stud* OR psychometric* OR reproducibility of results OR valid* OR reliab* OR unreliab* OR coefficient OR internal consist* OR alpha* OR cronbach* OR cronbach* alpha OR correlation* OR inter-rater OR interrater OR intrarater OR intra-rater OR kappa* OR general* OR correlation* OR measurement* OR measurement error OR construct validity OR content validity OR face validity OR structural validity OR IRT OR rasch analyses OR cross-cultural validity OR cross cultural validity OR criterion validity OR responsiveness OR factor analysis OR exploratory factor analysis OR confirmatory factor analysis
5. Measures	Self-report* OR self report* OR measur* OR question* OR inventor* OR scale* OR assess* OR survey* OR outcome* OR interview* OR test* OR tool*

Embase search terms.

<i>CONCEPT</i>	<i>SPECIFIC SEARCH TERMS SELECTED IN DATABASE</i>
1. Mental disorder (MeSH) – Selected words to prevent exploding in unnecessary areas	Mental disease/ or anxiety disorder/ or emotional disorder/ or mood disorder/ or personality disorder/ or psychosis/
2. Psychological disorder – General key words	Psychological disorder* OR emotional disorder* OR mental health problem* OR mental disorder* OR mental illness* OR psychiatric disorder*
3. Social functioning	Social function*
4. Validation study terms	Validation stud* OR psychometric* OR reproducibility of results OR valid* OR reliab* OR unreliab* OR coefficient OR internal consist* OR alpha* OR cronbach* OR cronbach* alpha OR correlation* OR inter-rater OR interrater OR intrarater OR intra-rater OR kappa* OR general* OR correlation* OR measurement* OR measurement error OR construct validity OR content validity OR face validity OR structural validity OR IRT OR rasch analyses OR cross-cultural validity OR cross cultural validity OR criterion validity OR responsiveness OR factor analysis OR exploratory factor analysis OR confirmatory factor analysis
5. Measures	Self-report* OR self report* OR measur* OR question* OR inventor* OR scale* OR assess* OR survey* OR outcome* OR interview* OR test* OR tool*

Table 3. MEDLINE (including MEDLINE In-process & Other Non-indexed Citations) search terms.

<i>CONCEPT</i>	<i>SPECIFIC SEARCH TERMS SELECTED IN DATABASE</i>
1. Mental disorder (MeSH) – Selected words to prevent exploding in unnecessary areas	Mental disorders/ or anxiety disorders/ or agoraphobia/ or anxiety, separation/ or obsessive-compulsive disorder/ or hoarding disorder/ or panic disorder/ or phobic disorders/ or phobia, social/ or "bipolar and related disorders"/ or bipolar disorder/ or "feeding and eating disorders"/ or anorexia nervosa/ or binge-eating disorder/ or bulimia nervosa/ or mood disorders/ or depressive

	<p>disorder/ or depressive disorder, major/ or depressive disorder, treatment-resistant/ or dysthymic disorder/ or seasonal affective disorder/ or cyclothymic disorder/ or personality disorders/ or antisocial personality disorder/ or borderline personality disorder/ or compulsive personality disorder/ or dependent personality disorder/ or histrionic personality disorder/ or paranoid personality disorder/ or passive-aggressive personality disorder/ or schizoid personality disorder/ or schizotypal personality disorder/ or "schizophrenia spectrum and other psychotic disorders"/ or affective disorders, psychotic/ or paranoid disorders/ or psychotic disorders/ or schizophrenia/ or schizophrenia, catatonic/ or schizophrenia, disorganized/ or schizophrenia, paranoid/ or somatoform disorders/ or body dysmorphic disorders/ or hypochondriasis/ or "trauma and stressor related disorders"/ or stress disorders, traumatic/ or stress disorders, post-traumatic/ or stress disorders, traumatic, acute/</p>
2. Psychological disorder – General key words	<p>Psychological disorder* OR emotional disorder* OR mental health problem* OR mental disorder* OR mental illness* OR psychiatric disorder*</p>
3. Social functioning	<p>Social function*</p>
4. Validation study terms	<p>Validation stud* OR psychometric* OR reproducibility of results OR valid* OR reliab* OR unreliab* OR coefficient OR internal consist* OR alpha* OR cronbach* OR cronbach* alpha OR correlation* OR inter-rater OR interrater OR intrarater OR intra-rater OR kappa* OR general* OR correlation* OR measurement* OR measurement error OR construct validity OR content validity OR face validity OR structural validity OR IRT OR rasch analyses OR cross-cultural validity OR cross cultural validity OR criterion validity OR responsiveness OR factor analysis OR exploratory factor analysis OR confirmatory factor analysis</p>
5. Measures	<p>Self-report* OR self report* OR measur* OR question* OR inventor* OR scale* OR assess*</p>

	OR survey* OR outcome* OR interview* OR test* OR tool*
--	--

Appendix 2. Systematic review protocol

PROSPERO

International prospective register of systematic reviews

Psychometric properties of social functioning measures: a systematic review in populations experiencing mental health problems

Measha Bright, Sophie Parker, Emmeline Joyce, Adrian Wells

Citation

Measha Bright, Sophie Parker, Emmeline Joyce, Adrian Wells. Psychometric properties of social functioning measures: a systematic review in populations experiencing mental health problems.

PROSPERO 2018 CRD42018087952 Available from:

http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42018087952

Review question

- i. What social functioning measures have been used in studies with people experiencing mental health problems?
- ii. What is the quality of the social functioning measures used in studies with people experiencing mental health problems?

Searches

Electronic databases PsycINFO, EMBASE and MEDLINE (including MEDLINE In-process and Other Non-Indexed Citations) will be searched via OVID. Boolean logic will be used to combine the terms. No date restrictions will be applied to search (i.e. no specific start date (so as to include earliest record) and search will be completed up to and including the date of the search (10/09/2017)). Reference lists of eligible studies will be checked for additional relevant articles.

Types of study to be included

Only studies that report on the validity and reliability (psychometric properties) of social functioning measures used in populations experiencing mental health problems are to be included in this review. Articles must be written in English language.

Condition or domain being studied

Validation studies of social functioning measures that include participants meeting criteria for one or more of the following mental health problems: anxiety or mood disorder; psychosis spectrum disorder; eating or somatoform disorder; personality disorder.

Participants/population

Inclusion: Validation studies of social functioning measures that include participants meeting criteria for one or more psychological disorder (i.e. anxiety, mood, psychosis spectrum, eating, somatoform or personality disorder) as defined by a validated measure (e.g. Structured Clinical Interview for DSM III/IV/V Axis I Disorders (SCID), the ICD-10, Comprehensive Assessment of At Risk Mental States (CAARMS)), Positive and Negative Syndrome Scale (PANSS)). No age restrictions are in place for this systematic review.

Exclusion: Studies that include populations of people diagnosed with a learning disability/difficulty, behavioural or neurological problems or physical health condition.

Intervention(s), exposure(s)

Not applicable.

Comparator(s)/control

Not applicable.

Context

Primary outcome(s)

Identify validated studies of social functioning measures used with people experiencing mental health problems. Assess the quality of these measures using COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) checklist.

Timing and effect measures

Secondary outcome(s)

Provide a general overview of the concept of social functioning using validation studies included in the review.

Data extraction (selection and coding)

Two researchers will independently review studies for inclusion. Any discrepancies will be resolved with a third reviewer, and if required, a fourth reviewer. Inter-rater reliability will be conducted at title, abstract and full article level using Kappa coefficients. Reference lists of included full articles will be manually searched for eligible studies.

Risk of bias (quality) assessment

Two researchers will review articles for inclusion. The quality of each measure will be assessed using the COSMIN checklist.

Strategy for data synthesis

Data will be summarised using a narrative synthesis with a particular focus on quality of social functioning measures, the population such measures have been validated in, and an appraisal of any further work required in this area. EndNote X5 and Microsoft Excel 2010 will be used to manage data throughout the review process. SPSS Statistics Version 22 will be used to conduct analyses (e.g. Kappa coefficients).

Analysis of subgroups or subsets

Where appropriate, subgroup analysis will be conducted (e.g. by mental health problem or age).

Contact details for further information

Measha Bright

measha.bright@postgrad.manchester.ac.uk

Organisational affiliation of the review

University of Manchester and Greater Manchester Mental Health NHS Foundation Trust

Review team members and their organisational affiliations

Miss Measha Bright. University of Manchester and Greater Manchester Mental Health NHS Foundation Trust

Dr Sophie Parker. Greater Manchester Mental Health NHS Foundation Trust and University of Manchester

Miss Emmeline Joyce. Greater Manchester Mental Health NHS Foundation Trust

Professor Adrian Wells. University of Manchester

Anticipated or actual start date

10 September 2017

Anticipated completion date

30 June 2018

Funding sources/sponsors

None

Conflicts of interest

Language

Country

England

Stage of review

Review_Ongoing

Subject index terms status
Subject indexing assigned by CRD

Subject index terms
Humans; Mental Health; Psychometrics; Reproducibility of Results; Surveys and Questionnaires

Date of registration in PROSPERO
06 February 2018

Date of publication of this version
06 February 2018

Details of any existing review of the same topic by the same authors

Stage of review at time of this submission

Stage Started Completed

Preliminary searches Yes Yes

Piloting of the study selection process Yes Yes

Formal screening of search results against eligibility criteria Yes No

Data extraction No No

Risk of bias (quality) assessment No No

Data analysis No No

Versions

06 February 2018

PROSPERO

Appendix 3. Questionnaire study consent form

Investigating metacognition, social functioning and emotion

CONSENT FORM

If you are happy to participate please complete and sign the consent form below.

Please initial box

1. I confirm that I have read the attached Participant Information Sheet (V2, 28/07/2017) on the above project and have had the opportunity to consider the information and ask questions and had these answered satisfactorily.	
2. I confirm that I am <u>not</u> currently experiencing or seeking help for a mental health problem (e.g. anxiety or mood disorder) or neurological problem.	
3. I confirm that I am currently living in the UK.	
4. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason and without detriment.	
5. I understand that I am required to complete questionnaires at three separate times 4 weeks apart.	
6. I agree that researchers can collect sensitive personal data from me, and that such data can be collected and used for the purposes of research. I understand that sensitive records will be kept separately from other research data.	
7. I agree to be reminded to complete the questionnaires as specified in the Participant Information Sheet (V2, 28/07/2017).	
8. I understand that my data will remain confidential in accordance with the Data Protection Act 1998 with respect to data collection, storage, and destruction.	
9. I understand that the information collected about me will be used to support other research in the future, and may be shared anonymously with other researchers.	
10. I agree to take part in this study.	

I agree to take part in the above project:

_____	_____	_____
Name of participant	Date	Signature
_____	_____	_____
_____	_____	_____

Please select 'Next' button below to proceed to the study.

This Project Has Been Approved by the University of Manchester's Research Ethics Committee [UREC reference number: 2017-2286-3502]

Appendix 4. Questionnaire study participant information sheet

Investigating metacognition, social functioning and emotion

Participant Information Sheet

You are being invited to take part in a research study being conducted for a postgraduate research degree (Ph.D) project. Before you decide whether or not you'd like to take part in this study, it is important for you to understand why this is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for taking the time to read this.

Who will conduct the research?

Measha Bright (Ph.D Student); Professor Adrian Wells; and Dr Sophie Parker
University of Manchester
Zochonis Building, 2nd Floor
Brunswick Street
Manchester
M13 9PL

What is the purpose of the research?

This study is part of a postgraduate research degree (Ph.D) project supervised by Prof Adrian Wells and Dr Sophie Parker. The aim of this study is to explore a particular type of thinking known as metacognition. Metacognition is described as thinking about thinking. Previous research has found that certain ways of thinking can contribute to emotional difficulties and affect levels of distress. It is possible that certain thinking processes can contribute to levels of social functioning in people experiencing psychological difficulties. This study aims to investigate this in the general population to enhance knowledge in this area.

Is the study suitable for me?

You may take part in this study if you are 16 years or over, living in the UK, and not currently experiencing or seeking help for a mental health problem (e.g. mood, anxiety or other psychiatric disorder) or neurological disorder.

What would I be asked to do if I took part?

This is an online questionnaire study. You will first be asked to read this Participant Information Sheet and then sign a consent form. Once you have signed the consent form you will then be required to answer questions from different questionnaires that will explore your activity levels, thinking processes, different beliefs you may have, and emotion (e.g. questions about mood or anxiety). You will be asked to complete these questionnaires on three separate occasions, four weeks apart. The first time you complete these questionnaires will be immediately after you have consented to take part in the study, then on two more occasions after that (each four weeks apart). It should take no longer than 45 minutes to complete these questionnaires each time. You will be sent up to 2 email reminders when it is time to complete your questionnaires.

What happens to the data collected?

All the data will be stored securely on a University of Manchester password protected computer and on the University's network server. Only the researchers of this study will have access to all data. The data will be analysed by the research team. The results of this research will potentially be published and/or presented to other researchers. Anonymous data collected will be used to support other research in the future, and may be shared with other researchers.

How is confidentiality maintained?

All information gathered during this study will be kept strictly confidential and will conform to the Data Protection Act 1998 with respect to data collection, storage, and destruction. Any personal identifiable data (e.g. name, email address) will be held by Measha Bright and can only be accessed by this researcher and her supervisors Prof Adrian Wells and Dr Sophie Parker. Participants' identities will remain completely anonymous after data collection.

What happens if I do not want to take part or if I change my mind?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw up to the point of submitting your completed questionnaires on SelectSurvey.net without giving a reason and without detriment to yourself.

Will I be paid for participating in the research?

There will not be payments for research participants. There will be a prize draw at the end of the study where one person selected at random will receive a £50 High Street voucher. The winner of the prize draw will be notified via email.

What is the duration of the research?

This study involves completing questionnaires at three separate time-points four weeks apart. Completion of the questionnaires should be no more than 45 minutes on each occasion.

Where will the research be conducted?

This study will be conducted online via SelectSurvey.net. This will allow you to complete the study your own time (e.g. at home). A link will be provided, which directs you to the study.

Will the outcomes of the research be published?

The results of this research will potentially be published and/or presented to other researchers.

Who has reviewed the research project?

The project has been reviewed by the University of Manchester Research Ethics Committee (Ref: 2017-2286-3683).

What if something goes wrong?

Answering the questionnaires should not be harmful. However some of the questions will be about the way you feel, beliefs and activity levels, which may be upsetting. We would advise you to speak with your GP in the event you would like to discuss any concerns you have regarding any of these matters. Below are contact details for services you can get further support from:

National Services

- **NHS Direct**
111 (Free phone)
- **Samaritans**
116 123 (Free phone)
www.samaritans.org

What if I want to make a complaint?

Minor complaints

If you have a minor complaint then you need to contact the researchers in the first instance.

PROF ADRIAN WELLS

Email: Adrian.Wells@manchester.ac.uk

Tel: 0161 276 5331

DR SOPHIE PARKER

Email: Sophie.Parker@gmmh.nhs.uk

Tel: 0161 358 1395 or Work mob: 07767 755790

Formal Complaints

If you wish to make a formal complaint or if you are not satisfied with the response you have gained from the researchers in the first instance then please contact the Research Governance and Integrity Manager, Research Office, Christie Building, University of Manchester, Oxford Road, Manchester, M13 9PL, by emailing: research.complaints@manchester.ac.uk or by telephoning 0161 275 2674 or 275 2046.

What Do I Do Now?

If you have any queries about the study, please contact the researcher(s) using the contact details below. If after reading this information sheet you decide you would like to take part in the study, please click on the 'Next' button below to proceed to the consent form.

MEASHA BRIGHT

Email: Measha.Bright@postgrad.manchester.ac.uk

Tel: 0161 358 1791

Work mob: 07824 475374

PROF ADRIAN WELLS

Email: Adrian.Wells@manchester.ac.uk

Tel: 0161 276 5331

DR SOPHIE PARKER

Email: Sophie.Parker@gmmh.nhs.uk

Tel: 0161 358 1395

Work mob: 07767 755790

This Project Has Been Approved by the University of Manchester's Research Ethics Committee UREC,
reference number: 2017-2286-3683.

Appendix 5. Topic guide for qualitative interview

1. Background of psychological difficulties

Opening question: *Can you tell me a bit about how you became involved in the PRODIGY study?*

E.g. Prompts: What difficulties were you experiencing? What did you feel you needed help with?

Aim: Use opening question to establish rapport and generate dialogue about past difficulties. Interview will go on to ask about how things are now (e.g. social functioning, mental health, relationships with others).

2. Meta-beliefs/appraisals

Question: *Has there been a time recently when you have found yourself thinking a lot about things or worrying? Can you tell me a bit more about that?*

E.g. Prompts: Did you have any thoughts about your mental state? What were these thoughts?
Do you notice any changes in your social functioning/day-to-day activities/interactions with others? What are these changes?
Do you think there are any advantages/disadvantages to worrying? What are the advantages/disadvantages?

Aim: To understand the nature of worry/rumination and how this affects social functioning.

3. Coping strategies

Question: *When you felt worried/anxious/paranoid etc. what did you do to cope with the situation?*

E.g. Prompts: Did you do anything to deal with threat, danger or feelings? What did you do?
Did you do anything to control your thoughts? What did you do?
How often do you avoid/seek out social contact? Reasons?

Aim: Establish ways participants cope with worrying thoughts/rumination and effect on frequency of social activity.

4. Cognitive processes, attention

Question: *What were you paying most attention to in the situation?*

Prompts: Were focusing on your thoughts, feelings or the situation?

Aim: Elicit dialogue around focus of attention when they worry or ruminate. Determine effects of this (e.g. difficulties focussing on tasks).

5. Cognitive processes, judgements

Question: *How did you form your judgements in the situation?*

Prompts: What sort of evidence did you look for? (Links to CAS – internal/mental or external/physical information)

Aims: Determine where participants obtain their information to form judgments, and their confidence in these judgements. Influence of social factors on formulation of judgements.

6. Mode

Question: *Did you accept your thoughts and judgements as facts based on reality?*

Prompts: Could you see your thoughts as distortions of what was really happening in the situation?
Can you keep your distance from these negative thoughts and feelings when they occur?

Aims: Establish perception of thoughts. Are participants able to distance themselves from their thoughts? Explore effects of judgements on social functioning.

7. Is there anything else that you would like to add?

Appendix 6. Time Use Survey (Administered version)

TIME USE INTERVIEW

EMPLOYMENT

1. Did you do any paid work in the last month, either as an employee or self-employed?

YES → ASK DETAILS

NO → GO TO QU 3

Details

2. How many hours a week do you usually work in your main job? Include any overtime. How many hours have you worked in the last month?

Details

3. Over the last month have you been away from your main job?

YES → ASK DETAILS

NO → GO TO QU 4

Details

4. Have you ever had a paid job?

YES → ASK DETAILS

NO → GO TO 'EDUCATION AND TRAINING' SECTION

Details (What was the job? When left job, etc)

EDUCATION AND TRAINING

1. Are you studying for any formal qualifications at the moment?

YES → ASK DETAILS

NO → GO TO QU 2

Details (e.g. what, where, full/part time, hours in the last month)

2. In the last month, have you been on any taught courses or undertaken learning of any of the following sorts:

Taught courses meant to lead to qualifications (even if you did not obtain them)	
Taught courses designed to help you develop skills that you might use in a job	
Courses or instruction or tuition in driving, in playing a musical instrument, in an art or craft, in a sport or in any practical skill	
Evening classes (e.g. art/craft, languages, cookery)	
Learning which involved working on your own from a package of materials provided	

IF YES TO ANY OF THE ABOVE → ASK DETAILS

IF NONE OF THE ABOVE → GO TO 'VOLUNTARY WORK' SECTION

3. On how many occasions in the last month did you spend time studying at home outside of teaching sessions? How many hours?

Details (e.g. what, where, full/part time, hours in the last month)

VOLUNTARY WORK

Have you done any voluntary work through a group or on behalf of an organisation at any time during the last month? Have you done any unpaid work for anybody else e.g. running errands for elderly relatives?

YES → ASK DETAILS

NO → GO TO 'LEISURE ACTIVITIES'

Details of voluntary work

How many times in the past month?

LEISURE AND SPORT ACTIVITIES

1. I am now going to ask some questions about things that some people do in their spare time. For each activity that I mention could you please tell me whether or not you have done this in the last month, AND how often?

ACTIVITY	NUMBER OF TIMES	AMOUNT OF TIME
Been to cinema		
Been to an event as a spectator (e.g. sports event, theatre, live music performance)		
Been to a museum, art gallery or heritage site		
Been to a library		
Been out to eat or drink at a café, restaurant, pub or wine bar		
Been to a shopping centre, or mall, apart from regular shopping for food and household items		
Been to some other place of entertainment (e.g. dance, club, bingo, casino)		
Been on any other outdoor trips (including going to places of natural beauty, picnics, going for a drive or going to the beach)		
Been involved in any community based activities (e.g. Scouts, going to church)		

2. I am now going to ask about sports activities. Could you please tell me whether or not you took part in any of these sports in the last month AND how often?

ACTIVITY	NUMBER OF TIMES	AMOUNT OF TIME
Swimming		
Cycling		
Gym/weight training		
Exercise classes (e.g. aerobics, martial arts)		
Team sports (e.g. rugby, football, cricket, hockey, netball)		
Racquet sports (e.g. tennis, badminton, squash)		
Jogging, cross country, road running		
Walking or hiking for 2 miles or more (recreationally)		
Climbing/mountaineering		

Reading, playing and talking with children	
Accompanying child (e.g. to school, doctor, friend's house, etc)	

HOUSEWORK AND CHORES

How many people do you live with? Who is mainly responsible for the housework?

--

How much time do you spend doing housework and chores per week?

Food management and preparation	
Cleaning, dusting, vacuuming, washing dishes	
Food shopping	
Washing	
Gardening	
DIY and repairs	

Appendix 7. Opt-out letter for qualitative study



Tel: 0161 358 1791

[Date]

Dear [Participant],

We are writing to you as you expressed an interest in hearing about future research when we last met. You are being invited to take part in an additional study that forms part of a Ph.D project.

Research Assistant Measha Bright, would once again like to contact you to see if you would like to take part in this additional study. This would mean meeting with Measha at a convenient place/time to complete some questionnaires and take part in a semi-structured interview. This study will last approximately 1.5 to 2 hours and you will receive £10 for to reimburse you for your time.

If you **do not** wish to be contacted by Measha, please complete the tear-off slip below and return in the enclosed self-addressed envelope. Alternatively, you can let us know that you do not want to be contacted by emailing measha.bright@gmw.nhs.uk or texting/calling 07824 475374 or 0161 358 1791. If using email or text to opt-out, you just need to send the code [*input opt-out code e.g. M001 OPT-OUT*] to let us know you do not want to be contacted. If we do not hear from you within 1 week, we will assume you are happy to be contacted. However, you are still free to decide not to take part in the study after being contacted by us.

Enclosed is a Participant Information Sheet which gives more information about this additional study. Please take the time to read this carefully. If you are happy to take part, but have changed your contact details, you can let us know via text, email, phone or by using the tear-off slip below.

Addition study with primary caregiver

The researcher is also looking to interview primary caregivers (e.g. parent) of PRODIGY study participants. This is a separate study from the one you are being invited to. This study is about caregiver experiences rather than your own. The researcher will not disclose any personal or confidential information about you or your participation in the study to your relative should they decide to take part. We will only approach your chosen relative with your permission. If you are happy for your parent or other primary caregiver to take part in this research, please could you provide them with the enclosed participant information sheet about the study, and if they are interested please advise them to use the

contact details on the sheet to contact me or give you permission for me to contact them directly. The tear-off slip below can be used to provide contact details for your chosen caregivers and let us know whether you are happy for them to be approached. You can still take part in the above study if your caregiver(s) does not want to take part in this study and vice versa.

If you have any concerns, queries, or would like more information, please contact Measha.

Yours sincerely,

Measha Bright

Research Assistant

Enc. *Participant information sheet (for PRODIGY participant)*

Participant information sheet (for caregivers)

Self-addressed envelope

Reply slip: [Participant's Name]

To the PRODIGY team, (Please tick)

I would not like to take part in the study at this time and would prefer not to be contacted.

I would be interested in taking part in the study but my contact details have changed. The best way to contact me is.....

Caregiver permissions

I would not like my primary caregiver to be contacted to take part in the research offered by Measha Bright.

I am happy for my parent/other _____ (*please specify*) to be contacted about the research offered by Measha Bright. They have given you permission to contact them. Their contact details are:

Name(s):

Telephone No. 1:

Telephone No. 2:

Email:

Appendix 8. Participant information sheet for qualitative study

Investigating metacognition and social functioning in young people experiencing early psychological difficulties

Participant Information Sheet

You are being invited to take part in a research study being conducted for a postgraduate research degree (Ph.D) project. Before you decide whether or not you'd like to speak with the researcher again, it is important for you to understand why this is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Feel free to ask if there is anything that is not clear or if you would like more information. Thank you for reading this.

What is the purpose of the study?

This study is part of a postgraduate research degree (Ph.D) project conducted by PRODIGY study researcher Measha Bright. The aim of this study is to explore a particular type of thinking known as metacognition. Metacognition is described as thinking about thinking. Previous research has found that certain ways of thinking can contribute to mental health difficulties and affect levels of distress. It is possible that certain thinking processes can contribute to levels of social functioning in people experiencing psychological difficulties. This study aims to investigate this to enhance knowledge in this area, which could contribute to developing better interventions to aid recovery in the future.

Why have I been contacted about this study?

We are contacting all PRODIGY study participants who consented to be approached at a later date about research to see whether they would like to take part in an additional study.

But what if I didn't get therapy?

As you know, you had a 50/50 chance of receiving therapy as part of the PRODIGY project and this was decided by chance. We are approaching everyone who agreed to participate in the PRODIGY study, even if they didn't receive the SRCBT therapy intervention. This is because we don't know how the therapy compares to treatment as usual and need to make comparisons.

Haven't I already given consent to take part in PRODIGY?

You have already completed a consent form in order to take part in the PRODIGY project. However, this is a separate study and therefore requires an additional consent procedure.

Do I have to take part?

No it is solely up to you to decide whether to take part in the study. If you do decide to take part you will be given this information sheet to keep and will be asked to sign another consent form. If you decide

to take part, you are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive.

What will happen to me if I take part?

You will have the opportunity to ask any questions you may have about the study via phone, email or face-to-face. If you do agree to take part, you will be asked to complete a semi-structured interview where you will be asked questions about your thinking and social functioning. This interview will last 30-60 minutes and must be audio recorded to allow the interview to be transcribed and interpreted. You will also be asked to complete 3 self-report questionnaires, and the researcher will ask you questions about how you have been spending your time. This part of the study will last around 30 minutes and will be conducted face-to-face. You can decide where you feel most comfortable meeting the researcher to take part in this interview, e.g. at home or other community venue.

What are the possible disadvantages and risks of taking part?

We don't anticipate that there will be any disadvantages or risks of taking part in this study. You don't have to talk about anything that you don't want to and if you feel uncomfortable completing any of the assessments then you do not have to.

What are the possible benefits of taking part?

We hope that meeting up with the researcher and talking about how things have been for you will be a positive experience.

The information we find out from this research may also help us to provide people with better help in the future. You will receive £10 for taking part in this study to reimburse you for your time.

What will happen if I do not want to carry on with the study?

If you decide to take part, you are still free to withdraw at any time and without giving a reason. A decision to withdraw, or a decision not to take part, will not affect the standard of care you receive.

What happens when the research stops?

All participants will receive standard care from their current team, if applicable, or their GP as usual.

What happens if something goes wrong?

It is unlikely that anything would go wrong. However, if you have a concern, you may contact me in the first instance or you can contact my supervisor Sophie Parker on 0161 772 4642. Any complaint you have about the study will be resolved with you promptly. Information will be provided by phone or in writing to inform you of how the complaint has been addressed. If they are unable to resolve your concern or you wish to make a complaint regarding the study, please contact please contact the University Research Governance and Integrity Manager, Research Office, Christie Building, University of Manchester, Oxford Road, Manchester, M13 9PL, Tel: 0161 275 2674 or 0161 275 2046 or by email to research.complaints@manchester.ac.uk.

In the event that something does go wrong and you are harmed during the research you may have grounds for a legal action for compensation against the University of Manchester or Greater Manchester West Mental Health NHS Foundation Trust, but you may have to pay your legal costs. The normal National Health Service complaints mechanisms will still be available to you.

Will my taking part in this study be kept confidential?

All information collected as part of this research including questionnaires and any recordings of assessments will be kept in a locked filing cabinet and secure IT systems on University or NHS sites. Data will be transferred between sites securely to ensure no-one outside the research team is able to access it. Any information from or about you will have your name, address and any other identifying features removed so that you cannot be recognised from it. This means that your anonymity will be preserved at all times during and after the study period.

The only time information about you would be disclosed outside the study is where you request this or where identified risk is at such a level that it presents a danger to yourself or others. This information will be shared with the most appropriate service(s) (e.g. GP, care co-ordinator, Police), and we will let you know if we have to disclose information outside the study, why this is being disclosed and to who this information is being sent. Only requested and/or relevant information will be disclosed.

Study information may need to be looked at during an audit or monitoring visit. This is when people from the University of Manchester, NHS Trust or regulatory authorities review all the data to make sure the study is being carried out as planned. If you agree, they will include your identifiable data when doing the checks (they will see it belongs to you). Anyone that does look at the data will have a duty to keep it confidential.

Where and how long will records be stored?

Audio recordings of sessions will be destroyed as soon as they have been transcribed. All other data, including transcriptions, will be kept for 10 years after the completion of the study and then destroyed. Data will be stored in locked cabinets and secure ICT systems on NHS or university premises.

What will happen to the results of the research study?

The results of the study will be written up for publication in health professional journals and may be presented at conferences in the UK and abroad. When we report the results of the research we may quote some of your words, however your anonymity will be preserved at all times. If you would like to be kept informed of any publications resulting from the study, please let the research team know.

Who is organising the research?

The research is being sponsored by The University of Manchester. The research is being carried out by researchers from the University of Manchester and Greater Manchester West Mental Health NHS Foundation Trust.

Who has reviewed the study?

The research has been considered and approved by the South Yorkshire Research Ethics Committee.

Thank you for reading this. If you need further information, please contact a member of the research team. The names of people to contact are given below.

We will give you this information sheet to keep as well as a signed consent form if you agree to take part in this study.

Contact for further information:

Measha Bright (Research Assistant Psychologist)

Tel: 07824 475374 or 0161 358 1791

Email: measha.bright@gmw.nhs.uk

Dr Sophie Parker (Supervisor)

Tel: 0161 358 1395 or 07767 755790

Email: sophie.parker@gmw.nhs.uk

Appendix 9: Qualitative study consent form

The University
of Manchester



Investigating metacognition and social functioning in young people experiencing early psychological difficulties

Consent Form

Psychology Dept.
Harrop House
Prestwich, Manchester
M25 3BL
0161 358 1791

Name of Researcher:

Please initial
boxes

1. I confirm that I have read and understand the participant information sheet dated 18/08/2016 (Version 4) for the '*Investigating metacognition and social functioning in young people experiencing early psychological difficulties study*' and have had the opportunity to have my questions answered.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.
3. I give my consent for tape recordings of assessment sessions to be made. I understand that this is for the purposes of analysing information I provide in the semi-structured interview and for supervision purposes, that any person hearing the tape will keep the information confidential, and that recordings will be stored under locked conditions.
4. I agree to my anonymous quotations being used for the project report and publications.

5. I understand that anonymised data may be transferred outside of the trust by a secure method in order to be analysed by the research team.

6. I understand that relevant sections of data collected during the study may be looked at by responsible individuals from the University of Manchester, from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in the research. I give permission for these individuals to have access to this data.

7. I agree to take part in this study.

Name of Participant

Date

Signature

Researcher

Date

Signature

When completed: 1 copy for participant; 1 original for researcher site file.

Appendix 10. Characteristics of included PROMS per validation study (N=38)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Beijing Performance-based Functional Ecological Test (BJ-PERFECT)*	Shi et al., 2013	China (Chinese)	Transportation; financial management; work ability (p.788)	Performance-based. Role plays based on Chinese culture.	Use maps to plan journey, role play withdrawal of cash and cashier role.	10-items	Performance on the day	Schizophrenia (outpatients)	N=87 (schizophrenia (n=50; healthy controls (n=37))	18 to 60	Schizophrenia: 36.58 (9.33); healthy controls: 35.35 (8.50)	Schizophrenia = 26:24; healthy controls = 18:19	Schizophrenia: healthy controls respectively: Transportation = 60.73 (27.94):84.77 (18.81); Financial management = 76.36 (21.65):92.14 (10.31); Work ability = 43.50 (13.48):73.99 (10.05); Global score: 60.20 (16.27):83.63 (9.13)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
First Episode Social Functioning Scale for early psychosis (FESFS)*	Lecomte et al., 2014	Canada (Language not specified)	Friendships and social activities, Independent living skills, Interacting with people, Family, Intimacy, relationships and social activities at work, Work abilities, Relationships and social activities at school, Educational abilities.	Self-report	4-point likert scales. Perceived ability scale (1 = Totally disagree to 4 = Totally agree); Frequency scale (1 = Never to 4 = Always)	34-item	Past 3 months	First episode psychosis	N=203	18 to 35	24.5 (4.25)	140:63	Friendships and social activities: 2.94 (0.54), Independent living skills: 3.47 (0.52), Interacting with people: 3.07 (0.56), Family: 3.21 (0.78), Intimacy: 2.91 (0.57), relationships and social activities at work: 2.93 (0.54), Work abilities: 3.11 (0.52), Relationships and social activities at school: 3.04 (0.55), Educational abilities: 3.01 (0.60).

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Global Functioning: Social (GFS)*	Cornblatt et al., 2007	United States (English)	'Quantity and quality of peer relationships, level of peer conflict, age appropriate intimate relationships, and involvement with family members.' (p.691)	Interview-based. Data previously obtained can be used to score.	Single scale from 1-10 (1 = Extreme social isolation to 10 = Superior social/interpersonal functioning)	1 single score from 1-10 scale	3 time-points are scored: Past month, and the highest and lowest scores in past year	At-risk mental state (ARMS). Psychosis (converters)	N=163 (ARMS (n=121); Controls (n=44))	12 to 29	ARMS group 1 (n=69): 15.96 (1.98); ARMS group 2 (n=52): 17.28 (3.80); Controls (n=44): 17.00 (2.63)	ARMS group 1 = 45:24; ARMS group 2 = 34:18; Controls = 17:27	ARMS combined (n=98): 6.04 (1.57); Psychosis (converters) (n=23): 4.87 (1.58)
GFS: Italian	Lo Cascio et al., 2017	Italy (Italian)	As above.	As above.	As above.	As above.	As above.	ARMS. Non-ARMS, but help seeking group (e.g. depressive-spectrum, adjustment disorder).	N=237 (ARMS (n=39); Non-ARMS (n=198))	12 to 21	15.2 (2.1)	117:120	ARMS = 5.9 (1.6); Non-ARMS = 6.8 (1.3); Total sample = 6.6 (1.4)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Hospital Social Functioning Questionnaire (HSFQ)*	Willmott and McMurray; 2015	United Kingdom (English)	Looking after living environment; self-care; finance; work; recreation; family relationships; social relationships with staff; social relationships with patients; working relationships with staff; managing stress. (p.73)	Self-report	4-point likert scale (0 = Most of the time to 3 = Not at all)	19-items	Past month	Personality disorder (antisocial (76%), borderline (54%), paranoid (44%), avoidant (37%), narcissistic (9%), schizoid (9%), obsessive-compulsive (6%), dependent (4%), schizotypal (4%), histrionic (2%)). Participants were inpatients of a high secure forensic hospital.	N=54	Not specified	42.61 (9.72)	All male	40.67 (7.83)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Personal and Social Performance scale (PSP)*	Morosini et al., 2000	Italy (Language not specified)	'Socially useful activities (e.g. work, study); Personal and social relationships; Self-care; Disturbing and aggressive behaviours' (p.323)	Clinician-rated	Single scale from 1-100 (1 =Lack of autonomy in basic functioning to 100 = Excellent functioning)	1 single score from 1-100 scale	Past month (states others can be specified)	Schizophrenia or schizoaffective diagnoses	N=61	16 to 89	48.9 (15.3)	35:26	Not reported
PSP	Nasrallah et al., 2007	United States (English)	As specified in original validation study above (Morosini et al., 2000)	Clinician-rated	Single scale from 1-100 (1 =Lack of autonomy in basic functioning to 100 = Excellent functioning)	1 single score from 1-100 scale	Past month	Schizophrenia or schizoaffective disorder (stable)	N=411 (Study I (2-weekly risperidone): n=324; Study II (monthly risperidone): n=87)	17 to 68	40.7 (11.59)	260:151	62.2 (14.23)
PSP	Kawata and Revicki, 2007	United States (English)	As specified in original validation study above (Morosini et al., 2000)	Clinician-rated	Single scale from 1-100 (1 =Lack of autonomy in basic functioning to 100 = Excellent functioning)	1 single score from 1-100 scale	Past month	Schizophrenia or schizoaffective disorder (community-based sample)	N=129	18+	43.8 (10.9)	86:43	64.9 (16.0)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
PSP: German	Juckel et al., 2008)	Germany (German)	As specified in original validation study above (Morosini et al., 2000)	Clinician-rated	Single scale from 1-100 (1 =Lack of autonomy in basic functioning to 100 = Excellent functioning)	1 single score from 1-100 scale	Past month	Schizophrenia or schizoaffective disorder (acute)	N=62 (Schizophrenia (n=41); Schizoaffective disorder (n=21))	20 to 65	39.56	32:30	Not reported
PSP	Patrick et al., 2009	United States (English)	As specified in original validation study above (Morosini et al., 2000)	Clinician-rated	Single scale from 1-100 (1 =Lack of autonomy in basic functioning to 100 = Excellent functioning)	1 single score from 1-100 scale	Past month	Schizophrenia (acute)	N=1,964 (Paliperidone treatment study (n=1,665); Non-intervention study (n=299))	18+	Paliperidone treatment: 38.1 (10.90); Non-intervention: 43.9 (11.82)	Paliperidone treatment: 1,056:609 ; Non-intervention: 201:94	Paliperidone: Mild or less symptoms = 62.0 (13.10); Moderate or more symptoms = 47.1 (14.02). Non-intervention: Low symptom severity = 51.8 (15.01); High symptom severity = 46.6 (16.68).

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
PSP:Spanish	Apiquian et al., 2009	Mexico (Spanish)	As specified in original validation study above (Morosini et al., 2000)	Clinician-rated	Single scale from 1-100 (1 =Lack of autonomy in basic functioning to 100 = Excellent functioning)	1 single score from 1-100 scale	Past month	Schizophrenia or schizoaffective disorder (outpatients and inpatients)	N=100	15 to 65	34.4 (9.2)	41:59	Inpatients: 52.68 (14.78); Outpatients: 64.54 (24)
PSP:Chinese	Tianmei et al., 2011	China (Chinese)	As specified in original validation study above (Morosini et al., 2000)	Clinician-rated	Single scale from 1-100 (1 =Lack of autonomy in basic functioning to 100 = Excellent functioning)	1 single score from 1-100 scale	Past month	Schizophrenia (inpatients and outpatients)	N=157	16 to 65	35.7 (13.7)	105:52	44.0 (16.8)
PSP	Nafees et al., 2012	United Kingdom (English)	As specified in original validation study above (Morosini et al., 2000)	Clinician-rated	Single scale from 1-100 (1 =Lack of autonomy in basic functioning to 100 = Excellent functioning)	1 single score from 1-100 scale	Past month	Schizophrenia	N=73	18 to 65	38.9 (12.1)	60:13:00	61.6 (23.8)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
PSP: Portuguese	Brissos et al., 2012	Portugal (Portuguese)	As specified in original validation study above (Morosini et al., 2000)	Clinician-rated	Single scale from 1-100 (1 =Lack of autonomy in basic functioning to 100 = Excellent functioning)	1 single score from 1-100 scale	Past month	Schizophrenia (inpatients and outpatients)	N=104 (Inpatients (n=28); Outpatients (n=76))	18 to 65	Inpatients: 34.6 (10.55); Outpatients: 39.8 (9.70)	72:32	Inpatients: 48.3 (16.10); Outpatients: 55.5 (17.26)
PSP: Portuguese	Menezes et al., 2012	Brazil (Portuguese)	As specified in original validation study above (Morosini et al., 2000)	Clinician-rated	Single scale from 1-100 (1 =Lack of autonomy in basic functioning to 100 = Excellent functioning)	1 single score from 1-100 scale	Past month	Schizophrenia	N=17	Not specified	39.6 (10.3)	12:5	Rater 1: 60.4 (16.8); Rater 2: 59.1 (19.0)
Taiwanese Mandarin version of the Personal and Social Performance scale (TMV-PSP)	Wu et al., 2013	Taiwan (Taiwanese)	As specified in original validation study above (Morosini et al., 2000)	Clinician-rated	Single scale from 1-100 (1 =Lack of autonomy in basic functioning to 100 = Excellent functioning)	1 single score from 1-100 scale	Past month	Schizophrenia or schizoaffective disorder (stable)	N=655	22 to 88	50.3 (9.9)	568:87	50.7 (13.8)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
PSP: Spanish	Ulloa et al., 2015	Mexico (Spanish)	As specified in original validation study above (Morosini et al., 2000)	Clinician-rated	Single scale from 1-100 (1 =Lack of autonomy in basic functioning to 100 = Excellent functioning)	1 single score from 1-100 scale	Past month	Schizophrenia or schizophreniform disorder (inpatients and outpatients)	N=40	12 to 17	15 (1.4)	30:10	32.1 (11.2)
Questionnaire de Fonctionnement Social (QFS)*	Zanello et al., 2004	Switzerland (French)	Activities, household, leisure, couple and family relationships, extended social relationships, financial and administrative management, general health management and community life and news from the world' (p.78).	Self-report	5-point likert scales that measure frequency and satisfaction	16-items	Past 2 weeks	Anxious-depressive (n=99); personality disorders (n=25); psychotic disorders (n=52).	N=457 (outpatients (n=176); healthy controls (n=281))	18 to 65	Outpatients: 36 (12); Healthy controls: 37 (10)	Outpatients = 73:103; Healthy controls = 95:186	Not specified

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Social Adaption Self-evaluation Scale (SASS)*	Bosc et al., 1997	France (English, French, Italian, Portuguese, and Polish)	'Work and leisure, family and extra-family relationships, intellectual interests, satisfaction in roles and patient self perception of his ability to manage and control his environment.' (p.S58)	Self-report	Scale from 0-3 with various response options (e.g. 0 = Not at all to 3 = Very)	21-items	In the moment	Depression	N=3,912 (Depressed (n=549); General population (n=3363))	18 to 65	Not specified	Not reported	Depressed (fluoxetine-treated): Initial = 29.65 (8.73), Post-treatment = 37.56 (8.22); Depressed (reboxetine-treated): Initial = 29.61 (8.89), Post-treatment = 38.96 (9.65); Depressed (placebo-treated): Initial = 27.33 (8.34), Post-treatment = 32.6 (9.28)
SASS	Bech et al., 2002	Denmark (Language not specified)	As specified in original validation study above (Bosc et al., 1997).	Self-report	As above.	21-items	In the moment	Depression	N=30	19 to 70	41.3	8:22	Baseline: 30.97 (9.06); 12-weeks post anti-depression treatment: 36.05 (9.02)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
SASS: Turkish	Akkaya et al., 2008	Turkey (Turkish)	As above, but some changes were made to the 14th item to fit with Turkish culture. Items 5, 7, 8 and 9 had question marks added to fit with Turkish grammar. (p.3)	Self-report	As above.	21-items	In the moment	Depression	N=293 (Depressed (n=227); Healthy controls (n=66))	Depressed: 18 to 66; Healthy controls: 19 to 59	Depressed: 37.2 (12.3); Healthy controls: 31.9 (8.8)	76:217	Depressed: 30.2 (9.4); Healthy controls: 44.5 (6.2)
SASS: Japanese (SASS-J)	Ueda et al., 2011	Japan (Japanese)	As specified in original validation study above (Bosc et al., 1997).	Self-report	As above.	21-items	In the moment	Depression	N=322 (Depressed working (n=95); Depressed non-working (n=99); Healthy controls (n=128))	Not specified	Depressed working: 42.3 (11.2); Depressed non-working: 42.4 (11.0); Healthy controls: 40.6 (11.1)	Depressed working = 50:45; Depressed non-working = 57:42; Healthy controls = 64:64	Depressed working: 33.7 (7.9); Depressed non-working: 25.2 (7.8); Healthy controls: 36.1 (6.0)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Social Adjustment Scale - Self report (SAS-SR)*	Weissman et al., 1978	United States (English)	Work as a worker, housewife, or student; social and leisure activities; relationship with extended family; marital role as a spouse; parental role; and membership in the family unit" (p. 319)	Self-report	5-point scale	42-items	Past 2 weeks	Acutely depressed and schizophrenia	N=774 (Psychiatric sample (n=292); Community sample (n=482))	18+	Not specified	288:486	Acutely depressed: 2.53 (0.46); Schizophrenia: 1.96 (0.62); Alcohol dependent: 2.23 (0.61); Community sample: 1.59 (0.33)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
SAS-SR: Brazilian	Gorenstein et al., 2002	Brazil (Portuguese)	Work as a worker, housewife, or student; social and leisure activities; relationship with extended family; marital role as a spouse; parental role; and membership in the family unit" (p. 169)	Self-report	5-point scale	42-items	Past 2 weeks	Depression, panic disorder and bulimia	N=260 (Acutely depressed (n=44); In remission depressed (n=28); Acute panic disorder (n=40); In remission panic disorder (n=58); Cocaine dependence (n=14); Bulimia (n=15); Non-clinical (n=61))	Acutely depressed: 22 to 75; In remission depressed: 22 to 54; Acute panic disorder: 18 to 60; In remission panic disorder: 22 to 58; Cocaine dependence: 20 to 34; Bulimia: 22 to 48; Non-clinical: 20 to 68	Acutely depressed: 39.1 (12.4); In remission depressed: 35.8 (9.0); Acute panic disorder: 35.7 (10.2); In remission panic disorder: 37.6 (8.7); Cocaine dependence: 24.6 (5.1); Bulimia: 30.9 (7.7); Non-clinical: 38.3 (12.8)	Acutely depressed: 18:26; In remission depressed = 8:20; Acute panic disorder = 10:30; In remission panic disorder = 22:36; Cocaine dependence = 14:0; Bulimia = 1:14; Non-clinical = 24:37	Acutely depressed: 2.55 (0.56); In remission depressed: 2.00 (0.59); Acute panic disorder: 2.17 (0.43); In remission panic disorder: 1.71 (0.38); Cocaine dependence: 2.70 (0.78); Bulimia: 2.55 (0.63); Non-clinical: 1.56 (0.36)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Social Adjustment Scale - Self report (SAS-SR): Short*	Gameroff et al., 2012	United States (English and Spanish)	Work (paid, housework, student); social and leisure; family outside the home; primary relationship; parental; family unit (p.62)	Self-report	5-point scale	24-items	Past 2 weeks	Major depressive disorder	N=348 (Family study sample (n=141); Primary Care sample (n=207))	18 to 71	Not specified	Family study = 55:86; Primary Care = 49:158	Major depressive disorder: 2.61 (0.78); Other psychiatric disorders: 2.18 (0.46); No psychiatric disorders: 1.72 (0.46)
Social Adjustment Scale - Self report (SAS-SR): Screener*	Gameroff et al., 2012	United States (English and Spanish)	Work (paid, housework, student); social and leisure; family outside the home; primary relationship; parental; family unit (p.62)	Self-report	5-point scale	14-items	Past 2 weeks	Major depressive disorder; other psychiatric disorders (not specified)	N=348	18 to 71	Not specified	Family study = 55:86; Primary Care = 49:158	Major depressive disorder: 2.58 (0.84); Other psychiatric disorders: 2.07 (0.68); No psychiatric disorders: 1.58 (0.47)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Social Behaviour Schedule (SBS)*	Cella et al., 2014	United Kingdom (English)	Antisocial Behaviour, Depressed Behaviour, Social Withdrawal and Thought Disturbance.' (p.220)	Interview. Administered to mental health professionals.	5-point anchored scale (0 to 4)	17-items	Past month	Schizophrenia (outpatients)	Study 1: N=421; study 2: N=143	Not specified	Study 1: 36.4 (11.7); study 2: 43.8 (9.6)	Study 1 = 232:189; study 2 = 93:50	Study 1: study 2 respectively: SBS Total = 9.1 (7.6):8.7 (5.9); Antisocial behaviour = 2.9 (3.6):2.4 (2.6); Depressed behaviour = 2.0 (2.3):2.2 (1.9); Social withdrawal = 2.8 (2.6):3(2.3); Thought disturbance = 1.3 (2.1):1.2 (2.1); Problem score = 1.1 (1.6):1.0 (1.4)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Social Dysfunction Index (SDI)*	Munroe-Blum et al., 1996	Canada (Language not specified)	Public self (behaviour, appearance, social presentation); independent living; occupational functioning; family relationships; important relationships other than parental family; community, leisure and recreational activities; health maintenance activities; communication; insight and expectations' (p.213)	Semi-structured interview	Degree and no. of areas of dysfunction rated from 0-3; satisfaction with functioning level rated 0-1. Not applicable option also available for all responses.	27-items	Past month	Schizophrenia or schizoaffective disorder	N=213 (Study 1 (n=33); study 2 (n=67); study 3 (n=113))	Not specified	Study 1: 25.8 (4.5); study 2: 35.5 (4.8); study 3: 27.5 (5.8)	Study 1 = 11:22; study 2 = 45:22; study 3 = 80:33	Study 1: 38.21 (12.92); study 2: 28.86 (13.99); study 3: 37.28 (11.96)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Social Functioning Scale (SFS)*	Birchwood et al., 1990	United Kingdom (English)	Social engagement/withdrawal; interpersonal behaviour; pro-social activities; recreation; independence-competence; independence-performance; employment/occupation.	Self-report (self or informant)	Various likert scales usually between 0 and 3 (e.g. 0 = Never to 3 = Often)	76-items	Past 3 months	Schizophrenia (outpatients)	N=434 (Schizophrenia (n=334); community (n=100))	Not specified	Schizophrenia: 30.8 (10.1); community: 30.5 (8.4)	Schizophrenia = 238:96; community = 65:24	Schizophrenia: 111.3 (employed), 100.0 (unemployed); community: 124.6 (employed), 112.2 (unemployed)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
SFS: Spanish	Vazquez Morejon et al., 2000	Spain (Spanish)	Social engagement/withdrawal; interpersonal behaviour; pro-social activities; recreation; independence-competence; independence-performance; employment/occupation.	Self-report (self or informant)	Various likert scales usually between 0 and 3 (e.g. 0 = Never to 3 = Often)	76-items	Past 3 months	Functional psychosis (outpatients)	N=150	20 to 79	37.9 (11.15)	90:60	Withdrawal: 9.11 (3.53); interpersonal: 5.77 (2.81); recreation: 12.99 (5.71); pro-social: 13.60 (9.97); independence-competence: 32.33 (6.16); independence-performance: 21.18 (9.11); employment: 4.43 (3.46).

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
SFS: Norwegian	Hellvin et al., 2010	Norway (Norwegian)	Social engagement/withdrawal; interpersonal behaviour; pro-social activities; recreation; independence-competence; independence-performance; employment/occupation.	Self-report (self or informant)	Various likert scales usually between 0 and 3 (e.g. 0 = Never to 3 = Often)	76-items	Past 3 months	Bipolar disorder and schizophrenia	N=300 (Bipolar (n=100); schizophrenia (n=100); healthy controls (n=100))	Not specified	Bipolar: 37.1 (12.6); schizophrenia: 31.3 (9.4); healthy controls: 32.0 (9.2)	Bipolar = 45:55; schizophrenia = 52:48; healthy controls = 52:48	Full scale: Bipolar = 110.2 (9.6); schizophrenia = 105.2 (8.1); healthy controls = 124.0 (5.0)
SFS: German	Iffland et al., 2015	Germany (German)	Social engagement/withdrawal; interpersonal behaviour; pro-social activities; recreation; independence-competence; independence-performance; employment/occupation.	Self-report (self or informant)	Various likert scales usually between 0 and 3 (e.g. 0 = Never to 3 = Often)	76-items	Past 3 months	Schizophrenia	N=202 (Schizophrenia (n=101); controls (n=101))	Not specified	Schizophrenia: 35.76 (10.04); controls: 35.76 (10.09)	For both groups = 60:41	Full scale: Schizophrenia: males = 106.2 (8.8), females = 109.1 (8.0); controls: males = 117.0 (5.3), females = 121.9 (3.8)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Social Functioning Schedule (SFSchedule)*	Remington and Tyrer, 1979	United Kingdom (English)	Employment, household chores, money, self-care, marital relationship, child care, patient-child relationships, patient-parent relationships, household relationships, extra-marital relationships, social contacts, hobbies and spare time activities.' (p.152)	Interview-based	10cm analogue scale (No difficulties to Severe breakdown in functioning)	16-items	Past month	'Non-psychotic patients' (p.151). Anxiety, depression, phobic neuroses.	N=42 (reliability and validity study); N=106 (factor analysis)	Reliability and validity sample: 19 to 60	Reliability and validity sample: 35	Reliability and validity sample: 13:29	Not specified
Social Integration Survey (SIS)*	Kawata and Revicki, 2007	United States (English)	Social Perception; Work Interactions; Social Skills; Social Cognition; and Instrumental Activities of Daily Living (IADL)/Self-care' (p.125)	Self or informant report	4-to 6-point scales	62-items	Past 4 weeks	Schizophrenia or schizoaffective disorder (community sample)	N=129 ('patient/informant dyads')	18+	43.8 (10.9)	86:43	Not specified

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Social Occupational Functioning Scale (SOFS)*	Saraswat et al.; 2006	India (Not specified)	Self-care; Social interactions; Finance management; Mobility; Leisure; Respect for property; Independence	Observer rating scale to be used by carers and professionals.	5-point likert scale (1 = No impairment to 5 = Extreme impairment)	14-items	Past month	Study 1: Schizophrenia (includes 3 groups: inpatient; rehabilitation; outpatient) Study 2: Schizophrenia community sample	Study 1: N=70 (inpatient (n=25); rehabilitation (n=20); outpatient (n=25)) Study 2: N=70	Not specified	Study 1: Inpatient = 29.44 (7.44); Rehabilitation = 39.60 (7.98); Outpatient = 33.28 (7.92) Study 2: 31.27 (7.42)	Study 1: Inpatient = 18:07; Rehabilitation = 14:06; Outpatient = 16:09 Study 2: 49:21	Study 1: Inpatients = 32.72(10.44); Rehabilitation = 27.40 (9.21); Outpatient = 21.52 (5.05) Study 2: Not reported as main aim was conduction of EFA to assess structural validity

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Specific Level of Functioning Scale (SLOF)†	Mucci et al.; 2014	Italy (Italian)	Physical functioning; Personal care skills; Interpersonal relationships; Social acceptability; Activities of community living; and Work skills. ¹ (p. 145)	Interview-based. Administered to carer or professional about person experiencing schizophrenia.	5-point likert scale (1 = Poorest functioning to 5 = Best functioning)	43-items	Past week	Schizophrenia (community-based sample)	N=895	18 to 65	40 (10.6)	627:268	Physical functioning: 24.2 (1.4) Personal care skills: 31.7 (4.0) Interpersonal relationships: 22.4 (6.1) Social acceptability: 32.5 (3.3) Activities: 45.8 (8.6) Work skills: 20.0 (6.1)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Time Budget Measure (TB)*	Jolley et al., 2005	United Kingdom (English)	Domestic activities. Social contacts, work, and leisure (p.907)	Dairy format	Four time blocks for each day (morning, lunchtime, afternoon, evening). Score activity (e.g. 0 = Doing nothing to 4 = Engaged in variety of demanding activities).	28-blocks	Week-long dairy	Schizophrenia spectrum diagnoses	N=42 (Early psychosis group (n=10); longer duration group (n=32))	16 to 65	Early psychosis: 32.2 (6.1); longer duration group: 43.3 (10.5)	33:09	Early psychosis: 58.0 (17.1); longer duration: 47.6 (12.1)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
TB	Jolley et al., 2006	United Kingdom (English)	Domestic activities. Social contacts, work, and leisure (p.907)	Dairy format	Four time blocks for each day (morning, lunchtime, afternoon, evening). Score activity (e.g. 0 = Doing nothing to 4 = Engaged in variety of demanding activities).	28-blocks	Week-long dairy	Non-affective psychosis	N=276	18 to 65	39.5 (11.5)	Not reported	50.1 (19.7)

PROM	Reference	Country study conducted (language of PROM in parentheses)	Social functioning areas covered	PROM administration type	Rating type	No. of items	Time-period	Primary mental health problem(s) of sample	Sample size	Age range (years)	Mean age in years (SD in parentheses)	Male:female ratio	PROM mean scores for target populations (SD in parentheses)
Time Use Survey (TUS)	Hodgkins et al., 2015	United Kingdom (English)	Employment (paid and voluntary work), education, housework and chores, childcare, leisure and sports. (p.190)	Clinician-rated	Respondents asked to provide frequency and duration of activities over the past month. Weekly hourly scores calculated for each subscale, and an overall total calculated.	9-areas covered	Past month	Psychosis-spectrum	N=6,840 (ARMS (n=199); First episode psychosis (n=878); Delayed recovery (psychosis) (n=77); Non-clinical (n=5,686)	14 to 52	ARMS: 21.0 (4.4); First episode psychosis: 22.9 (4.8); Delayed recovery: 29.0 (6.8); Non-clinical: 26.7 (6.2)		

Appendix 11. Article definitions of social functioning and other characteristics

Reference	Definition of social function in article	Social functioning measure used	Items included in the measure	Mental health problem of sample(s)
Akkaya et al., 2008	<i>'Social functioning is defined as a person's functioning in ability to perform activities related to work, home, and social life, as well as other pleasurable activities. In addition, it includes the success of and satisfaction with a person's roles as partner, parent, friend, and colleague (Kasper, 1999)' (p.1)</i>	Turkish Version of the Social Adaption Self-Evaluation Scale (SASS)	'...work, free time, family, and dealing with the environment' (p.2)	Depression
Apiquian et al., 2009	<i>'Social functioning is defined as the capacity of a person to function in different societal roles and their actual societal performance (Priebe, 2007)' (p.181)</i>	Personal and Social Performance Scale (PSP)	'Socially useful activities (e.g. work, study); Personal and social relationships; Self-care; Disturbing and aggressive behaviours.' (p.182)	Schizophrenia and schizoaffective disorder
Brissos et al., 2012	<i>'The concept of social functioning includes such things as the capacity of a person to function in different societal roles such as homemaker, worker, student, spouse, family member or friend. Also of importance is the individuals' satisfaction with their ability to meet these roles, their ability to take care of themselves, and the extent of their leisure and recreational activities' (p.1077-1078).</i>	Portuguese version of the Personal and Social Performance Scale (PSP)	'Socially useful activities (e.g. work, study); Personal and social relationships; Self-care; Disturbing and aggressive behaviours.' (p.1078)	Schizophrenia

Gorenstein et al., 2002	<i>'The importance of assessing the impact of a psychiatric disorder on patients' social functioning in terms of the patients' ability to perform roles and their adequacy in interpersonal relationships is now well recognized... several areas of social functioning, such as work, social and leisure activities, and family relationships, are well covered by the Social Adjustment Scale' (p. 167-168)</i>	Social Adjustment Scale (SAS)	'...work (as a worker, housewife or student); social and leisure activities; relationship with extended family; marital role as a spouse; parental role; membership in the family unit; and economic adequacy'. (p.169)	Depression, panic disorder, bulimia
Hodgekins et al., 2015	<i>'Social functioning difficulties (i.e., difficulties engaging in meaningful activities and relationships)...' (p.188)</i>	Time Use Survey (TUS)	Work, education, voluntary work, housework and childcare, leisure, sports and hobbies. Face-to-face socialising, non-direct socialising (e.g. social media, phone calls, text messaging).	Psychosis-spectrum
Iffland et al., 2015	<i>'Social functioning is a heterogeneous concept comprising both differential societal roles in addition to actual social performance and patients may be differentially affected across these areas of functioning' (p.2)</i>	The Social Functioning Scale (SFS)	Withdrawal, interpersonal behaviour, pro-social activities, recreation, independence-competence, independence-performance, employment. (p.5)	Schizophrenia
Lecomte et al., 2014	<i>'Social functioning includes everything needed to successfully live in today's society, such as independent living skills (cooking, cleaning, hygiene, etc.), engaging in positive relationships</i>	First Episode Social Functioning Scale (FESFS)	Friendships and social activities, Independent living skills, Interacting with people, Family, Intimacy, relationships and social activities at work, Work	First episode psychosis

	<i>with family and friends (social skills), as well as abilities at school and work (Lin A. et al.,2013; Lecomte et al.,2008a).'</i> (p.412)		abilities, Relationships and social activities at school, Educational abilities. (p.413)	
Munroe-Blum et al., 1996	'Social functioning involves a complex array of verbal and non-verbal skills, social and emotional skills, and cognitive or information processing skills used to effect successful negotiation of social roles and interpersonal transactions' (Dawson et al., 1983; Liberman et al., 1986; Cook, 1992) (p. 211).	Social Dysfunction Index (SDI)	'Behaviour; Appearance; Social presentation; Independent living; Occupational functioning; Family relationships; Important relationships other than parental family; Community, Leisure and recreational; Activities; Health maintenance activities; Communication [textual and contextual communication as described in the theory of language and information processing deficits of schizophrenia presented by Dawson et al. (1983)]; Insight and expectations (a broad measure of locus of control and learned helplessness).' (p.213)	Schizophrenia and schizoaffective disorder
Nasrallah et al., 2008	<i>'The description of social functioning [in the DSM-IV-TR] includes three broad domains: work/academic, interpersonal relations, and self-care.'</i> (p.214)	Personal and Social Performance Scale (PSP)	'...socially useful activities (e.g. work, study); Personal and social relationships; Self-care; Disturbing and aggressive behaviours.' (p.215)	Schizophrenia

Saraswat et al., 2006	<p><i>'The concept of social functioning is, however, complex. It comprises of essentially two main components: (i) the ability to look after oneself and maintain daily activities and (ii) the instrumental and social skills to manage oneself and live in the community... Social functioning was operationally defined [by the authors] as comprising of self-care and activities of daily living, communication and interpersonal relations, instrumental living skills and work' (p. 302)</i></p>	Social Occupational Functioning Scale (SOFS)	<p>Bathing and grooming; clothing and dressing; eating, feeding and diet; neatness and maintenance activities; conversational skills; social appropriateness/politeness; social engagement; money management; orientation/mobility ; instrumental social skills; recreation/leisure; work; respect for property; independence/responsibility. (p.304)</p>	Schizophrenia
Willmot and McMurrin, 2015	<p><i>'Tyrer (1993) defined social functioning as 'the level at which an individual functions in his or her social context' (p. 8), which includes domains of reciprocal interactions with others, leisure activities, employment or education, and intimate relationships.'</i> (p.72)</p>	Hospital Social Functioning Questionnaire (HSFQ)	<p>'looking after living environment, self-care, finance, work, recreation, family relationships, social relationships with staff, social relationships with patients, working relationships with staff, managing stress.' (p.73)</p>	Personality disorder
Zanello et al., 2004	<p><i>'...social functioning has been defined by Tyrer (1993a) as 'the level at which an individual functions in his or her social context, such function ranging between self-preservation and basic living skills to relationships with others in society'' (p.77)</i></p>	Questionnaire de Fonctionnement Sociale (QFS)	<p>'Frequency and satisfaction' in relation to eight domains: 'Activities, household, leisure, couple and family relationships, extended social relationships, financial and administrative management, general health</p>	Anxious-depressive, personality, and psychotic disorders

management and
community life and
news from the
world.' (p.78)

Note: Social functioning definitions have been extracted from articles as verbatim quotes. The quotes also include references the authors have made to cite the origin of the definition provided where it is not a definition they have constructed. Due to this, the references for these quotes are not included in the current paper, but can be found in the article from which the definition was extracted.

Appendix 12. Social Functioning Scale (SFS)

Social Withdrawal (tick or underline the correct answers)

1. On average what time do you get up?

Average weekday:

Before 9 am / 9 – 11 am / 11 am – 1pm / after 1 pm

Average weekend:

Before 9 am / 9 – 11 am / 11 am – 1 pm / after 1 pm

2. How many hours of the waking day do you usually spend alone?

(e.g. In your room alone, walking alone, watching T.V. alone)

Very little time / 0 – 3 hours alone

Some of the time / 3 – 6 hours alone

Quite a lot of the time / 6 – 9 hours alone

A great deal of the time / 9 – 12 hours

Practically all the time / more than 12 hours

3. How often will you start a conversation at home?

Almost never / rarely / sometimes / often

4. How often will you leave the house for any reason?

Almost never / rarely / sometimes / often

5. How do you react to the presence of strangers?

Avoid them / feel nervous / accept them / like them

Relationships (tick or underline the correct answers)

1. How many friends do you have at the moment?

(people whom you see regularly, talk with, do activities with, etc)

none / one friend / two friends / three or more friends

2. Do you have someone you find it easy to discuss feelings / difficulties with?

yes no

3. How often have you confided in them?

almost never / rarely / sometimes / often

4. Do other people discuss their problems with you?

almost never / rarely / sometimes / often

5. If not married, do you have a boyfriend / girlfriend?

yes / no / married

6. **Have you had arguments with friends, relatives or neighbours recently?**
none / 1 or 2 minor / continued minor or 1 major / many major
7. **How often are you able to have a conversation with someone?**
almost never / rarely / sometimes / often
8. **How easy or difficult do you find talking to people at present?**
very easy / quite easy / average / quite difficult / very difficult
9. **Do you feel uneasy with groups of people?**
almost never / rarely / sometimes / often
10. **Do you prefer to spend time on your own?**
often / sometimes / rarely / almost never

Social Activities

Over the past three months, how often have you participated in any of the following?
(put a tick in the appropriate boxes)

	Never	Rarely	Sometimes	Often
Cinema				
Theatre / concert etc				
Watching indoor sport				
Art gallery / museum				
Exhibition				
Visiting places of interest				
Meeting , talk etc				
<i>Evening class</i>				
Visiting relatives				
Being visited by relatives				
Visiting friends*				
Being visited by friends*				
Parties				

Formal occasions				
Disco etc				
Nightclub / social club				
Playing an indoor sport				
Playing an outdoor sport				
Club / society				
Pub				
<i>Eating out</i>				
Church activity				

(*includes boy / girlfriend/partner)

Any other activity?	Rarely	Sometimes	Often

Recreational Activities

Over the past three months, how often have you done any of the following?

(put a tick in the appropriate boxes)

	Never	Rarely	Sometimes	Often
Playing musical instruments				
Sewing, knitting				
Gardening				
Reading				
Watching television				
Listening to records / radio				

Cooking				
D.I.Y. activities				
Fixing things (car, bike etc)				
Walking / rambling				
Driving/cycling (for leisure)				
Swimming				
Hobby (collecting things)				
Shopping				
Artistic or craft activity				

Any other activity?	Rarely	Sometimes	Often

Independence (Competence)

Place a tick against each item to show how able you are at doing or using the following:

	Adequately, no help needed	Need help or prompting	Unable or only with lots of help	Not known
Public transport				
Handling money correctly				
Budgeting				
Cookery for self				
Weekly shopping				
How to look for a job				
Washing own clothes				
Personal hygiene				
Washing, tidying etc				

Purchasing from shops				
Leaving the house alone				
Choosing and buying clothes				
Taking care of personal appearance				

Independence (Performance)

Place a tick against each item to show how often you have done the following *over the past three months*:

	Never	Rarely	Sometimes	Often
Buying items from shop alone				
Washing pots, tidying up etc				
Regular washing and bathing				
Washing own clothes				
Looking for a job				
Doing the food shopping				
Prepare and cook a meal				
Leaving the house alone				
Using buses, trains etc				
Using money				
Budgeting				
Choosing and buying clothes				
Taking care of personal appearance				

Employment

1. **Are you in regular employment** (this includes Industrial therapy, rehabilitation or retraining courses)?

2. YES / NO

IF YES:

What sort of job? _____

How many hours a week do you work? _____

How long have you had this job? _____

IF NO:

When were you last in employment? _____

What sort of job was it? _____

How many hours a week did you work? _____

1. If not employed:

Are you registered disabled?

YES / NO (please underline)

Do you attend hospital as a day patient?

YES / NO (please underline)

Do you think you are capable of some sort of employment?

* Definitely Yes / Would have difficulty / Definitely no

How often do you make attempts to find a job?

* Almost never / Rarely / Sometimes / Often

2. If not employed how do you usually occupy your day?

Morning	
---------	--

Afternoon	
Evening	

Appendix 13: Cross-sectional (time 1) multiple hierarchical regression model with metacognitive beliefs as predictors of social functioning (SFS) controlling for age, gender, TUS Time 1, symptoms and schemas (N=228).

	ΔR	ΔF	p	η^2	t	P
Step 1	0.07	7.92	<0.001			
Age				0.24	3.79	0.000
Gender				0.08	1.30	0.196
Step 2	0.12	32.32	<0.001			
Age				0.19	3.10	0.002
Gender				0.08	1.33	0.184
TUS Time 1				0.35	5.69	0.000
Step 3	0.10	16.32	<0.001			
Age				0.14	2.34	0.020
Gender				0.09	1.56	0.119
TUS Time 1				0.31	5.39	0.000
CAPE Positive symptoms				0.25	2.79	0.006
CAPE Negative symptoms				-0.48	-5.33	0.000
Step 4	0.16	31.07	<0.001			
Age				0.08	1.45	0.149
Gender				0.10	1.98	0.048
TUS Time 1				0.30	5.78	0.000
CAPE Positive symptoms				0.08	1.01	0.315
CAPE Negative symptoms				-0.19	-2.05	0.042
SIAS				-0.32	-5.37	0.000
HADS Depression				-0.19	-2.80	0.006
Step 5	0.06	5.98	<0.001			
Age				0.07	1.45	0.150
Gender				0.11	2.18	0.030
TUS Time 1				0.29	5.83	0.000
CAPE Positive symptoms				0.08	1.00	0.318
CAPE Negative symptoms				-0.12	-1.30	0.196
SIAS				-0.23	-3.58	0.000
HADS Depression				-0.14	-2.12	0.035
BCSS Negative self				-0.18	-2.56	0.011
BCSS Positive self				0.04	0.61	0.543
BCSS Negative other				-0.14	-2.24	0.026
BCSS Positive other				-0.02	-0.27	0.787
Step 6	0.03	2.68	0.022			
Age				0.06	1.10	0.273
Gender				0.09	1.82	0.071
TUS Time 1				0.30	6.05	0.000
CAPE Positive symptoms				0.09	1.07	0.285
CAPE Negative symptoms				-0.11	-1.18	0.239
SIAS				-0.21	-3.05	0.003
HADS Depression				-0.16	-2.30	0.022
BCSS Negative self				-0.19	-2.72	0.007
BCSS Positive self				0.05	0.83	0.409
BCSS Negative other				-0.13	-2.20	0.029
BCSS Positive other				-0.02	-0.40	0.687
Positive beliefs				0.13	2.47	0.014
Negative beliefs about uncontrollability and danger				0.13	1.87	0.063
Cognitive confidence				-0.12	-2.00	0.046
Need to control thoughts				-0.08	-1.29	0.197
Cognitive self-consciousness				-0.06	-0.92	0.360

Note: **Bold** = Significant p-values.