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An Examination of Emotion Regulation in Psychosis
and
**A Trans-diagnostic Emotion Regulation group therapy intervention
for an acute inpatient setting: A Mixed Methods Pilot Evaluation
Study**



Ruth Lennon

Doctorate in Clinical Psychology

University of Edinburgh

July 2015

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THESIS ABSTRACT

Purpose: The systematic review aimed to review and evaluate constructs and measures of emotion regulation (ER) in the psychosis spectrum population literature. The empirical study aimed to examine the feasibility and acceptability of a trans-diagnostic emotion regulation (ER) group developed for an acute inpatient setting.

Methods: The literature was systematically searched for research related to the measurement of emotion regulation (ER) in a psychosis spectrum population. A mixed method design was employed to assess acceptability and feasibility of a six session ER skills group delivered in an acute mental health inpatient setting. The group intervention was developed and piloted over a 5 month period. The mixed method design included a multiple single case series design and qualitative exit interviews, conducted with eight participants.

Results: 24 papers met criteria for inclusion in the systematic review. 15 different self-report tools were identified as measures of ER strategies in this review. Descriptive data from the empirical study indicated high attendance and low attrition rates. Group level analysis identified large effect sizes for change in ER skills. Case series data indicated that sustained change, on at least one measured variable, occurred for four participants. Qualitative themes triangulate findings related to acceptability of the group, change in ER strategies and increased emotional acceptance.

Conclusions: ER conceptualisation is variable in the literature reviewed, where the understanding of how ER and psychosis are linked is limited. The emphasis on the literature reviewed is on cognitive strategies of ER. The pilot study indicates that the intervention is feasible and acceptable, with preliminary evidence identifying potential clinical benefits. The challenges in evaluating interventions in an acute inpatient environment are discussed.

THESIS PREFACE AND STRUCTURE

Content

This thesis is about Emotion Regulation and Psychosis, and the evaluation of a trans-diagnostic Emotion Regulation group intervention. The thesis is in two sections. The first is a systematic literature review that focuses on how emotion regulation is conceptualised and measured in psychosis spectrum populations. The second section is an empirical research paper which examines the acceptability and feasibility of a trans-diagnostic emotion regulation group intervention delivered in an inpatient setting.

Format

Both sections follow the publication guidelines for the journal *Clinical Psychology and Psychotherapy*. However, to enhance readability of this thesis, reasonable adjustments have been made to formatting and the overall length of the articles. References and appendices for each section are presented directly following the article. The guidelines for publication in *Clinical Psychology and Psychotherapy* are included at the end of the empirical research paper (Appendix E).

A systematic review of constructs and measures of emotion regulation in a psychosis spectrum population.

Authors: Ruth Lennon¹², Helen Griffiths²

¹*NHS Lothian*

²*Section of Clinical and Health Psychology, School of Health in Social Science, University of Edinburgh, UK*

Address correspondence to:

Ruth Lennon,
Psychology Department,
Royal Edinburgh Hospital,
Morningside Terrace
Edinburgh
EH10 5HF

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Abstract

Title: A systematic review of constructs and measures of emotion regulation in a psychosis spectrum population.

Objective: To systematically review and evaluate constructs and measures of emotion regulation (ER) in the psychosis spectrum population literature.

Methods: A list of electronic databases was comprehensively searched from December 2014 to February 2015. ER constructs were identified and organised, alongside the identified relationship between ER and psychosis. The identified measures were evaluated in relation to their underlying theoretical framework and frequency of use.

Results: 24 papers were identified as suitable for review. These papers were firstly reviewed in relation to the clarity of ER conceptualisation. Secondly the measurement tools used to assess ER are critically evaluated. 15 different psychometric tools were identified as measures of ER strategies in this review. Finally the papers were reviewed in relation to how ER was linked with psychosis.

Conclusion: ER conceptualisation is variable in the literature reviewed, where the understanding of how ER and psychosis are linked is limited. The emphasis on the literature reviewed is on cognitive strategies of ER. Integrative understandings of ER are not typically applied to psychosis populations.

Key Words: *Emotion regulation, psychosis, construct, measurement tools.*

Key Practitioner Message:

- Research on Emotion Regulation (ER) in Psychosis has increased in recent years, although no clearly defined conceptualisation of ER has been applied consistently across the literature.
- This review would suggest that ER and psychosis research has focused on specific ER skills, such as reappraisal, suppression, rumination and acceptance.
- 15 different tools were employed to measure ER, making comparability across findings difficult.
- The review highlighted that tentative links between ER difficulties and psychosis exist in the literature, although the nature of these links remain unclear.
- A shared multi-dimensional definition of ER could provide the basis for developing a theoretical framework to further understand the relationship between ER and psychosis.

1. Background

1.1 Emotion Regulation

There is a lack of clarity around the definition of Emotion Regulation (ER). However, broadly speaking it refers to the ongoing processes individuals engage in to influence emotions in themselves or others (Block *et al.*, 2010; Koole, 2009). ER can take many forms depending on the context and can be considered an intrinsic process (regulating one's own emotions) or an extrinsic process (regulating someone else's emotions, such as a mother soothing her baby) (Gross & Jazaieri, 2014). Effective ER facilitates engagement in goal directed behaviour in the face of difficult affective states, which is an important part of healthy functioning (Cole *et al.*, 2004). However, certain patterns of ER can impair functioning. For example, the use of self-harm as a strategy to manage emotional distress in a relationship may lead to further interpersonal difficulties. When ER patterns interfere with goal directed behaviour they can become linked with symptoms of psychopathology, where ineffectual strategies can lead to emotional dysregulation (Cole, Michel & Teti, 1994).

1.2 Emotion Regulation in Mental Health

ER is the focus of much recent psychological research in mental health (Berking & Wupperman, 2012; Kring & Sloan, 2009), where difficulties with emotion and ER have been explicitly linked with many psychiatric disorders (Gross & Jazaieri, 2014). Research on mental health difficulties has increasingly acknowledged the role that ER plays as a trans-diagnostic factor relevant in the development and maintenance of several mental health disorders (Aldao *et al.*, 2010; Berking & Wupperman, 2012). Knowledge of the role of ER has shifted our perception of certain mental health disorders, such as psychosis, which has traditionally been considered a "non-affective" mental health difficulty (Henry *et al.*, 2007).

1.3 Emotion and Psychosis

Historically the role that emotions play in schizophrenia has been neglected (Bentall, 2003). The perception of diminished emotional expression in schizophrenia, termed *flat affect*, may account for the historical dearth of research on emotional experience in psychosis. In contrast to this view, research has evidenced that people with schizophrenia experience similar levels of positive and negative emotions compared to healthy controls, despite being less emotionally expressive (Kring *et al.*, 1993; Bentall, 2003; Kring & Moran, 2008). The appearance of flat affect reflects a difficulty in emotional expression (Bentall, 2003). Clarke (2009) suggests that flat affect may be a self-protective strategy to manage hypersensitivity to emotional arousal.

High levels of anxiety and depression correlate with the experience of delusions and hallucinations (Bentall, 2003; Freeman & Garety, 2003), but not with negative symptoms like apathy or social withdrawal (Bentall, 2003; Norman & Malla, 1991). Emotional distress and trauma has been associated with psychosis experiences, and there is also evidence of psychosis related post-traumatic stress (Gumley, 2009), and post psychotic depression (Birchwood *et al.*, 2000). Birchwood (2003) highlighted that affect plays a clear role in psychosis, where emotional distress can be seen as either a precursor to psychosis, as a psychological reaction to the psychosis experience, or both. Further research by Myin-Germeys and van Os (2007) suggests an affective pathway to psychosis, where increased emotional reactivity to daily stress is linked to an increased risk for experiencing psychosis. Longitudinal research carried out by

van Rossum and colleagues (2011) highlighted that psychotic experiences occurred during periods of emotional dysregulation.

This evolution in the understanding of the role of affect in psychosis has led to ER becoming an important aspect of psychosis research. For example, emotion dysregulation has been associated with the development and course of psychosis (Badcock *et al.*, 2011; van der Meer *et al.*, 2014; Gruber *et al.*, 2011). However, the precise role of ER in psychosis is not fully understood (Owens *et al.*, 2012). Two major issues in the research literature are inconsistency in research findings (Badcock *et al.*, 2011; Perry *et al.*, 2011) and a lack of clarity around the definition of ER.

Much of the literature on psychosis and ER focuses on two ER strategies, cognitive reappraisal and expressive suppression (Badcock *et al.*, 2011; Livingstone *et al.*, 2009; van der Meer *et al.*, 2009). Van der Meer and colleagues (2009) identified that individuals with schizophrenia reported significantly more use of suppression strategies as compared with healthy controls. Badcock and colleagues (2011) found no significant difference between individuals with schizophrenia, who experienced auditory hallucinations, and healthy controls in the use of suppression or reappraisal. However, increased use of suppression was linked with increased severity of auditory hallucinations (Badcock *et al.*, 2011). Perry and colleagues (2011) found no difference between individuals with schizophrenia and matched controls in the use of suppression and reappraisal. There are inconsistent findings in relation to the use of suppression and reappraisal in psychosis. Furthermore, this narrow focus on suppression and reappraisal does not facilitate a broader understanding of how ER mechanisms are associated with the development and maintenance of psychosis. Some recent research (Perry *et al.*, 2011) has used a broader multidimensional view of ER, including elements of emotional acceptance and awareness (Gratz & Roemer, 2004). Perry and colleagues (2011) identified that individuals with schizophrenia were less likely to report use of acceptance compared to matched controls. Within the schizophrenia group, increased acceptance was significantly associated with increased social functioning (Perry *et al.*, 2011). Research which incorporates a broader conceptualisation of ER may provide a clearer understanding of important ER mechanisms. However, the lack of consistent ER definitions in the literature poses a challenge for designing research and interpreting findings.

1.4 Models of ER

Despite the growing focus on ER in psychopathology it remains a poorly defined construct. There have been a number of definitions of ER offered by various researchers and theorists. One of the prominent theories of ER, the Process Model, was proposed by Gross (1998a). Gross defined ER as: “The process by which individuals influence which emotion they have, when they have them and how they experience and express their emotions” (1998a, p. 275). The Process Model suggests that ER strategies can be classified according to when they intervene during the process of emotion generation (Koole, 2009). These strategies are distinguished as either “antecedent focused” (before the emotional response) or “response focused” (after the emotional response) (Gross, 1998b). This model has a cognitive focus and hypothesises that emotional responses occur in a fixed trajectory, wherein attention to emotional stimuli is followed by appraisals which then generate emotionally expressive behaviour. Criticisms of the model highlight variability in the order in which emotional

responses are generated (Niedenthal *et al.*, 2005). In addition, the process model identifies ER as an intrinsic process, and does not explicitly address extrinsic factors (Bloch, Moran & Kring, 2010).

Thompson's (1994) definition of ER places a greater emphasis on the extrinsic factors, such as other people, which serve ER functions. Thompson provides a developmental conceptualisation of ER which acknowledges the relational nature of affect (Fonagy *et al.*, 2004). Gross and Thompson (2007) presented a model of ER which combined their respective conceptualisations, incorporating a focus on extrinsic factors alongside the process model which focuses on emotion regulation in the self (Kring & Sloan, 2009).

Thompson and Calkins (1996) highlighted the importance of emotional awareness in ER, viewing adaptive ER as monitoring and understanding emotional experiences, leading to the modification of these experiences. Building on this understanding, some conceptualisations of ER emphasize emotional acceptance (Cole *et al.*, 1994; Linehan, 1993). For example, Gratz & Roemer (2004) conceptualise ER as:

“(a) An awareness and understanding of emotions, (b) acceptance of emotions, (c) ability to control impulsive behaviours and behave in accordance with desired goals when experiencing negative emotions, and (d) ability to use situationally appropriate emotion regulation strategies flexibly to modulate emotional responses as desired in order to meet individual goals and situational demands” (p.43).

This integrative conceptualisation of ER emphasises emotional awareness, understanding of emotions, and emotional acceptance as key mechanisms, and draws on personality disorder research which identified that ER deficits are core underlying difficulties (Linehan, 1993).

1.5 Key Issues in defining ER

There are several key arguments in the conceptualisation of ER. One key disagreement is the separation of emotion and emotion regulation in ER conceptualisation (Thompson & Goodman, 2010). Certain theorists have argued that emotion is both regulatory and regulated and as such the two processes are collectively categorised under the term emotion regulation (Cole *et al.*, 1994). An alternative view proposes that while emotion and ER are linked they can also be categorised as independent processes. For example, changes in cardiovascular activity can be considered an aspect of emotions and not of ER. Furthermore it has been highlighted that not all emotional experiences require regulation (Feldman-Barrett *et al.*, 2001).

The relative importance of intrinsic and extrinsic processes in the conceptualisation of ER has been discussed widely in the literature (Koole, 2009; Thompson, 1994). While there has been a general consensus for the inclusion of both processes in our understanding of ER, some ER models do not explicitly take into account extrinsic factors (e.g.: Gross' Process Model) (Thompson & Goodman, 2010). However, given the increased difficulty in classifying and measuring extrinsic factors of ER (e.g.: the impact of other people), the research literature has predominately focused on self-regulation of emotions (Koole, 2009; Gross, 2007).

Where the focus of ER has been on self-regulation of emotions, it has been argued that knowledge of specific ER strategies used, in the absence of contextual information; provides

limited information on an individual's ability to effectively regulate emotions (Gratz & Roemer, 2004). Hence it can be argued that ER strategies cannot be definitively classified as adaptive or maladaptive, as the effectiveness of the strategies is inherently linked with the context in which they occur (Aldao *et al.*, 2010).

The breath of what can be considered an ER strategy also remains a debated issue in ER research. One prominent view identifies that ER should be considered in the context of individuals goals, rather than labelled as strategies that are adaptive or maladaptive (Thompson & Goodman, 2010). Furthermore, in an integrative review paper, Koole (2009) argues for a dual classification of ER strategies in terms of targets *and* functions. However, Berking and Wupperman (2012) have argued that defining ER in terms of function results in the possibility that numerous processes could be described as ER if driven by goals or intentions. They argue that this broad conceptualisation of ER runs the risk of losing meaning and value (Berking & Wupperman, 2012).

A further conceptual issue in defining ER has been the role of control strategies. ER strategies have been discussed in the context of controlling emotional responses (Gross, 1998a). However, it has been argued that placing a sole emphasis on control strategies may not distinguish between processes that increase dysregulation and those that are adaptive ER processes (Gratz & Roemer, 2004). Research highlights that attempts to control emotional expression (Gross & Levenson, 1997) or to avoid internal emotional experiences (Hayes *et al.*, 1996) can increase the risk for emotional dysregulation. Acknowledging ER to be separate from emotional control highlights that effective ER does not necessarily involve the immediate reduction of negative affect (Gratz & Roemer, 2004). The argument opposes previously held assumptions that the presence of negative emotions could be an implication of ineffective ER (e.g.: van Rossum *et al.*, 2011). These findings have subsequently seen a shift toward an understanding of emotional acceptance as a key function of ER (Gratz & Roemer, 2004; Hayes *et al.*, 1996).

1.6 Theoretical perspectives related to ER

There are several psychological constructs that are conceptually similar to ER, which may be a factor in the lack of an accepted definition of ER. Experiential avoidance has been linked with individuals experiencing more difficulty in regulating emotions (Hayes *et al.*, 1996) and is defined as an unwillingness to experience certain internal states, leading to attempts to alter or avoid these states. Mindfulness involves developing non-judgmental awareness of the present, and has been linked with effective engagement with emotional experiences, reducing over-engagement (e.g. worry) or under-engagement (e.g. experiential avoidance) (Chambers *et al.*, 2009). While the specific relationship between mindfulness and ER remains unclear, mindfulness has been shown to be associated with self-regulation and ER (Kabat- Zinn, 1990).

Attachment theorists have proposed that affect regulation is strongly linked with the concept of self-regulation and mentalization (Fonagy *et al.*, 2004), where the capacity to mentalize is dependant on the quality of early attachment relationships (Fonagy & Luyten, 2009). In this framework, the object of regulation moves beyond just affect to the regulation of the self. Mentalization and reflective function are viewed in this broader term of self-regulation where affect regulation through “mentalized affectivity” functions to achieve the broader goal of self-regulation. Mentalized affectivity is described as an individual's ability to regulate affect

through conscious awareness of one's own affect (Fonagy *et al.*, 2004). Research on reflective functioning and mentalization highlight the conceptual overlap with ER, wherein a broader understanding of ER is considered (Fonagy *et al.*, 2004). However it is beyond the scope of this review to explore these broader constructs in any great detail.

Numerous researchers have offered conceptualisations of ER. However, despite attempts to integrate our understanding (Koole, 2009), there remains an absence of a consistent and agreed upon conceptualisation of ER, in addition to comprehensive measures that adequately assess the complexity of this construct (Gratz & Roemer, 2004).

1.7 Measuring ER

The increased focus on ER in psychopathology literature has seen parallel developments in research on ER measurement (Aldao *et al.*, 2010). However, given the ambiguity surrounding ER conceptualisation, there is an ongoing challenge to develop instruments and procedure that can reliably and validly assess ER (Berking & Wupperman, 2012). ER is assessed through a variety of methods ranging from self-report measures to experimental design research (Aldao *et al.*, 2010). Psychometric assessments and self-report tools are frequently used in research due to their speed and ease of administration (Aldao *et al.*, 2010). However, the accuracy of self-report measures of ER is in part dependent on each individual's capacity for meta-cognitive awareness (Aldao *et al.*, 2010). Experimental designs may provide findings with clearer ecological validity, as contextual factors are explicitly accounted for in the assessment of ER. However, experimental studies may not address individual or group differences in the use of ER strategies, or the relationships between ER strategies (Gross & John, 2003). Therefore, this review focuses on the measurement of ER through the use of psychometric measurement tools.

The link between ER as assessed and underlying theoretical construct of ER are not always well formulated (Cole *et al.*, 2004). Koole (2009) proposes a dual classification system for ER strategies, which includes both the targets and functions of ER. However, many self-report measurement tools do not focus on both of these facets of ER (Koole, 2009). Bridges and colleagues (2004) identified that the assessment of ER through the use of self-report measures varies from focusing on the *type* of ER strategy used to the *amount* of an ER strategy used. Furthermore, the measurement of ER is dependent on contextual demands, which may not be accounted for in ER instruments (Bridges *et al.*, 2010). Some self-report instruments aim to measure the use of *adaptive* and *maladaptive* ER strategies, though one could argue that the effectiveness of any given strategy is solely dependent on the context in which it is used (Aldao *et al.*, 2010).

Research on ER may focus on the measurement of conceptually similar concepts (for example mindfulness) without providing a clear theoretical framework to link these concepts with ER. When ER has been conceptualised as the ability to control emotional experiences, the presence of negative emotions has been taken to indicate emotional dysregulation, rather than ER being measured through the identification of a regulation process (e.g.: Van Rossum *et al.*, 2011).

As there are competing models of ER, it is perhaps unsurprising that there are a range of measures with which one can assess ER abilities. Test selection implies an acceptance of the concomitant theory which may impact on the scope and validity of the findings. Given that our understanding of the role of ER mechanisms in psychosis remains in its early stages, a narrow

focus on ER measurement may hinder the development of this research. Likewise, the use of multiple measures all claiming to measure a similar underlying construct may lead to apparent contradictions in research findings.

2. Rationale for Review

Research in recent years has increasingly focused on ER in psychosis, providing preliminary hypotheses about the role that ER may play. However, the concept of ER is ill-defined (Koole, 2009). A potentially narrow perspective of ER, focused on ER strategies of reappraisal and suppression, has been explored in psychosis research. As a result, our understanding of ER in the context of psychosis development, maintenance and symptom severity is limited (Henry *et al.*, 2008; Westermann *et al.*, 2012; Badcock *et al.*, 2011). While some researchers have explored broader elements of ER in psychosis, such as acceptance, a multidimensional understanding of ER has not been consistently applied. Research on the ER strategies of suppression and reappraisal in psychosis has yielded inconsistent results. It is unclear whether this is due to methodological issues, lack of clarity in ER conceptualisation or issues in the measurement of ER. The present review proposes systematically to identify and critically evaluate how ER has been conceptualised and measured in psychosis spectrum populations.

2.1 Review Objectives

This review aims to:

1. Describe how ER is conceptualised in the psychosis spectrum literature.
2. Identify how ER has been measured in this literature.
3. Describe how ER is linked with psychosis experiences in the literature.

3. Methodology

3.1 Criteria for considering studies for this review

3.1.1 Types of Studies

This systematic review considered all empirical primary studies which included a measurement/quantification of ER, either as a primary or secondary outcome, within a psychosis spectrum population. Studies were considered independent of research design, on the basis of using a psychometric instrument to assess emotion regulation. As the aim of the review was to systematically describe the way ER is conceptualised and measured in psychosis literature, studies were not excluded on the basis of low methodological or reporting quality (Tugwell *et al.* 2010; King *et al.* 2013). A measure of ER was defined as any psychometric instrument (e.g. self-report questionnaire, inventory, scale or subscale), which the authors of the study explicitly used to represent and quantify emotion regulation or any identified facet of ER. Studies where the measurement instrument could not be identified were excluded. There were no restrictions in relation to the period of inclusion of studies. Language limits were imposed, and only studies in English were considered due to the author's available language resources. It is acknowledged that this introduces a potential cultural bias (Elwood, 2007).

3.1.2 Types of participants

Studies were considered if they included individuals identified within a psychosis spectrum. This could be individuals of (a) any age (b) any gender; (c) who had experienced either: a first episode psychosis; had a diagnosis of schizophrenia; had a diagnosis of schizo-affective disorder diagnosis; had a bipolar disorder diagnosis; were identified as at risk for psychosis; or community samples in which a measure of psychosis spectrum was employed.

3.1.3 Types of outcome measures

The review included studies that provided at least one specifically stated outcome measure of emotion regulation. Studies were included if ER was explicitly identified as a primary or secondary outcome, and if instruments were explicitly selected as measures of this construct i.e. if authors provided a rationale or statement that linked the measure to the construct (Sanderson *et al.*, 2007).

Table 1. Summary of inclusion and exclusion criteria for studies

Inclusion Criteria	
1.	Studies which were peer reviewed original empirical work (i.e. not book chapters, conference abstracts, reviews)
2.	Studies which have been written in English
3.	Studies reporting on quantitative data (no research design limits)
4.	Studies which employ a measurement/quantification of emotion regulation as either a primary or secondary outcome
5.	Studies which provide at least one explicitly identified measure of emotion regulation using any of the follow self-report instruments: questionnaire, inventory, scale or subscale
6.	Studies which include individuals of any age or gender that have experienced psychosis including; a first episode psychosis; or have a diagnosis of schizophrenia; or a schizo-affective disorder diagnosis; or a bipolar disorder diagnosis; or are identified as at risk for psychosis
7.	Studies which used non-clinical samples, but employed a measure of psychosis experience (i.e.: paranoia/delusions) to quantify their study sample along a psychosis experience spectrum.
Exclusion Criteria	
1.	Studies which report on qualitative data or review data
2.	Studies which do not identify the measures used
3.	Studies which include individuals who have not experienced psychosis, or studies that have not used a measure of psychosis experience employed across a non-clinical sample.

3.2 Search Strategy

A preliminary search of the Cochrane Library was conducted (10/11/14) to identify if any previous systematic reviews of emotion regulation measures or affect regulation measures in a psychosis population existed. One review examining how affective instability was defined and measured across clinical populations in general was identified (Marwaha *et al.*, 2013). However no review specific to ER, or its measurement in psychosis was identified.

Most of the studies considered for this review fell into the category of observational, non-randomised studies. Therefore the design of the systematic review prioritised sensitivity over specificity (Coehlo *et al.*, 2014; Reeves *et al.*, 2008). English language studies were identified

through searches in the databases Cumulative Index to Nursing and Allied Health Literature (CINAHL), Psychology and Behavioural Sciences Collection (PBSC), MEDLINE, psychINFO, Excerpta, Medica database (EMBASE), Education Resources Information Centre (ERIC), Health Management Information Consortium (NMIC), Cochrane database and PUBMED. The database searches occurred between December 2014 and February 2015. All search terms were in English. These terms related to ER were: emotion regulation; affect regulation; emotion dysregulation; and affect dysregulation. Specific ER strategies were also used as search terms and these terms were; reappraisal; suppression; acceptance; experiential avoidance; emotional awareness, mindfulness and rumination. Search terms related to the population were: psychosis; schizophrenia; schizo-affective; bipolar, first episode psychosis; at risk of psychosis; psychosis proneness. In order to maximise capturing the literature around this population search terms related to common psychosis experiences were used. These terms were: hallucination; delusion; paranoia; persecutory ideation; positive symptoms; negative symptoms. Details of the search are included in Appendix A. Search results were filtered to include only English language studies.

3.3 Data collection and analysis

3.3.1 Selection Strategy

Publications or records were selected by the main author, using a funnelling approach over successive sifts of data, applying the inclusion criteria systematically. 8,932 records were identified using this search strategy, once duplicates and non-English language records were removed. Records were initially appraised for inclusion based on their title. A second rater, independent to the study, appraised approximately 20% of the records ($n = 1,825$) at this stage. Level of agreement was very high (99%; Cohen's Kappa = 0.91). Remaining records ($n = 538$) were subsequently appraised from reading their abstract. The first author (RL) read all abstracts to identify relevant articles for full-text review. The second rater assessed 50% of the abstracts to identify relevant articles (Marwaha *et al.*, 2013). The level of agreement was high between both raters (99%; Cohen's Kappa = 0.90), where disagreements were resolved by consensus. The full text of records was read when appraisal could not be completed from the abstract.

3.3.2 Data extraction and management

Data extraction was completed by the first author using a review specific form (Appendix C). The data extraction was guided by the objectives of the review. The first objective was to describe and evaluate how ER is conceptualised in the psychosis literature. The second objective was to identify how ER has been measured in this literature. The final objective was to describe how ER is linked with psychosis experiences in the literature. ER concepts and ER measures used are described, and the frequency of their use in the retrieved records is presented. The specific measures are then critically evaluated in relation to their conceptual clarity and selected psychometric properties (Table 7).

3.3.3 Assessment of quality or risk of bias

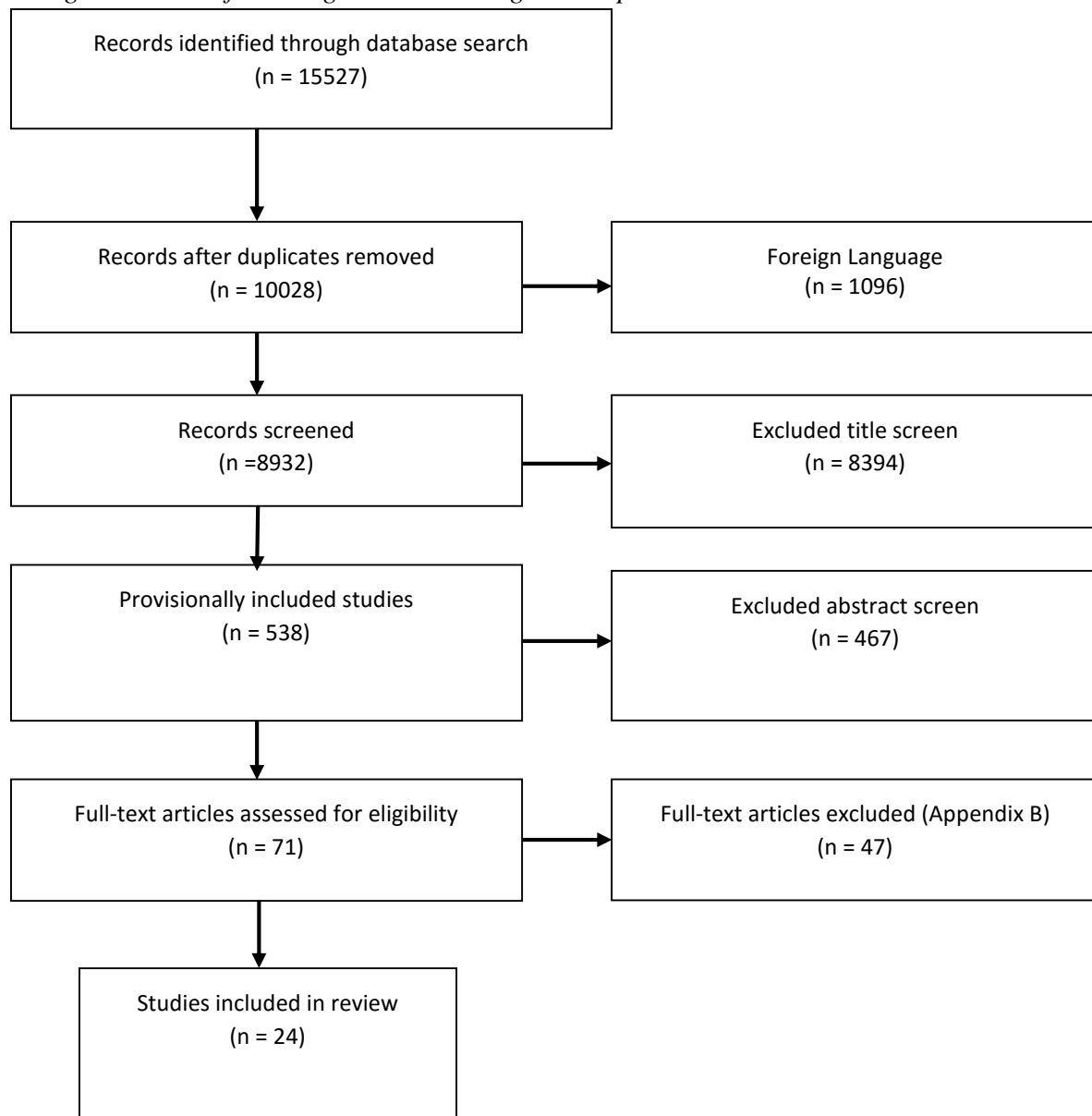
The aim of this review was to generate a clear survey of all the published quantitative research on the psychometric measurement of ER in psychosis. Therefore studies were not excluded on the basis of methodological limitations, such as small sample sizes (Sanderson *et al.*, 2007). Given the review aim, it was identified that formal assessment of methodological quality or risk of bias was not necessary (Sanderson *et al.*, 2007; King *et al.*, 2013).

4. Results

4.1 Study Selection

The PRISMA flowchart (Fig. 1) illustrates the stages of the review process. A total of 71 papers were identified for full text screening, of which 47 were excluded. The reasons for exclusion were: the publication did not identify ER as a primary or secondary outcome; the publication did not use a self-report measure of ER; the publication was a review article; the publication was a conference abstract or no full text peer reviewed article was available. References and reasons for exclusion for these 47 studies are presented in Appendix B. This process identified 24 records as suitable for inclusion in this review.

Fig 1. PRISMA flow diagram illustrating review process



4.2 Study Characteristics

24 full text articles were reviewed, first in relation to conceptual clarity of ER, secondly in relation to the measurement of ER, and finally relation to how ER is linked with psychosis experiences. The majority of the studies reviewed were cross sectional in design (n=14). The remaining papers employed: multi-method design (n = 2); non-randomised outcome design (n=1); pilot randomised trial (n=1); randomised repeated measure design (n=1); longitudinal design (n=2); and experimental design (n=3). Included studies were conducted in the USA, Australia, Canada, the UK, Germany and Holland. The clinical population groups were described as people who had experienced: schizophrenia; schizoaffective disorder; first episode psychosis; psychosis; bipolar disorder; were at high risk for psychosis; or were at high risk for bipolar. The non-clinical populations were taken from community samples where measures of psychosis experiences were employed. The population characteristics of included studies are shown in Table 2. General characteristics of all 24 studies included in this review are outlined in Table 3.

Table 2. Population Characteristics of included records reviewed.

Population Studied	No. Studies	Study reference
Schizophrenia & non-clinical controls	N = 4	Badcock <i>et al.</i> , (2011); Kimhy <i>et al.</i> , (2012); Perry <i>et al.</i> , (2011); Van Der Meer <i>et al.</i> , (2009).
Schizophrenia & schizoaffective & non-clinical controls	N= 1	Henry <i>et al.</i> , (2008)
Schizophrenia/schizoaffective & mental health workers	N = 1	Owens <i>et al.</i> , (2012)
Schizophrenia & non-affected relatives & non-clinical controls	N = 1	Van Der Meer <i>et al.</i> , (2014)
Psychosis & anxiety/depression & non-clinical controls	N = 2	Lincoln <i>et al.</i> , (2014); Livingstone <i>et al.</i> , (2009).
First episode psychosis	N = 1	Khoury <i>et al.</i> , (2015)
Psychosis prone/Ultra High Risk & non clinical controls	N = 1	Van Rijn <i>et al.</i> , (2011).
Schizophrenia & Bipolar Disorder & non-clinical controls	N = 2	Rowland <i>et al.</i> , (2013); Rowland <i>et al.</i> , (2012).
Bipolar disorder	N = 1	Goldstein <i>et al.</i> , (2014)
Bipolar disorder & non-affected relatives & non-clinical controls	N = 1	Green <i>et al.</i> , (2011)
Bipolar disorder & depression & non-clinical controls	N = 1	Wolkenstein <i>et al.</i> , (2014)
Bipolar disorder & non-clinical controls	N = 2	Gruber <i>et al.</i> , (2008); Gruber <i>et al.</i> , (2011)
At Risk of Bipolar disorder	N = 1	Stange <i>et al.</i> , (2013)
Community sample	N = 5	Westermann <i>et al.</i> , (2013); Westermann <i>et al.</i> , (2012); Westermann & Lincoln (2011); Westermann <i>et al.</i> , (2014); Henry <i>et al.</i> , (2009).

Table 3. General Characteristics of the 24 records reviewed

Study (year)	Sample & Sample N	Age (Range/Mean/SD)	Country	Definition of ER	Measures*
Badcock et al. (2011)	Schizophrenia (n=34) Non-clinical controls (n=34)	R: 18 - 60	Australia	Integrative definition according to Koole <i>et al.</i> (2009)	ERQ PSWQ RRS
Green et al. (2011)	Bipolar Disorder I (n=124) Unaffected relatives (n=124) Non-clinical controls (n=63)	BDI group (R=21-78; M=52.39; SD=14.1) UR group (R=18-85; M=52.3; SD=15.65) NCC group (R=20-83; M=58.3; SD=16.83)	Australia	According to Gross (1998), Garnefski, Kraaij & Spinhoven (2001), Thompson (1994)	CERQ
Gruber et al. (2008)	Bipolar Disorder (n=21) Non-clinical controls (n=20) Insomnia Group (n=19)	BD group (M=39.04) NCC group (M=48.79) I Group (M=37.8)	USA & UK	No definition ER provided. Author links trans-diagnostic processes of worry, rumination and negative automatic thoughts to ER.	GRS PSWQ CCL
Gruber et al. (2011)	Bipolar Disorder (n=39) Non-clinical controls (n=34)	R: 18 – 63 BD group (M=42.50; SD=13.79) NCC Group (M=38.2; SD=11.12)	USA	According to Gross & Thompson (2007)	RRS RPA
Goldstein et al. (2014)	Bipolar Disorder DBT (n=14) Bipolar Disorder TAU (n=6)	DBT group (M=15.82) TAU group (M=16.83)	USA	No Definition provided. Reference to Linehan (1993) as it is a Dialectic Behaviour Therapy (DBT) intervention study	CALS
Henry et al. (2009)	Schizotypy spectrum (n=54) Community Sample (n=204)	Schizotypy group (M=19.5) Community Group (M=45.4; SD=20.92)	Australia	According to Gross (2001), Kring & Werner (2004)	ERQ (suppression scale only)
Henry et al. (2008)	Schizophrenia (n=32) Schizoaffective (n=9) Non-clinical controls (n=38)	Clinical groups combined (M=37.5; SD=10.67) NCC group (M=36.1; SD=11.99)	Australia	According to Kring & Werner (2004), John & Gross (2007)	ERQ
Khoury et al. (2015)	1 st episode psychosis (n=17)	(M=29.08; SD=8.13)	Canada	No definition provided. Reference to authors previous paper Khoury & Lecomte (2012)	CERQ
Kimhy et al. (2012)	Schizophrenia (n=44) Non-clinical controls (n=20)	Schizophrenia Group (M=30.33; SD=8.08) NCC group (M=24.20; SD=4.62)	USA	According to Gross (1998), Gross (2007)	EMT ERQ

Lincoln et al. (2014)	Psychosis (n=37) Depression (n=30) Non-clinical controls (n=28)	Psychosis (M=40.3; SD=12.3) Depression (M=41.7; SD=11.1) NCC (M=35.5; SD=14.5)	Germany	According to Gross (2007), Koole et al. (2009), Berking (2008).	ERSQ
Livingstone et al. (2009)	Psychosis (n=21) Anxiety/Depression (n=21) Non-clinical controls (n=21)	Psychosis (M=39.26; SD=11.3) Anx/Dep (M=40.52; SD=10.67) NCC (M=40; SD=11.88)	UK	According to Gross (1998), Eisenberg & Fabes (1995), Thompson (1994), Philips (2005)	ERQ REQ
Owens et al. (2012)	Schizophrenia or schizoaffective or psychosis (n=81) Mental Health Workers (n=39)	Clinical Group (M=38.06; SD=11.55)	UK	According to Mikuliner & Shaver (2001)	DERS
Perry et al. (2011)	Schizophrenia (n=33) Non-clinical controls (n=36)	Schizophrenia (M=43.7; SD=9.89) NCC (M=40.8; SD=11.49)	Australia	According to Gross (1998), Hayes et al (2006)	ERQ AAQ
Rowland et al. (2013)	Schizophrenia (n=126) Bipolar Disorder I (n=97) Non-clinical controls (n=81)	SZ (R:26-67; M=45.46; SD=10.96) BD (R:24-70; M=51.26; SD=12.10) NCC (R:23-69; M=44.65; SD=12.86)	Australia	According to Gross (1998), Thompson (1994), Eisenberg (2000)	CERQ
Rowland et al. (2012)	Schizophrenia (n=56) Bipolar Disorder I (n=33) Non-clinical controls (n=58)	SZ (R:19-63; M=44.57; SD=10.37) BD (R:22-60; M=40.67; SD=11.27) NCC (R:19-61; M=33.91; SD=12.24)	Australia	According to Gross (1998), Eisenberg (2000)	CERQ
Stange et al. (2013)	At risk Bipolar (n=161)	M=18.08; SD=1.57	USA	No definition of ER provided. Author links emotional clarity to ER. Emotional clarity according to Gohm & Clore (2000)	RRS ECQ
Van Der Meer et al. (2014)	Schizophrenia (n=20) Non-affected relative (n=20) Non-clinical controls (n=20)	SZ (M=35.2; SD=10.8) NAR (M=32.6; SD=8.6) NCC (M=35.5; SD=11.7)	Holland	According to Gross (1998)	ERQ
Van Der Meer et al. (2009)	Schizophrenia (n=31) Non-clinical controls (n=44)	SZ (M=32.3; SD=8) NCC (M=29.2; SD=8.6)	Holland	According to Gross (1998)	ERQ BVAQ

Van Rijn et al. (2011)	Ultra High Risk Psychosis (n=34) Non- clinical controls (n=23)	UHR (R:12-18; M=15.5; SD=2.1) NCC (R:12-18; M:15.7; SD=1.4)	Holland	According to Taylor <i>et al</i> (1997), Salovey & Grewall (2005)	BVAQ
Westermann et al. (2013)	Online sample (n=116)	R:18-48; M=28.23; SD=8.08	Germany	According to Koole <i>et al</i> (2009)	CERQ
Westermann et al. (2012)	Online sample (n=116)	M=28.52; SD=7.85	Germany	According to Gross & John (2003)	ERQ
Westermann & Lincoln (2011)	Online sample (n=151)	M=31.6; SD=10.2	Germany	According to Koole <i>et al</i> (2009)	DERS
Westermann et al. (2014)	Student sample (n=79)	R:19-36; M=21.2; SD; 2.99	Germany	According to Gross (2002)	ERQ
Wolkenstein et al. (2014)	Bipolar disorder (n=42) Depressive Disorder (n=43) Non-clinical controls (n=39)	BD group (M=40.86; SD=12.79) DD group (M=36.91; SD=13.35) NCC group (M=42.18; SD=13.27)	Germany	According to Gross (1998), Gyurak, Gross & Etkin (2011)	CERQ

*ERQ – Emotion Regulation Questionnaire (Gross et al., 2003); PSWQ- Penn State Worry Questionnaire (Meyer et al., 1990); (CERQ- Cognitive Emotion Regulation Questionnaire (Garnefski et al., 2007); ERSQ-Emotion Regulation Skills Questionnaire (Elbert et al., 2013) ; REQ- The Regulation of Emotions Questionnaire (Philips, 2005); Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004); CCL- Cognitions Checklist (Beck et al., 1987); EMT- Emotion Management Task (Neuchterlein & Green, 2006); CALS- Children’s Affective Liability Scale (Gerson et al., 1996); RPA – Response to Positive Affect Scale (Feldman et al., 2008); GRS- Global Rumination Scale (McIntosh & Martin, 1992); AAQ – Acceptance and Action Questionnaire (Hayes et al., 1996); BVAQ – Bermond-Vorst Alexithymia Questionnaire (Bermond, Oosterveld, & Vorst, 1999); ECQ – Emotional Clarity Questionnaire (Flynn & Rudolph, 2010)

4.3 ER Conceptualisation

Twenty four papers were reviewed. A clear definition of ER was provided in twenty of the papers (Table 4.). Four of the papers did not provide a clear definition of ER. In the papers where ER was not clearly defined, one linked ER to trans-diagnostic strategies which could be conceptualised as ER strategies (worry and rumination; Gruber *et al.*, 2008). Goldstein *et al.* (2014) did not provide any definition of ER, or link it with any other similar concepts; however they did reference Linehan’s work on DBT. Houry *et al.* (2015) described ER strategies (reappraisal, exposure, detachment, meta-cognition, acceptance, compassion, and mindfulness) although they do not provide a definition for the construct of ER. Stange *et al.* (2013) refers to the concept of emotional clarity, which the authors link to ER.

In the twenty papers where a definition of ER was provided, these definitions ranged from: the Process model conceptualisation of ER (n=10); an integrative review of ER according to Koole (2009) (n=4); mixed conceptualisations of ER drawing on cognitive and developmental models (n=3); a mixed conceptualisation drawing on cognitive and acceptance based models of ER (n=1); an attachment model conceptualisation (n=1); and a conceptualisation based on emotional intelligence/awareness (n=1).

Table 4. Conceptualisation of ER as identified from records reviewed

ER Conceptualisation	N	Record Reference
Process Model (Gross, 1998)	n =10	Green <i>et al.</i> , (2011); Henry <i>et al.</i> , (2009); Henry <i>et al.</i> , (2008); Kimhy <i>et al.</i> , (2012); Rowland <i>et al.</i> , (2012); Van Der Meer <i>et al.</i> , (2014); Van Der Meer <i>et al.</i> , (2009); Westermann <i>et al.</i> , (2012); Westermann <i>et al.</i> , (2014); Wolkenstein <i>et al.</i> , (2014)
Integrative Review of ER - according to Koole (2009)	n =4	Badcock <i>et al.</i> , (2011); Westermann <i>et al.</i> , (2013); Westermann & Lincoln (2011); Lincoln <i>et al.</i> , (2014)
Mixed –Cognitive & Developmental	n =3	Gruber <i>et al.</i> , (2011); Livingstone <i>et al.</i> , (2009); Rowland <i>et al.</i> , (2013)
Mixed – Cognitive and Acceptance	n =1	Perry <i>et al.</i> , (2011)
Attachment Model	n =1	Owens <i>et al.</i> , (2012)
Emotional Intelligence/awareness Model	n =1	Van Rijn <i>et al.</i> , (2011)

i. Process Model

Ten of the records define ER in relation to the Process Model put forward by Gross (1998a, 1998b). The Process Model, described earlier, is primarily cognitive in nature. According to this model emotions are regulated across five stages in the emotion generation process. The majority of research based on the process model focuses on two ER strategies, cognitive reappraisal and suppression.

ii. Integrative Review of ER according to Koole (2009)

Four of the review articles referenced ER as described by Koole (2009) in an integrative review paper, where ER is broadly defined as “*people’s active attempts to manage their emotional states*” (Koole, p6, 2009). Koole’s conceptualisation of ER focuses on self-regulation of

emotion as described by Gross's Process model (Gross, 1998a). However, Koole (2009) argues that ER should be classified according to the targets and functions of ER. Emotion generated systems that are targeted are attention, knowledge, and bodily responses (Koole, 2009). The functions of ER include engaging in goal directed behaviour, meeting hedonic needs, and supporting one's personality system (Koole, 2009). One of the records, which references this integrative review conceptualisation, makes specific reference to the alternative ER strategies including tolerance and acceptance of emotions (Lincoln *et al.*, 2014).

iii. Mixed Model– Cognitive and Developmental focus

Three of the records in this review provided a conceptualisation of ER which took into account the Process Model (Gross, 1998a) alongside a developmental understanding of ER, which incorporates the importance of extrinsic factors in the regulation of emotions, similar to the integrative work by Gross and Thompson (2007).

iv. Mixed Model– Cognitive and Acceptance focus

One record provided a conceptualisation of ER which referenced both the Gross Process Model (1998a), alongside work by Hayes and colleagues (2006) on experiential avoidance and acceptance. Acceptance relates to the active process of both awareness and acceptance of internal experiences. In this record the authors describe that acceptance can be viewed as a response focused ER strategy within the Process Model, where acceptance targets maladaptive avoidance strategies (Perry *et al.*, 2011).

v. Attachment Model

One record conceptualised ER in an attachment framework, where ER development is understood to occur in the context of the relationship between the child and the primary caregiver. This conceptualisation of ER places emphasis on the developmental and extrinsic factors in ER, in contrast to the intrinsic, cognitive focus of the Process Model.

vi. Emotional Intelligence/Awareness Model

One record describes the importance of emotional awareness, which includes labelling both emotional and physiological experiences, in the regulation of emotions. They describe the ability to read one's own emotions as well as the emotions of others as key to effective ER, where their description of emotional awareness sits within the broader concept of emotional intelligence.

4.4 Measurement of ER

4.4.1 ER Strategies Measured

Four of the records specifically referred to Koole's (2009) integrative review of ER which highlights the importance of categorising and assessing ER in terms of functions and targets. However, all twenty four records measured strategies of ER, rather than referring to or measuring the function and target of ER.

All twenty four records identified ER as either a primary or secondary outcome. Different ER strategies were measured across the records and included: cognitive strategies (n=20);

suppression (n=9); emotional awareness (n=6); acceptance based strategies (n=4); behavioural strategies (n=4); affective lability (n=1); emotional management (n=1).

Table 5. Overview of ER Strategies Measured

Broader Category of ER Strategies Measured	No. of Records
Cognitive Strategies	N=20
Suppression	N=9
Emotional Awareness	N=6
Acceptance based Strategies	N=4
Behavioural Strategies	N=4
Affective Lability	N=1
Emotion Management	N=1

4.4.2 Employed ER measurement tools

Fifteen different psychometric measurement tools were used across the twenty four records reviewed. The most commonly used measures were: the Emotion Regulation Scale – ERQ (n=10); the Cognitive Emotion Regulation Questionnaire – CERQ (n=6); the Rumination Response Scale – RRS (n=3); the Penn State Worry Questionnaire - PSWQ (n=2); the Bermond-Vorst Alexithymia Scale – BVAQ (n=2); and the Difficulties in Emotion Regulation Scale – DERS (n=2). The remaining measures were only used in one record (Global Rumination Scale - GRS; Cognitions Checklist- CCL; Response to Positive Affect Scale - RPA; Children’s Affective Lability Scale - CALS; Emotion Management Task- EMT; Emotion Regulation Skills Questionnaire – ERSQ-ES; Regulation of Emotions Questionnaire – REQ; Acceptance and Actions Questionnaire – AAQ; and the Emotion Clarity Questionnaire - ECQ) (Table 6.).

Table 6. Name and frequency of ER measures used across the records.

Name of self-report ER Measure	No. of records measure was used in
Emotion Regulation Questionnaire – ERQ	10
Cognitive Emotion Regulation Questionnaire – CERQ	6
Ruminative Response Scale – RRS	3
Penn State Worry Questionnaire - PSWQ	2
Bermond-Vorst Alexithymia Questionnaire - BVAQ	2
Difficulties in Emotion Regulation Scale - DERS	2
Global Rumination Scale - GRS	1
Cognitions Checklist - CCL	1
Response to Positive Affect Scale - RPA	1
Children’s Affective Lability Scale - CALS	1
Emotion Management Task - EMT	1
Emotion Regulation Skills Questionnaire – ERSQ-ES	1
Regulation of Emotions Questionnaire - REQ	1
Acceptance and Actions Questionnaire - AAQ	1
Emotion Clarity Questionnaire - ECQ	1

4.4.3 Psychometric Properties of ER tools

Psychometric properties on each of the measures was collated, from the information available in the reviewed records (see Table 7 and Appendix F). Information on reliability (using Cronbach’s alpha) was available on nine measures (REQ; CERQ; RRS; BVAQ; DERS; RPA; EMT; AAQ; ECQ). These values indicated moderate to excellent levels of internal consistency,

with alpha values ranging from 0.67 (RPA, self-focused subscale) to 0.93 (DERS). Seven measures (REQ; CERQ; RRS; DERS; EMT; AAQ; ECQ) offered alpha values related to psychosis samples, where alpha values ranged from 0.51 (Perry *et al.*, 2012; ERQ suppression subscale) to 0.89 (Owens *et al.*, 2013; DERS) (Table 7). Few studies reported further psychometric information such as test–retest or inter-rater reliability. Only one measure had test-retest values reported (ERQ; $r=0.69$) and one measure had values reported for external validity (DERS, $r=0.63$).

Information on specific psychometric properties was not available on 5 of the measures (CALs, CCL, GRS, ERSQ-ES, REQ) and related to reporting in four of the records (Gruber *et al.*, 2008; Goldstein *et al.*, 2014; Lincoln *et al.*, 2014; Livingstone *et al.*, 2009). These records ranged from offering no information on psychometric properties (Goldstein *et al.*, 2014 – CALs); to describing the psychometric properties as “good” or “acceptable” (Gruber *et al.*, 2011; RPA & CCL; Lincoln *et al.*, 2014 – ERSQ-ES); to reporting that no psychometric properties were yet available for the measure (Livingstone *et al.*, 2009; REQ).

Table 7. Reported values for Internal Consistency of Psychometric Measures

Name of Measure	Internal Consistency (IC)	Included studies which used the measure.
ERQ Emotion Regulation Questionnaire (Gross & John, 2003)	<p>IC: $\alpha = 0.79, 0.73$ for Reappraisal and Suppression scales respectively.</p> <p>In schizophrenia group IC: $\alpha = 0.72, 0.67$ for Reappraisal and Suppression scales respectively (Henry <i>et al.</i>, 2008)</p> <p>In high and low Schizotypy sample IC: $\alpha = 0.74$ for Suppression scale sample (Henry <i>et al.</i>, 2009)</p> <p>In Schizophrenia group IC: $\alpha = 0.86, 0.51$ for Reappraisal & Suppression subscale (Perry <i>et al.</i>, 2012).</p>	<p>Badcock <i>et al.</i>, (2011); Henry <i>et al.</i>, (2009); Henry <i>et al.</i>, (2008); Kimhy <i>et al.</i>, (2012); Livingstone <i>et al.</i>, (2009); Perry <i>et al.</i>, (2012); Van der Meer <i>et al.</i>, (2014); Van der Meer <i>et al.</i>, (2009); Westermann <i>et al.</i>, (2012); Westermann <i>et al.</i>, (2014)</p>
CERQ The Cognitive Emotion Regulation Questionnaire (Garnefski & Kraaji, 2007)	<p>IC: α ranges from 0.68 to 0.83, across all subscales (Garnefski <i>et al.</i>, 2001).</p> <p>In Bipolar Disorder (BD) sample IC: $\alpha = 0.88$ (Green <i>et al.</i>, 2011)</p> <p>In BD sample IC α ranges from 0.64 to 0.88 across all subscales (Wolkenstein <i>et al.</i>, 2014)</p>	<p>Green <i>et al.</i>, (2011); Khoury <i>et al.</i>, (2015); Rowland <i>et al.</i>, (2013); Rowland <i>et al.</i>, (2012); Westermann <i>et al.</i>, (2013); Wolkenstein <i>et al.</i>, (2014)</p>
RRS Rumination Response Scale (Treyner, Gonzalez & Nolen-Hoeksema 2003)	<p>IC: $\alpha = 0.94$ (Gruber <i>et al.</i>, 2011)</p> <p>In high risk bipolar sample IC: $\alpha = 0.76$ in brooding subscale (Stange <i>et al.</i>, 2013)</p>	<p>Badcock <i>et al.</i>, (2011); Gruber <i>et al.</i>, (2011); Stange <i>et al.</i>, (2013)</p>
PSWQ Penn State Worry Questionnaire (Meyer, Miller, Metzger & Borkovec, 1990)	<p>IC: α value not reported in records.</p>	<p>Badcock <i>et al.</i>, (2011); Gruber <i>et al.</i>, (2008)</p>
BVAQ Bermond-Vorst Alexithymia Scale (Bermond <i>et al.</i>, 1994)	<p>IC: α ranges from 0.67 to 0.87 (Vorst & Bermond, 2001)</p>	<p>Van der Meer <i>et al.</i>, (2009); Van Rijn <i>et al.</i>, (2011)</p>
DERS Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004)	<p>IC: $\alpha = 0.93$ (Gratz & Roemer, 2004)</p> <p>IC: α ranges 0.76 to 0.87 in a German version (Westermann & Lincoln, 2011)</p> <p>In psychosis population IC: α ranges 0.70 to 0.89 across all subscales (Owens <i>et al.</i>, 2013), intra-class coefficients ranging from 0.83 and 0.93 (Owens <i>et al.</i>, 2013).</p>	<p>Owens <i>et al.</i>, (2012); Westermann & Lincoln (2011)</p>

Name of Measure	Internal Consistency (IC)	Included studies which used the measure.
GRS Global Rumination Scale (McIntosh & Martin, 1992)	IC: α value not reported in record.	Gruber <i>et al.</i> , (2008)
CCL Cognitions Checklist (Beck, Brown & Steer, 1987)	IC: α value not reported in record.	Gruber <i>et al.</i> , (2008)
RPA Response to Positive Affect Scale (Feldman, Joormann & Johnson, 2008).	IC: $\alpha = 0.83; 0.67; 0.83$ for subscales (Gruber <i>et al.</i> , 2011).	Gruber <i>et al.</i> , (2011)
CALS Children's Affective Lability Scale (Gerson <i>et al.</i>, 1996)	IC: α value not reported in record.	Goldstein <i>et al.</i> , (2014)
EMT Emotion Management Task (Neuchterlein & Green, 2006)	In schizophrenia sample IC: $\alpha = 0.73$ (Neuchterlein & Green, 2006)	Kimhy <i>et al.</i> , (2012)
ERSQ – ES The Emotion Regulation Skills Questionnaire (Ebert <i>et al.</i>, 2013)	IC: α value not reported in record.	Lincoln <i>et al.</i> , (2014)
REQ Regulation of Emotions Questionnaire (Philips, 2005).	IC: α value not reported in record.	Livingstone <i>et al.</i> , (2009)
AAQ Acceptante and Action Questionnaire. (Hayes <i>et al.</i> 2004)	IC: $\alpha = 0.70$ validity (Hayes <i>et al.</i> , 2004). In schizophrenia sample IC: $\alpha = 0.63$ (Perry <i>et al.</i> , 2011).	Perry <i>et al.</i> , (2012)
ECQ Emotional Clarity Questionnaire (Flynn & Rudolph, 2010)	In high risk for bipolar sample IC: $\alpha = .71$ (Stange <i>et al.</i> , 2013).	Stange <i>et al.</i> , (2013)

4.4.4 Single Factor Measures of ER

Six measures addressed single elements of ER. For example, the RRS (Treyner *et al.*, 2003) focuses solely on rumination, a cognitive strategy. Similarly the Penn State Worry Questionnaire (worry), the Global Rumination Scale (rumination), and the Cognitions Checklist (negative automatic thoughts) all look at a single cognitive strategy. The Emotional Clarity Questionnaire (Flynn & Rudolf, 2010) measures a single aspect of ER, the awareness and understanding of emotional experiences. The AAQ (Hayes *et al.*, 1996) is a single factor measure of experiential avoidance, which includes a focus on the avoidance of emotional experiences (Gratz & Roemer, 2004). All the records in the review which used single factor questionnaires did so in conjunction with other measures, either another single factor measure or a multifactor measure.

4.4.5 Multi-factor Measures of ER

There are seven multi factor measures of ER used in the records of this review. The ERQ (Gross & John, 2003) was the most commonly used measure in this review (n=10) and consists of two scales which measure reappraisal and expressive suppression. The ERQ is based on the Process Model of ER (Gross, 1998a). Nine studies using the ERQ referred to the Process Model conceptualisation of ER. However, Badcock *et al.* (2011) referenced ER from the integrative review paper by Koole (2009). Badcock and colleagues (2011) supplemented their measurement of ER with the RRS and the Penn State Worry Questionnaire.

The CERQ (Garnefski & Kraaji, 2007) was used in six of the records reviewed. It measures nine cognitive strategies employed to regulate emotions and solely assesses responses to negative events (Green *et al.*, 2011). The CERQ is based on the theory of cognitive emotion regulation, which relates to the cognitive processing of emotionally relevant material (Garnefski *et al.*, 2001). The cognitive emotion regulation theory considers cognitive strategies in a conceptually pure way, and separate from behaviour strategies (Garnefski *et al.*, 2001). Hence the CERQ measures only cognitive elements, and does not ascribe to a broader integrative conceptualisation of ER. In records where the CERQ was used (n=6), four of them identified an explicit focus solely on cognitive strategies as their decision to use to CERQ (Rowland *et al.*, 2012, Rowland *et al.*, 2013; Westermann *et al.*, 2013; Wolkenstein *et al.*, 2014), though they provided a broader ER definition. One record provides a conceptualisation of ER consistent with the use of the CERQ (Green *et al.*, 2011). One record (Khoury *et al.*, 2015) did not provide a clear ER definition, though referenced a broad range of ER strategies consistent with Gratz and Roemer's (2004) integrative conceptualisation of ER. Ascribing to an integrative model of ER would appear to be inconsistent with use of the CERQ as a sole measure of ER.

The BVAQ (Bermond *et al.*, 1994) measures the multidimensional construct of alexithymia, which is conceptualised as difficulty with emotional awareness, separating feelings from physical sensations, labelling emotions and communicating feelings (Swart *et al.*, 200; van t'Wout *et al.*, 2007). In reference to the Gratz and Roemer (2004) conceptualisation of ER, the BVAQ measures elements of ER including awareness of emotions, and differentiating emotions from bodily sensations. Two records used the BVAQ (Van Der Meer *et al.*, 2009; Van Rijn *et al.*, 2011). In one record the author clearly links the trait of alexithymia to difficulties in ER (Van Der Meer *et al.*, 2009). In this record the authors use the Process Model

(Gross, 1998a) to conceptualise ER, rather than Gratz and Roemer's (2004) integrative model that would take account of alexithymia traits that they hypothesise to be related to ER. Van Rijn *et al.* (2011) used the BVAQ as their sole measure of ER. In this record the authors conceptualised ER as emotional awareness, where this conceptualisation was in line with the similar concept of emotional intelligence.

The ERSQ-ES (Ebert *et al.*, 2013) assesses ER skills as related to specific emotions. One record (Lincoln *et al.*, 2014) used this instrument to measure ER. Skills assessed in this measure are: awareness; clarity; understanding; acceptance; tolerance; self-support; willingness to confront situations to attain relevant goals; and modification. These ER skills fit within a broader conceptualisation of ER, akin to that offered by Gratz and Roemer (2004). The authors of this record (Lincoln *et al.*, 2014) did not reference the Gratz and Roemer (2004) model of ER, however they did refer to the importance of emotional awareness and emotional labelling as ER strategies, alongside referencing Koole's (2009) integrative review on ER.

The REQ (Philips, 2005) was initially developed for children and adolescents. The REQ categorises strategies as either functional or dysfunctional. It also differentiates between internal strategies (e.g. cognitive reappraisal) and external strategies (e.g. environmental change) giving four subscales (Livingstone *et al.*, 2009). The REQ was used alongside the ERQ in one record, which provided a conceptualisation of ER from both cognitive and developmental perspectives (Livingstone *et al.*, 2009).

The DERS (Gratz & Roemer, 2004) measures emotional dysregulation in response to negative emotions across six domains: non-acceptance, difficulty engaging in goal-directed behaviour, difficulties controlling impulsive behaviours, limited access to effective ER strategies, lack of emotional awareness, and lack of emotional clarity. The strength of the scale is that it incorporates multiple dimensions of ER based on an integrative conceptualisation of ER (Owens *et al.*, 2012). Two records (Owens *et al.*, 2012; Westermann & Lincoln, 2011) in this review used the DERS to measure ER. Owens *et al.* (2012) conceptualise ER using an attachment framework. Westermann & Lincoln (2011) reference Koole's (2009) integrative review paper in their conceptualisation of ER.

The Response to Positive Affect Questionnaire - RPA (Feldman *et al.*, 2008) focuses on rumination about positive emotion using three subscales: emotion focused, self-focused; and dampening. The emotion focused and self-focused subscales measure amplification of positive emotions, the dampening subscale measures responses that reduce positive emotional experiences. One record (Gruber *et al.*, 2011) used this instrument to measure ER, alongside the RRS. The authors of this record provided a mixed conceptualisation of ER integrating cognitive and developmental models. The RPA measures rumination, a cognitive strategy of ER. However, the authors had a specific research question which they explored through experimental design, and as such the choice of this measure appeared to be appropriate.

4.4.6 Measures theoretically linked to ER

The Emotion Management Task (EMT) from the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Nuechterlein & Green, 2006) rates the ability of individuals to identify effective responses to manage emotions in situations described in vignettes. In contrast to the more common use of self-report measures, the EMT assesses the ability to choose contextually effective ER strategies. This measure was used in one record (Kimhy *et al.*, 2012) alongside the ERQ. The authors of this record provided a conceptualisation of ER in line with the Process model (Gross, 1998a). In their paper they described the use of the ERQ as a strategy specific measures in line with the Process model, while they describe the EMT as a global measure of emotion management. The EMT allows for assessment of ER taking into account contextual information.

The Children's Affective Lability Scale - CALS (Gerson *et al.*, 1996) measures the presence of affective lability, rather than any active ER process. One record (Goldstein *et al.*, 2014) used this to measure emotion dysregulation, where it measured the presence of emotional dysregulation, rather than consideration of availability of strategies to regulation emotion.

4.4.7 Summary of Measures of ER

To summarise, fifteen different measures of ER were used across the twenty four papers included in this review. The instruments measure different facets of ER including: emotional awareness (BVAQ; ECQ); emotional acceptance (AAQ); and specific ER strategies (ERQ; CERQ; REQ; RRS; RPA; PSWQ; CCL; GRS).

One instrument measured just the presence of emotion dysregulation rather than any process of regulation (CALS). A further instrument measured ER contextually (EMT). Two of the instruments measure ER in a broader sense, ascribing to a more integrative understanding of the concept (DERS; ERSQ-ES). Overall, the most commonly used instrument was the ERQ, which has a cognitive focus and is based on the Process model (Gross, 1998a).

In general, there was limited information on the measures psychometric properties reported in the records. Internal consistency was most commonly reported, where this information was available for nine of the measures. Internal consistency specific to a psychosis sample was available for seven of the measures. Where reported, the internal consistency was generally good.

4.5 How are ER and Psychosis linked?

All twenty four records explored ER in a psychosis spectrum population. All records were reviewed to identify how ER was conceptualised to be linked with psychosis spectrum experiences.

4.5.1 No link between ER and Psychosis

Two records reported no specific link between ER and psychosis. One of these records (Henry *et al.*, 2008) examined whether individuals with schizophrenia differed from controls in relation to their use of suppression and reappraisal. No differences were substantiated

following analysis of their findings. Stange *et al.* (2013) had a focus on depressive symptomatology in people with sensitivity to bipolar disorder, and thus did not focus on or suggest any link between ER and psychosis.

4.5.2 ER and psychosis are associated

Sixteen records suggest that ER difficulties and psychosis experiences are associated, but no causal link was proposed. From these sixteen records, difficulties in ER were associated with: the experience of psychosis (n=5); a diagnosis of schizophrenia (n=4); a diagnosis of bipolar disorder (n=6); a high risk for psychosis group (n=1); a high schizotypy group (n=1); and paranoid ideation (n=1).

The following ER difficulties were associated with the experience of psychosis group (n=5): difficulties in cognitive emotion regulation (Khoury *et al.*, 2015); reduced awareness and acceptance of emotions (Lincoln *et al.*, 2014); increased dysfunctional ER strategies (Livingstone *et al.*, 2009); difficulties in ER (Owens *et al.*, 2012); and reduced use of acceptance (Perry *et al.*, 2011).

Increased suppression use and difficulties with emotional awareness (Kimhy *et al.*, 2012); reduced use of putting into perspective, rumination, catastrophizing and self-blame (Rowland *et al.*, 2013); catastrophizing, rumination, self-blame and other blame (Rowland *et al.*, 2012); and increased use of suppression, reduced use of reappraisal and difficulties with emotional awareness (Van der Meer *et al.*, 2009) were associated with the schizophrenia group (n=4).

The Bipolar disorder samples (n=6) were associated with: rumination, self-blame and catastrophizing (Green *et al.*, 2011); rumination and worry (Gruber *et al.*, 2008); emotion dysregulation (Goldstein *et al.*, 2014); rumination, self-blame, catastrophizing and less use of putting into perspective (Rowland *et al.*, 2013); rumination, self-blame and catastrophizing and less use of positive reappraisal (Rowland *et al.*, 2012); rumination, self-blame, catastrophizing, decreased use of positive appraisal, and decreased use of putting into perspective (Wolkenstein *et al.*, 2014).

Increased suppression use and amplification difficulties were associated with a high schizotypy group (Henry *et al.*, 2009), and difficulties with emotional awareness were correlated with the high risk for psychosis sample (Van Rjin *et al.*, 2011). One record reported an association between non-acceptance of emotions and a specific element of psychosis, namely paranoid ideation (Westermann & Lincoln, 2011).

4.5.3 Causal link between ER and psychosis proposed

Six records (Badcock *et al.*, 2011; Gruber *et al.*, 2011; Van der Meer *et al.*, 2014; Westermann *et al.*, 2013; Westermann *et al.*, 2012; Westermann *et al.*, 2014) propose a causal link between ER and psychosis, where ER difficulties lead to psychosis experience development, maintenance or symptom severity. Badcock and colleagues (2011) report that increased used of expressive suppression impacts on the severity of auditory hallucinations, although their study design was correlational. Gruber and colleagues (2011) linked rumination with the onset and maintenance of bipolar disorder. Van der Meer *et al.* (2014) report that reduced levels of

ER processing in neural circuits (as assessed by neural imaging) can be related to vulnerability to schizophrenia. Of note, they did not identify any causal mechanisms of ER and psychosis from their use of the ERQ. Westermann *et al.* (2013) report that the cognitive ER strategy of self-blame predicts the experience of paranoia. Westermann and colleagues (2012) reported that the use of reappraisal leads to increased paranoia in socially stressful situations, in individuals that are paranoia prone. Westermann and colleagues (2014) proposed a tentative causal link between unsuccessful reappraisals of threats leading to increased experiences of delusional ideation.

From these six records ER was causally linked with: the onset of bipolar disorder (Gruber *et al.*, 2011); vulnerability to schizophrenia (Van der Meer *et al.*, 2014); and positive symptoms of psychosis (auditory hallucinations – Badcock *et al.*, 2011; paranoia – Westermann *et al.*, 2013, 2012; delusional ideation – Westermann *et al.*, 2014). No causal links between ER and negative symptoms of psychosis were explored in these records.

Table 8: Reported linkage between ER and Psychosis

Study (year)	ER in context of Psychosis	Proposed relationship between ER and Psychosis**	Effectiveness of hypothesis testing	Statistics related to significant findings
Badcock et al. (2011)	Difficulties in ER impact on severity of auditory hallucination	Causal Mechanism (3)	Study is correlational, no experimental design employed to test hypothesis.	Correlation: PSYRATS severity & suppression $r=0.405$, $p<0.05$
Green et al., (2011)	People with bipolar disorder engage in more rumination, self-blame and catastrophizing compared with controls.	Correlation (2)	Study is correlational in design	Rumination $F_{2, 163} = 25.74$, $p<0.001$ Catastrophizing $F_{2, 163} = 10.78$, $p<0.001$ Self-blame $F_{2, 163} = 15.17$, $p<0.0005$
Gruber et al., (2008)	People with bipolar disorder endorsed more use of rumination and worry compared with controls	Correlation (2)	Study is correlational in design	Rumination $F_{256} = 5.33$, $p<0.01$ Worry $F_{256} = 4.67$, $p<0.05$
Gruber et al., (2011)	Rumination is linked with the onset and maintenance of bipolar disorder	Causal Mechanism (3)	Hypothesis tested using an experimental design	ANOVA conducted – test statistic not reported. Correlation: rumination & depressive episode ($r=0.47$, $p<0.05$) Correlation: mania & emotion-focus ($r=0.47$, $p<0.05$), self-focus ($r=0.48$, $p<0.05$), dampening ($r=0.47$, $p<0.05$)
Goldstein et al., (2014)	Difficulties in ER linked with experience of bipolar disorder	Correlation (2)	Study is an intervention design, assessing impact of DBT vs TAU on numerous outcomes including ER	For DBT group sig. reduction in CALS-P ($F=3.71$, $p=0.01$) & CALS-C ($F=4.22$, $p=0.008$)
Henry et al., (2009)	Highly schizotypal individual's present with difficulties with amplification of emotion expressive behaviour.	Correlation (2)	Study had both a correlational and experiment design component. Experimental design explored causal mechanisms, with no significant results found.	Correlation: Schizotypal personality questionnaire total & suppression ($r=0.30$, $p<0.01$)

Study (year)	ER in context of Psychosis	Proposed relationship between ER and Psychosis**	Effectiveness of hypothesis testing	Statistics related to significant findings
Henry <i>et al.</i>, (2008)	Authors explored link between ER difficulties and schizophrenia, however results indicated that individuals with schizophrenia did not differ from controls in regard to use of suppression and reappraisal.	Not linked (1)	Study is a correlational design	No significant correlations between scale for assessment of positive symptoms and scale for assessment negative symptoms and ERQ (suppression & reappraisal). Correlations ranged from -0.28 to 0.30.
Khoury <i>et al.</i>, (2015)	Difficulties in ER linked with experience of psychosis	Correlation (2)	Study is an intervention design, assessing feasibility of compassion, acceptance, and mindfulness intervention. Numerous secondary outcomes including ER.	3 month follow up - large effect size for improvement in ER of negative emotions $d=1.00$, $p=0.007$
Kimhy <i>et al.</i>, (2012)	Individuals with schizophrenia have significant difficulties with describing and identifying emotions, and use more suppression and less reappraisal strategies compared with controls.	Correlation (2)	Study is correlational in design	Schizophrenia vs control group on suppression $t=2.51$, $p=0.01$ Schizophrenia vs control group on reappraisal $t=2.16$, $p=0.03$ Schizophrenia vs control on EMT $t=3.22$, $p<0.001$
Lincoln <i>et al.</i>, (2014)	Individuals with psychosis show reduced skills in emotional awareness, understanding and acceptance when compared with controls	Correlation (2)	Study is a correlational design	MANOVA group difference $A=0.558$, $F(16, 170)=3.59$, $p<0.001$ Psychosis lower than HC on: acceptance, understanding ($F_{2,92}=17.00$; 14.11 , $p<0.001$), tolerating, clarity ($F_{2,92}=9.95$; 6.93 , $p<0.01$), awareness, confronting ($F_{2,92}=8.54$; 11.91 , $p<0.05$)
Livingstone <i>et al.</i>, (2009)	Individuals with psychosis use similar ER strategies when compared to those with mood disorders. Both groups use more dysfunctional ER strategies and less functional ER strategies when compared with controls.	Correlation (2)	Study is a correlational design	Clinical group vs HC for: reappraisal $t=-4.003$, $p<0.025$; internal dysfunctional $t=8.661$, $p<0.025$; internal functional $t=-3.009$, $p<0.025$.

Study (year)	ER in context of Psychosis	Proposed relationship between ER and Psychosis**	Effectiveness of hypothesis testing	Statistics related to significant findings
Owens <i>et al.</i>, (2012)	Psychosis linked with insecure attachment from previous body of literature. Insecure attachment significantly associated with greater difficulties in ER in this study.	Correlation (2)	Study is a correlational design	Correlation: DERS total & PANSS psychotic symptoms ($r=0.36$, $p=0.012$); DERS total & attachment anxiety ($r=0.69$, $p<0.0001$); DERS total & attachment avoidance ($r=0.42$, $p=0.003$).
Perry <i>et al.</i>, (2011)	Individuals with psychosis show reduced use of acceptance when compared with controls. No difference between the uses of suppression/reappraisal noted between psychosis sample and controls.	Correlation (2)	Study is a correlational design	Schizophrenia group vs control on acceptance $t=4.74$, $p<0.001$
Rowland <i>et al.</i>, (2013)	Individuals with schizophrenia (SZ) & bipolar disorder (BD) report more frequent use of rumination, catastrophizing and self-blame, and less use of putting into perspective strategies as compared to controls. Use of self-blame and catastrophizing was consistent predictor for mood disturbance in schizophrenia sample.	Correlation (2)	Study is a correlational design. Mechanisms hypothesis tested in relation to ER predicted mood disturbance rather than psychosis symptomatology.	BD&SZ>HC for: rumination SZ ($F_{3,206} = 8.05$, $p<0.0005$), BD ($F_{3,177} = 14.16$, $p<0.0005$); catastrophizing SZ ($F_{3,206} = 10.17$, $p<0.0005$), BD ($F_{3,177} = 4.77$, $p<0.0003$); self-blame SZ ($F_{3,206} = 5.12$, $p=0.002$), BD ($F_{3,177} = 9.25$, $p<0.0005$). BD&SZ<HC for: putting into perspective SZ ($F_{3,206} = 4.65$, $p=0.004$), BD ($F_{3,177} = 3.10$, $p=0.0028$). SZ>HC for self-blame ($F_{3,206} = 3.35$, $p=0.02$).
Rowland <i>et al.</i>, (2012)	Individuals with SZ & BD more likely to engage in catastrophizing and rumination and self-blame as compared with healthy controls (HC). SZ group more likely to engage in other blame compared with BD and HC. BD group less likely to use positive reappraisal.	Correlation (2)	Study is a correlational design	BD&SZ>HC for: rumination ($F_{2,91} = 3.53$, $p=0.034$); Catastrophizing ($F_{2,91} = 5.36$, $p=0.006$); self-blame $F_{2,91} = 3.19$, $p=0.046$. SZ> BD&HC for other blame ($F_{2,155} = 5.86$, $p=0.019$) BD< HC for positive reappraisal ($F_{2,59} = 9.38$, $p=0.003$).

Study (year)	ER in context of Psychosis	Proposed relationship between ER and Psychosis**	Effectiveness of hypothesis testing	Statistics related to significant findings
Stange <i>et al.</i>, (2013)	Rumination and Emotional Clarity (EC) interact with cognitive styles to be implicated in the experience of depression in individuals with sensitivity to bipolar disorder	Not linked (1)	Study is a correlational design	Linear regression model suggest low levels of EC and high brooding indicated risk for depression
Van Der Meer <i>et al.</i>, (2014)	Individuals with schizophrenia display reduced levels of emotion regulation processing in neural circuits. This also holds for siblings, indicating it may be related to vulnerability for psychosis.	Causal Mechanism (3)	Hypothesis tested using an experimental design	No sig group difference found on ERQ (statistic not reported) Causal mechanism identified via fMRI
Van Der Meer <i>et al.</i>, (2009)	Schizophrenia linked with more use of suppression and less use of reappraisal as compared with controls. Schizophrenia linked with specific difficulties in identifying feelings.	Correlation (2)	Study is a correlational design	SZ>HC for suppression: ($F_{1, 73} = 4.638, p = 0.025$) SZ<HC for reappraisal (not sig): ($F_{1, 73} = 3.490, p = 0.066$) SZ<HC for identify emotions: ($F_{1, 68} = 9.086, p = 0.004$)
Van Rijn <i>et al.</i>, (2011)	Emotional awareness problems are related to schizotypal traits in an ultra-high risk (UHR) of psychosis group. Emotional awareness is a prerequisite for the regulation of emotions in a social context.	Correlation (2)	Study is a correlational design	MANCOVA (Full scale IQ is covariate) UHR>HC for difficulties with: verbalising: ($F_{1, 54} = 5.5, p = 0.02$), identifying ($F_{1, 54} = 19.4, p < 0.001$).
Westermann <i>et al.</i>, (2013)	The maladaptive ER strategy of self-blaming predicts the experience of paranoia.	Causal Mechanism (3)	Hypothesis tested using an exploratory longitudinal study design	Regression Model: self-blame at baseline predicted paranoia at follow up: ($r^2 = 0.63, F_{3, 59} = 31.63, p < 0.001$).
Westermann <i>et al.</i>, (2012)	In high paranoia prone individuals' use of reappraisal in distressing social situations predicts higher paranoia.	Causal Mechanism (3)	Hypothesis tested using an experimental study design	Regression Model: under social stress reappraisal and paranoia proneness predicted paranoia: ($r^2 = 0.25, F_{8, 107} = 4.15, p < 0.001$).

Study (year)	ER in context of Psychosis	Proposed relationship between ER and Psychosis**	Effectiveness of hypothesis testing	Statistics related to significant findings
Westermann & Lincoln (2011)	Paranoid ideation is associated with ER deficits.	Correlation (2)	Study is a correlational design	Correlations between ER deficits (DERS subscales excluding awareness subscale): frequency of paranoia (r=0.26 to r=0.45); conviction of paranoia (r=0.25 to r=0.38). Correlation between non-acceptance and distress associated with paranoid ideation (r=0.27, p<.001)
Westermann et al., (2014)	Delusion prone individuals are less successful in applying reappraisal. Lower success in reappraisal of threat was linked to higher state delusional ideation.	(Tentative) Causal Mechanism (3)	Hypothesis tested using an experimental design	Multi-level linear analysis: Delusion proneness impacts on ER success in reappraisal ($F_{2, 158} = 3.70, p = 0.027$).
Wolkenstein et al., (2014)	Bipolar disorder (BD) is linked with increased use of rumination, self-blame, catastrophizing, and decreased use of positive reappraisal and putting into perspective as compared with controls.	Correlation (2)	Study is a correlational design	BD>MDD&HC for self-blame ($F_{2, 120} = 12.78, p < 0.001$), rumination ($F_{2, 120} = 24.11, p < 0.001$); catastrophizing ($F_{2, 120} = 11.37, p < 0.01$) BD<MDD&HC for: putting into perspective ($F_{2, 120} = 16.91, p < 0.001$); positive reappraisal ($F_{2, 120} = 4.17, p = 0.018$).

*PSYRATS – Psychotic Symptom Rating Scale; HC – Healthy Controls, MANOVA- Multivariate analysis of variance ; ANOVA – Analysis of variance; CALS –Children’s affective lability scale; PANSS-Positive and Negative Symptoms Scale; DERS-Difficulties in Emotion Regulation Scale; ERQ - Emotion Regulation Scale; MANCOVA- Multivariate analysis of co-variance; MDD-Major Depressive Disorder Group

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- 1 -No link between psychosis and ER proposed, or no link between ER and psychosis identified from study findings.
 - 2- Correlation between ER difficulties and ER proposed. No clear mechanism or causal link proposed.
 - 3 - Causal mechanism between ER difficulties and psychosis proposed, where ER difficulties hypothesised to lead to psychosis development, maintenance or severity.
 - 4 - Causal mechanism between ER difficulties and psychosis proposed, where psychosis experience hypothesised to lead to difficulties in ER.

5. Discussion

The review aimed to describe how ER is conceptualised in the psychosis spectrum literature, how ER has been measured, and how ER is linked with psychosis. The review included 24 records, where 15 different instruments measuring ER were used across these records.

5.1 ER Conceptualisation in the literature

As discussed in the introduction, there has been no consistent definition of ER offered in the literature (Henry *et al.*, 2008; Badcock *et al.*, 2011; Westermann *et al.*, 2012). This variability has been mirrored in the findings of this review. Within the variability of ER conceptualisations, this review identified that the Process model (Gross, 1998a), which is primarily cognitive in nature, was most frequently used to define ER. The Process model (Gross, 1998a) proposes clearly identified and distinct processes in ER (situation selection, situation modification; attentional deployment; cognitive change and response modulation). This has allowed for research to explore links between mental health difficulties and distinct ER processes (Kring & Sloan, 2010). However, it also has several limitations, including a lack of focus on extrinsic factors, a narrow cognitive focus which discounts emotional awareness and acceptance, and a classification system that does not focus purely on the target and function of the ER strategy. Across the records in this review there has been a focus on ER strategies, where the non-action elements of ER, such as awareness and attitude to emotions, are not adequately addressed. This is perhaps unsurprising given that actively engaging in ER strategies most closely matches the idea of “regulating” an emotion. From a psychological standpoint, cognitive behavioural models of psychosis have been the dominant paradigm (Tarrier & Wkyes, 2004; Beck & Rector, 2003), which may in part explain the focus on cognitive ER in the literature reviewed.

5.2 Towards a shared conceptualisation?

Given the breadth of concepts defined as ER, a shared conceptualisation of ER in psychosis would be beneficial in advancing the field. It is useful to look beyond the conceptualisations described in the studies reviewed here. In particular, the field of personality disorder (PD) research, which was the forerunner in emotion dysregulation may provide guidance. For example, the Gratz and Roemer's' (2004) integrative conceptualisation of ER was not offered across any records in this review, despite being an established conceptualisation in PD research and clinical practice. Difficulties in attachment and experiences of childhood trauma have been implicated in the development of both psychosis and PD (Gumley, 2009; Fonagy & Luyten, 2009). This suggests the PD evidence base is potentially relevant in understanding ER difficulties in psychosis. Conceptualisations used in PD would suggest a broader definition of the process of emotional regulation, incorporating emotional awareness, identifying emotions, as well as a broader range of responses to emotions, including emotional acceptance. As ER research in psychosis is in its early stages, with clear theoretical models yet to be established, it is perhaps prudent to consider a more expansive definition of ER, whilst being aware of the risk of being over inclusive (Berking & Wupperman, 2012). Adopting a multi-factorial conceptualisation allows for a more detailed and nuanced evaluation of the links between ER and psychosis, and would allow for testing of the impact of deficits at different stages of the ER process. It appears clear from the definitions and aspects of ER measured that there are several distinct processes in ER. These include emotional awareness, emotional acceptance, choosing and employing strategies to regulate emotions, and remaining goal directed in the

face of emotional arousal. Effective ER is a multi-factorial process which involves the application of attention to: identify and label emotional arousal; accept the presence of emotional experience; develop awareness of and maintain focus on goal-directed behaviour; and identify and employ contextually appropriate ER strategies. Difficulties in ER can occur within any of these facets.

5.3 ER Measurement

Fifteen different measurement tools were identified in this review, where the instruments measured different facets of ER including emotional awareness, emotional acceptance and specific ER strategies. Overall, the most commonly used instrument was the ERQ, which is based on the Process model (Gross, 1998a) and has a cognitive focus. Two of the instruments measure a broader understanding of ER, based on a more integrative understanding of the concept (DERS; ERSQ-ES). Given the range of research questions asked in the studies included in the review, the breadth of measurement instruments is perhaps unsurprising. However, the variation in measures, and in the constructs evaluated, make it difficult to aggregate research findings. For example the acceptance subscale of the CERQ appears to measure a different construct to acceptance as described in the AAQ.

The majority of the self-report instruments in this review assess the individuals' perception of their use of ER processes. This may not match the ER processes used in real world situations. The influence of context is addressed in two instruments in the review (DERS, EMT). For example, the DERS (Gratz & Roemer, 2004) includes a subjective appraisal of the effectiveness of ER strategies.

Psychometric properties were available for nine of the measures, where internal consistency ranged from moderate to excellent. The majority of measures used in this review were developed and standardised in non-psychosis populations. While this does not necessarily invalidate their use in psychosis populations, it does highlight the need for standardisation of measures for the population being studied. In this review internal consistency was reported for seven of the measures specifically related to their use in a psychosis population. Further analysis, including factor analysis, would be important to determine validity of the measures in this population group. Psychometric properties were not reported for six of the measures in this review. This may relate to reporting quality in the records rather than reflect characteristics of these measures. However, this limits the conclusions that can be drawn about the suitability of these measures for use in research in psychosis populations.

This review included only records that clearly identified ER as an outcome. Consequently, concepts that are theoretically similar to ER, such as mindfulness or reflective functioning, are not included in this review. This may be contrasted with the better developed understanding of ER in personality disorder research, where the links between ER and concepts such as mindfulness and reflective functioning, are better established (Linehan, 1993; Bateman & Fonagy, 2006). At present, there is a lack of coherence on how ER and psychosis are linked developmentally. Difficulties in attachment have been linked to both deficits in ER (Fonagy *et al.*, 2004) and psychosis (Gumley *et al.*, 2014). However, in this current review only one record mentioned ER in the context of attachment (Owens *et al.*, 2012), highlighting the contrast

between the developmentally focused tradition of personality disorder research, as compared with recent psychosis literature.

5.4 The role of ER in Psychosis

The presence of difficult emotions appears to have an impact on distress associated with psychosis (Gumley, 2009). However, the presence of distressing emotions may be reflective of more difficult life circumstances rather than directly relating to skills and abilities in regulating emotions. Teasing apart emotion from emotion regulation is difficult, and a clear understanding of ER is an important step in this process (Thompson & Goodman, 2010). The studies in the review were mainly cross sectional, with sixteen records drawing links between psychosis experiences and various ER strategies. This review identified that certain ER strategies were associated with specific psychosis groups in two records or more. Difficulties with emotional acceptance were noted to be related to psychosis samples in two records (Perry *et al.*, 2011; Lincoln *et al.*, 2014). Difficulties with emotional acceptance (Van der Meer *et al.*, 2009; Kimhy *et al.*, 2012); reduced use of reappraisal (Rowland *et al.*, 2012; Van der Meer *et al.*, 2009); rumination (Rowland *et al.*, 2012; 2013); and catastrophizing (Rowland *et al.*, 2012; 2013) was noted to be linked with schizophrenia samples. In bipolar samples, associated ER strategies included: rumination (Green *et al.*, 2011; Gruber *et al.*, 2008; Rowland *et al.*, 2012,2013; Wolkenstein *et al.*, 2014); self-blame and catastrophizing (Green *et al.*, 2011; Rowland *et al.*, 2012,2013; Wolkenstein *et al.*, 2014); and less use of positive reappraisal and putting into perspective (Rowland *et al.*, 2012, 2013; Wolkenstein *et al.*, 2014). From these initial patterns difficulties with emotional awareness and acceptance alongside cognitive ER strategies appear to be linked with psychosis and schizophrenia samples. Only cognitive ER strategies were associated with bipolar disorder as there was no research into the role of emotional acceptance and awareness in this group. Due to the small number of records on each population which investigated similar ER difficulties, the conclusions that can be drawn from these patterns are limited.

Six records in this review proposed a causal link between ER difficulties and the onset, maintenance or severity of psychosis experiences. In three of these records, authored by Westermann and colleagues (2012; 2013; 2014), reappraisal was found to be unsuccessful in reducing paranoia in delusion-prone individuals. Westermann *et al.* (2012) propose a working model of ER and delusions to explain this process. The model describes that a range of vulnerabilities, including cognitive biases and pre-existing delusional beliefs, disturb the down-regulation of negative emotions. Failed reappraisals lead to, or reinforce, paranoid thoughts increasing negative emotions. This forms a feedback loop that reinforces cognitive biases and pre-existing beliefs. While this model incorporates a range of potential vulnerability factors, it has a narrow focus in terms of ER. However the authors note that the model can easily incorporate different ER strategies and is based on a temporal model of ER (Westermann *et al.*, 2012). This model has not been tested in experimental or longitudinal design studies, however it may provide initial insight into causal mechanisms and clinical implications of ER in psychosis.

Of note from this review, it was identified that a causal link between ER and negative symptoms of psychosis experiences was not explored in the records. Research by MacBeth

and colleagues (2015) highlight that in a first episode psychosis sample, negative symptoms are associated with deficits in mentalization and meta-cognitive functioning. Given that ER conceptualisation in psychosis literature does not integrate theoretically similar constructs like mentalization, it is not surprising that this review did not identify any ER strategies specific to negative symptoms. A broader definition of ER may allow for a more focused examination of causal mechanisms of each different facet of psychosis experiences. For example, it may be prudent to examine which elements of an integrative understanding of ER are linked with positive symptoms versus those linked with negative symptoms of psychosis. Further research focused on exploring the impact of ER at different phases of psychosis experiences (onset, maintenance, and recovery phases) would further progress and inform our understanding, and assist in developing targeted therapeutic interventions.

6. Limitations

The current review included only records published in English, which may introduce cultural bias. Language limitations may also lead to omission of some measures or definitions of emotion regulation. Many of the studies in this review are observational in nature, where records were not excluded based on low methodological or reporting quality. As this narrative review aimed to systematically describe ER measurement and conceptualisation in psychosis literature, excluding studies on the basis of methodological quality may have introduced bias, preventing a systematic overview of the field.

While no formal assessment of reporting quality was undertaken in this review, quality was assessed informally during the characterisation of the records. The quality of reporting was noted to be variable across the records, in particular in relation to describing the rationale for measures used, and their psychometric properties.

The focus of the review is narrative, in describing the state of the field, and as such bias is inherent (Higgins *et al.*, 2011). This review had an explicit focus on constructs and measures of ER in the literature, to provide a homogenous set of records. This required that records made reference to the construct of ER, and employed an instrument with the purpose of measuring ER. This resulted in the potential exclusion of records which described related constructs that may have further informed the review objectives. As outlined in the discussion, concepts such as mentalization, experiential avoidance, reflective functioning and mindfulness may have relevance to the review question.

The records included population samples that ranged from clinical groups to community samples. It could be argued that the lack of homogeneity across the samples may reduce the generalisability of the findings. However, a clear rationale for including non-clinical samples has been described in the Continuum hypothesis (Freeman *et al.*, 2005; Johns & van Os, 2001), where psychotic experiences are viewed to lie on a continuum with normality. Furthermore, non-clinical samples provide control for the effect of confounding factors such as medication and neuropsychological deficits (Westermann *et al.*, 2012). This allows identification of difficulties in ER that may be causal, rather than just secondary to psychopathological processes (Westermann *et al.*, 2012).

7. Conclusion

Research into ER in psychosis appears to be in its early stages with the earliest record identified in the review being from 2008 (Henry *et al.*, 2008). Ongoing development in this research area may provide insight into how interventions with a focus on ER could reduce distress in psychosis. These advancements would assist in achieving a complete shift from a symptom focused approach in treatment towards a distress reduction focus (BPS, 2015). However, given the variability found in: the conceptualisation of ER, the role of ER in psychosis and of the measurement strategy undertaken in this review, there is currently little comparability across findings. This review would suggest that, at present many researchers are focusing on specific ER skills such as reappraisal, acceptance or rumination, rather than conceptualising emotional regulation or dysregulation as a broader concept. A shared multifactorial definition of ER could provide the basis for development of a theoretical framework for the role of ER in psychosis, or indeed for the role of psychosis in ER. This review has highlighted tentative links between ER difficulties and symptoms of psychosis, though the mechanisms through which this occurs remain unclear. Based on this review, there is presently one tentative model for the role of ER in psychosis (Westermann *et al.*, 2012). Research which further explores psychometric properties of measures in more detail would determine which psychometric tools are most appropriate for answering research questions about the causal linkages between ER and psychosis.

It may be useful for researchers to draw on the knowledge of ER gained from research and interventions in personality disorder research (Linehan, 1993; Gratz & Roemer, 2004). This could provide a more helpful basis for the integration of ER concepts into current psychological models of psychosis. Furthermore, it would provide a foundation for ongoing research into targeted treatment interventions, which fully account for developmental perspectives of psychosis. The use of suitable ER measurement tools in both psychosis intervention studies, and routine clinical work may further guide our understanding of relevant ER mechanisms and effective treatments.

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*Records included in the systematic review

**Records excluded after full text review

Appendices Index:

- A: Systematic search terms
- B: Articles removed during full text sift
- C: Data Extraction Form
- D: Extracted Data from 24 included records
- E: Characteristics of ER definition and ER measures used
- F: Supplementary information on measures employed in included studies
- G: Specific ER strategies measured

APPENDIX A: Systematic search terms.

Search terms and results from Search Databases - PSYCH info, PBSC

#	Query	Limiters/Expanders	Last Run Via	Results
S7	S5 AND S6	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO;Psychology and Behavioral Sciences Collection	5,705
S6	S1 OR S3	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO;Psychology and Behavioral Sciences Collection	224,364
S5	S2 OR S4	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO;Psychology and Behavioral Sciences Collection	142,320
S4	AB hallucination OR AB persecutory OR AB delusion OR AB paranoi* OR AB positive N1 symptom* OR AB negative N1 symptom*	Expanders - Apply related words Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO;Psychology and Behavioral Sciences Collection	30,750
S3	AB suppression OR AB reappraisal OR AB experiential OR AB acceptance OR AB avoidance OR AB mindfulness OR AB awareness OR AB rumination	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO;Psychology and Behavioral Sciences Collection	191,612
S2	AB psychosis* OR AB schizo* OR AB bi-polar OR AB psychot*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO;Psychology and Behavioral Sciences Collection	128,094
S1	TX emot* N5 regulat* OR TX affect* N5 regulat* OR TX emot* N5 dysregulat* OR TX affect* N5 dysregulat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO;Psychology and Behavioral Sciences Collection	37,872

Search terms and results from Search Databases – *CINHAL and MEDLINE*

S7	S5 AND S6	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - ERIC;CINAHL Plus;MEDLINE	4,209
S6	S1 OR S3	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - ERIC;CINAHL Plus;MEDLINE	455,661
S5	S2 OR S4	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - ERIC;CINAHL Plus;MEDLINE	116,974
S4	AB paranoi* OR AB hallucination OR AB persecutory OR AB delusion OR AB positive N1 symptom* OR AB negative N1 symptom*	Expanders - Apply related words Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - ERIC;CINAHL Plus;MEDLINE	29,426
S3	AB AB suppression OR AB reappraisal OR AB experiential OR AB acceptance OR AB avoidance OR AB mindfulness OR AB awareness OR AB rumination	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - ERIC;CINAHL Plus;MEDLINE	433,195
S2	AB AB psychosis* OR AB schizo* OR AB bi-polar OR AB psychot*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - ERIC;CINAHL Plus;MEDLINE	109,154
S1	TX emotion* N5 regulat* OR TX emotion* N5 dysregulat* OR TX affect* N5 dysregulat* OR TX affect* N5 regulat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - ERIC;CINAHL Plus;MEDLINE	24,885

# ▼	Searches	Results
9	7 and 8	1278
8	3 or 4	13575
7	2 or 6	306485
6	(hallucinat* or persecut* or delusion* or paranoi* or "positive symptom*" or "negative symptom*").ab.	38155
4	(((((supression or reappraisal or experiential).ab. or emotion*.mp.) adj3 acceptance.ab.) or avoidance.ab. or mindfulness.ab. or emotion*.mp.) adj3 awareness.ab.) or rumination.ab. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]	8540
3	(((((emotion* adj5 regulat*).af. or emotion*.mp.) adj5 dysreg*.af.) or affect*.mp.) adj5 regulat*.af.) or affect*.mp.) adj5 dysregulat*.af. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]	5079
2	(psychosis* or bi?polar or schizo* or psychot*).ti,ab.	293546

Search terms and results from Search Databases - HMIC searched through OVID

# ▼	Searches	Results
9	7 and 8	1278
8	3 or 4	13575
7	2 or 6	306485
6	(hallucinat* or persecut* or delusion* or paranoi* or "positive symptom*" or "negative symptom*").ab.	38155
4	(((supression or reappraisal or experiential).ab. or emotion*.mp.) adj3 acceptance.ab.) or avoidance.ab. or mindfulness.ab. or emotion*.mp.) adj3 awareness.ab.) or rumination.ab. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]	8540
3	(((emotion* adj5 regulat*).af. or emotion*.mp.) adj5 dysreg*.af.) or affect*.mp.) adj5 regulat*.af.) or affect*.mp.) adj5 dysregulat*.af. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]	5079
2	(psychosis* or bi?polar or schizo* or psychot*).ti,ab.	293546

Search terms and results from Search Databases - PUBMED

Search	Query	Items found
#119	Search #117 AND #118	4313
#120	Search (((((#117 AND #118)) NOT vein[Title/Abstract]) NOT cardi*[Title/Abstract]) NOT cancer[Title/Abstract]) NOT insulin[Title/Abstract]	4176
#118	Search #99 OR #113	293588
#117	Search #116 OR #97	194946
#116	Search ((((((psychosis*[Title/Abstract]) OR bi-polar*[Title/Abstract]) OR schizo*[Title/Abstract]) OR psychot*[Title/Abstract])))	183182
#115	Search ((((((psychosis*[Title/Abstract]) OR bi-polar*[Title/Abstract]) OR schizo*[Title/Abstract]) OR psychot*[Title/Abstract])))	183182
#114	Search #113 OR #99	293588
#113	Search (((((((suppression[Title/Abstract]) OR reappraisal[Title/Abstract]) OR experiential[Title/Abstract]) OR acceptance[Title/Abstract]) OR avoidance[Title/Abstract]) OR mindfulness[Title/Abstract]) OR rumination[Title/Abstract]) OR "emotion* awareness"[Title/Abstract]	288272
#112	Search (((((((((((suppression[Title/Abstract]) OR reappraisal[Title/Abstract]) OR experiential[Title/Abstract]) OR acceptance[Title/Abstract]) OR avoidance[Title/Abstract]) OR mindfulness[Title/Abstract]) OR rumination[Title/Abstract]) OR "emotion* awareness"[Title/Abstract])))	288272
#111	Search (((((((((((suppression[Title/Abstract]) OR reappraisal[Title/Abstract]) OR experiential[Title/Abstract]) OR acceptance[Title/Abstract]) OR avoidance[Title/Abstract]) OR mindfulness[Title/Abstract]) OR rumination[Title/Abstract]) OR "emotion* awareness"[Title/Abstract])))	3847
#110	Search #107 AND #109	4201
#109	Search #97 OR #98	191939
#108	Search #97 AND #98	11731
#107	Search #106 OR #99	293563
#106	Search (((((((((((suppression[Title/Abstract]) OR reappraisal[Title/Abstract]) OR experiential[Title/Abstract]) OR acceptance[Title/Abstract]) OR avoidance[Title/Abstract]) OR mindfulness[Title/Abstract]) OR rumination[Title/Abstract])))	288246
#105	Search (((((((((((suppression[Title/Abstract]) OR reappraisal[Title/Abstract]) OR experiential[Title/Abstract]) OR acceptance[Title/Abstract]) OR avoidance[Title/Abstract]) OR mindfulness[Title/Abstract]) OR awareness[Title/Abstract]) OR rumination[Title/Abstract]))) NOT (insulin[Title/Abstract] OR vein[Title/Abstract] OR cancer[Title/Abstract] OR cardi*[Title/Abstract])	324391
#104	Search #102 AND #103	10851
#103	Search #98 OR #99	185215
#102	Search #99 OR #100	379928
#101	Search #99 AND #100	290

#100	Search (((((((suppression[Title/Abstract]) OR reappraisal[Title/Abstract]) OR experiential[Title/Abstract]) OR acceptance[Title/Abstract]) OR avoidance[Title/Abstract]) OR mindfulness[Title/Abstract]) OR awareness[Title/Abstract]) OR rumination[Title/Abstract]))	374650
#99	Search (((emotion* reg*) OR emotion* dysreg*) OR affect* reg*) OR affect* dysreg*)	5568
#98	Search (((((psychosis*[Title/Abstract]) OR bi-polar*[Title/Abstract]) OR schizo*[Title/Abstract]) OR psychot*[Title/Abstract])) NOT (vein[Title/Abstract] OR cancer[Title/Abstract] OR cardi*[Title/Abstract]))	180019
#97	Search ((((((hallucinat*[Title/Abstract]) OR persecut*[Title/Abstract]) OR delusion*[Title/Abstract]) OR paranoi*[Title/Abstract]) OR "positive symptom*" [Title/Abstract]) OR "negative symptom*" [Title/Abstract]))	23651
#96	Search (((((((suppression[Title/Abstract]) OR reappraisal[Title/Abstract]) OR experiential[Title/Abstract]) OR acceptance[Title/Abstract]) OR avoidance[Title/Abstract]) OR mindfulness[Title/Abstract]) OR awareness[Title/Abstract]) OR rumination)	374672
#8	Search #6 AND #7	16211

APPENDIX B Articles Removed during full text sift.

Number	REFERENCE	REASON FOR EXCLUSION
1	Abbott, A. (2012). Stress and the city: Urban decay. <i>Nature</i> , 490(7419), 162-164.	Record is a review article.
2	Aldebot, S., & de Mamani, A. G. (2009). Denial and acceptance coping styles and medication adherence in schizophrenia. <i>Journal of Nervous & Mental Disease</i> , 197(8), 580-584.	ER not explicitly identified as a primary or secondary outcome. No measure of ER used.
3	Allott, K. A., Rapado-Castro, M., Proffitt, T.-M., Bendall, S., Garner, B., Butselaar, F., Markulev, C., Phassouliotis, C., McGorry, P., Woods, C., Cotton, S. M., Phillips, L. J. (2014). The impact of neuropsychological functioning and coping style on perceived stress in individuals with first-episode psychosis and healthy controls. <i>Psychiatry Research</i> 226(1), 128-135.	ER not explicitly identified as a primary or secondary outcome. No measure of ER used.
4	Amino, S. R., Jensen, J., Lagerberg, T. V., Andreassen, O. A., & Melle, I. (2009). Decreased reported arousal of aversive affective stimuli in schizophrenia and bipolar disorder. <i>Bipolar Disorders</i> , 11 (1), 16.	ER not explicitly identified as a primary or secondary outcome. No measure of ER used.
5	Armando, M., Lin, A., Girardi, P., Righetti, V., Dario, C., Saba, R., . . . Fiori Nastro, P. (2013). Prevalence of psychotic-like experiences in young adults with social anxiety disorder and correlation with affective dysregulation. <i>The Journal Of Nervous And Mental Disease</i> , 201(12), 1053-1059.	ER not explicitly identified as a primary or secondary outcome. No measure of ER used.
6	Bartels, M. N., Shoval, H. A., Vakhrusheva, J., Armstrong, H. F., Gomez, J. I., & Kimhy, D. A. (2013). Autonomic dysregulation and altered affective functioning in schizophrenia. <i>Clinical Autonomic Research</i> , 23 (5), 282.	Record is a conference abstract – no full peer reviewed paper available.
7	Baslet, G., Termini, L., & Herbener, E. (2009). Deficits in emotional awareness in schizophrenia and their relationship with other measures of functioning. <i>Journal of Nervous and Mental Disease</i> , 197(9), 655-660	ER not explicitly identified as a primary/secondary outcome despite the Levels of Emotional Awareness Scale used. Emotional awareness examined in context of social functioning and psychopathology.
8	Batmaz, S., Ulusoy Kaymak, S., Kocbiyik, S., & Turkcapar, M. H. (2014). Metacognitions and emotional schemas: a new cognitive perspective for the distinction between unipolar and bipolar depression. <i>Compr Psychiatry</i> , 55(7), 1546-1555.	ER not explicitly identified as a primary or secondary outcome. Meta-cognitive Questionnaire 30 (MCQ-30) and Leahy Emotional Schema Scale (LESS) used in context of examining attitudes to emotions.
9	Bechi, M., Riccaboni, R., Ali, S., Fresi, F., Buonocore, M., Bosia, M., . . . Cavallaro, R. (2012). Theory of mind and emotion processing training for patients with schizophrenia: Preliminary findings. <i>Psychiatry Research</i> , 198(3), 371-377	ER not explicitly identified as a primary or secondary outcome. Emotional processing (Pictures of facial affect) and Theory of mind assessed. Emotional processing not explicitly linked to ER.

Number	REFERENCE	REASON FOR EXCLUSION
10	Brewer, L. W. (2008). <i>Emotional reactivity and social oddness in schizotypal individuals</i> . Dissertation Abstracts International: Section B: The Sciences and Engineering 68, 4812.	Record is a dissertation, and not a peer reviewed article.
11	Caponigro, J. M., Moran E. K., Kring A. M., & Moskowitz, J. T. (2014). Awareness and Coping with Emotion in Schizophrenia: Acceptability, Feasibility and Case Illustrations. <i>Clinical Psychology & Psychotherapy</i> , 21(4), 371-380	ER not explicitly identified as a primary/secondary outcome. Outcomes were acceptability and feasibility of the intervention, assessment of outcome was supplemented by qualitative interview. No measure of ER used.
12	Cohen, A. S., Najolia, G. M., Brown, L. A., & Minor, K. S. (2011). The state-trait disjunction of anhedonia in schizophrenia: Potential affective, cognitive and social-based mechanisms. <i>Clinical Psychology Review</i> , 31(3), 440-448	Record is a review article.
13	Cotier, F. A., Chen, L. H., Mark, W., Kong, P., Leung, S., Leung, C. N. W., . . . Touloupoulou, T. (2014). Dysfunctional emotion regulation as a vulnerability marker for psychosis: The twins scan China study. <i>Schizophrenia Research</i> , 153, 143	Record is a conference abstract – no full peer reviewed paper available.
14	Cuellar, A. K., Johnson, S. L., & Ruggero, C. J. (2009). Affective reactivity in response to criticism in remitted bipolar disorder: A laboratory analog of expressed emotion. <i>Journal of Clinical Psychology</i> , 65(9), 925-941	ER not explicitly identified as a primary or secondary outcome. Record examines levels of expressed emotion.
15	D'Antonio, E., Kahn, J., McKelvey, J., Berenbaum, H., & Serper, M. R. (2014). Emotional awareness and delusions in schizophrenia and schizoaffective disorder. <i>Comprehensive Psychiatry</i> , 57, 106-111.	ER not explicitly identified as a primary or secondary outcome. Record measures emotional awareness (Trait Meta Mood Scale) and Emotional Clarity (Toronto Alexithymia Scale-20) however does not explicitly link these constructs with ER.
16	Dickstein, D. P., Brazel, A. C., Goldberg, L. D., & Hunt, J. I. (2009). Affect Regulation in Pediatric Bipolar Disorder. <i>Child and Adolescent Psychiatric Clinics of North America</i> , 18(2), 405-420	Record is a review article.
17	Eisner, L., Gironde, S., & Deckersbach, T. Enhancing emotion regulation in bipolar disorder. <i>Bipolar Disorders. Conference: 10th International Conference on Bipolar Disorder Miami Beach, FL United States. Conference Start</i> , 15, 97-98.	Record is a conference abstract – no full peer reviewed paper available.
18	Freeman, D., Garety, P. A., & Kuipers, E. (2001). Persecutory delusions: Developing the understanding of belief maintenance and emotional distress. <i>Psychological Medicine</i> , 31(7), 1293-1306.	ER not explicitly identified as a primary or secondary outcome. Record examines Emotional Distress. Emotional distress not explicitly linked with ER.

Number	REFERENCE	REASON FOR EXCLUSION
19	Gajwani, R. P. M. (2013). Attachment: Developmental pathways to affective dysregulation in young people at ultra-high risk of developing psychosis. <i>British Journal of Clinical Psychology</i> , 52(4), 424-437.	No specific ER measure used. Affect dysregulation difficulties implied from anxiety and depression measures.
20	Gaudiano, B. A. (2004). <i>Acceptance and commitment therapy for psychiatric inpatients with psychotic symptoms</i> . Doctoral dissertation, Drexel University.	Record is a dissertation, and not a peer reviewed article.
21	Gaudiano, B. A., & Herbert, J. D. (2006). Acute treatment of inpatients with psychotic symptoms using Acceptance and Commitment Therapy: Pilot results. <i>Behaviour Research and Therapy</i> , 44(3), 415-437	No measure of ER used.
22	Gaudiano, B. A., Herbert, J. D., & Hayes, S. C. (2010). Is it the symptom or the relation to it? Investigating potential mediators of change in acceptance and commitment therapy for psychosis. <i>Behavior Therapy</i> , 41(4), 543-554	ER not explicitly identified as a primary or secondary outcome.
23	Gaudiano, B. A., Nowlan, K., Brown, L. A., Epstein-Lubow, G., & Miller, I. W. (2013). An open trial of a new acceptance-based behavioral treatment for major depression with psychotic features. <i>Behavior Modification</i> , 37(3), 324-355	ER not explicitly identified as a primary or secondary outcome of the research. Acceptance measured using the AAQ.
24	Gokhan, N. (1996). <i>Affective experience in borderline versus schizotypal personality disorders</i> . Doctoral Dissertation.	Record is a dissertation, and not a peer reviewed article.
25	Green, M. J., Roberts, G., McCormack, C., Frankland, A., Wright, A., Rowland, J., . . . Mitchell, P. B. (2012). Social cognition in young people at-risk for bipolar disorder: Associations with neurocognition and emotion regulation. <i>Bipolar Disorders</i> , 14, 79	Record is a conference abstract. No full peer reviewed article.
26	Green, M. J., Sparkes, A., James, C., O'Donnell, M., & McDonald, S. (2009). Cognitive emotion regulation in schizophrenia: Associations with neurocognition and social perception. <i>Biological Psychiatry</i> , 1, 192	ER identified as outcome and measured using the CERQ however record is a conference abstract – no full peer reviewed paper available
27	Gumley, A., Braehler, C., Laithwaite, H., MacBeth, A., & Gilbert, P. (2010). A compassion focused model of recovery after psychosis. <i>International Journal of Cognitive Therapy</i> , 3(2), 186-201	Record is a review article.
28	Henry, J. D., Green, M. J., de Lucia, A., Restuccia, C., McDonald, S., & O'Donnell, M. (2007). Emotion dysregulation in schizophrenia: Reduced amplification of emotional expression is associated with emotional blunting. <i>Schizophrenia Research</i> , 95(1-3), 197-204	ER was explicitly identified as outcome however ER is measured by researcher ratings of two observed ER strategies (amplification and suppression). No self-report ER measure used.

Number	REFERENCE	REASON FOR EXCLUSION
29	Hepworth, C., Startup, H., & Freeman, D. (2011). Developing treatments of persistent persecutory delusions: the impact of an emotional processing and metacognitive awareness intervention. <i>The Journal Of Nervous And Mental Disease</i> , 199(9), 653-658.	ER not explicitly identified as a primary or secondary outcome.
30	Kearns, J. G. (2006). Schizotypy facets, cognitive control, and emotion. <i>Journal of Abnormal Psychology</i> , 115(3), 418-427	ER not explicitly identified as a primary or secondary outcome. Emotion confusion and emotionality measured in this study. However these constructs are not conceptualised as explicitly linked with ER.
31	Khoury, B., & Lecomte, T. (2012). Emotion regulation and schizophrenia. <i>International Journal of Cognitive Therapy</i> , 5(1), 67-76.	Record is a review article.
32	Kimhy, D., Vakhrusheva, J., Khan, S., Chang, R. W., Hansen, M. C., Ballon, J. S., Malaspina, D., & Gross, J. J. (2014). Emotional granularity and social functioning in individuals with schizophrenia: An experience sampling study. <i>Journal of Psychiatric Research</i> 53: 141-148.	ER not explicitly identified as a primary or secondary outcome. No measure of ER used.
33	Kubota, M., Miyata, J., Sasamoto, A., Kawada, R., Fujimoto, S., Tanaka, Y., . . . Murai, T. (2012). Alexithymia and reduced white matter integrity in schizophrenia: A diffusion tensor imaging study on impaired emotional self-awareness. <i>Schizophrenia Research</i> , 141(2-3), 137-143	ER not explicitly identified as a primary or secondary outcome. Alexithymia measured using the Toronto Alexithymia Scale used, however the construct is not linked with ER.
34	Morris, E. M. J., Garety, P., & Peters, E. (2014). Psychological flexibility and nonjudgemental acceptance in voice hearers: Relationships with omnipotence and distress. <i>Australian and New Zealand Journal of Psychiatry</i> , 48(12), 1150-1162	ER not explicitly identified as primary or secondary outcome. Authors used AAQ to explore relationship between psychological flexibility, non-judgemental acceptance, appraisals of voices, coping strategies, and voice distress. No explicit link between ER and acceptance made.
35	O'Driscoll, C., Laing, J., & Mason, O. (2014). Cognitive emotion regulation strategies, alexithymia and dissociation in schizophrenia, a review and meta-analysis. <i>Clinical Psychology Review</i> , 34(6), 482-495	Record is a review article (systematic review).
36	Oorschot, M., Lataster, T., Thewissen, V., Lardinois, M., Wichers, M., van Os, J., . . . Myin-Germeys, I. (2013). Emotional experience in negative symptoms of schizophrenia—No evidence for a generalized hedonic deficit. <i>Schizophrenia Bulletin</i> , 39(1), 217-225.	Record examines Emotional experience and behaviour using the experience Sampling Method. No self-report measure of ER used.

Number	REFERENCE	REASON FOR EXCLUSION
37	Perry, Y., Henry, J. D., Nangle, M. R., & Grisham, J. R. (2012). Regulation of negative affect in schizophrenia: The effectiveness of acceptance versus reappraisal and suppression. <i>Journal of Clinical and Experimental Neuropsychology</i> , 34(5), 497-508	Record examines ER using an experimental design, no self-report measure ER used.
38	Ponizovsky, A. M., Vitenberg, E., Baumgarten-Katz, I., & Grinshpoon, A. (2013). Attachment styles and affect regulation among outpatients with schizophrenia: Relationships to symptomatology and emotional distress. <i>Psychology & Psychotherapy: Theory, Research & Practice</i> , 86(2), 164-182.	Record explicitly identifies attachment style and affect regulation as outcome. However affect regulation measured through The General Health Questionnaire –and maladaptive ER inferred by the presence of emotional distress. No self-report measure of ER used.
39	Rai, K., Mohanty, S., & Kumar, S. (2015). Emotion awareness and regulation in persons with chronic schizophrenia. <i>Indian Journal of Psychiatry</i> , 1, 121-122.	Record is a conference abstract – no full peer reviewed paper available.
40	Sanchez, A., Cooper, S., & Gard, D. (2012). Emotion dysregulation in younger versus older people with schizophrenia. <i>Early Intervention in Psychiatry</i> , 6, 50	Record is a conference abstract – no full peer reviewed paper available.
41	Sherry, A. R. (2002). <i>Adult attachment, developmental personality styles and interpersonal affect regulation</i> . Unpublished dissertation, University of Southern Mississippi.	Record is a dissertation, and not a peer reviewed article.
42	Udachina, A. F.-G. I. R. P. (2014). The role of experiential avoidance in paranoid delusions: An experience sampling study. <i>British Journal of Clinical Psychology</i> , 53(4), 422-432.	Record examines experiential avoidance (EA) as outcome. EA is explicitly identified as an ER strategy. However record uses experience sampling method (ESM), and a structured diary technique to measure experiential avoidance. No self-report measure used.
43	van 't Wout, M., Aleman, A., Bermond, B., & Kahn, R. S. (2007). No words for feelings: Alexithymia in schizophrenia patients and first-degree relatives. <i>Comprehensive Psychiatry</i> , 48(1), 27-33	Alexithymia explicitly identified as an outcome. While elements of Alexithymia (experience and express emotions) are linked with ER by the author, this record conceptualises Alexithymia as a personality trait rather than ER process.
44	Van Os, J. (2010). Affective dysregulation and reality distortion. <i>Schizophrenia Research</i> , 117 (2-3), 148	Record is a conference abstract – no full peer reviewed paper available.
45	Van Rossum, I., Dominguez, M. D. G., Lieb, R., Wittchen, H. U., & Van Os, J. (2011). Affective dysregulation and reality distortion: A 10-year prospective study of their association and clinical relevance. <i>Schizophrenia Bulletin</i> , 37(3), 561-571.	ER explicitly identified as an outcome. However affective dysregulation measured by presence of depression, dysthymia, and mania. No measure of ER used.

Number	REFERENCE	REASON FOR EXCLUSION
46	White, R., Gumley, A., McTaggart, J., Rattrie, L., McConville, D., Cleare, S., & Mitchell, G. (2011). A feasibility study of Acceptance and Commitment Therapy for emotional dysfunction following psychosis. <i>Behaviour Research and Therapy</i> , 49(12), 901-907.	ER not explicitly identified as a primary/secondary outcome. Emotional dysfunction identified as an outcome – and measured by presence of anxiety or depression. AAQ used to measure experiential avoidance, however experiential avoidance not explicitly linked to a process of ER.
47	Wolkenstein, L. Can't stop me now-dysfunctional emotion regulation and cognitive control deficits in bipolar patients. <i>Bipolar Disorders. Conference: 10th International Conference on Bipolar Disorder Miami Beach, FL United States. Conference Start</i> , 15, 79-80.	Record is a conference abstract – no full peer reviewed paper available.

APPENDIX C: Data Extraction Form

<u>Full reference:</u>		
<u>Date Category</u>	<u>Verbatim support</u>	<u>Additional comments</u>
Study Objectives		
Study population (N)		
Study Design		
Construct of ER: <ul style="list-style-type: none"> • Definition • Reference to Model/theory • Related to wider literature • How ER is linked with psychosis? 		
ER Measurement Instrument: <ul style="list-style-type: none"> • Name • Explicit in how it relates to ER • General properties (number items, subscales) • Psychometric properties 		
Main findings summary		

APPENDIX D: Extracted Data from 24 included records

Study ID	Objective	Design	Sample & N	Construct ER	Theory/Model Reference	ER Measures	Summary Main Finding
Badcock <i>et al.</i> , 2011	Examined the relationship between ER and the experience of Auditory Hallucinations (AH)	Cross sectional	Australia N-34 individuals with schizophrenia and current AH N-34 non clinical controls	“Broadly refers to peoples active attempts to manage their emotional states”	Gross Integrative Review- Koole (2009)	Emotion Regulation Questionnaire (ERQ) Penn State Worry Questionnaire (PSWQ) Ruminative Response Scale (RRS)	Increased use of suppressive expression was correlated with severity of AH. ERQ item of suppression was positively associated with disruption to life (PSYRATS). Rumination positively correlated with distress related to AH. ERQ suppression and RRS scores not significantly correlated suggesting that they are relatively independent.
Green <i>et al.</i> , 2011	Examined their hypothesis that patients with bipolar disorder (BD-I) and unaffected relatives (UR) would use more “maladaptive” ER strategies and less “adaptive” strategies compared with healthy controls.	Cross Sectional	Australia N- 105 individuals with BD-I N- 124 unaffected relatives (UR) N – 63 healthy controls.	“Emotion regulation includes flexible cognitive strategies employed to increase, maintain, or decreased the physiological and/or behavioural components of an emotional response”	References Gross, Thompson & Garnefski. Some lack of clarity on which model.	Cognitive Emotion Regulation Questionnaire (CERQ)	BD-I and UR reported more frequent use of maladaptive ER strategies. ER strategies of catastrophizing and self-blame may be associated with vulnerability to mood disorder.
Gruber <i>et al.</i> , 2008	Examined hypothesis that participants in BD-I and insomnia group would report more worry, rumination, negative automatic thoughts (NAT) compared to control.	Cross Sectional	America N – 21 BD-I N – 20 control group UK N- 19 Insomnia	“Trans-diagnostic processes such as worry, rumination and NAT are understood to play a significant role in ER”	No reference to any underlying theory/model of ER	Global Rumination Scale (GRS) PSWQ Cognitions Checklist (CCL)	Rumination and worry were endorsed to a larger degree in BD-I and insomnia group. These findings did not remain when anxiety and depression were controlled for.

Study ID	Objective	Design	Sample & N	Construct ER	Theory/Model Reference	ER Measures	Summary Main Finding
Gruber <i>et al.</i> , 2011	Examined rumination about negative and positive emotions in inter-episode bipolar group and healthy controls.	Multi Method – experimental design	America BD N= 39 Control N = 34	“ER refers to the process by which individuals consciously or unconsciously modify their emotions”	Gross & Thompson, 2007.	RRS Response to Positive Affect Questionnaire (RPA)	BD group reported greater trait rumination about positive and negative emotions, but no difference emerged during experimental rumination induction.
Goldstein <i>et al.</i> , 2014	A pilot randomised trial of Dialectic Behaviour Therapy (DBT) versus treatment as usual (TAU) for adolescents with a diagnosis of BD.	Pilot Randomised Trial	America Adolescents with BD in DBT arm N=14 Adolescents with BD in TAU arm N= 6	ER Identified as one of the outcomes for the pilot trial, however no definition of ER provided.	No Model referenced.	Children’s Affective Lability Scale (CALS)	DBT was associated with greater treatment engagement and less severe depressive symptomatology over follow-up compared with TAU.
Henry <i>et al.</i> , 2009	Two part study. 1.To assess whether individuals vulnerable to schizophrenia have difficulties with amplification 2. To assess relationship between self-reported suppression and schizotypy	Multi method – two part study. Experimental design and cross sectional design	Australia Part 1: N – 27 high schizotypy N- 27 low schizotypy Part 2: N – 204 community volunteers	“A prominent theoretical account of ER identified two regulatory strategies: antecedent focused and response focused” “Emotion dysregulation deficiency in regulatory processes and maladaptive use of otherwise intact processes (where blunted affect may reflect deficiency in amplification)”	Gross (2001) Kring & Werner (2004)	Suppression Scale from the ERQ	Part 1: Highly Schizotypal people presented with specific difficulties with amplification but not suppression Part 2: Suppression was linked with higher scores of anxiety and depression. Greater use of suppression was associated with higher scores on the Schizotypal Personality Questionnaire (SPQ).

Study ID	Objective	Design	Sample & N	Construct ER	Theory/Model Reference	ER Measures	Summary Main Finding
Henry <i>et al.</i> , 2008	To assess self-reported use of suppression and reappraisal ER strategies in individuals with schizophrenia.	Cross Sectional	Australia N=41 (32 schizophrenia dx) N=9 schizoaffective dx) N = 38 controls	“Emotion dysregulation deficiency in regulatory processes and maladaptive use of otherwise intact processes (where blunted affect may reflect deficiency in amplification)” “Antecedent and response focused ER strategies “	Kring & Werner (2004) Reference to Process Model - Gross	ERQ	Relative to controls, individuals with schizophrenia did not differ with regard to reported use of reappraisal or suppression.
Khoury <i>et al.</i> , 2015	Examine the acceptability, feasibility & clinical utility of an ER intervention which combines 3 rd wave strategies: compassion acceptance, mindfulness (CAM)	Non-randomised non-perspective follow-up study	Canada N=17 outpatients from a first episode psychosis clinic	ER not defined. Reference to ER strategies such as reappraisal, exposure, meta-cognition, mindfulness, compassion.	No model provided, author reference their own previous research (Khoury & Lecomte, 2012).	CERQ	The intervention was feasible and was associated with increase in emotion self-regulation, decrease in anxiety, depression, and improvement in self-care.
Kimhy <i>et al.</i> , 2012	Compare emotion awareness (EA) and regulation in individuals with schizophrenia and healthy controls. To examine links between EA, ER and social functioning in individuals with schizophrenia.	Cross Sectional	America N-44 individuals with schizophrenia N- 20 health controls	“The processes that are engaged in order to influence which emotions people have, when they have them, and how the emotions are experienced or expressed” Reference to antecedent and response focused strategies.	Gross (2007) referenced. Gross process model referenced.	Emotion management task (EMT) ERQ	Individuals with schizophrenia displayed significant deficits describing and identifying emotions, and used significantly less reappraisal and more suppression strategies compared with controls.

Study ID	Objective	Design	Sample & N	Construct ER	Theory/Model Reference	ER Measures	Summary Main Finding
Lincoln <i>et al.</i> , 2014	Examine whether ER difficulties in psychosis are more prominent for ability to modify emotions or ability to tolerate and accept emotions.	Randomised repeated measures	Germany N - 37 psychosis N – 30 depression N – 28 controls	“individuals consciously or automatically use various strategies to regulate their emotions” “reappraisal, self-soothing, diverting attention – OR regulating through understanding, accepting and tolerating”	Reference Gross (2007); Koole (2009) and Berking (2008) Integrated conceptualisation including elements of acceptance.	Emotion Regulation Skills Questionnaire (ERSQ-ES)	Individuals with psychosis showed reduced skills related to awareness, understanding and acceptance of distressing emotions, but no reduced ability to modify them.
Livingstone <i>et al.</i> , 2009	Examine emotional experience and regulation in individuals who have experienced psychosis, individuals experiencing anxiety or mood disorder and controls.	Cross Sectional	UK N- 21 psychosis N-21 anxiety/depression N-21 controls	“the process by which an individual shapes his or her emotional experience and expression”	Reference Gross (1998) Provide overview of numerous models: Eisenberg & Fabes (1995); Thomson (1994); Philips (2005)	ERQ Regulation of Emotions Questionnaire (REQ)	Clinical Groups used more dysfunctional ER strategies compared to controls. Clinical groups experience greater levels of negative emotions and less levels of happiness when compared to controls.

Study ID	Objective	Design	Sample & N	Construct ER	Theory/Model Reference	ER Measures	Summary Main Finding
Owens <i>et al.</i> , 2012	Explore the value of attachment theory as a framework for understanding the ways in which the staff-patient relationship is associated with different methods of regulating emotion in individuals with psychosis.	Cross Sectional	UK N-81 schizophrenia/schizoaffective/psychosis N-39 Mental Health workers 49 patient-staff dyads.	“Broadly refers to various strategies individuals use to manipulate their emotional experience and expressions. Regulatory efforts may be directed at various parts of the emotion process, altering appraisals, arousal levels, thoughts, expression and actions”	Developmental model of ER. Reference Mikuliner & Shaver 2001	Difficulties in Emotion Regulation Questionnaire (DERS) Author provide rationale for DERS as it incorporates multiple dimensions of ER based on extant empirical work.	Insecure attachment significantly associated with greater difficulties in regulating emotions.
Perry <i>et al.</i> , 2011	Investigate the habitual use of suppression, reappraisal and acceptance in schizophrenia.	Cross-Sectional	Australia N-33 schizophrenia group N – 36 matched controls	“Broadly refers to various strategies individuals use to influence emotional domains: Antecedent and response focused strategies discussed where “acceptance fits as a response strategy”	Gross process model (1998) Reference to Hayes (2006) concept of acceptance as alternative approach to ER	ERQ Acceptance and Action Questionnaire(AAQ) - to measure acceptance domain for ER)	Clinical participants report using less acceptance. No group differences found in use of suppression or reappraisal.

Study ID	Objective	Design	Sample & N	Construct ER	Theory/Model Reference	ER Measures	Summary Main Finding
Rowland <i>et al.</i> , 2013	Test hypothesis that both schizophrenia and BD patients would report greater frequency of the use of maladaptive coping strategies for ER	Cross sectional	Australia N-126 schizophrenia N-97 BD-I N- 81 controls	“a range of voluntary and involuntary processes used to modulate the occurrence, intensity and duration of internal feeling states and physiological processes that occur in response to external events, and optimally in accord with ones goals”	Reference Thomson (1994); Gross (1998); Eisenberg (2000)	CERQ (Authors give clear rationale for use of the CERQ – reporting primary interest is in cognitive ER strategies).	Patients with schizophrenia and BD-I report more frequent rumination catastrophizing and self-blame, and less use of putting into perspective relative to healthy controls. Self-blame and catastrophizing were consistent predictors of symptomatology for schizophrenia. Rumination and reduced positive reappraisal were consistent predictors or symptoms in BD-I.
Rowland <i>et al.</i> , 2012	Examine relationships between emotion perception and theory of mind (TOM) disturbances in the use of cognitive strategies for regulating negative emotion in schizophrenia and bipolar disorder.	Cross sectional	Australia N- 56 schizophrenia N-33 BD-I N- 58 Controls	“a range of voluntary and involuntary processes used to modulate the occurrence, intensity and duration of internal feeling states and physiological processes that occur in relationship to external events, in order to respond appropriately in accord with ones goals”	Reference to Gross (1998); Eisenberg (2000)	CERQ (rationale for use provided by authors as use of this measure in their own previous studies on ER; and primary interest in cognitive strategies)	Schizophrenia population were more impaired than BD-I, who were more impaired than controls on TOM tasks. Schizophrenia group more likely to engage in catastrophizing and rumination. BD-I were more likely like to engage in self-blame and less positive reappraisal. No link between social cognition and ER in either clinical group. Schizophrenia group more likely to blame others compared with BD-I group.

Study ID	Objective	Design	Sample & N	Construct ER	Theory/Model Reference	ER Measures	Summary Main Finding
Stange <i>et al.</i> , 2013	Investigate whether rumination and emotional clarity (EC) would moderate the relationship between cognitive vulnerabilities and prospective increases in depressive symptoms, particularly in a group high on behavioural approach system (BAS) sensitivity	Prospective Behavioural high risk design (longitudinal study)	USA N- 98 at risk of bipolar disorder in high BAS group N – 63 at risk of bipolar disorder in moderate BAS group	ER referred to in context of ER strategies linked to depression specifically rumination and emotional clarity. EC defined as awareness and understanding one's own emotions and emotional experiences as well as the ability to properly label them.	No ER models referenced.	RRS Emotional Clarity Questionnaire (ECQ)	EC and brooding had greatest effect on individuals high in self-criticism and neediness. EC was protective against depressive symptoms, brooding exacerbated depressive symptoms.
Van Der Meer <i>et al.</i> , 2014	To investigate neural mechanisms underlying ER in patients with schizophrenia and non-affected siblings in comparison with healthy controls.	Experimental design	Holland N- 20 schizophrenia group N-20 relatives N-20 controls	“ER refers to the conscious and unconscious process by which the emotional experience is manipulated and the subsequent expression of these emotions” Refers to antecedent and response focused ER strategies.	Gross (1998) – Process model. Authors clarify their focus to be on reappraisal and suppression as these strategies can be measured by experimental design.	ERQ (Dutch translation)	No significant group differences on the ERQ. Schizophrenia and affected siblings group reported higher levels of negative affect across all task conditions compared with controls. Neuro imaging showed less activation in ventral lateral prefrontal cortex, insula middle temporal, gyrus caudate, and thalamus in schizophrenia group compared with healthy controls.

Study ID	Objective	Design	Sample & N	Construct ER	Theory/Model Reference	ER Measures	Summary Main Finding
Van Der Meer <i>et al.</i> , 2009	Investigate role of verbal premorbid IQ in Alexithymia. Investigate relationship between ER and Alexithymia.	Cross Sectional	Holland N-31 schizophrenia group N-44 Healthy controls	'ER refers to a diverse set of processes by which "individuals influence which emotions they have, when they have them, and how they experience and express these emotions"	Gross (1998) Suppression and reappraisal discussed from Process Model	ERQ Bermond-Vorst Alexithymia Scale (BVAQ)	Significantly more use of suppression in the schizophrenia group. Patients scored higher on the cognitive emotional aspects of alexithymia due to more difficulties on the identifying subscale of the BVAQ. Premorbid IQ does not account for Alexithymia. Cognitive emotional alexithymia scores predicted use of suppression but not reappraisal.
Van Rijn <i>et al.</i> , 2011	Aim to test if adolescents at high risk of psychosis would show reduced emotion awareness. To test if reduced emotion awareness would be related to social dysfunction.	Cross Sectional	Holland N-34 adolescents at ultra-high risk (UHR) of psychosis N-23 non clinical controls	Emotion processing and emotional awareness (EA) are discussed as fundamental to ER. Alexithymia is described as a synonym of poor EA. Emotion processing – the ability to perceive, use, understand and manage one's own emotions has a significant contribution to social adaptive behaviour.	Reference Taylor <i>et al</i> 1997; Salovey & Grewall 2005.	BVAQ (used to measure emotional awareness)	UHR group had more problems in identifying and verbalising emotions independent of IQ. In UHR group, problems identifying emotions were associated with feelings of social inadequacy

Study ID	Objective	Design	Sample & N	Construct ER	Theory/Model Reference	ER Measures	Summary Main Finding
Westermann <i>et al.</i> , 2013	To explore the relevance of common adaptive and maladaptive ER strategies to paranoia and their predictive value in a subclinical sample.	Longitudinal exploratory study	Germany N- 116 online recruits (time 1) N- 60 remained at follow up (time 2)	“ER is a set of processes whereby people seek to redirect the spontaneous flow of their emotions” Cognitive ER strategies discussed.	Koole (2009) – integrative review of ER	CERQ (authors clarify main interest is cognitive ER strategies relevant to paranoia)	Self-blaming and lower age predicted paranoia at time 2. Only maladaptive cognitive ER strategies were correlated with ER.
Westermann <i>et al.</i> , 2012	Investigate the effect of habitual use of reappraisal and suppression on social stress in paranoia prone participants	Experimental design	Germany N-116 online recruits	Authors discusses process model of ER, and use this model to inform their own explicit model of emotional dysregulation in delusions.	Gross & John (2003) – Process model	ERQ	The use of reappraisal led to increased state paranoia in a socially stressful situation in paranoia prone individuals, indicating that reappraisal can be maladaptive.
Westermann & Lincoln, 2011	Investigate if paranoid ideation is associated with difficulties in regulating emotions, and if so can specific domains of ER be identified.	Cross sectional	Germany N-151 online recruits	“ER is a set or processes whereby people seek to redirect the spontaneous flow of their emotions” Cognitive safety behaviours are linked to maladaptive ER.	Koole (2009) – integrative review of ER	DERS (German version)	All DERS subscales (except lack of awareness) were moderately and significantly correlated with frequency and conviction of paranoid thoughts. Non-acceptance of negative emotions was associated with paranoid ideation.

Study ID	Objective	Design	Sample & N	Construct ER	Theory/Model Reference	ER Measures	Summary Main Finding
Westermann <i>et al.</i> , 2014	Investigate if individuals with high delusion proneness have difficulties with reappraising threatening situations.	Experimental within subjects design Quasi experimental between subjects design.	Germany N- 87 undergraduate students	ER not defined in body of text, but process model of ER discussed in context of reappraisal and suppression.	Gross (1998)– Process Model	ERQ	Reappraisal was more effective than suppression in reducing anxiety. Delusion prone individuals were less successful in applying reappraisal in face of anxiety inducing stimuli. Low success in reappraisal led to higher conviction in delusion like thoughts.
Wolkenstein <i>et al.</i> , 2014	To test differences in the use of cognitive ER strategies, particularly use of rumination, catastrophizing, positive reappraisal and putting into perspective, in a euthymic bipolar group and Major Depressive Disorder (MDD) group.	Cross Sectional	Germany N- 42 remitted bipolar patients (BD-I and BD-II) N- 43 remitted MDD individuals N-39 healthy controls	ER refers to processes by which “individuals influence the appearance of emotions, and how they experience and express these emotions, some ER strategies are implicit others are explicit”	Gross (1998) Gyurak, Gross & Etkin (2011)	CERQ (authors clarify use of CERQ as it samples a broader range of cognitive strategies than the Response Style Questionnaire)	No difference between the BD and MDD groups in ER use. Both groups had more self-blame, rumination and catastrophizing and less use of perspective taking and positive reappraisal as compared with controls. In BD group acceptance was negatively correlated with depressive symptoms.

Appendix E: Characteristics of ER definition and ER measures used

Study (year)	Sample & Sample N	Country	Definition ER	Measures of ER
Badcock <i>et al.</i>, (2011)	Schizophrenia (n=34) Non-clinical controls (n=34)	Australia	Integrative definition according to Koole <i>et al.</i> (2009)	Emotion Regulation Questionnaire (ERQ) Penn State Worry Questionnaire (PSWQ) Rumination Response Scale (RRS)
Green <i>et al.</i>, (2011)	Bipolar Disorder I (n=124) Unaffected relatives (n=124) Non-clinical controls (n=63)	Australia	According to Gross (1998), Garnefski, Kraaij & Spinhoven (2001), Thompson (1994)	Cognitive Emotion Regulation Questionnaire (CERQ)
Gruber <i>et al.</i>, (2008)	Bipolar Disorder (n=21) Non-clinical controls (n=20) Insomnia Group (n=19)	USA & UK	No definition ER provided. Author links trans-diagnostic processes of worry, rumination and negative automatic thoughts to ER.	Global Rumination Scale (GRS) PSWQ Cognitions Checklist (CCL)
Gruber <i>et al.</i>, (2011)	Bipolar Disorder (n=39) Non-clinical controls (n=34)	USA	According to Gross & Thompson (2007)	RRS Response to positive affect Scale (RPA)
Goldstein <i>et al.</i>, (2014)	Bipolar Disorder (n=20)	USA	No Definition provided. Reference to Linehan (1993) as it is a DBT intervention study	Children's Affective Liability Scale (CALS)
Henry <i>et al.</i>, (2009)	Schizotypy spectrum (n=54) Community Sample (n=204)	Australia	According to Gross (2001), Kring & Werner (2004)	ERQ (suppression scale only)

Study (year)	Sample & Sample N	Country	Definition ER	Measures of ER
Henry <i>et al.</i>, (2008)	Schizophrenia (n=32) Schizoaffective (n=9) Non-clinical controls (n=38)	Australia	According to Kring & Werner (2004), John & Gross (2007)	ERQ
Khoury <i>et al.</i>, (2015)	1 st episode psychosis (n=17)	Canada	No definition provided. Author referenced their own previous work Khoury & Lecomte (2012)	CERQ
Kimhy <i>et al.</i>, (2012)	Schizophrenia (n=44) Non-clinical controls (n=20)	USA	According to Gross (1998), Gross (2007)	Emotion Management Task (EMT) ERQ
Lincoln <i>et al.</i>, (2014)	Psychosis (n=37) Depression (n=30) Non-clinical controls (n=28)	Germany	According to Gross (2007), Koole <i>et al.</i> (2009), Berking (2008).	Emotion Regulation Skills Questionnaire (ERSQ-ES)
Livingstone <i>et al.</i>, (2009)	Psychosis (n=21) Anxiety/Depression (n=21) Non-clinical controls (n=21)	UK	According to Gross (1998), Eisenberg & Fabes (1995), Thompson (1994), Philips (2005)	ERQ Regulation of Emotions Questionnaire (REQ)
Owens <i>et al.</i>, (2012)	Schizophrenia or schizoaffective or psychosis (n=81) Mental Health Workers (n=39)	UK	According to Mikuliner & Shaver (2001)	Difficulties in Emotion Regulation Scale (DERS)

Study (year)	Sample & Sample N	Country	Definition ER	Measures of ER
Perry <i>et al.</i>, (2011)	Schizophrenia (n=33) Non-clinical controls (n=36)	Australia	According to Gross (1998), Hayes <i>et al</i> (2006)	ERQ Acceptance and Action Questionnaire (AAQ)
Rowland <i>et al.</i>, (2013)	Schizophrenia (n=126) Bipolar Disorder I (n=97) Non-clinical controls (n=81)	Australia	According to Gross (1998), Thompson (1994), Eisenberg (2000)	CERQ
Rowland <i>et al.</i>, (2012)	Schizophrenia (n=56) Bipolar Disorder I (n=33) Non-clinical controls (n=58)	Australia	According to Gross (1998), Eisenberg (2000)	CERQ
Stange <i>et al.</i>, (2013)	At risk Bipolar (n=161)	USA	No definition of ER provided. Author links emotional clarity to ER. Emotional clarity according to Gohm & Clore (2000)	RRS Emotional Clarity Questionnaire (ECQ)
Van Der Meer <i>et al.</i>, (2014)	Schizophrenia (n=20) Non-affected relative (n=20) Non-clinical controls (n=20)	Holland	According to Gross (1998)	ERQ
Van Der Meer <i>et al.</i>, (2009)	Schizophrenia (n=31) Non-clinical controls (n=44)	Holland	According to Gross (1998)	ERQ Bermond-Vorst Alexithymia Questionnaire (BVAQ)

Study (year)	Sample & Sample N	Country	Definition ER	Measures of ER
Van Rihjn <i>et al.</i>, (2011)	Ultra High Risk for Psychosis (n=34)	Holland	According to Taylor <i>et al</i> (1997), Salovey & Grewall (2005)	BVAQ
Westermann <i>et al.</i>, (2013)	Online sample (n=116)	Germany	According to Koole <i>et al</i> (2009)	CERQ
Westermann <i>et al.</i>, (2012)	Online sample (n=116)	Germany	According to Gross & John (2003)	ERQ
Westermann & Lincoln, (2011)	Online sample (n=151)	Germany	According to Koole <i>et al</i> (2009)	DERS
Westermann <i>et al.</i>, (2014)	Student sample (n=87)	Germany	According to Gross (2002)	ERQ
Wolkenstein <i>et al.</i>, (2014)	Bipolar disorder (n=42) Major Depressive Disorder (n=43) Non-clinical controls (n=39)	Germany	According to Gross (1998), Gyurak, Gross & Etkin (2011)	CERQ

Appendix F: Supplementary Information on Measures (n=15) employed in the included studies.

Questionnaires	Description	Reliability and validity (as reported in the records).	Included studies which used the questionnaire
<p>ERQ</p> <p>Emotion Regulation Questionnaire (Gross & John, 2003)</p>	<p>10 questions, 4 of which focus upon suppression (e.g., “I keep my emotions to myself”) and 6 of which focus on cognitive reappraisal (e.g., “When I want to feel more positive emotion I change what I’m thinking about”).</p>	<p>Acceptable reliability and considerable validity for Reappraisal and Suppression. IC: α for Reappraisal was 0.79 and for Suppression was 0.73. Test–retest reliability across 3 months $r=0.69$ for both scales (Gross & John, 2003).</p> <p>In schizophrenia group $\alpha=0.67$ and 0.72 for the Suppression and Reappraisal scales, respectively (Henry <i>et al.</i>, 2008)</p> <p>$\alpha = 0.74$ for suppression scale in high and low Schizotypy sample (Henry <i>et al.</i>, 2009)</p> <p>$\alpha = 0.51, 0.86$, for suppression & reappraisal subscale in schizophrenia group (Perry <i>et al.</i>, 2012).</p> <p>$\alpha=0.74$ in a German version (Abler & Kessler, 2009)</p>	<p>Badcock <i>et al.</i>, (2011); Henry <i>et al.</i>, (2009); Henry <i>et al.</i>, (2008); Kimhy <i>et al.</i>, (2012); Livingstone <i>et al.</i>, (2009); Perry <i>et al.</i>, (2012); Van der Meer <i>et al.</i>, (2014); Van der Meer <i>et al.</i>, (2009); Westermann <i>et al.</i>, (2012); Westermann <i>et al.</i>, (2014)</p>
<p>CERQ</p> <p>The Cognitive Emotion Regulation Questionnaire (Garnefski & Kraaji, 2007)</p>	<p>The CERQ is a 36 item scale and has nine separate emotion regulation subscales which include: self-blame, other blame, rumination, catastrophizing, putting into perspective, positive refocusing, positive reappraisal, acceptance, and planning. Tendency to engage in each strategy is measured on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). The CERQ is based on the theory of cognitive emotion regulation, which refers to the conscious cognitive way of handling the intake of emotionally arousing information (Garnefski <i>et al.</i>, 2001). The cognitive emotion regulation theory considers cognitive strategies in a conceptually pure way, and separate from behaviour strategies (Garnefski <i>et al.</i>, 2001).</p>	<p>Garnefski and colleagues (2001) reported that internal consistency of the subscales range from 0.68 to 0.83. Evidence for discriminant and convergent validity has been reported (Garnefski <i>et al.</i>, 2004; 2005).</p> <p>In Bipolar Disorder (BD) sample IC: α 0.88 (Green <i>et al.</i>, 2011)</p> <p>In BD sample IC $\alpha= .64$ to $.88$ (Wolkenstein <i>et al.</i>, 2014)</p>	<p>Green <i>et al.</i>, (2011); Khoury <i>et al.</i>, (2015); Rowland <i>et al.</i>, (2013); Rowland <i>et al.</i>, (2012); Westermann <i>et al.</i>, (2013); Wolkenstein <i>et al.</i>, (2014)</p>

Questionnaires	Description	Reliability and validity (as reported in the records).	Included studies which used the questionnaire
RRS Rumination Response Scale (Treyner, Gonzalez, & Nolen-Hoeksema 2003)	22-item measure rated on a 1 (almost never) to 4 (almost always) scale, to assess typical responses to feeling down. The RRS has 3 factor derived subscales: depression related; brooding; and reflection.	Good IC ($\alpha = 0.94$) (Gruber <i>et al.</i> , 2011) $\alpha = 0.76$ for brooding subscale in high risk bipolar disorder sample (Stange <i>et al.</i> , 2013)	Badcock <i>et al.</i> , (2011); Gruber <i>et al.</i> , (2011); Stange <i>et al.</i> , (2013)
PSWQ Penn State Worry Questionnaire (Meyer, Miller, Metzger & Borkovec, 1990)	A self-report measure of trait pathological worry that assess persistence of worry across time and circumstances, perceived controllability of the worry, and intensity of the worry. Contains 16 statements related to worrying, with scores ranging from 0 – 80.	High Validity and good test-retest reliability (McIntosh & Martin, 1992; Molina & Borkovec, 1994)	Badcock <i>et al.</i> , (2011); Gruber <i>et al.</i> , (2008)
BVAQ Bermond-Vorst Alexithymia Scale (Bermond <i>et al.</i> , 1994)	THE BVAQ measures the multidimensional construct of alexithymia, which is conceptualised as difficulties in identifying, describing and communicating feelings, alongside difficulties in differentiating feelings from bodily sensations and diminished affect-related fantasy (van t'Wout <i>et al.</i> , 2007). The BVAQ has five subscales: emotionizing; fantasizing; identifying emotions; verbalising emotions; and analysing emotions.	Vorst & Bermond (2001) reported Cronbach's alpha score ranging from $\alpha = 0.67$ to 0.87.	Van der Meer <i>et al.</i> , (2009); Van Rijn <i>et al.</i> , (2011)
DERS Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004)	A 36-item measure. Assesses levels of emotion dysregulation across six subscales: non acceptance of negative emotions, inability to engage in goal-directed and non-impulsive behaviour when experiencing negative emotions, difficulties controlling impulsive behaviours when experiencing negative emotions, limited access to emotion regulation strategies, lack of emotional awareness, and lack of emotional clarity.	IC: $\alpha=0.93$. Validity: strongly correlated with an experimental measure of emotion regulation among patients with borderline personality disorder ($r=0.63$; Gratz & Gunderson, 2006) Research by Owens and colleagues (2013) provided evidence to support the measure's psychometric properties in a psychosis population, wherein Cronbach alphas suggested good levels of internal reliability for each subscale (ranging from 0.70 to 0.89). They also assessed reliability finding intra-class coefficients to be ranging from 0.83 and 0.93, and reported good validity (Owens <i>et al.</i> , 2013). α ranges from 0.76 to 0.87 in a German version (Westermann & Lincoln, 2011)	Owens <i>et al.</i> , (2012); Westermann & Lincoln (2011)

Questionnaires	Description	Reliability and validity (as reported in the records).	Included studies which used the questionnaire
GRS Global Rumination Scale (McIntosh & Martin, 1992)	10-item measure of trait rumination consisting of self-statements, with scores ranging from 10 to 70.	Demonstrates good test-retest reliability and discriminant validity (McIntosh & Martin, 1992)	Gruber <i>et al.</i> , (2008)
CCL Cognitions Checklist (Beck, Brown & Steer, 1987)	Assesses the prevalence of depressive and anxious automatic thoughts. Participants rate frequency of 26 negative automatic thoughts with total scores ranging from 0 to 104.	Acceptable reliability and discriminant and convergent validity for both subscales (Beck <i>et al.</i> , 1987)	Gruber <i>et al.</i> , (2008)
RPA Response to Positive Affect Scale (Feldman, Joormann & Johnson, 2008).	17-item measure on a 1 (almost never) to 4 (almost always) scale to assess typical responses to feeling happy. RPA has 3 factor subscales: emotion-focused; self-focused; dampening.	IC: $\alpha = 0.83, 0.67, 0.83$ for subscales (Gruber <i>et al.</i> , 2011)	Gruber <i>et al.</i> , (2011)
CALS Children's Affective Liability Scale (Gerson <i>et al.</i> , 1996)	20 item measure of behaviour reflective of emotional dysregulation.	No psychometric properties reported.	Goldstein <i>et al.</i> , (2014)
EMT Emotion Management Task (Neuchterlein & Green, 2006)	Ability measure where respondents rate effectiveness of potential actions in managing emotions in various situations depicted in vignettes. Actions rated from 1 (very ineffective) to 5 (very effective)	Reliable and valid measure among individuals with schizophrenia ($\alpha = 0.73$) (Neuchterlein & Green, 2006)	Kimhy <i>et al.</i> , (2012)
ERSQ – ES The Emotion Regulation Skills Questionnaire (Ebert <i>et al.</i> , 2013)	The ERSQ-ES assess ER separately for specific emotions. Individuals rate the intensity of each emotional state on Likert scale ranging from 0 (absent) to 10 (extreme presence). For each emotion rated 1 or higher, individuals rate their use of skills to regulate this particular emotion from 0 (not at all) to 4 (almost always). Examples of the skills used to regulate emotions include: awareness; clarity; understanding; acceptance; tolerance; self-support; willingness to conform situations to attain relevant goals; and modification. Lincoln <i>et al.</i> (2014) used the German version of the ERSQ-ES in a psychosis population.	Good to very good psychometric properties in clinical and non-clinical samples (Ebert <i>et al.</i> , 2013)	Lincoln <i>et al.</i> , (2014)

Questionnaires	Description	Reliability and validity (as reported in the records).	Included studies which used the questionnaire
REQ Regulation of Emotions Questionnaire (Philips, 2005).	The REQ was developed as a measure of ER for children and adolescents. It is based on a model of ER which categorises ER strategies as functional or dysfunctional (in relation to acceptance or rejection of emotional states) and as an internal regulatory strategy (e.g. cognitive change) or an external regulatory strategy (e.g. environmental change) (Livingstone <i>et al.</i> , 2009). The REQ asks individuals to rate how often they engage in the use of the strategies in response to their emotions on a 5 point Likert scale. A confirmatory analysis supported a model of ER strategies that categorise ER strategies on the basis of functionality and the use of internal/external resources.	No reliability or validity statistics were reported (Livingstone <i>et al.</i> , 2009).	Livingstone <i>et al.</i> , (2009)
AAQ Acceptance and Action Questionnaire. (Hayes <i>et al.</i> , 2004)	The AAQ is a 9-item measure of experiential avoidance, or the tendency to avoid unwanted internal experiences. Although the AAQ was developed as a measure of the tendency to avoid internal experiences in general, many items focus on the avoidance of emotions. The AAQ thus captures emotional avoidance or emotional non-acceptance, which is noted to be an element of ER as proposed by Gratz & Roemer's (2004) integrative conceptualisation of ER. Items assess "experiential avoidance and control, negative evaluation of internal experiences, psychological acceptance and the extent to which an individual acts regardless of emotional distress" (Hayes <i>et al.</i> , 2004). Example items include, "I try hard to avoid feeling depressed or anxious" and "Anxiety is bad."	The AAQ has been found to have adequate internal consistency ($\alpha = .70$), as well as adequate convergent, discriminant, and concurrent validity (Hayes <i>et al.</i> , 2004). The questionnaire was used in a study with a schizophrenia and control population where Cronbach's alphas reported were $\alpha = 0.63$ and 0.62 respectively (Perry <i>et al.</i> , 2011).	Perry <i>et al.</i> , (2012)
ECQ Emotional Clarity Questionnaire (Flynn & Rudolph, 2010)	7 item self-report scale rating the way individuals experience their feelings, scored on 5-point Likert scale	IC $\alpha = .71$ in sample or high risk for bipolar disorder (Stange <i>et al.</i> , 2013)	Stange <i>et al.</i> , (2013)

*IC: Internal Consistency

Appendix G: Specific ER Strategies Measured

Broader Category	No. of Records	Identified Strategies	No. of Records	Record References
Cognitive Strategies	N=20	Cognitive reappraisal	N=9	Badcock <i>et al.</i> , (2011); Henry <i>et al.</i> , (2008); Kimhy <i>et al.</i> , (2012); Livingstone <i>et al.</i> , (2009); Perry <i>et al.</i> , (2011); Van der Meer <i>et al.</i> , (2014); Van der Meer <i>et al.</i> , (2009); Westermann <i>et al.</i> , (2012); Westermann <i>et al.</i> , (2014)
		Rumination	N=7	Badcock <i>et al.</i> , (2011); Green <i>et al.</i> , (2011); Gruber <i>et al.</i> , (2008); Gruber <i>et al.</i> , (2011); Stange <i>et al.</i> , (2013); Westermann <i>et al.</i> , (2013); Wolkenstein <i>et al.</i> , (2014)
		Putting into Perspective	N=5	Green <i>et al.</i> , (2011); Rowland <i>et al.</i> , (2013); Rowland <i>et al.</i> , (2012); Westermann <i>et al.</i> , (2013); Wolkenstein <i>et al.</i> , (2014)
		Positive refocusing	N=5	Green <i>et al.</i> , (2011); Rowland <i>et al.</i> , (2013); Rowland <i>et al.</i> , (2012); Westermann <i>et al.</i> , (2013); Wolkenstein <i>et al.</i> , (2014)
		Positive reappraisal	N=5	Green <i>et al.</i> , (2011); Rowland <i>et al.</i> , (2013); Rowland <i>et al.</i> , (2012); Westermann <i>et al.</i> , (2013); Wolkenstein <i>et al.</i> , (2014)
		Accept and resigning to what has happened	N=5	Green <i>et al.</i> , (2011); Rowland <i>et al.</i> , (2013); Rowland <i>et al.</i> , (2012); Westermann <i>et al.</i> , (2013); Wolkenstein <i>et al.</i> , (2014)
		Refocus on planning	N=5	Green <i>et al.</i> , (2011); Rowland <i>et al.</i> , (2013); Rowland <i>et al.</i> , (2012); Westermann <i>et al.</i> , (2013); Wolkenstein <i>et al.</i> , (2014)
		Self-blame	N=5	Green <i>et al.</i> , (2011); Rowland <i>et al.</i> , (2013); Rowland <i>et al.</i> , (2012); Westermann <i>et al.</i> , (2013); Wolkenstein <i>et al.</i> , (2014)
		Other-blame	N=5	Green <i>et al.</i> , (2011); Rowland <i>et al.</i> , (2013); Rowland <i>et al.</i> , (2012); Westermann <i>et al.</i> , (2013); Wolkenstein <i>et al.</i> , (2014)
		Catastrophizing	N=5	Green <i>et al.</i> , (2011); Rowland <i>et al.</i> , (2013); Rowland <i>et al.</i> , (2012); Westermann <i>et al.</i> , (2013); Wolkenstein <i>et al.</i> , (2014)
		Strategies	N=2	Owens <i>et al.</i> , (2012); Westermann & Lincoln (2011)
		Worry	N=2	Badcock <i>et al.</i> , (2011); Gruber <i>et al.</i> , (2008)
		Positive cognitive emotion regulation strategies	N=1	Khoury <i>et al.</i> , (2015)
		Internal functional strategies	N=1	Livingstone <i>et al.</i> , (2009)
		Negative cognitive emotion regulation strategies	N=1	Khoury <i>et al.</i> , (2015)
Internal dysfunctional strategies	N=1	Livingstone <i>et al.</i> , (2009);		
Automatic Negative Thoughts	N=1	Gruber <i>et al.</i> , (2008)		

Broader Category	No. of Records	Identified Strategies	No. of Records	Record References
Suppression	N=9	Expressive Suppression	N=9	Badcock <i>et al.</i> , (2011); Henry <i>et al.</i> , (2009); Henry <i>et al.</i> , (2008); Livingstone <i>et al.</i> , (2009); Perry <i>et al.</i> , (2011); Van der Meer <i>et al.</i> , (2014); Van der Meer <i>et al.</i> , (2009); Westermann <i>et al.</i> , (2012); Westermann <i>et al.</i> , (2014)
Behavioural Strategies	N=4	Impulsiveness	N=2	Owens <i>et al.</i> , (2012); Westermann & Lincoln (2011)
		External functional strategies	N=1	Livingstone <i>et al.</i> , (2009)
		Modification	N=1	Lincoln <i>et al.</i> , (2014)
		External dysfunctional strategies	N=1	Livingstone <i>et al.</i> , (2009)
Acceptance based Strategies	N=4	Acceptance	N=3	Lincoln <i>et al.</i> , (2014); Owens <i>et al.</i> , (2012); Perry <i>et al.</i> , (2011)
		Tolerance	N=1	Lincoln <i>et al.</i> , (2014)
		Self-support	N=1	Lincoln <i>et al.</i> , (2014)
		Willingness to Confront	N=1	Lincoln <i>et al.</i> , (2014)
		Goals	N=2	Owens <i>et al.</i> , (2012); Westermann & Lincoln (2011)
Affective lability	N=1	Affective Lability	N=1	Goldstein <i>et al.</i> , (2014)
Emotion Management	N=1	Emotion Management	N=1	Kimhy <i>et al.</i> , (2012)
Emotional Awareness	N=6	Awareness	N=4	Lincoln <i>et al.</i> , (2014); Owens <i>et al.</i> , (2012); Van Rijn <i>et al.</i> , (2011); Westermann & Lincoln (2011)
		Clarity	N=4	Lincoln <i>et al.</i> , (2014); Owens <i>et al.</i> , (2012); Stange <i>et al.</i> , (2013); Westermann & Lincoln (2011)
		Understanding	N=1	Lincoln <i>et al.</i> , (2014)
		Alexithymia (inability to identify and verbalise feelings)	N=1	Van der Meer <i>et al.</i> , (2009)

A Trans-diagnostic Emotion Regulation group therapy intervention for an acute inpatient setting: A Mixed Methods Pilot Evaluation Study

Authors: Ruth Lennon^{1,2}, Helen Griffiths², Sean Harper¹

¹*NHS Lothian*

²*Section of Clinical and Health Psychology, School of Health in Social Science, University of Edinburgh, UK*

Address correspondence to:

Ruth Lennon,
Psychology Department,
Royal Edinburgh Hospital,
Morningside Terrace
Edinburgh
EH10 5HF

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Abstract

Title: A Trans-diagnostic Emotion Regulation group therapy intervention for an acute inpatient setting: A Mixed Methods Pilot Evaluation Study.

Objective: This study aimed to examine the feasibility and acceptability of running and evaluating a trans-diagnostic emotion regulation (ER) group developed for an acute inpatient setting.

Method: A six session ER skills group was developed and piloted within an acute inpatient mental health setting. The group was an open, rolling group piloted over a 5 month period, with two sessions delivered per week. Participants completed pre and post group ratings of emotion regulation (DERS, REQ-2), acceptance (AAQ-II) and distress (CORE-5). Participants also completed ratings of emotion regulation (visual analogue scales), acceptance (AAQ-II) and distress (CORE-5), at each group session. A mixed method design was employed, which included a multiple single case series design and qualitative exit interviews with eight participants. Qualitative interviews aimed to explore the acceptability and feasibility of the intervention. Case series and qualitative data is triangulated where possible.

Results: Descriptive data indicate high group attendance rates and low attrition rates. Group level analysis indicates large effect sizes for changes on the DERS and REQ-2 (internal functional subscale), and moderate effect sizes for changes on the CORE-5 and AAQ-II following the intervention. Case series data indicate sustained change occurred on at least one measure for four participants. Qualitative themes triangulate findings related to acceptability of the group, change in ER strategies and increased emotional acceptance.

Conclusion: The pilot study indicates that the intervention is feasible and acceptable, with preliminary evidence identifying potential clinical benefits. The challenges in evaluating interventions in an acute inpatient environment are discussed.

Key Words: *Emotion regulation, Trans-diagnostic, Group treatment, acute inpatient setting, mixed method design.*

Key Practitioner Message:

- In a Scottish context, there is a lack of suitable psychological therapies offered to individuals in acute inpatient mental health settings.
- This is a pilot study of a trans-diagnostic emotion regulation group, specifically designed to be delivered in an acute inpatient setting.
- Preliminary evidence demonstrated the acceptability and feasibility of the group intervention, with promising indications of its clinical benefit.
- Further studies should extend this work to specifically examine the efficacy of this treatment approach.

1. Introduction

1.1 Acute Inpatient Services

The drive for increased provision of mental health services in the community, such as the establishment of intensive home treatment teams, has led to an increased threshold for inpatient admission, with a focus on briefer stays (Division of Clinical Psychology (DCP), 2012). Those admitted to acute wards are increasingly likely to be detained under mental health legislation (MIND, 2010), and inpatient environments are becoming more secure (Care Quality Commission, 2010). This can paradoxically result in the ward environment becoming a risk factor in the exacerbation of individuals' existing difficulties (Heriot-Maitland *et al.*, 2014), highlighting that the quality of a ward's therapeutic atmosphere is key in the provision of effective inpatient services (Lok & Buldukoglu, 2015).

Service user forums (MIND, 2011) government policy (Department of Health, 2002) and academic literature (DCP, 2012; Clarke & Wilson, 2008) highlight the need for access to psychological therapies in acute settings. The Division of Clinical Psychology (2011) have highlighted the importance of psychological formulation in inpatient settings to develop collaborative understandings of individuals' difficulties, which can inform their clinical treatment. However, access to psychological therapy in acute mental health settings remains limited (BPS, 2012) with some notable exceptions. The Woodhaven acute care pathway (Clarke & Wilson, 2008) has seen the implementation of a trans-diagnostic CBT formulation model in an inpatient service, with promising preliminary results (Durrant *et al.*, 2007). Similarly, the service user inspired *Star Wards* approach (Janner, 2007; Wards, 2008) has provided a framework for the implementation of increased therapeutic interactions on acute wards. However, in Scotland, there remains limited psychological therapy input in acute mental health inpatient settings as compared with community mental health settings.

On inpatient wards, the spectrum of presenting problems and the variability in length of admission have been some of the barriers to implementation of psychological therapies (Rendle & Wilson, 2009). Furthermore, the inpatient setting remains primarily rooted in a traditional medical model framework of service delivery, which can present a "clash of philosophies" in the implementation of psychological understandings of acute mental health presentations (Heriot-Maitland *et al.*, 2014; Clarke & Wilson, 2009). The care received while in an acute setting can affect the impact that the mental health episode can have on an individual's life (Clarke, 2009a). Increased access to psychological therapies in acute settings may promote recovery and inclusion. This is further echoed in the Royal College of Psychiatrists (RCP) Accreditation for Inpatient Mental Health Services (AIMS) document (2009) which recommends that a trained psychological therapist provides evidence based treatment to an inpatient ward at least one half-day per week.

1.2 Challenges Evaluating Psychological Interventions in Inpatient setting

New mental health interventions need rigorous evaluation to ascertain their acceptability and effectiveness (Clarke, 2009b). NICE guidelines recommend the randomised control trial (RCT) as the gold standard of evidence for health interventions (Durrant & Tolland, 2009). However, acute inpatient settings pose difficulties for conducting a RCT. Challenges in implementation and evaluation of psychological services in acute settings include: variability in mental health presentations; uncertainty around length of admission; difficulty in collecting full data sets; difficulty collecting post intervention data; and losing participants to discharge/transfer (Clarke, 2009b). In addition, individuals admitted to hospital are sometimes unwilling, or not capable of completing outcome measures due to increased levels of distress (Clarke, 2009b;

Durrant *et al.*, 2007). While on an inpatient ward, individuals usually receive therapeutic input from many different disciplines including psychiatry, nursing and occupational therapy. It is important that outcome measures capture change brought about by psychological interventions as separate to any alternative therapeutic input (Clarke, 2009b; Durrant & Tolland, 2009). Consequently, practice based evidence approaches may be more suitable evaluation processes for acute environments (Durrant & Tolland, 2009). Given the challenges highlighted in implementation and evaluation it is important that clinicians apply pragmatic research designs to further evaluate the interventions they offer in acute settings (Durrant & Tolland, 2009; Heriot-Maitland *et al.*, 2014). For example, the application of mixed methods or case series research designs can overcome some of the difficulties of sample sizes or missing data without compromising the validity of the results (Ostlund *et al.*, 2011; Mengshoel, 2012). Furthermore, case series research designs allow for the measurement of mechanisms of change, which can highlight the psychological elements implicated in this process (Ruddle *et al.*, 2014).

1.3 Initial Evaluations of Psychological Interventions in Acute Inpatient Services

There is limited research investigating feasible and effective psychotherapeutic interventions delivered exclusively during psychiatric inpatient admission (Gaudio & Herbert, 2006; Durrant *et al.*, 2007; Heriot-Maitland *et al.*, 2014). Given the paucity of research in the area there is a need to be tentatively guided by initial findings with acknowledgment given to the challenges in collecting methodologically rigorous and robust data (Durrant & Tolland, 2009; Durrant *et al.*, 2007; Heriot-Maitland *et al.*, 2014). Durrant *et al.* (2007) conducted a pilot evaluation of the Woodhaven approach, a brief CBT based trans-diagnostic therapy intervention, in an acute inpatient setting. The modified therapy approach is based in a cognitive science model and draws from Dialectic Behaviour Therapy (DBT) and mindfulness-based CBT interventions, where the intervention focuses on development of a simple acute crisis formulation and skills based individual treatment (Durrant *et al.*, 2007). Their sample consisted of 14 inpatients in a pre-post design, who were assessed on measures of locus of control, mental health confidence, emotion regulation and goal setting. The number of therapy sessions varied dependant on an individual's length of admission. The study outcomes indicated improvements in coping style, internal locus of control, expression of emotion and use of emotion regulation strategies (Durrant *et al.*, 2007). These preliminary results indicate that the Woodhaven approach may provide individuals the opportunity to make sense of their mental health crisis and develop a sense of self efficacy in managing their mental health difficulties (Durrant *et al.*, 2007). The small sample size (n=14), while reflective of inherent challenges to recruitment in acute settings, limits the generalisability of these findings. Alternative research methodologies, including case series design or mixed research methodologies, could provide a framework in which to interpret smaller data sets in a more meaningful way (Heriot-Maitland *et al.*, 2014; Ruddle *et al.*, 2014).

Heriot-Maitland and colleagues (2014) piloted a four session Compassion focused therapy (CFT) informed group intervention in an acute setting using a trans-diagnostic framework. They used a mixed method design to collect quantitative data on 57 participants before and after each group session, using non-standardised measures of calmness and distress. Results indicated significant reduction in distress, in particular following the group session on compassion. They also found a significant improvement on calmness, notably so following the group session on imagery (Heriot-Maitland *et al.*, 2014). Thematic analysis of four qualitative interviews suggested that the group was acceptable and participants adopted key features of CFT (Heriot-Maitland *et al.*, 2014). The lack of standardised measures can be seen as a limitation due to uncertainty about reliability and validity. However, the use of mixed

methods design, which allowed for a richer data set, can mediate for some of the methodological issues inherent in researching outcomes in acute inpatient settings.

Gaudio and Herbert (2006) piloted acceptance and commitment therapy (ACT) for acute inpatients experiencing psychosis symptoms. A sample of 40 individuals were randomised to either enhanced treatment as usual (ETAU) or ETAU plus ACT. ETAU included pharmacotherapy, case management and psychotherapy (including psycho-education and mood management groups, and individual therapy). Individuals in the ETAU group received a similar amount of individual therapy time as compared with those in the ACT group, to control for confounding factors related to extra individual sessions (Gaudio & Herbert, 2006). The ACT intervention was designed to allow for flexible delivery, where the intervention could be presented in as little as one session. The number of treatment sessions ranged from one to five. This variability in intervention length appears to accurately reflect the clinical context for which these interventions are designed. Given that the underlying principles of ACT centre around changing an individual's *relationship* with internal experiences (Hayes *et al.*, 2006), rather than changing the experiences themselves, it was not surprising that the results showed no significant difference between the groups on measures related to psychotic symptom frequency and severity, though this was a primary outcome measure for the study. However, the ACT group experienced significantly less distress related to hallucinations when compared with the ETAU group (Gaudio & Herbert, 2006). The authors noted that the individuals who received ACT also had better outcomes for affective severity and social functioning. Limitations to the study design include a modest sample size, variability in number of treatment sessions, and several results which were only marginally significant (Gaudio & Herbert, 2006). Reporting effect sizes may have been more prudent due to the sensitivity of null hypothesis significance testing to sample size (Mairs *et al.*, 2011). As the study was exploratory, effect sizes would have given a clearer indication of the impact of the intervention on target variables (Ferguson, 2009). This intervention showed promising results grounded in a robust methodological design which provides foundational practice based evidence and highlights both the feasibility and acceptability of delivering structured psychological therapy in inpatient settings.

1.4 Trans-Diagnostic Approaches

Two of the studies described above (Durrant *et al.*, 2007; Heriot-Maitland *et al.*, 2014) were trans-diagnostic therapeutic interventions delivered in acute settings. Given the variability in mental health presentations in inpatient settings, it is not surprising that trans-diagnostic approaches are being piloted. Trans-diagnostic approaches allow for suitable application of psychological models that address individual needs across a range of diagnoses (Clarke, 2009b). Trans-diagnostic approaches assume that common underlying psychological processes are present in many mental health diagnoses (Mansell *et al.*, 2009). For example, ACT describes difficulties in cognitive fusion and experiential avoidance as the common underlying factors in mental health problems, providing a focus for therapeutic intervention (Valdivia-Silas *et al.*, 2010). A meta-analysis supports initial evidence of the efficacy of ACT as a trans-diagnostic approach across a broad range of mental health difficulties and varying problem severity (Hayes *et al.*, 2006).

A further trans-diagnostic approach is the Unified Protocol (UP), which was developed for treatment of emotional disorders (Barlow *et al.*, 2004). The UP identifies the multifactorial process of emotion regulation (ER) as a unifying factor across a limited range of mental health problems, namely the emotional disorders. The UP is an emotion-focused cognitive-behavioural treatment (Wilamowska *et al.*, 2010). Results from an initial trial, in a mood

disorders population, demonstrated strong treatment effects, though the study had a small sample size (Ellard *et al.*, 2010). However, as the theoretical basis and clinical application of the UP has been limited to emotional disorders, it does not provide a treatment approach for a broader range of psychopathology (Mansell *et al.*, 2009).

1.5 Emotion Regulation (ER) as Trans-diagnostic Process

Deficits in emotion regulation (ER) have been identified as a trans-diagnostic factor relevant across mental health difficulties (Mansell *et al.*, 2009). There are many definitions of ER (Aldao *et al.*, 2010). However for the purpose of this paper, a multifactorial conceptualisation will be adopted, consistent with ACT and Dialectical Behaviour Therapy (DBT) perspectives of ER. Hence, ER is defined as emotional awareness and acceptance, maintaining a focus on goal directed behaviour in the face of emotional arousal, and effective application of contextually appropriate ER strategies (Lennon & Griffiths, 2015). ER difficulties have been linked with the experience of mood disorders, anxiety disorders, eating disorders, psychosis, and personality disorders (Berking *et al.*, 2008). Studies using neuro-imaging technology have identified that adaptive ER involves the use of areas in the brain that have been found to be functionally impaired in individuals with mental health difficulties (Ochsner & Gross, 2008). Several ER strategies have been hypothesized to be risk factors for psychopathology (Kring & Sloan, 2010). For example, maladaptive use of distraction can be common to disorders such as: anxiety; post-traumatic stress disorder; bulimia; borderline personality disorder (BPD) and alcohol dependence (Werner & Gross, 2010). Furthermore, there is evidence that common difficulties in ER occur across diagnostic categories, including experiential avoidance (Hayes *et al.*, 1999), suppression (Salters-Pedneault *et al.*, 2010), rumination (Berking & Wupperman, 2012) and goal dysregulation (Johnson *et al.*, 2009). Berking and colleagues (2008) found that, in relation to negative emotions; emotional acceptance, emotional tolerance and active modification were the ER skills most predictive of treatment gains and improved mental health outcomes in psychotherapeutic interventions. Formulating ER as universal factor across psychopathologies, indicates a value in broad trans-diagnostic ER interventions.

1.6 The Interacting Cognitive Subsystems (ICS) model

ICS postulates two levels of processing or two subsystems, the implicational and the propositional. Optimal functioning occurs when both subsystems are communicating effectively. The ICS model proposes that in severe and enduring mental health difficulties there is a deficit in integration between the subsystems, wherein the implicative system is dominant (Teasdale & Bernard, 1993; Clarke, 2009b). This implies the presence of overwhelming emotion. ICS maps onto clinical practice in DBT, where the ICS integration can be seen as similar to the DBT concept of wise mind (Clarke, 2009b). ICS can provide a theoretical framework in which there is coherence between the trans-diagnostic process of ER and the mechanism of change in third wave therapies, such as mindfulness and acceptance (Clarke, 2009b).

1.7 ER Interventions

The most developed evidence base on ER interventions are the treatments developed for a personality disorder population (Gratz & Gunderson, 2006), where emotional dysregulation has been well established as a core feature of these disorders. However, with an increased focus on ER deficits across other psychopathologies, there is now emerging research on ER interventions designed and delivered trans-diagnostically, with good effect (Berking *et al.*, 2008).

ER specific interventions form a core element of DBT (Linehan, 1993), a therapeutic program originally developed for individuals engaging in suicidal and self-harming behaviour. DBT offers an ER specific group intervention embedded within a long term therapy model (1–3 years). The development of mindfulness skills is central to DBT, wherein the primary focus is not on altering cognitions, but on altering the relationship between cognitions and feelings. Mindfulness is also a core element of many third wave therapies, including ACT (Hayes *et al.*, 1999), and Mindfulness Based Cognitive Therapy (MBCT: Segal *et al.*, 2002). Corcoran and colleagues (2010) hypothesize that “*mindfulness training enhances emotion regulation through the development of increased attentional capacity and greater metacognitive awareness. This is associated with reduced avoidance of thoughts and feelings, increased ability to tolerate negative emotions and decreased reliance on strategies such as rumination and fusion with thoughts*” (p.349).

Researchers have further investigated the effectiveness of ER as a primary target in shorter term interventions. Gratz & Gunderson (2006) piloted a 14 week acceptance-based ER group intervention for women with a BPD diagnosis who were engaging in self-harm. The intervention was based on DBT (Linehan, 1993), ACT (Hayes *et al.*, 1999) and emotion focused psychotherapy (Greenberg, 2002). Following the group intervention participants reported a decrease in: self-harm, emotional dysregulation, experiential avoidance, and symptoms of anxiety and depression (Gratz & Gunderson, 2006). This study shows promising results for the efficacy of short-term ER interventions in this BPD population. Given the length of the intervention, it would be difficult to implement in an inpatient setting, as evidenced by the short duration of other pilot studies (Durrant *et al.*, 2007; Gaudiano & Herbert, 2006; Heriot-Maitland *et al.*, 2007). As deficits in ER occur trans-diagnostically, it appears prudent to pilot a shorter-term ER intervention for an acute inpatient setting.

1.8 Group based Interventions

Both DBT and Gratz and Gunderson’s (2006) ER intervention are delivered in a group format. Group interventions provide increased opportunities for validation and reducing shame related to a certain psychological experiences or diagnoses (Gratz & Gunderson, 2006). Research has identified positive effects of group based intervention in terms of general wellbeing (Drinnen, 2004) and service user’s group experiences (Bickerdike & Matias, 2010). A literature review identified no differences in effect sizes in group therapy as compared with individual therapy in a severe and enduring mental health population (Wykes *et al.*, 2008). Furthermore, in the introduction of novel therapeutic approaches, group delivery has been identified as a practical way of streamlining the intervention to assist with evaluation (Owen *et al.*, 2015). Also, informal evidence for a compassionate mind based trans-diagnostic group delivered in an acute setting noted that participants reported positive experiences of group attendance (Hill, Clarke & Wilson, 2009).

Therapeutic interventions in Scottish acute inpatients settings are limited, and consequently the psychological needs of many service users are not adequately addressed. The provision of group based talking therapies on inpatient wards allows for increased access to therapeutic interventions (Wards, 2008; Hill *et al.*, 2009), in line with the UK governments initiatives for the provision of psychological input on inpatient mental health wards (Department Of Health, 2002).

2. Rationale for the current study

Psychological therapy provision must suitably address the needs of inpatients across a range of diagnostic categories. Given our current understanding of mental health difficulties and

emotion regulation, it is proposed that a trans-diagnostic intervention based on developing adaptive emotion regulation strategies is indicated. Group based interventions have been shown to be effective with inpatient settings with individuals with a history of psychosis (Laithwaite *et al.*, 2009), PD populations (Linehan, 1993) and trans-diagnostic populations (Hill *et al.*, 2009). The current study involves the development of an acceptance and mindfulness based inpatient ER intervention group program for individuals with severe and enduring mental health conditions. This is based on our understanding of ER as an underlying trans-diagnostic factor across mental health problems, where the ICS model proposes improved mental health functioning through the integration of propositional and implicational systems. This integration can be facilitated through the application of mindfulness and emotional acceptance (Clarke, 2009b).

2.1 Research Aims

As the implementation of this intervention is a pilot study, this research project examined:

1. The acceptability and feasibility of this intervention delivered in an inpatient setting, using a mixed method case series design.
2. The study also examined whether the intervention improves emotion regulation strategies as measured by the Difficulties in Emotion Regulation Questionnaire (DERS) and the Regulation of Emotions Questionnaire 2 (REQ-2), and levels of emotional acceptance as measured by the Acceptance and Action Questionnaire-II (AAQ-II).
3. Finally, the study explored whether there was any relationship between changes that occurred on the measured variables (ER, acceptance, distress), at an individual level.

3. Methodology

3.1 Design

This study employed a mixed-method case series design, using both quantitative and qualitative approaches. The qualitative and quantitative data was given equal weight and integrated during the analysis and discussion phases. The purpose of the two data streams was to triangulate and cross-validate the findings (Hanson *et al.*, 2005; Mengshoel, 2012). Mixed method research allows for the limitations of one design to be compensated for by the strengths of the other, providing more comprehensive and valid results than either method alone (Mengshoel, 2012). This design allowed for initial exploration of the feasibility and acceptability of the intervention. Furthermore the design was employed to mitigate for challenges inherent in assessing psychological interventions in inpatient mental health settings, for example a difficulty in generating large samples. This practice based research approach creates the opportunity for increased validity of findings in this population, compared with RCT trails, as inpatient settings do not reflect conditions tested in RCT research (Durrant & Tolland, 2009).

This pilot research is primarily exploratory, and the mixed method design allows for hypothesis generation to inform future larger scaled studies. A similar design (mixed methods multiple single case design) has previously been used in studies assessing populations experiencing severe and enduring mental health, including psychosis populations and acute inpatient populations (Greaves *et al.*, 2012; Mairs *et al.*, 2011; Heriot-Maitland *et al.*, 2014). This study received NHS ethical approval and local research governance approval (Appendix A).

3.1.1 Quantitative Methodology

In this multiple single case series design each participant acted as their own control (Greaves *et al.*, 2012; Ruddle *et al.*, 2014). Differences at the group level are reported, however, differences within individuals' were the main focus of the analysis. Similar to Ruddle and

colleagues (2014) each case represents simple time series data. Measures were collected at a maximum of seven time points, one at pre-intervention, five during the intervention phase, and a final data point at the end of the intervention. During the intervention phase, session by session change on measures of distress, acceptance and emotion regulation skills was collected.

3.1.2 Qualitative Methodology

Consenting research participants who attended the group intervention were invited to participate in a qualitative exit interview following completion of the intervention. Where individuals were unable to complete all group sessions, due to upcoming discharge or transfer, qualitative exit interviews were conducted prior to the participants departure from the ward. A semi-structured interview schedule was employed (Appendix B), to minimize variance in questions asked to each participant, while retaining sufficient flexibility to explore individual experiences (Patton, 1987). The interview schedule employed neutral open ended questions, with suggested prompts, to explore participants' perceptions of the intervention, its feasibility, acceptability, and any mechanisms of change. Interviews were conducted by the primary research (RL). All interviews were digitally recorded and ranged in length from 7 minutes 3 seconds to 37 minutes 24 seconds (Mean = 25 minutes 28 seconds). As the study was exploratory, the interview transcripts were analysed using thematic analysis (TA) (Braun & Clarke, 2006). TA has been identified as a method which provides rich and complex accounts of data (Braun & Clarke, 2006).

3.2 Participants

3.2.1 Inclusion Criteria

As the group intervention was trans-diagnostic, no individual was excluded from participation based on their mental health diagnosis. The following inclusion criteria were employed: (a) participants were over the age of 18 years old; (b) participants were current inpatients across specific wards in the psychiatric hospital in which the research was taking place; (c) participants were deemed capable by their psychiatric team to give informed consent; (d) participants were able to speak English. Individuals who experienced major cognitive difficulties which acted as a barrier to engaging in talking therapy (such as advanced dementia or severe to profound learning disabilities) were excluded from the research.

3.2.2 Sample

The sample consisted of 8 inpatients, 5 from an acute ward and 3 from a rehabilitation ward. There were six female and two male inpatients. The female participants had a mean age of 39 years (Range=22-57); the male patients had a mean age of 35 years (Range=34-36). Diagnoses included depression; bipolar disorder, personality disorder; schizophrenia and schizoaffective disorder (Appendix D).

3.3 Intervention

Participants attended the "Living Well with Emotions" group intervention. This emotion regulation group intervention was designed and developed by the first author (RL), specifically for an inpatient setting. The group consisted of 6 sessions, and was delivered twice weekly in a suitable group therapy room in the psychiatric hospital. The group was facilitated by the first author (RL), a trainee clinical psychologist. The co-facilitator for the group varied depending on staffing and included: a clinical psychologist; a trained nurse; occupational therapist; and psychological therapist. The group was an open, rolling group, where participants could start the intervention at any session and were then able to remain in the group until they had completed all six sessions. Individuals who were discharged prior to completing all six sessions were offered the option to complete any remaining group sessions on an outpatient

basis. None of the participants in the study who were discharged prior to completing all six sessions opted to return on an outpatient basis. Reasons cited for this included difficulty with transport, and feeling uncomfortable in returning to the inpatient environment.

Table 1. Key elements of Living Well with Emotions group content

Topic	Key Elements
1. Labelling emotions	Mindfulness and experiential practice Cycle of avoiding emotions and its negative impact Approach through noticing and labelling emotions
2. Function of emotions	Mindfulness and experiential practice Cycle of avoiding emotions – and how to approach Function of emotions
3. Expression of emotions	Mindfulness and experiential practice Cycle of avoiding emotions – and how to approach How emotional expression effects emotional experience Effective and ineffective expression of emotions
4. Reducing vulnerability to emotions	Mindfulness and experiential practice Cycle of avoiding emotions– and how to approach Strategies to reduce emotional vulnerability
5. Self- soothing & increasing positive emotions	Mindfulness and experiential practice Cycle of avoiding emotions– and how to approach Self-soothing, self-kindness strategies Strategies to increase and prolong positive emotions
6. Acting Opposite	Mindfulness and experiential practice Cycle of avoiding emotions– and how to approach Strategies for acting opposite to difficult emotions

The Living Well with Emotions group is based on acceptance and mindfulness principles and draws on techniques from ACT (Hayes *et al.*, 1999), and DBT (Linehan, 1993). The ICS model provides a theoretical framework for the use of mindfulness and acceptance strategies to facilitate effective integration of the propositional and implicational systems of processing (Teasdale & Bernard, 1993). The group content was drawn from a review of existing emotional regulation programs (e.g. Gratz & Gunderson 2006; Linehan, 1993) which have mainly been applied for individuals with personality disorder diagnoses. The current study intervention was adapted for a trans-diagnostic acute inpatient population. These adaptations include addressing difficulties with emotional expression (Perry *et al.*, 2011), problems with anticipatory pleasure (Gard *et al.*, 2007), recognition of emotional states (van der Meer *et al.*, 2009), and recognition of cognitive fusion such as rumination or self-blame (Wolkenstein *et al.*, 2014). The content of the group included: an introduction to mindfulness and acceptance; emotional identification and awareness; the function of emotions and emotional expression; primary and secondary emotions; self-soothing and self-kindness; increasing positive emotions; and emotional avoidance versus emotional acceptance (Table 1). Each group session included mindfulness and the cycle of avoiding emotions, along with a discrete skills based topic. As the group was open and rolling, each individual session was designed to work as a standalone intervention.

3.4 Procedure

The inpatient medical teams on the two designated research wards were given information about the group intervention and asked to provide this to each inpatient that they deemed

capable to consent to the research project. Individuals who consented to take part in the research were offered an individual appointment with the primary researcher (RL) to complete the pre-intervention measures which included: Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004); the Regulation of Emotions Questionnaire 2 (REQ-2; Philips & Power, 2007); the Clinical Outcomes in Routine Evaluation – 5 (CORE - 5; Evans *et al.*, 2000), Acceptance and Action Questionnaire – II (AAQ-II; Bond *et al.*, 2011), and a four-item Visual Analogue Scale (VAS) (Appendix C). Participants then commenced the group intervention, where they remained until they had completed six sessions or were due to be discharged. Participants completed session by session measures of distress (CORE-5), acceptance (AAQ-II) and ER skills (as measured by the VAS). Only these three brief measures were completed at each group session due to the time consuming nature of completing all five study measures. Furthermore, the choice of session by session measures was influenced by the aim of identifying whether increased acceptance functioned as a mechanism of change in improved ER outcomes. The study aimed to balance clinical treatment need with adherence to research design, to maximise engagement and clinical benefits for participants.

Following the intervention, participants were offered a further individual appointment and asked to complete the REQ-2, CORE-5, DERS, and the AAQ-II. A final appointment was scheduled with individuals to complete the qualitative exit interview with the primary researcher (RL), prior to their discharge.

3.5 Study Measures

The DERS (Gratz & Roemer, 2004) is a 36-item measure of emotional dysregulation with six subscales: non-acceptance of negative emotions; difficulty engaging in goal directed behaviour; difficulty controlling impulsive behaviour; effective emotion regulation strategies; emotional awareness; and emotional clarity. The DERS has good validity and high internal consistency (Gratz & Roemer, 2004). The DERS is based on an integrative conceptualisation of ER, which incorporates emotional acceptance and awareness in effective ER. Given the underlying therapeutic principles of mindfulness and acceptance within the group intervention, the DERS was employed to capture clinical change that may occur in these domains.

The REQ-2 (Philips & Power, 2007) is a 21 item self-report scale measuring four domains of emotion regulation: internal functional; internal dysfunctional; external functional; and external dysfunctional. The REQ-2 has shown good internal consistency and external validity (Philips & Power, 2007). Elements of the group intervention, drawing on DBT principles, aimed to reduce dysfunctional ER strategies and provide functional ER skills to participants. The REQ-2 was employed as a measure of any clinical change in these domains.

The AAQ-II (Bond *et al.*, 2011) is a seven item single factor scale which measures acceptance and action. The AAQ-II was found to be a reliable and valid measure of acceptance and experiential avoidance (Fledderus *et al.*, 2012).

The CORE-5 is a brief 5 item self-report measure used to measure subjective global distress, based on the CORE outcomes system (Barkham *et al.*, 2012; Evans *et al.*, 2000). The CORE-5 was selected as it is the briefest available measure of distress, and so appears suitable for session-by-session measurement.

Visual Analogue Scales (VAS) were used to measure functional and dysfunctional emotion regulation skills at each time point. VAS have been shown to have good inter-concept validity

and discriminate sensitivity in measuring clinical stress (Lesage *et al.*, 2012). The use of VAS provided a measure of subjective experiences which can easily be completed, therefore useful for case series design. The VAS measure of emotion regulation was based on items from the REQ-2 covering each of the four domains (internal functional; internal dysfunctional; external functional; and external dysfunctional ER). The four VAS items were agreed following discussion with one of the REQ-2 authors (Power, personal communication) and were:

“*I ask others for advice*” (external functional)

“*I dwell on my thoughts and feelings*” (internal dysfunctional)

“*I get annoyed with things or people around me*” (external dysfunctional)

“*I review (rethink) my goals or plans*” (internal functional)

Participants responded to each item by placing a cross on a 10-cm horizontal line ranging from ‘not at all’ to ‘Always/A lot’ for each factor. The scale was scored by measuring the point of the cross on the line and transforming this to a percentage of total line length.

3.6 Analysis

The quantitative and qualitative data analysis in this study was connected, with inferences made between the findings. This is in line with the expectations of concurrent triangulation design (Mengshoel, 2012).

3.6.1 Quantitative Data Analysis

Descriptive statistics on attendance and attrition rates were conducted to explore group feasibility and acceptability. Quantitative data was analysed at a group level for pre and post measures, however the small sample sizes and lack of control group limits inferences that can be drawn from this data. Therefore the main focus on quantitative data analysis was the analysis of the case series data.

For group level outcomes, basic inferential statistics (paired sample t-tests) were performed to identify any group level change. Where post intervention measures were not collected the last observation carried forward (LOCF) method was employed (Morrison *et al.*, 2012; Hamer & Simpson, 2009). Outcomes are presented as confidence intervals and effect size to account for the difficulties of significance testing in small sample sizes and to provide an indication of the clinical utility of any differences identified (Ruddle *et al.*, 2014; Mairs *et al.*, 2011).

Case series data was initially analysed using visual analysis of graphical presentations of the measures (Ruddle *et al.*, 2014; Brossart *et al.*, 2006). Graphs were compiled using Origin Ver 8.1 and were inspected for patterns of change, whilst maintaining awareness of the risks of false positives in using this approach (Borckardt *et al.*, 2004). Due to identified limitations in accuracy of visual analysis (Borckardt *et al.*, 2004), indications of change were also compared to pre and post outcome measures, to cross-validate findings. Where visual analysis identified change on two or more variables, cross correlation co-efficients (CCF) were calculated using Simulation Modelling Analysis Ver 8.3.3 (Borckardt, 2006) to explore if these changes occurred in synchrony or if changes in one variable preceded change in the other variable (Borckardt, 2006; Ruddle *et al.*, 2014).

3.6.2 Qualitative Data Analysis

The qualitative interviews were transcribed verbatim by the primary researcher (RL). Responses were analysed using thematic analysis as described by Braum and Clarke (2006). Initially transcripts were read several times in order to become familiar with the material, and generate an overall view of the data (Mairs *et al.*, 2011). Impressions related to the complete data set were recorded, following which a list of codes was generated. The final stage involved

the grouping of these codes to develop themes (Mairs *et al.*, 2011). Themes were defined and labelled, and subsequently reviewed to ensure that they were representative of the entire dataset. This analysis was completed by the primary researcher (RL), and discussed with the second author (HG). Subjectivity is a recognised facet of qualitative research, and the primary researcher acknowledged the impact of their dual role as both group facilitator and researcher. Furthermore the primary researcher acknowledged the impact of their own theoretical position and values at all stages of the research process. An awareness of the researchers' active role in the process of data interpretation and the extent to which themes reflect their values and assumptions remained central to the analysis (Hanson *et al.*, 2005). A journal was maintained during the coding process to record themes and as a tool to reflect on the primary researcher's beliefs and experiences (Gilbert *et al.*, 2008).

During the analysis phase the primary researcher frequently compared similar and contrasting findings across the two data streams. This repeated back and forth interaction between the two data streams allowed for dynamic communication between the two data sets, moving between inductive and deductive conceptual models (Mengsheol, 2012; Mendlinger & Cwikel, 2008). The analysis of the qualitative data was guided by findings from the quantitative data, specifically focusing on confirming patterns and expanding on quantitative findings. The qualitative data in turn highlighted important areas to be explored in the quantitative data set. This process of working across both data streams simultaneously enhanced reflexivity and understanding of the data gathered (Mengsheol, 2012).

4. Results

4.1 Quantitative Results

4.1.1 Group Feasibility

The group intervention was offered on two separate wards, an acute ward (comprising 20 female beds and 20 male beds) and a rehabilitation ward (20 mixed gender beds). The decision to also deliver the group on a rehabilitation ward was based on challenges in recruiting individuals from the acute ward into the research. 27 individuals attended the group from an acute ward over a five month period, however only 5 individuals consented to take part in the research. The difficulties with recruitment of individuals from the acute ward were: short admission times; ward transfers; unplanned discharges; and unwillingness to complete research questionnaires. This led to challenges in formally evaluating the group intervention. Consequently, the group was offered on a rehabilitation ward over a period of three weeks, where it was identified that research recruitment may be more successful amongst individuals in a more stable ward environment. Over a three week period on a rehabilitation ward, 4 individuals attended the group, 3 of whom consented to take part in the research (Table 2).

The mean number of group sessions that all individuals (research participants and non-participants) from the acute ward attended was 2.4, in comparison to mean attendance of 4.75 group session with individuals from a rehabilitation ward. This may indicate that it is less feasible for acute inpatients to attend a six session therapy group in comparison to inpatients from a rehabilitation ward (Table 2).

Table 2. Descriptive information on total no. of individuals attending group intervention across acute and rehabilitation ward (research participants and non-participants).

	Acute Ward	Rehabilitation Ward	Total across both wards
Length of time group was offered over	Over 5 months	Over 3 weeks	Over 5 months
Total no. group session offered	27	6	33
Total no. group sessions attended	24	6	30
Total no. individuals who attended 1 or more group sessions	27	4	31
Female	19	1	20
Male	8	3	11
Range of no. of group sessions attended	1 – 10	3 – 6	1-10
Mean no. group session attended per individual	2.4	4.75	2.71
Mode	1	5	1
Median	1	5	1

4.1.2 Group Acceptability – Attendance and Attrition

Over the course of five months, 27 group sessions were offered on an acute inpatient ward. On three occasions no participants took up the offer of the group. (Table 2). A total of six group sessions were offered on the rehabilitation ward. All six sessions were attended. A number of individuals, who were not participants in the research, attended the group sessions offered on both the acute and rehabilitation wards. The average attendance for group sessions was three individuals (range= 2-6).

The definition of therapy attrition provide by Heriot-Maitland and colleagues (2014) was adopted. This was defined as individuals leaving the group before they had completed at least two-thirds of the session and was based on clinical judgment that leaving prior to this point would reduce the extent to which individuals could gain a clinical benefit (Heriot-Maitland *et al.*, 2014). Attrition rates for all inpatient attenders was 8%. There was a 6% attrition rate for the eight consenting research participants (Table 3). Several reasons were informally reported for leaving sessions early including: needing to attend another ward appointment; high distress related to the ward environment and difficulty remaining in a group setting. This attrition rate compares favorably to attrition rates (using similar definition) of 34% reported by Heriot-Maitland and colleagues (2014).

Table 3. Attendance and attrition rates for all inpatients attending a group session

All Group therapy Attendees			Consenting Participants		
Total attendances at any Session	Total Completing (any session started)	Attrition	Total attendances at any Session	Total Completing (any session started)	Attrition
83	76	8%	32	30	6%

4.1.3 Descriptive Data on Research Participants

Eight individuals consented to take part in the research project. Five participants were inpatients on an acute ward, three on the rehabilitation ward. One participant declined to complete pre and post measures, but completed session by session measures alongside engaging in the qualitative interview. Session by session data was collected on all eight research participants. Pre measures were collected for seven research participants and post measures were collected for five research participants. Unexpected hospital discharge accounted for difficulties will collecting post measures for the remaining participants. Seven participants took part in the qualitative interview. Descriptive information on consenting participants is presented in Table 4, which further information available in Appendix D.

Table 4. Descriptive Information on Individuals who participated in the research

	Acute Ward	Rehabilitation Ward
No. of individuals	5	3
Degree of participation	4 (n) – consented to participate in all elements of research 1 (n) – consented to qualitative interview and session by session data only	3 (n) – consented to participate in all elements of research
Female	5	1
Male	0	2
Range of no. group sessions attended	2 – 6	5 – 6
Mean no. group session attended	4	5
Mode	No common value	5
Median	4	5

4.1.4 Group Level Outcomes

Measures of Emotion Regulation

Mean DERS total scores reduced following completion of group intervention sessions (Table 6), indicating that participants displayed less difficulties in areas of emotion dysregulation following the intervention. Effect sizes were calculated using the t value for dependent t tests with the equations described by Dunlap, Cortina, Vaslow & Burke (1996) $d = t_{dep} \left(\sqrt{\frac{2(1-r)}{n}} \right)$ (where r is the correlation between pre and post treatment scores). This is equivalent to using pooled standard deviations of gain scores $d = \frac{\bar{X}_1 - \bar{X}_2}{\text{pooled SD}}$ where $\text{pooled SD} = \frac{SD \text{ Gain scores}}{\sqrt{2(1-r)}}$. Effect size r is also reported and was obtained through conversion of d (Borenstein *et al.*, 2009). Values were calculated using the online calculator: http://www.psychometrica.de/effect_size.html. DERS total score and all DERS subscales (apart from the impulsivity subscale) showed large effect sizes (Table 5).

Table 5: Pre-treatment and Post-treatment DERS (N = 5)

Measure	Pre Treatment	Post Treatment	Change Score	95% confidence Interval		Effect Size	
	M (SD)	M (SD)		Lower	Upper	r	d
DERS total	120 (29.15)	96.3 (27.74)	23.7	5.51	41.89	0.38	0.83***
Non-Acceptance	21.6 (8.50)	16.0 (7.11)	5.6	-3.96	15.16	0.33	0.71***
Goals	20.1 (6.33)	14.8 (5.59)	5.3	-1.83	12.43	0.40	0.88***
Impulsivity	15.8 (5.76)	15.7 (5.85)	0.1	-3.53	3.73	0.01	0.02
Awareness	20.7 (3.80)	16.2 (5.26)	4.5	1.22	7.79	0.39	0.84***
Strategies	26.2 (10.80)	20.4 (7.16)	5.8	-2.59	14.19	0.27	0.56***
Clarity	15.6 (4.03)	13.2 (1.48)	2.4	-1.58	6.38	0.28	0.59***

***denotes large effect size.

Mean scores in the two functional domains measured by the REQ-2 showed change following completion of the group intervention. A small effect size was found for changes on the internal functional scale, and a large effect on the external functional scale (Table 6).

Table 6: Pre-treatment and Post-treatment REQ-2 (N = 5)

Measure	Pre Treatment	Post Treatment	Change Score	95% confidence Interval		Effect Size	
	M (SD)	M (SD)		Lower	Upper	r	d
Internal Functional	2.92 (0.59)	3.08 (0.58)	-0.16	-0.80	0.48	0.13	-0.27*
Internal Dysfunctional	2.83 (1.04)	2.60 (0.68)	0.23	-0.37	0.82	0.09	0.18
External Functional	2.33 (0.43)	2.53 (0.22)	-0.20	-0.72	0.31	0.27	-0.57***
External Dysfunctional	1.40 (0.14)	1.40 (0.42)	0	-0.39	0.39	0	0

*denotes small effect size; **denotes medium effect size; ***denotes large effect size.

Measure of Acceptance

The AAQ-II was administered as a pre and post intervention measures, in addition to being administered following each attended group session. Where post intervention AAQ-II scores were not collected (n=2), the last recorded data-point for the AAQ-II was carried forward (Morrison *et al.*, 2012; Hamer & Simpson, 2009). Mean scores on the AAQ-II reduced indicating increased levels of psychological flexibility and acceptance, of which emotional acceptance is included. A medium effect size, was found for changes in the AAQ-II (Table 7).

Table 7: Pre-treatment and Post-treatment AAQ-II (N = 7)

Measure	Pre Treatment	Post Treatment	Change Score	95% confidence Interval		Effect Size	
	M (SD)	M (SD)		Lower	Upper	r	d
AAQ-II Total	37.43 (12.19)	31.71 (9.05)	5.71 (7.08)	-0.84	12.27	0.24	0.49**

*denotes small effect size; **denotes medium effect size; ***denotes large effect size.

Measure of Distress

Only three participants completed the CORE-5 at pre and post treatment time points. The last available CORE-5 measure was carried forward for three further participants (Morrison *et al.*, 2012; Hamer & Simpson, 2009). Mean scores on the CORE-5 decreased following completion of the group intervention, with a medium effect size (Table 8).

Table 8: Pre-treatment and Post-treatment CORE-5 (N = 6)

Measure	Pre	Post	Change Score	95% confidence Interval		Effect Size	
	Treatment	Treatment		Lower	Upper	r	d
CORE-5	M (SD)	M (SD)					
	22.67 (14.24)	18.67 (9.61)	4 (11.24)	-7.80	15.80	0.15	0.31**
Total							

*denotes small effect size; **denotes medium effect size; ***denotes large effect size.

4.1.5 Case Level Outcomes

Session by session outcome data was collected from all eight participants. The amount of session by session data varied dependent on the number of group sessions each participant attended. There was also a variation in the completion of different variables from session by session data, which was particularly evident for the CORE-5 and the VAS. In several cases participants neglected to fill out the CORE-5, whilst for the VAS some participants completed the measure incorrectly (i.e. circling one of the end points of the measure rather than placing an x along the 10 cm line). Graphs of session by session data from the AAQ-II, CORE-5 and VAS were compiled using Origin 8.5.1 (Appendix F). Graphs were first inspected using visual analysis. Where change was noted on more than one variable, cross correlation coefficients (CCF) were calculated.

No evidence of sustained change on session by session data.

P1 has limited session by session data, therefore no formal analysis was conducted. P6 also had limited session by session data, although pre and post DERS measure indicated an improvement in ER skills (improvement of 1.5 Standard Deviation-SD based on DERS norms; Gratz & Roemer, 2004). P7 only completed the CORE-5 and AAQ-II. Visual analysis indicated no sustained change in these measures, consistent with pre-post measures which also indicated no changes. P8 displayed a non-sustained improvement in external functional ER strategies, which decreased at the last time point. P8 also displayed a slight increase in internal dysfunctional ER strategies.

Sustained change on one variable from session by session data.

Data was collected on P3 over the course of two admissions. Given the length of time elapsed between admissions (2 months) the data presented on P3 relates to their second admission. P3 showed a sustained improvement in psychological flexibility and acceptance (as measured by the AAQ-II) and a sustained reduction in distress as measured by the CORE-5. Due to missing time points for the CORE-5 it is not possible to perform CCF to explore for lagged changes.

P2 showed a sustained increase in external functional ER strategies. Some fluctuations were noted in other variables, though no other sustained improvements were identified from visual analysis. P2 demonstrated change of 1 SD on the DERS providing some cross validation from the finding of improvement in case series data (Figure 1).

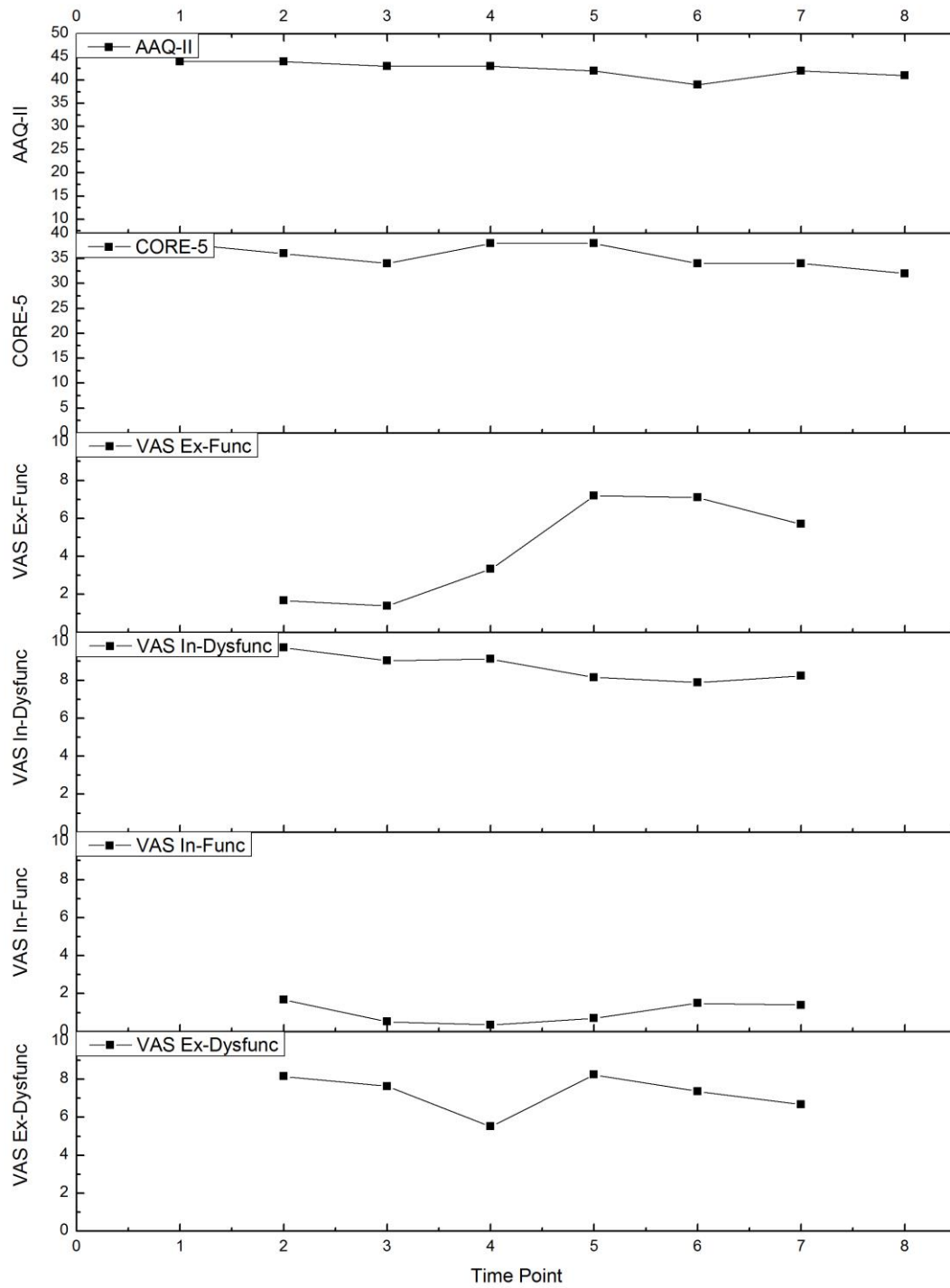
Changes on two or more case series variables.

P4 showed a sustained improvement on four variables (CORE-5, VAS external functional; VAS internal functional; VAS internal dysfunctional) (Figure 2). It was not possible to cross validate these findings as no post intervention data was available. Cross correlations were calculated to identify any relationship between changes in use of ER strategies (VAS) and distress (CORE-5). There was no evidence that changes in ER strategy use led to a reduction in distress (LAG: 01 VAS internal functional CCF= +0.11, p= 0.413; LAG: 01 VAS internal dysfunctional CCF=-0.02, p= 0.489; LAG: 01 VAS external functional CCF=+0.20, p= 0.318).

The only significant relationship found was between changes in CORE-5 and VAS external functional strategies, where change occurred simultaneously (LAG: 0 CCF =-0.94, p= 0.008)

P5 showed a sustained improvement in AAQ-II scores. Graph inspection indicated stable scores in VAS external functional scale, with an improvement following attendance of the last group session. There was a non-sustained improvement in the use of external dysfunctional ER strategies as measured by VAS (Figure 3). These changes were cross validated with pre and post DERS scores where a change of approximately 1-SD was noted. Cross correlations were calculated to identify any relationships between changes on the AAQ-II and VAS external functional scale. No relationship was found between change across the two measures (LAG:-1, CCF=0.18, p=0.382; LAG: 0, CCF=-0.35, p=0.310; LAG: +1, CCF=-0.04, p=0.480).

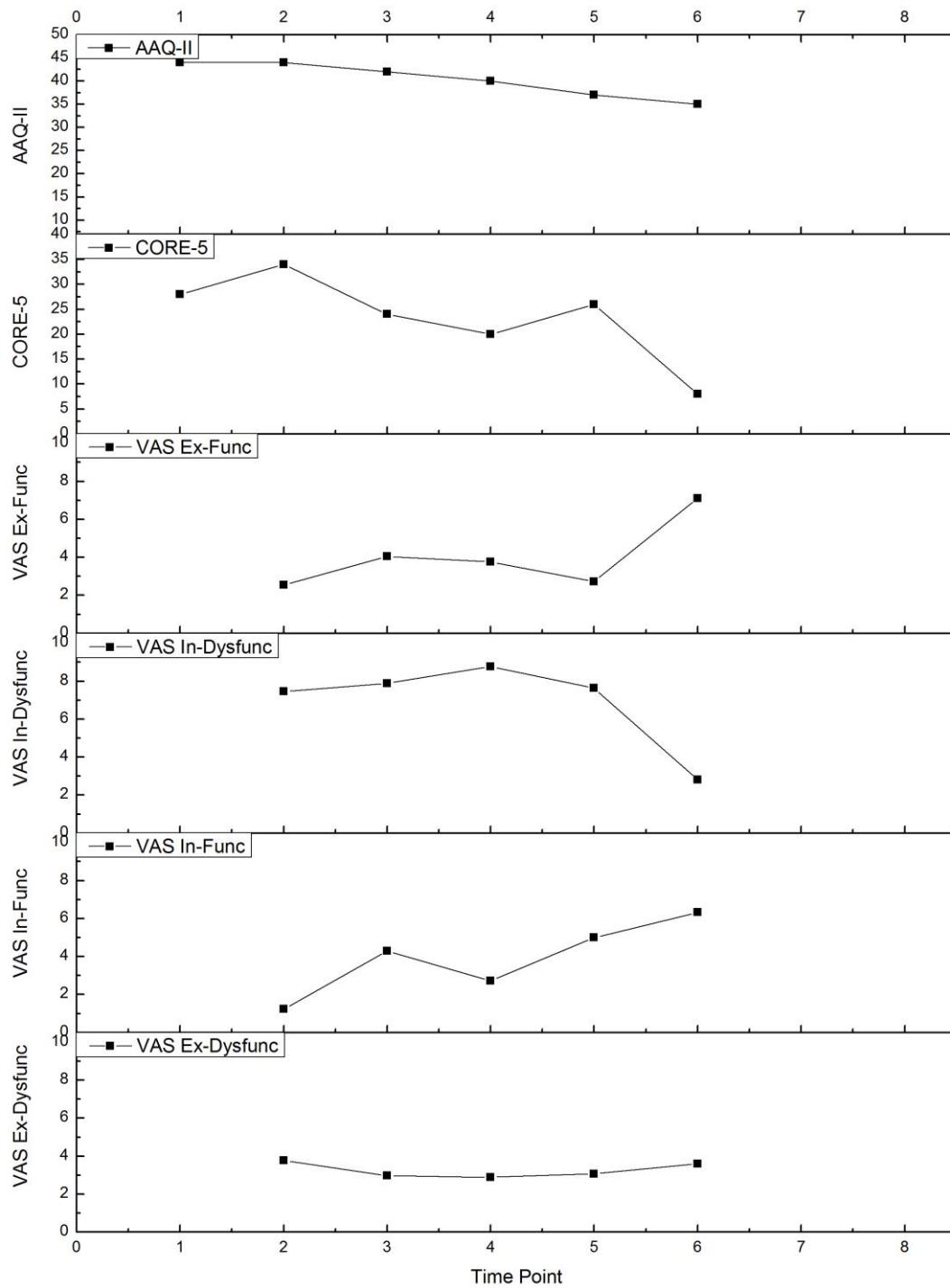
Figure 1. P2 Case series data



Participant (gender)	Pre	Post	DERS norms [†]	Change	Change \geq norm SD
2 (f)	165	143	78 (SD 21)	22	*(\approx 1 SD)

[†]DERS Gender Norms taken from Gratz & Roemer (2004)

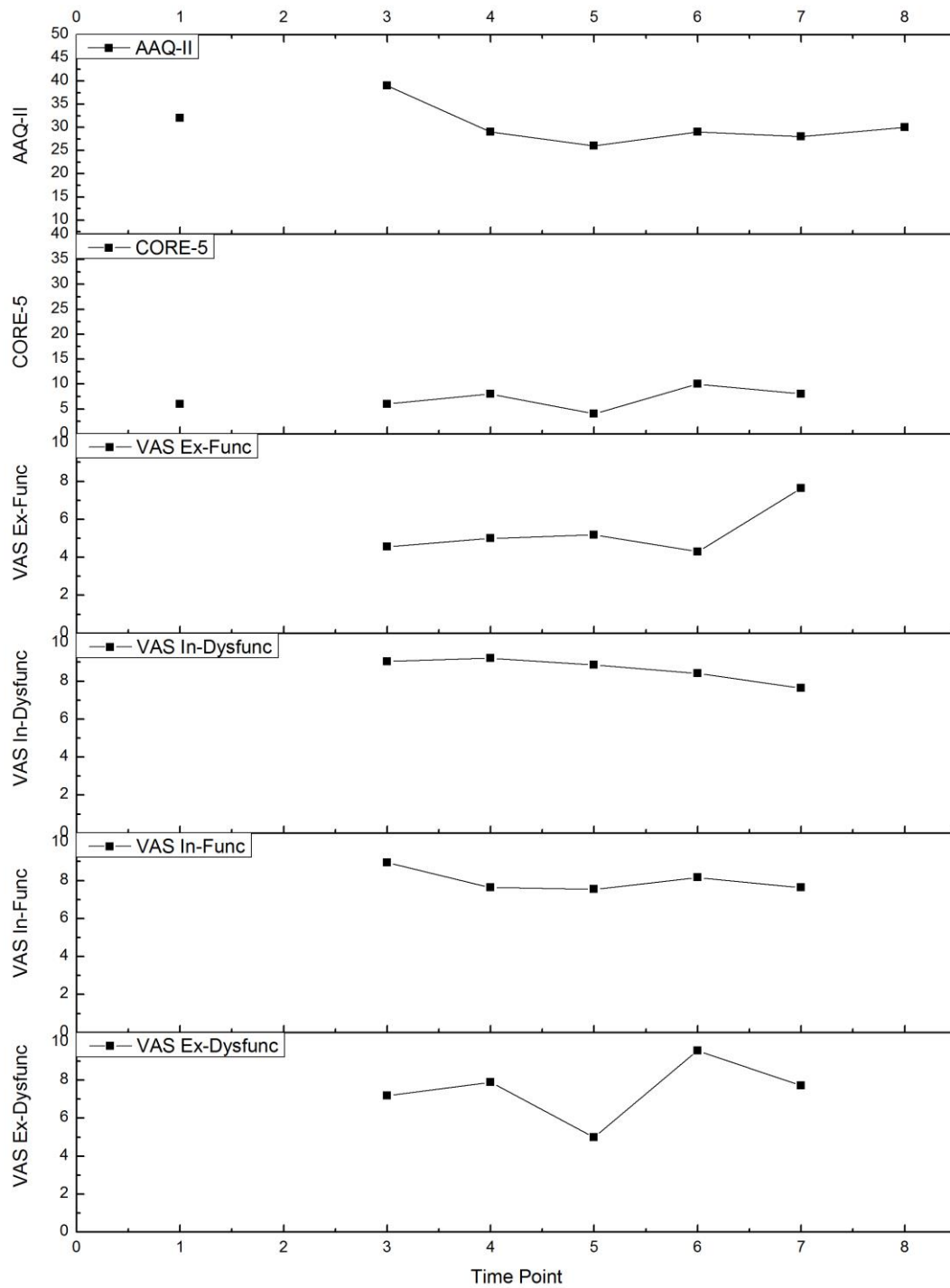
Figure 2. P4 Case series data



Participant (gender)	Pre	Post	DERS norms†	Change	Change ≥ norm SD
4 (f)	128	Not collected	78 (SD 21)	-	-

†DERS Gender Norms taken from Gratz & Roemer (2004)

Figure 3. P5 Case series data



Participant (gender)	Pre	Post	DERS norms†	Change	Change ≥ norm SD
5 (f)	97	71.5	78 (SD 21)	25.5	≈1 SD

†DERS Gender Norms taken from Gratz & Roemer (2004)

4.2 Qualitative Results

Thematic analysis resulted in 21 categories which were grouped into five key themes. From these five key themes, two were spilt into sub-themes reflecting specific aspects of the primary theme.

4.4.1 Group Acceptability

The first theme related to participants perception of the acceptability of the group. This theme was spilt into two sub-themes which identified that the participants described both positive elements and negative elements related to the group experience.

i. Positive Acceptability

A number of common positive aspects of being in the group were identified. A positive and consistent description of group acceptability was present in most of the participant's transcripts. The group was described as a useful and interesting process to engage in, where the discourse frequently reflected the positive role of inter group relationships, and group identity.

*“Oh yeah it was useful to do when we were here”
“It was quite good. It was interesting listening to other people's experiences and eh, you look forward to coming to the group” P3*

The group was described as a playing a positive role in encouraging self-understanding and providing ongoing motivation, in the face of challenging recovery journeys.

*“It should be longer cause it made you want to learn more, and understand more”
“I enjoyed it. Even though it was hard at times. Even though it was hard it made you want to be there” P7*

What was evident in participant's transcripts was how the acceptability of the group was linked with how individuals described the quality of intra-group relationships.

“It was quite relaxing, and to find out about other people's opinions. I found out the fact that I like just what people's opinions are” P4

The suitability of the group was also acknowledged in two of the transcripts, where participants highlighted the need for this group in the ward setting. It also appeared to be linked with participants' perception of a lack of alternative similar forums on the ward.

“It's a very good one (the group) for people with mental health issues because a lot of problems we have are emotional and are not addressed. So it's an ideal forum for people to get in touch with emotions and be allowed to in a safe setting where there's no right or wrong way of doing it, so people don't feel judged” P6

“There aren't em, any other opportunities like this to em discuss how you are feeling. And em, ways to cope with em overwhelming emotions. I think it's been a really useful tool.” P1

The group experience was highlighted as a positive in comparison to other ward processes, where the group offered the opportunity to engage with peers in a non-judgmental environment, as compared to an alternative experience of attending a ward round. This highlights the ongoing power imbalance in psychiatric hospitals, and the importance of redressing this to provide more person-centred care.

“I think it was different in the group setting because we were all patients in here because em, we are not well. Whereas in the (ward round) meeting it’s a, people who I’d never seen before and that felt just intimidating like they were all going to judge me” P1

The theme of positive group acceptability is mirrored in the quantitative data, as identified through attendance rates at the group amongst research and non-research participants on the wards, alongside a low attrition rate.

ii. Negative acceptability

Two of the transcripts identified negative elements related to sharing experiences in the group. One transcript highlighted the challenges in hearing others group members distressing stories, and how this can impact on the individual. This emphasises the importance of containment in group settings to ensure the group provides a therapeutic balance between validating individual experiences and minimising risk of distress to others from sharing experiences.

“Like I think there was one incident, I found that quite distressing. Listening to someone talking about how she ended up in hospital, that was quite hard to hear” P1

One transcript highlighted the challenges for an individual in managing their own self view which appeared to be heightened in the context of entering into a group context.

“I was very conscious of going on too much and taking up too much space in the group” P5

4.2.3 Group identification

i. Validation

There was a coherent description of positive group identification and universality in the transcripts. The group setting appeared to offer the opportunity for validation of the individuals’ experiences, in the context of relationships within the group.

“The majority of people you felt you could relate to. Cause they were the same as you. And you understood that you aren’t just experiencing it all in yourself, there’s others experiencing the same.”

“In the group, with people who had difficulties with emotions – it was like staring at a window or a mirror, and you were looking at yourself” P7

Validation in the context of shared emotional experiences, may function to enhance participants’ emotional awareness, and emotional acceptance. The theme of validation may be linked with increased acceptance of emotional experiences, as identified by large and medium effect sizes changes in the DERS and AAQ-II scores respectively, noted in the quantitative data stream.

ii. Different from others

While only evident in two of the transcripts, this sub-theme highlights how the group setting introduced the possibility for participants to feel different from others. The group context appeared to heighten the experience of separateness for one individual.

“Well I sort of felt em, a bit like the odd one out.”

“Em and in another group I was with two other women and I didnae fit in with them either. On one session I sort of did, but that was when I was very unwell”. P2

One transcript highlighted that this sense of feeling different stemmed from being unable to develop a common understanding with other group participants.

“But there were a couple of times where you didn’t feel as though, either you were inappropriate and you shouldn’t be there, or that other person was inappropriate and they shouldn’t be there. Cause there wasn’t that understanding” P7

4.2.3 Positive Functionality of the Group

All participants acknowledged that the group had served a positive function. One coherent theme woven throughout the interviews related to the opportunity for learning from others. Participants described the benefit of hearing strategies that other group member use. This highlighted the benefit of group member feedback, which may have been lost if the group was delivered in a more didactic or psycho-educational framework.

“It was good to find out about other people opinions and how to relax and things like that” P4

“Hearing people talking about ways to deal with emotions, Eh, ways to do it, to feel better when you feel bad, and how to avoid PRN” P5

Participants also discussed the opportunity to impart knowledge to other group members, where the group functioned to provide an environment to support their engagement in this role. It appears that this role provided a sense of meaning for some of the participants.

“Well I enjoyed sharing, and I enjoyed trying to maybe coach some of the other guys into sharing” P6

“To bring understanding and meaning to others”

“You were making sure that they understood, that either they weren’t alone or that they were not dealing with what we were supposed to deal with” P7

Within the transcripts there was a clear description of how the group provided the opportunity to connect with others, and develop a sense of social inclusion. Participants described how attending the group allowed for the development of relationships with people on the ward, where the group facilitated communication relating specifically to emotional experiences.

“It was good to have that group setting. Because on the ward most people they just keep themselves to themselves so, you can’t really talk to them. And like after coming to the group then people in general felt more comfortable to em chat about how they were feeling. And like approach others who have also been in that group” P1

Transcripts also highlighted how the group setting provided containment, where boundaries and structure may have created a sense of stability and predictability. During this analysis the primary researcher reflected on the importance of this consistency for individuals who have frequently experienced chaotic lives, and the risk that a busy inpatient environment can sometimes reflect this chaos.

“When there were discussions they weren’t going off track. That it remained the same. We remained focused and we would talk about a certain thing but we weren’t talking about deviating about our own experiences all the time” P7

And that’s some sort of structure and some feeling of achievement that you’ve contributed something” P6

4.2.4 Emotional Acceptance

The theme of emotional awareness was identified across participant transcripts. This was a key element in the therapeutic content of the group intervention, and it appears to be coherently

captured in the qualitative data. Different elements of emotional acceptance were identified in the transcript, wherein increasing emotional awareness is acknowledged to be an important facet of emotional acceptance. Participants described their experience of becoming more aware of their emotional experiences.

*“To get in touch with body sensations that went with different emotions”
“It helped me get in touch with emotions, some emotional stuff that had been suppressed” P6*

“It all made sense together about what we were talking about, to do with what stress, anger fear and thoughts, what we could hear in silence, and what our minds were thinking” P5

Transcripts highlighted an acceptance of emotional experiences, where one participant linked this to having a better understanding of the function of emotions. This theme also reflected a change in participants’ relationship with their emotions, which ties into the focus of the intervention and the underlying theory of third wave therapies.

*“That it’s a natural emotion. Everyone feels sad at some point. Em or angry.”
It doesn’t make them go away, but now I have a better understanding of, of like why they are there.” P1*

“Em and now I can feel an emotions, and I can say to myself ‘it’s okay to feel that way. It’s justified, there’s reasons why you’re feeling that way. Don’t take it in, let it go and it will pass’” P2

The theme of emotional acceptance is further highlighted in the quantitative data, which indicates large effect sizes for emotional clarity and acceptance as measured by the DERS, alongside a medium effect size for psychological flexibility and emotional acceptance as measured by the AAQ-II.

4.2.5 Change

Participants described change in relation to how they manage their emotional distress. The change highlighted in the transcripts links in with the change strategies and skills delivered in the group sessions. Participants describe change through the use of different strategies, including acting opposite, mindfulness, acknowledging avoidance, approach strategies, and self-compassion.

“And I think just trying to have a plan of action for when I can feel myself getting overwhelmed with sadness. That I don’t take it out on myself, which just like feeds into this cycle of me feeling worse about myself.”

“And acting opposite, so instead of self-harming I could do something like self-care” P1

“Mindfulness, mindfulness exercises that we did. Concentrating on mindfulness, that really does help with people with depression and anxiety” P6

“It was confrontational. But if you weren’t confrontational it would take away the realisation that you weren’t dealing with your emotions”

“A better understanding of how unhelpfully we deal with emotions. And avoid them so much” P7

One participant also discussed change in a broader sense, identifying that the group experience allowed for a shift in perspective, indicating more psychological flexibility.

“This has brought things onto me, seeing a bigger picture.... So I’m looking at it from a completely different perspective and seeing things in a different way than what I used to” P2

As themes were identified during qualitative analysis, the primary researcher reflected on two of the key themes: emotional acceptance and change. These themes mirror the two major dialectics present in DBT, and consequently were present in the content of the group intervention. Furthermore these themes are mirrored in the quantitative data, where change is noted in individuals increased use of effective ER strategies as measured by the REQ-2 (increase in functional strategies) and the DERS.

5. Discussion

5.1 Group Feasibility and Acceptability

This current pilot research provides support for the acceptability and feasibility of a trans-diagnostic emotion regulation group intervention delivered in a Scottish inpatient setting. Taking into account research and non-research participants, the intervention saw 83 attendances throughout the course of the research project. This is a comparable number to Heriot-Maitland and colleagues (2014), however the current study had a much lower attrition rate, suggesting it was acceptable to an acute inpatient population. Qualitative data demonstrates evidence of acceptability of the group intervention, where participants identify the benefit of the group environment, inter-group relationships, and the suitability of an ER intervention. Participants also highlight the positive difference between the group intervention and other experiences that occur on the ward.

It appears to be more feasible to run a six session group intervention on a rehabilitation ward where mean number of group attendances was approaching five, compared with mean number of group attendances approaching two and a half sessions on the acute ward. The group intervention was designed to take account of this potential challenge, where it is delivered in an open rolling format. Each group session covered a discrete topic and can function as a standalone therapeutic intervention.

The differences in recruitment to research between an acute and rehabilitation ward illustrates the difficulties in evaluation research in acute settings. However, the methodological design employed allows for meaningful interpretations of small sample research where available data may be limited (Mengshoel, 2012).

5.2. Evidence for Intervention efficacy

At a group level, large effect sizes for ER as measured by the DERS, and external functional ER strategies as measured by the REQ-2 were found post-treatment. These results were cross-validated by qualitative data, where participants described change in both their relationship with their emotions, alongside change in the use of new ER strategies. Medium effect sizes for acceptance and distress were also identified post treatment. The study was explorative and preliminary findings suggest that the intervention may have had clinical benefit in relation to ER, acceptance and distress. Given the small sample size and the pilot nature of this research, it is important to interpret these findings with caution.

In relation to changes on the DERS, a pragmatic decision was made to use the normed standard deviation scores (Gratz & Roemer, 2004) as a marker indicating change, in the absence of a clear cut-off for clinically meaningful change. Therefore, apparent improvements noted in this data set should be tentatively interpreted. Session by session data showed sustained improvements for four individuals in at least one variable measured. Cross correlation

coefficients did not identify any lagged changes, therefore it is not possible to make any inferences about the mechanisms through which change occurred.

6. Limitations

Small sample size is a key limitation of this pilot study, alongside challenges in collecting outcome data on every consenting participant. The method employed in the pilot aimed to mitigate these limitations. The amount of data collected on each participant in this pilot was variable, where it is noted that there were particular challenges related to collecting outcome data. This highlights challenges in evaluation research in an inpatient setting. Some individuals declined to participate in the research citing reasons included upcoming planned discharge/transfer, and concerns with completing the longer pre and post questionnaires. However, the qualitative interview, which provided rich data, appeared to be a more acceptable data collection option for participants.

All eight participants were receiving multidisciplinary input throughout the term of the intervention, including medication and nursing care. All participants were also involved in individual psychological interventions (Appendix D). This input may have influenced the outcome measures, and suggests a need for cautious interpretation of the results. It is encouraging that qualitative data indicates that the group was valued, and that participants identified change or increased awareness occurring as a result of the group. The five participants from the acute ward were engaged in short-term individual psychology input to develop a formulation of their mental health crisis (similar to Clarke, 2009b). This input may have helped to facilitate initial engagement in the group intervention, particularly through highlighting the potential relevance of ER skills to their recovery.

The small sample size limits interpretations that can be made about the potential clinical impact of the intervention. Visual inspection for case series can overestimate treatment effects due to auto-correlation within variables (Brockardt *et al.* 2008; Ruddle *et al.*, 2014). Cross correlation tests and comparison with pre and post data mitigated these limitations and validated key findings in respect to visual inspection. Increasing the number of time points through an extended baseline, and a follow-up time point, alongside minimising missed sessions would increase validity of the case series data (Brockardt *et al.*, 2008; Ruddle *et al.*, 2014). Although this may prove difficult to implement in an inpatient context given the difficulties described.

Typically, sample sizes in qualitative research are based upon the concept of thematic saturation. Thematic saturation occurs when no new themes are observed in new interviews (Guest *et al.*, 2006). In this study seven participants took part in the qualitative exit interview, allowing exploration of their perceptions of the group, including acceptability and areas of perceived change. However given the small number of individuals, it is unlikely that thematic saturation occurred. Finally, the delivery of the group intervention and collection of all data (quantitative and qualitative) was completed by the primary researcher (RL). This occurred due to constraint of resources and the requirement to complete components of research for an academic qualification (DClinpsy). As such, it is acknowledged that the dual role held as both researcher and therapist introduces bias into the project, particularly the possibility of bias towards a positive evaluation of the intervention.

7. Implications

This pilot study is the first evaluation of a trans-diagnostic ER group intervention delivered in an acute Scottish inpatient setting. Triangulation of quantitative and qualitative results

highlight the acceptability and suitability of this intervention. Preliminary outcomes are promising. The intervention appears to offer the potential for clinical improvements in ER, acceptance and distress. The outcomes of the study suggest that further research to systematically assess this intervention is warranted.

The group was designed as an open, rolling intervention where group sessions could be delivered as standalone interventions. Further evaluation on the effectiveness of each group session, through pre and post session measures would be beneficial in identifying clinical benefit associated with particular group content. Given that the mean number of sessions attended was 2.4 for acute inpatients, further evaluation of the number of sessions needed to achieve maximum clinical benefit would also be helpful.

To account for the multi-disciplinary treatment input that occurs on inpatient wards, a more holistic approach to data collection may be necessary to determine the impact of psychological input. The use of a routine dataset for all inpatients may aid in developing practice based evidence for the relative benefit of particular interventions. Participants in the research were willing to engage in qualitative interviews, suggesting that this approach may be helpful in understanding factors important in the implementation of new interventions.

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Appendix A – Favourable Opinion Letter for NHS Ethical Approval

EoSRES



Research Ethics Service

East of Scotland Research Ethics Service (EoSRES) REC 1

Tayside Medical Sciences Centre (TASC)
Residency Block C, Level 3
Ninewells Hospital & Medical School
George Pirie Way
Dundee DD1 9SY

Ms Ruth Lennon
Trainee Clinical Psychologist
NHS Lothian
Department of Psychology, 2nd Floor Mackinnon House
Royal Edinburgh Hospital, Tipperlinn Road
Edinburgh
EH10 5HF

Date: 09 September 2014
Your Ref:
Our Ref: LR/14/ES/1051
Enquiries to: Mrs Lorraine Reilly
Extension: Ninewells extension: 83878
Direct Line: 01382 383878
Email: eosres.tayside@nhs.net

Dear Ms Lennon

Study title: A mindfulness based group intervention to enhance emotion regulation skills– A pilot study
REC reference: 14/ES/1051
IRAS project ID: 145952

Thank you for your letter of 04 September 2014, responding to the Committee's request for further information on the above research and submitting revised documentation.

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

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

Confirmation of ethical opinion

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

Conditions of the favourable opinion

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

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

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.



Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

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

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non clinical trials this is not currently mandatory.

If a sponsor wishes to contest the need for registration they should contact Catherine Blewett (catherineblewett@nhs.net), the HRA does not, however, expect exceptions to be made. Guidance on where to register is provided within IRAS.

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

Ethical review of research sites

NHS sites

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

Non-NHS sites

The Committee has not yet completed any site-specific assessment (SSA) for the non-NHS research site(s) taking part in this study. The favourable opinion does not therefore apply to any non-NHS site at present. We will write to you again as soon as an SSA application(s) has been reviewed. In the meantime no study procedures should be initiated at non-NHS sites.

Approved documents

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

Document	Version	Date
GP/consultant information sheets or letters [Health Professionals Information Leaflet]	Version 1	18 July 2014
Interview schedules or topic guides for participants [Interview Schedule]	Version 1	18 July 2014
IRAS Checklist XML [Checklist_04092014]		04 September 2014
Other [Group Therapy Protocol]	Version 1	18 July 2014



Other [Sponsor Insurance Policy]	Version 1	28 August 2014
Other [Clinical Supervisor CV]	Version 1	18 July 2014
Participant information sheet (PIS) [Amended PIS & Consent form]	Version 2	22 August 2014
REC Application Form [REC_Form_04092014]		04 September 2014
Research protocol or project proposal [Research Protocol]	Version 1	18 July 2014
Response to Request for Further Information		04 September 2014
Summary CV for Chief Investigator (CI) [Primary Investigator CV]	Version 1	18 July 2014
Summary CV for supervisor (student research) [Academic Supervisor CV]	Version 1	18 July 2014
Validated questionnaire [Project Questionnaires]	Version 1	18 July 2014

Statement of compliance

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

After ethical review

Reporting requirements

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

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

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

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website: <http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/>

HRA Training

We are pleased to welcome researchers and R&D staff at our training days – see details at <http://www.hra.nhs.uk/hra-training/>



14/ES/1051

Please quote this number on all correspondence

Yours sincerely



pp
Dr Carol Macmillan
Chair

Email: eosres.tayside@nhs.net

Enclosures: "After ethical review – guidance for researchers"

Copy to: Prof Charlotte Clarke
Karen Maitland, NHS Lothian

Appendix A – NHS Research and Development Approval Letter

University Hospitals Division

**Queen's Medical Research Institute
47 Little France Crescent, Edinburgh, EH16 4TJ**



FM/NM/approval

23 October 2014

Ms Ruth Lennon
Trainee Clinical Psychologist
Department of Psychology
2nd Floor Mackinnon House
Royal Edinburgh Hospital, Tipperlinn Road
Edinburgh
EH10 5HF

**Research & Development
Room E1.12
Tel: 0131 242 3330**

**Email:
R&DOffice@nhslothian.scot.nhs.uk**

Director: Professor David E Newby

Dear Ms Lennon

Lothian R&D Project No: 2014/0339

Title of Research: A mindfulness based group intervention to enhance emotion regulation skills - A pilot study

REC No: 14/ES/1051

Participant Information Sheet:
Version 2 dated 22 August 2014

Consent Form:
Version 2 dated 22 August 2014

Protocol:
Version 1 dated 18 July 2014

I am pleased to inform you that this study has been approved for NHS Lothian and you may proceed with your research, subject to the conditions below. This letter provides Site Specific approval for NHS Lothian.

Please note that the NHS Lothian R&D Office must be informed if there are any changes to the study such as amendments to the protocol, recruitment, funding, personnel or resource input required of NHS Lothian.

Substantial amendments to the protocol will require approval from the ethics committee which approved your study and the MHRA where applicable.

Please inform this office when recruitment has closed and when the study has been completed.

I wish you every success with your study.

Yours sincerely

A handwritten signature in black ink that reads 'Fiona McArdle'.

Ms Fiona McArdle
Deputy R&D Director

CC Mr Tim Montgomery, Director of Operations, REH

Appendix A – NHS Caldicott Approval Letter

Lothian NHS Board

Waverley Gate
2-4 Waterloo Place
Edinburgh
EH1 3EG
Telephone 0131 465 5452
Fax 0131 536 465 5494



www.nhslothian.scot.nhs.uk

Ms Ruth Lennon
Trainee Clinical Psychologist
McKinnon House
Royal Edinburgh Hospital
Morningside Terrace
Edinburgh

Date 18th March 2015
Your Ref
Our Ref CG/DF/1493
Enquiries to Caldicott Office
Extension 35452
Direct Line 0131 465 5452
Email Caldicott.Guardian@nhslothian.scot.nhs.uk

Dear Ms Lennon

CALDICOTT APPLICATION 1493

Thank you for the information supplied

Request received from	Ms Ruth Lennon
Summary of proposal	Living Well with emotions – A group therapy pilot
Patient identifiable information requested	Age, Date of Birth, Gender, Other: Mental Health Diagnosis, reason for admission. Psycho active medication, other interventions while an inpatient (i.e.: ECT)
Approved	YES
Advice	

Yours sincerely

A handwritten signature in black ink, appearing to read 'Alison McCallum', written in a cursive style.

Professor Alison McCallum
Director of Public Health & Health Policy

Appendix B – *Qualitative Exit Interview Schedule*



Section of Clinical and Health Psychology
School of Health in Social Science
The University of Edinburgh
Teviot Place
EH8 9AG



Department of Psychology
Royal Edinburgh Hospital
Morningside Terrace
EH10 5HF
Tel: 0131 537 6000

Qualitative Interview Schedule

1. Can you tell me about your experience of the group?

Prompts – likes, dislikes.

2. What was it like coming along to each group session?

Prompts – hearing other people's experiences? Sharing your experiences?

3. How did it compare to other therapy/treatment you have had in the past?

Prompt – differences, similarities, would you recommend it to others.

4. What stuck with you from the group intervention?

5. What did you find useful?

Prompt – which exercises, homework, content?

6. How could the group be improved?

7. Has anything changed for you through taking part in the group?

8. What things can you observe about yourself that are different now compared with when you first started?

9. What do you think has led to this change?

Wrap up

Is there anything else you would like to add that hasn't been covered in the questions?

Appendix C – Outcome Measures

Regulation of Emotion Questionnaire 2

We all experience lots of different feelings or emotions. For example, different things in our lives make us feel happy, sad, angry and so on...

The following questions ask you to think about **how often** you do certain things **in response to your emotions**. You do not have to think about specific emotions but just how often you **generally** do the things listed below.

Please tick the box corresponding to the answer that fits best. We all respond to our emotions in different ways so there are no right or wrong answers.

In GENERAL how do you respond to your emotions?	Never	Seldom	Often	Very Often	Always
1. I talk to someone about how I feel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I take my feelings out on others verbally (e.g. shouting, arguing)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I seek physical contact from friends or family (e.g. a hug, hold hands)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I review (rethink) my thoughts or beliefs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I harm or punish myself in some way	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I do something energetic (e.g. play sport, go for a walk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I dwell on my thoughts and feelings (e.g. It goes round and round in my head)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In **GENERAL** how do you respond to your emotions?

	Never	Seldom	Often	Very Often	Always
8. I ask others for advice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I review (rethink) my goals or plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I take my feelings out on others physically (e.g. fighting, lashing out)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I put the situation into perspective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. I concentrate on a pleasant activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I try to make others feel bad (e.g. being rude, ignoring them)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I think about people better off and make myself feel worse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I keep the feeling locked up inside	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. I plan what I could do better next time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. I bully other people (e.g. saying nasty things to them, hitting them)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. I take my feelings out on objects around me (e.g. deliberately causing damage to my house, school or outdoor things)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. Things feel unreal (e.g. I feel strange, things around me feel strange, I daydream)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I telephone friends or family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. I go out and do something nice (e.g. cinema, shopping, go for a meal, meet people)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thank you for your help.

Difficulties in Emotion Regulation Scale (DERS)

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item.

1-----	2-----	3-----	4-----	5
Almost never	sometimes	about half the time	most of the time	almost
always				
(0-10%)	(11-35%)	(36-65%)	(66-90%)	(91-100%)

- _____ 1) I am clear about my feelings.
- _____ 2) I pay attention to how I feel.
- _____ 3) I experience my emotions as overwhelming and out of control.
- _____ 4) I have no idea how I am feeling.
- _____ 5) I have difficulty making sense out of my feelings.
- _____ 6) I am attentive to my feelings.
- _____ 7) I know exactly how I am feeling.
- _____ 8) I care about what I am feeling.
- _____ 9) I am confused about how I feel.
- _____ 10) When I'm upset, I acknowledge my emotions.
- _____ 11) When I'm upset, I become angry with myself for feeling that way.
- _____ 12) When I'm upset, I become embarrassed for feeling that way.
- _____ 13) When I'm upset, I have difficulty getting work done.
- _____ 14) When I'm upset, I become out of control.
- _____ 15) When I'm upset, I believe that I will remain that way for a long time.
- _____ 16) When I'm upset, I believe that I will end up feeling very depressed.
- _____ 17) When I'm upset, I believe that my feelings are valid and important.
- _____ 18) When I'm upset, I have difficulty focusing on other things.
- _____ 19) When I'm upset, I feel out of control.
- _____ 20) When I'm upset, I can still get things done.

1-----2-----3-----4-----5
 Almost never sometimes about half the time most of the time almost
 always
 (0-10%) (11-35%) (36-65%) (66-90%) (91-
 100%)

- _____ 21) When I'm upset, I feel ashamed at myself for feeling that way.
- _____ 22) When I'm upset, I know that I can find a way to eventually feel better.
- _____ 23) When I'm upset, I feel like I am weak.
- _____ 24) When I'm upset, I feel like I can remain in control of my behaviours.
- _____ 25) When I'm upset, I feel guilty for feeling that way.
- _____ 26) When I'm upset, I have difficulty concentrating.
- _____ 27) When I'm upset, I have difficulty controlling my behaviours.
- _____ 28) When I'm upset, I believe there is nothing I can do to make myself feel better.
- _____ 29) When I'm upset, I become irritated at myself for feeling that way.
- _____ 30) When I'm upset, I start to feel very bad about myself.
- _____ 31) When I'm upset, I believe that wallowing in it is all I can do.
- _____ 32) When I'm upset, I lose control over my behaviour.
- _____ 33) When I'm upset, I have difficulty thinking about anything else.
- _____ 34) When I'm upset I take time to figure out what I'm really feeling.
- _____ 35) When I'm upset, it takes me a long time to feel better.
- _____ 36) When I'm upset, my emotions feel overwhelming.

SUBSCALE SCORING:**


1. Non-acceptance of emotional responses (NONACCEPT): 11, 12, 21, 23, 25, 29
 2. Difficulty engaging in Goal-directed behaviour (GOALS): 13, 18, 20R, 26, 33
 3. Impulse control difficulties (IMPULSE): 3, 14, 19, 24R, 27, 32
 4. Lack of emotional awareness (AWARENESS): 2R, 6R, 8R, 10R, 17R, 34R
 5. Limited access to emotion regulation strategies (STRATEGIES): 15, 16, 22R, 28, 30, 31, 35, 36
 6. Lack of emotional clarity (CLARITY): 1R, 4, 5, 7R, 9
- Total score: sum of all subscales
 **"R" indicates reverse scored item

AAQ-2

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| 1. My painful experiences and memories make it difficult for me to live a life that I would value. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. I'm afraid of my feelings. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. I worry about not being able to control my worries and feelings. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. My painful memories prevent me from having a fulfilling life. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. Emotions cause problems in my life. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. It seems like most people are handling their lives better than I am. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. Worries get in the way of my success. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |



CORE - 5

Site ID

letters only numbers only

Client ID

Therapist ID numbers only (1) numbers only (2)

Sub codes

D D M M Y Y Y Y

/ /

Date form given

Age

Male

Female

Session Number of Planned

IMPORTANT – PLEASE READ THIS FIRST

This form has 5 statements about how you have been OVER THE LAST WEEK.
Please read each statement and think how often you felt that way last week.
Then tick the box which is closest to this.
Please use a dark pen (not pencil) and tick clearly within the boxes.

	Not at all	Only Occasionally	Sometimes	Often	Most or all the time
1 I have felt terribly alone and isolated	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
2 I have felt OK about myself	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
3 I have felt panic or terror	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
4 I have been happy with the things I have done	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
5 I have felt despairing or hopeless	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Total Score

**Total Score multiplied by 2
(i.e. Clinical Score*)**

* **Procedure:** Add together the item scores, then divide by the number of questions completed to get the mean score, then multiply by 10 to get the Clinical Score.

Quick method for the CORE-5 (if all items completed): Add together the item scores to get the Total Score, then multiply by 2 to get the Clinical Score.

THANK YOU FOR YOUR TIME IN COMPLETING THIS QUESTIONNAIRE

Appendix C – Session by Session Measures

Below you will find a list of 7 statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. My painful experiences and memories make it difficult for me to live a life that I would value.	1	2	3	4	5	6	7
2. I'm afraid of my feelings.	1	2	3	4	5	6	7
3. I worry about not being able to control my worries and feelings.	1	2	3	4	5	6	7
4. My painful memories prevent me from having a fulfilling life.	1	2	3	4	5	6	7
5. Emotions cause problems in my life.	1	2	3	4	5	6	7
6. It seems like most people are handling their lives better than I am.	1	2	3	4	5	6	7
7. Worries get in the way of my success.	1	2	3	4	5	6	7

Over the last week

	Not at all	Only Occasionally	Sometimes	Often	Most or all the time
1 I have felt terribly alone and isolated	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
2 I have felt OK about myself	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
3 I have felt panic or terror	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
4 I have been happy with the things I have done	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
5 I have felt despairing or hopeless	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Thinking about how you have felt since the last session, please mark an X on the line for each of the questions below.

I ask others for advice.

Not at all/Never ----- Always/A Lot

I dwell on my thoughts and feelings

Not at all/Never ----- Always/A Lot

I get annoyed with things or people around me

Not at all/Never ----- Always/A Lot

I review (rethink) my goals or plans

Not at all/Never ----- Always/A Lot

Appendix D - Descriptive Information on each research participant

ID No	Gender	Age	Ward	Length Admission	Reason Admission	No. sessions attended	Diagnosis	Medication	Other medical intervention	Other psychology input
1	F	40	Acute	50 days	Suicidal Risk, Depression	2	Bipolar	2 atypical antipsychotics	ECT commenced on ward	Short Term (ST) Individual psychology
2	F	22	Acute	129 days	Suicidal Risk, Depression	6	Depression	1 SNRI anti-depressant 1 SSRI anti-depressant 1 Anxiolytic	None	ST Individual psychology
3	F	27	Acute	28 days	Suicidal Risk	Total 3: 1 on 1 st admission 2 on 2 nd admission	EUPD	1 NaSSA anti-depressant 1 Anxiolytic 1 anti-convulsant	None	ST Individual psychology
4	F	48	Acute	65 days	Suicidal Risk, Depression	5	EUPD	2 atypical antipsychotics 1 SSRI anti-depressant 1 SNRI anti-depressant 1 anti-convulsant	None	ST Individual psychology Private counselling
5	F	44	Rehab	645 days & ongoing	Psychosis, drug use	6	Bipolar	1 atypical anti-psychotic 1 mood stabiliser 1 anti-convulsant 1 non-benzo hypnotic 1 anxiolytic	None	Cognitive Analytic Therapy
6	M	34	Rehab	337 days & ongoing	Psychosis, non-compliance	5	Paranoid Schizophrenia	2 atypical anti-psychotics 1 SSRI anti-depressant 1 alcohol dependence drug	None	Individual psychology
7	M	36	Rehab	1035 days & ongoing	Psychosis	5	Schizo-affective Disorder	2 atypical anti-psychotics 1 anti-depressant 1 anxiolytic	None	Behaviour Family Therapy
8	F	57	Acute	23 days	Suicidal Risk, Depression	Total 4: 1 on 1 st admission 3 on 2 nd admission	Depression	1 anti-depressant	Long term ongoing ECT	ST Individual psychology

Appendix E – Author Guidelines for Journal: *Clinical Psychology and Psychotherapy*

Clinical Psychology & Psychotherapy

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Edited By: Paul Emmelkamp and Mick Power

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ISI Journal Citation Reports © Ranking: 2013: 28/111 (Psychology Clinical)

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A. A typical citation of an entire work consists of the author's name and the year of publication.

Example: Charlotte and Emily Bronte were polar opposites, not only in their personalities but in their sources of inspiration for writing (Taylor, 1990). Use the last name only in both first and subsequent citations, except when there is more than one author with the same last name. In that case, use the last name and the first initial.

B. If the author is named in the text, only the year is cited.

Example: According to Irene Taylor (1990), the personalities of Charlotte. . .

C. If both the name of the author and the date are used in the text, parenthetical reference is not necessary.

Example: In a 1989 article, Gould explains Darwin's most successful. . .

D. Specific citations of pages or chapters follow the year.

Example: Emily Bronte "expressed increasing hostility for the world of human relationships, whether sexual or social" (Taylor, 1988, p. 11).

E. When the reference is to a work by two authors, cite both names each time the reference appears.

Example: Sexual-selection theory often has been used to explore patters of various insect matings (Alcock & Thornhill, 1983) . . . Alcock and Thornhill (1983) also demonstrate. . .

F. When the reference is to a work by three to five authors, cite all the authors the first time the reference appears. In a subsequent reference, use the first author's last name followed by *et al.* (meaning "and others").

Example: Patterns of byzantine intrigue have long plagued the internal politics of community college administration in Texas (Douglas *et al.*, 1997) when the reference is to a work by six or more authors, use only the first author's name followed by *et al.* in the first and all subsequent references. The only exceptions to this rule are when some confusion might result because of similar names or the same author being cited. In that case, cite enough authors so that the distinction is clear.

G. When the reference is to a work by a corporate author, use the name of the organization as the author.

Example: Retired officers retain access to all of the university's educational and recreational facilities (Columbia University, 1987, p. 54).

H. Personal letters, telephone calls, and other material that cannot be retrieved are not listed in References but are cited in the text.

Example: Jesse Moore (telephone conversation, April 17, 1989) confirmed that the ideas. . .

I. Parenthetical references may mention more than one work, particularly when ideas have been summarized after drawing from several sources. Multiple citations should be arranged as follows.

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- Differentiate works by the same author and with the same publication date by adding an identifying letter to each date: (Bloom, 1987a, 1987b)
- List works by different authors in alphabetical order by last name, and use semicolons to separate the references: (Gould, 1989; Smith, 1983; Tutwiler, 1989).

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Book

Paloutzian, R. F. (1996). *Invitation to the psychology of religion* (2nd ed.). Boston: Allyn and Bacon.

Book with More than One Author

Natarajan, R., & Chaturvedi, R. (1983). *Geology of the Indian Ocean*. Hartford, CT: University of Hartford Press.
Hesen, J., Carpenter, K., Moriber, H., & Milsop, A. (1983). *Computers in the business world*. Hartford, CT: Capital Press. and so on.

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Stand-alone Web Document (no date)

Nielsen, M. E. (n.d.). *Notable people in psychology of religion*. Retrieved August 3, 2001, from <http://www.psywww.com/psyrelig/psyrelpr.htm>

Journal Article from Database

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Garrity, K., & Degelman, D. (1990). Effect of server introduction on restaurant tipping. *Journal of Applied Social Psychology*, 20, 168-172. Abstract retrieved July 23, 2001, from PsycINFO database.

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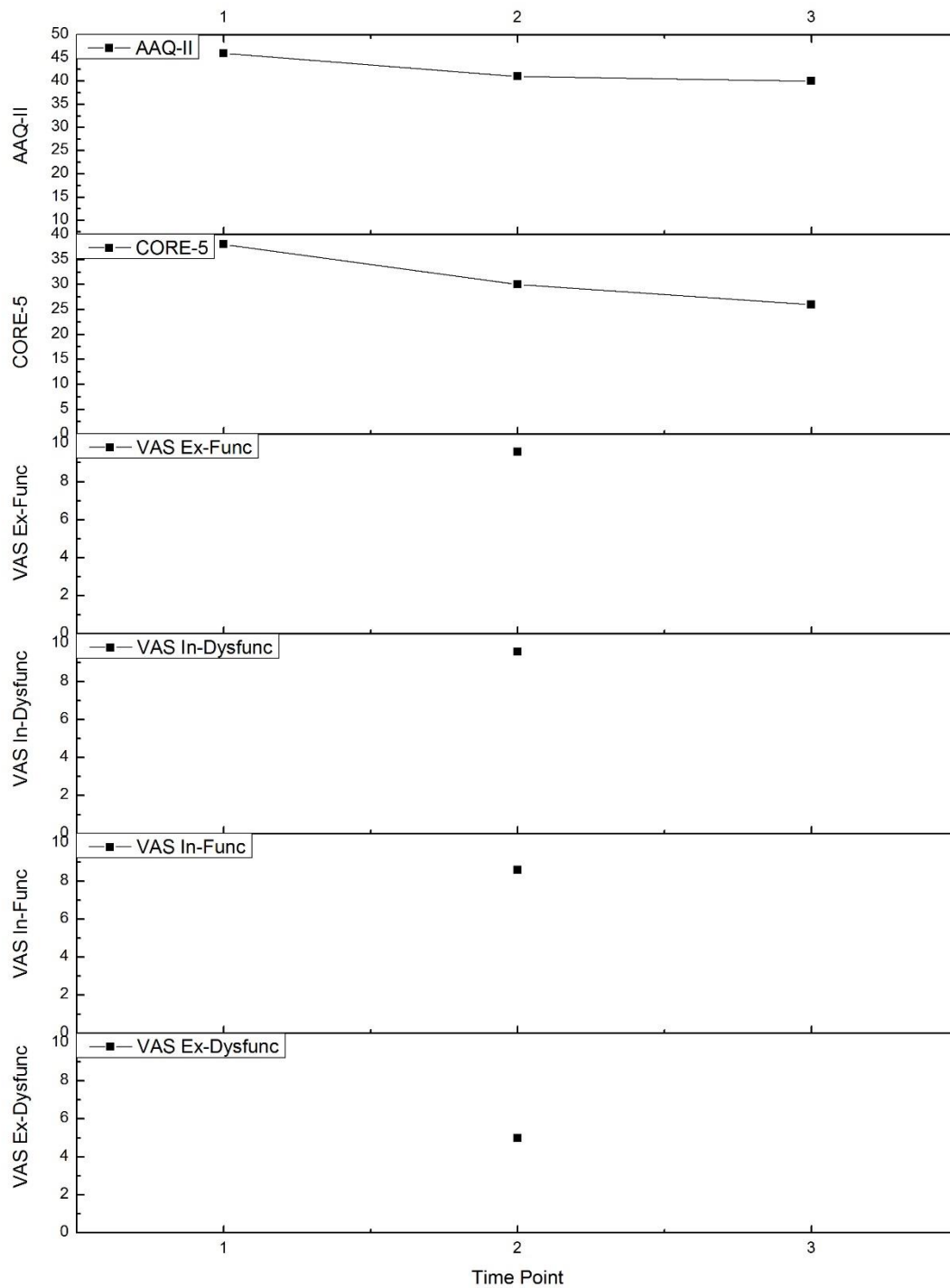
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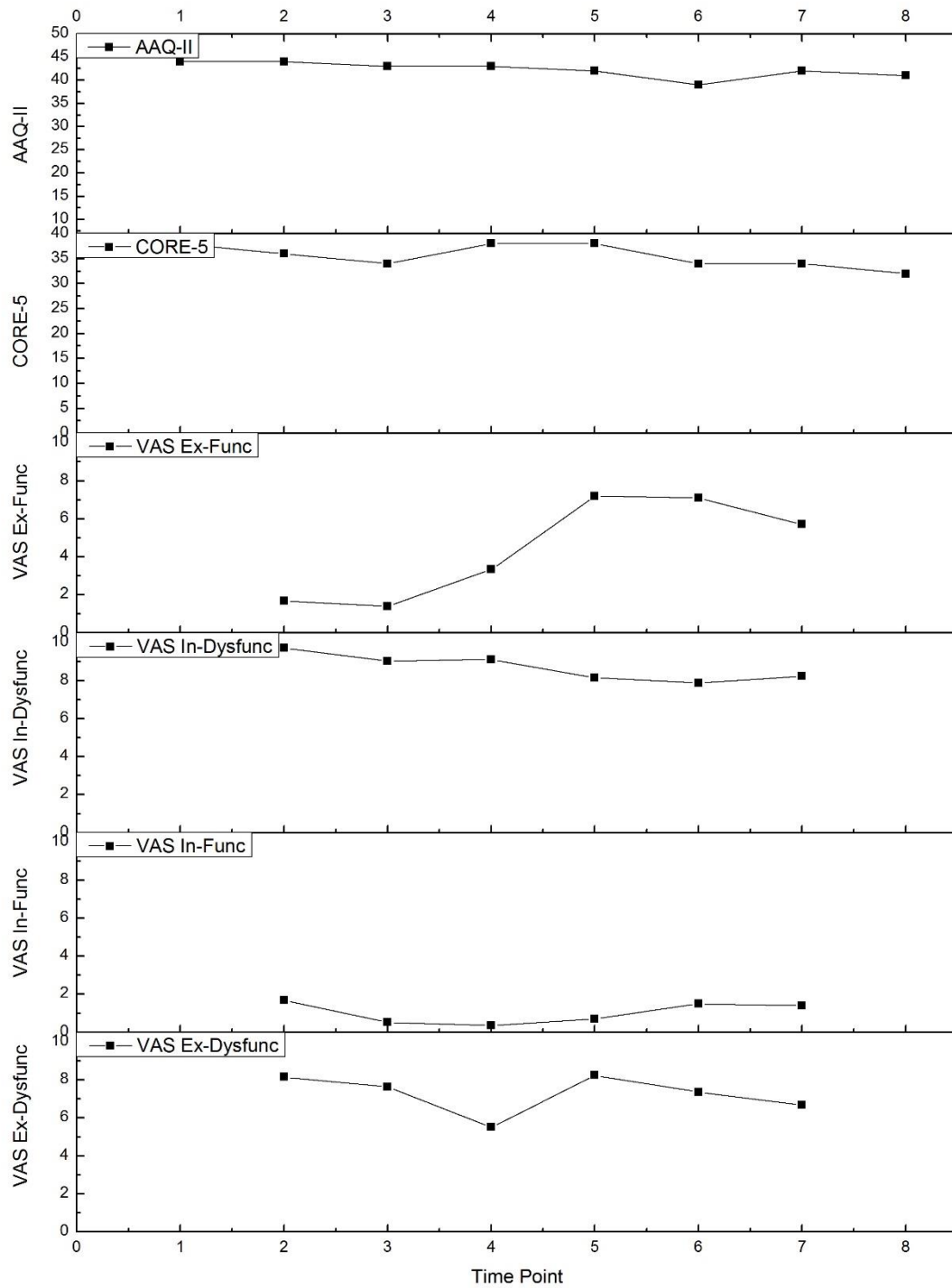
P1 Session By Session Graph



Participant (gender)	Pre	Post	DERS norms†	Change	Change \geq norm SD
1 (f)	140	Not collected	78 (SD 21)	-	-

†DERS Gender Norms taken from Gratz & Roemer (2004)

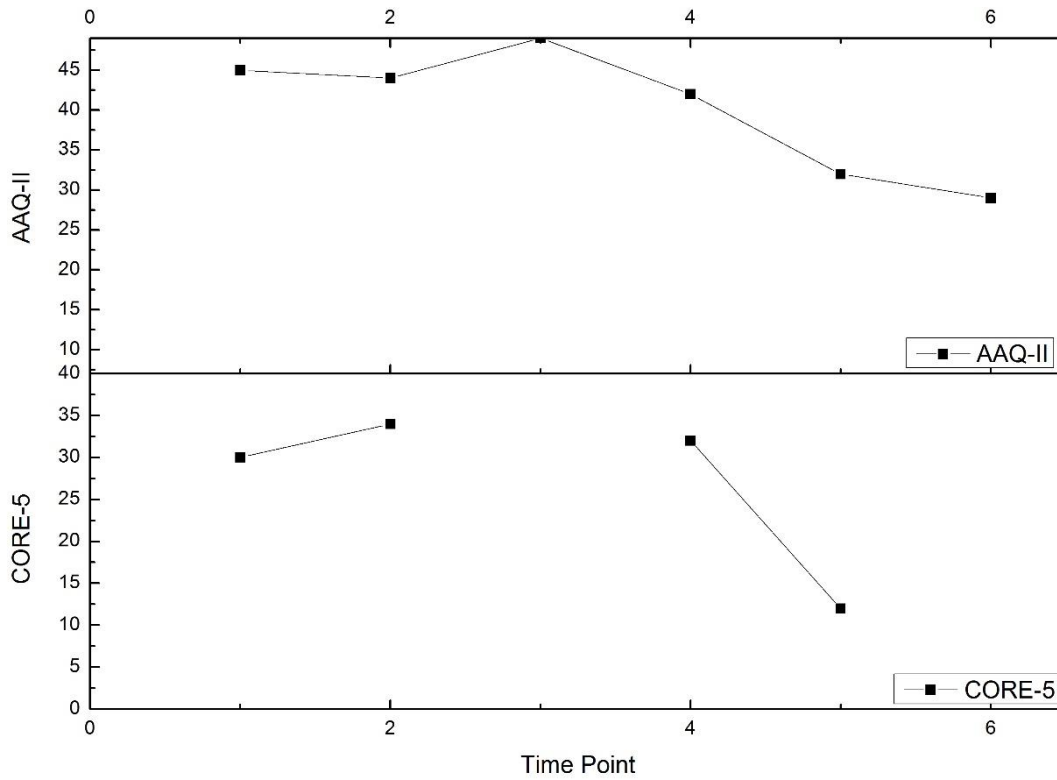
P2 Session By Session Graph



Participant (gender)	Pre	Post	DERS norms†	Change	Change ≥ norm SD
2 (f)	165	143	78 (SD 21)	22	≈1 SD

†DERS Gender Norms taken from Gratz & Roemer (2004)

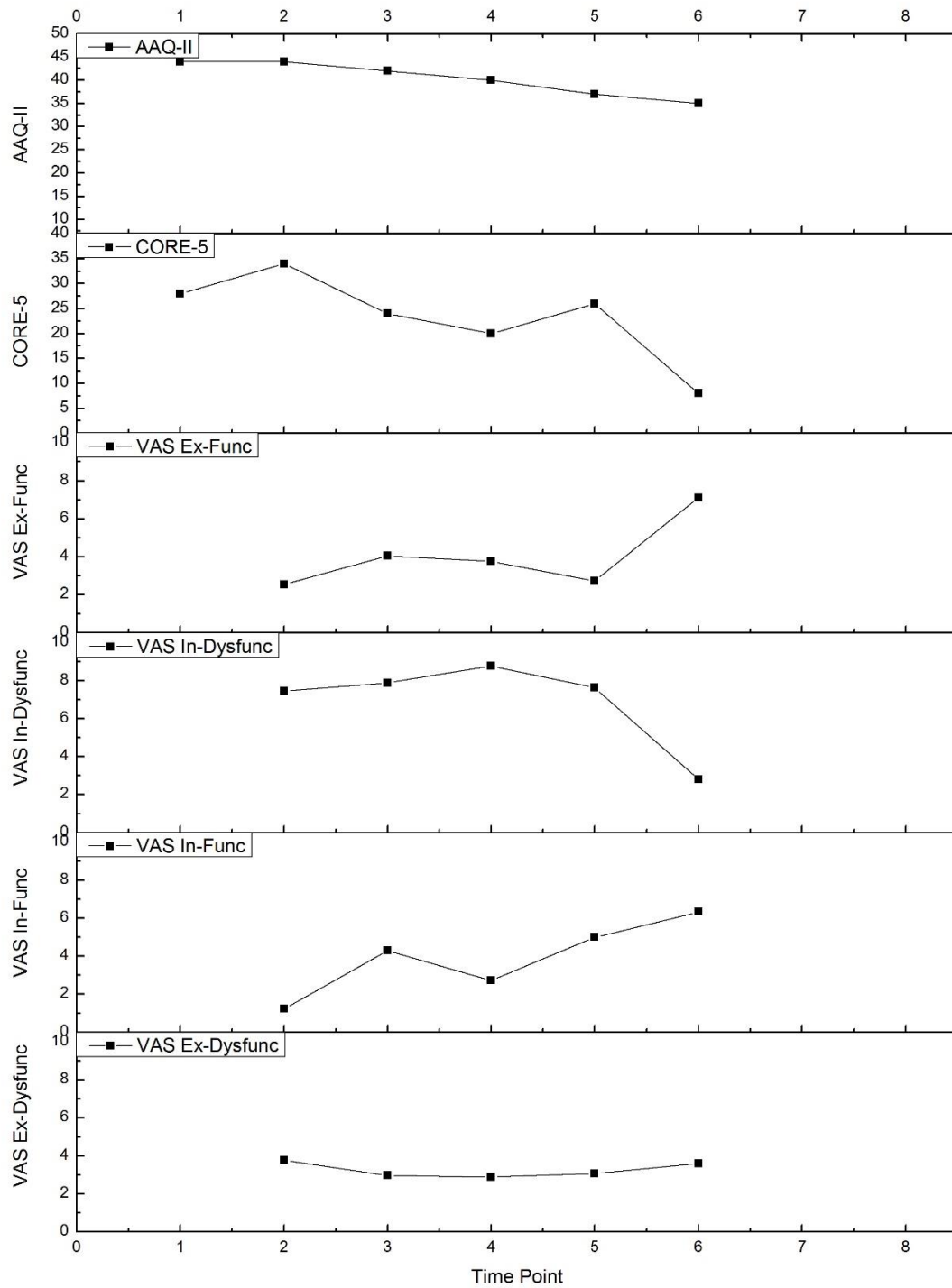
P3 Session By Session Graph



Participant (gender)	Pre	Post	DERS norms†	Change	Change ≥ norm SD
3 (f)	131	93	78 (SD 21)	38	*(≈2 SD)

†DERS Gender Norms taken from Gratz & Roemer (2004)

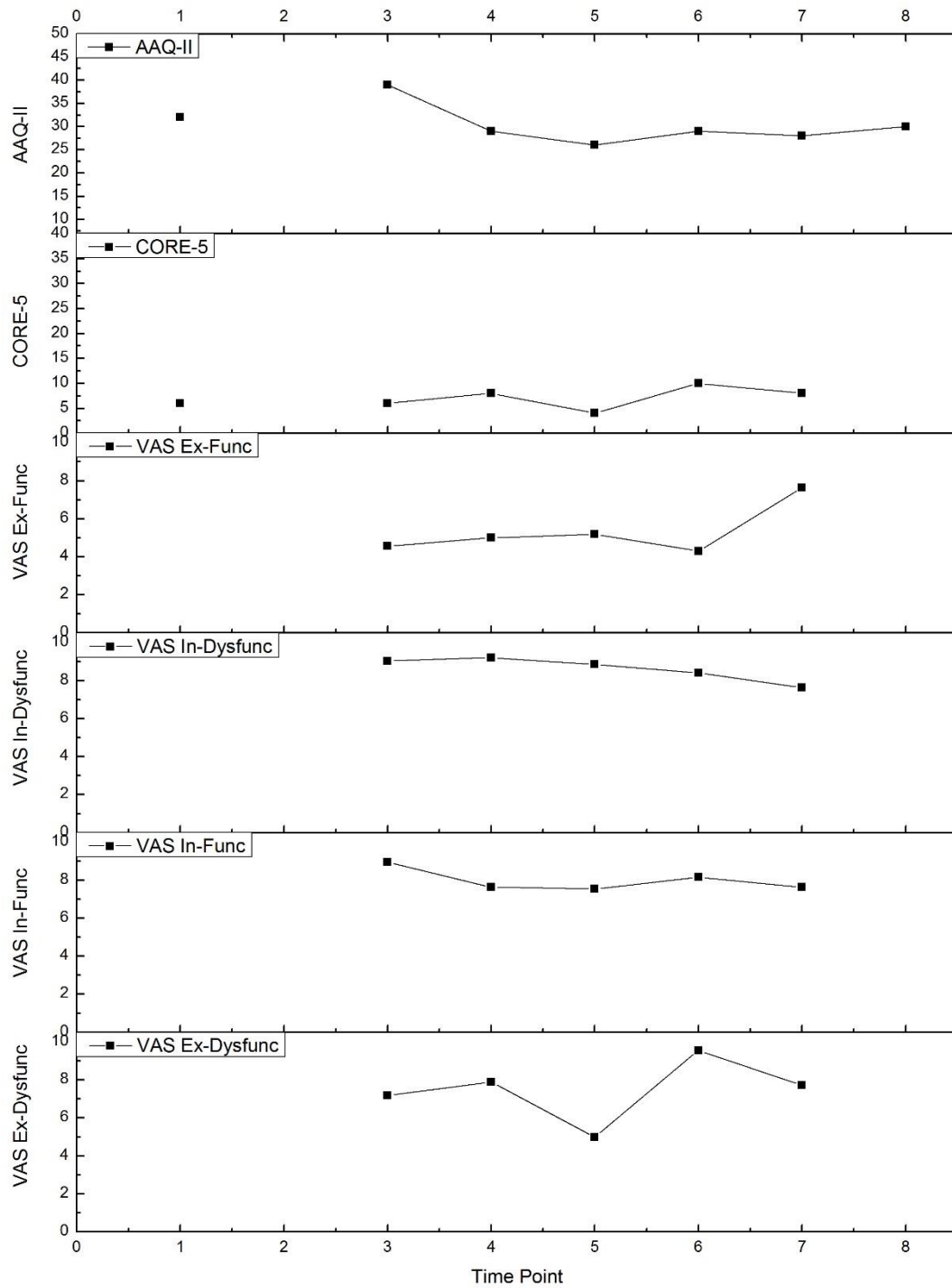
P4 Session By Session Graph



Participant (gender)	Pre	Post	DERS norms†	Change	Change ≥ norm SD
4 (f)	128	Not collected	78 (SD 21)	-	-

†DERS Gender Norms taken from Gratz & Roemer (2004)

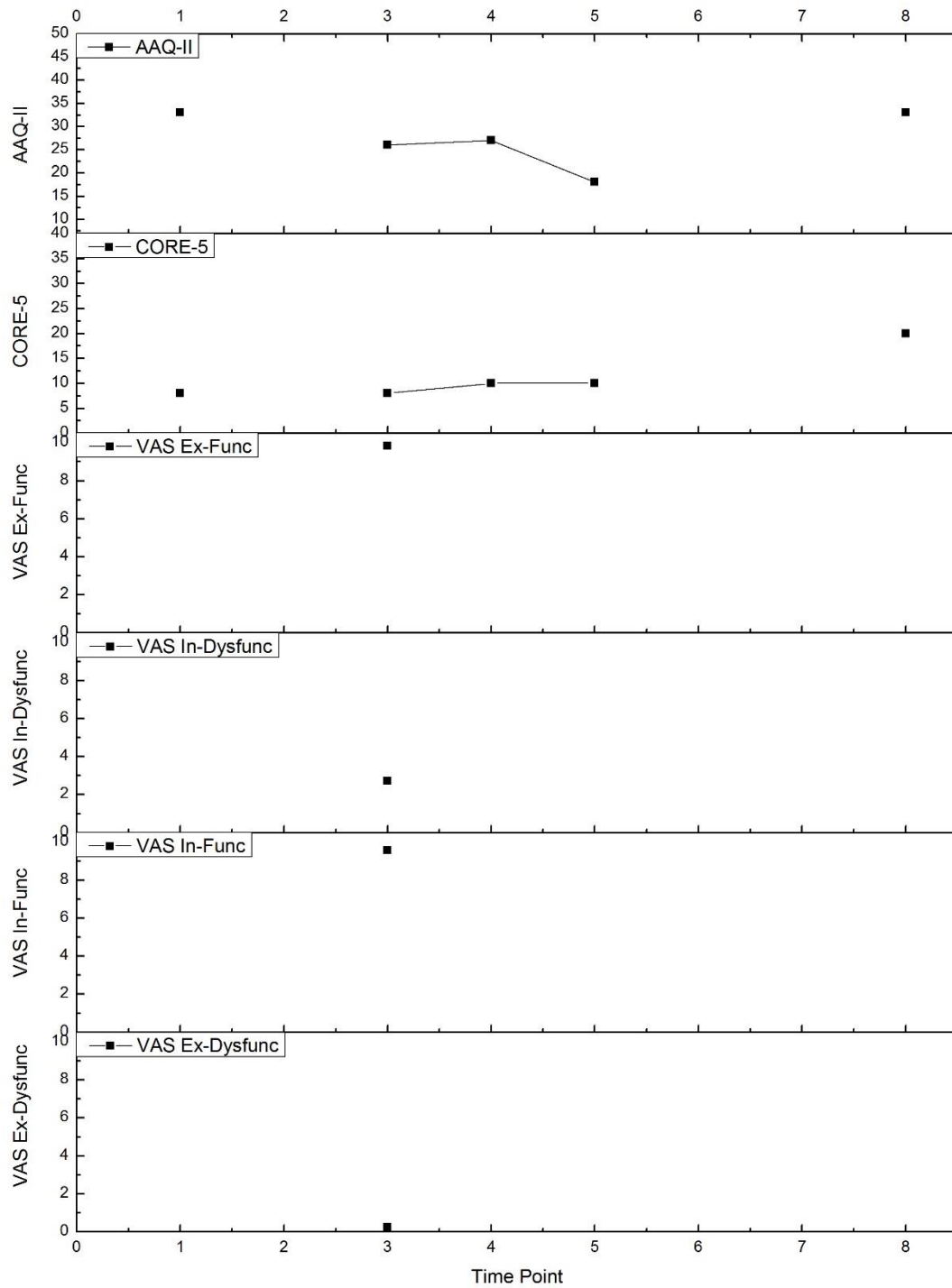
P5 Session By Session Graph



Participant (gender)	Pre	Post	DERS norms†	Change	Change ≥ norm SD
5 (f)	97	71.5	78 (SD 21)	25.5	*(≈1 SD)

†DERS Gender Norms taken from Gratz & Roemer (2004)

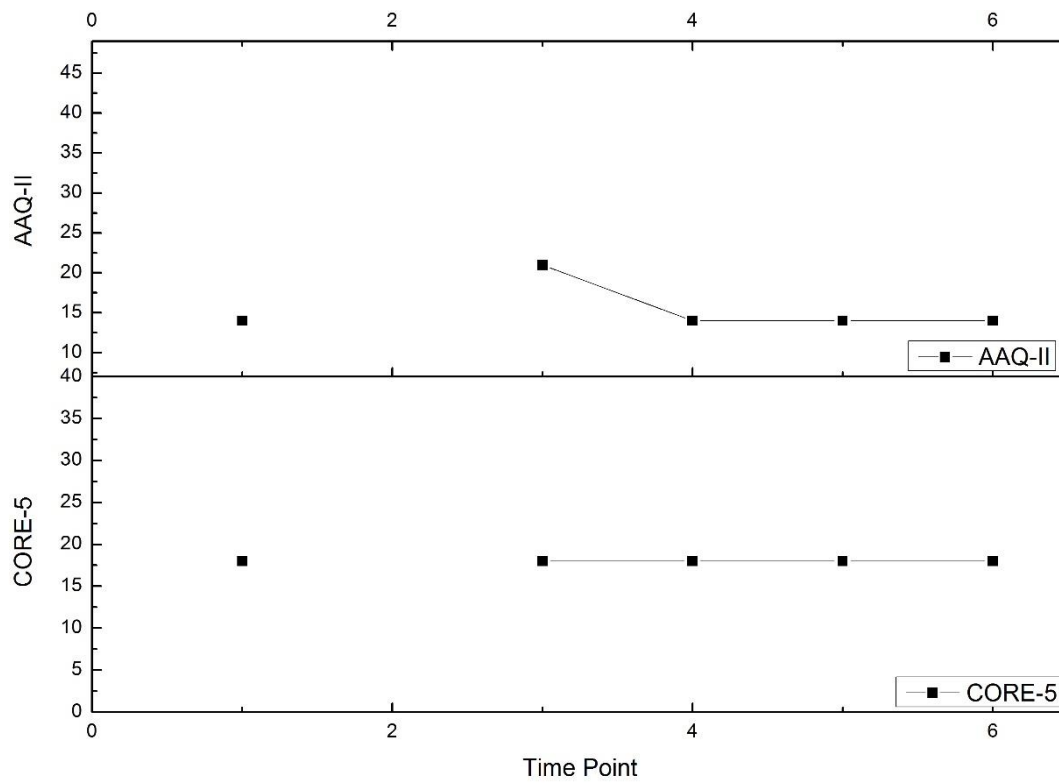
P6 Session By Session Graph



Participant (gender)	Pre	Post	DERS norms†	Change	Change ≥ norm SD
6 (m)	113	80	81 (SD 19)	33	*(≈1.5 SD)

†DERS Gender Norms taken from Gratz & Roemer (2004)

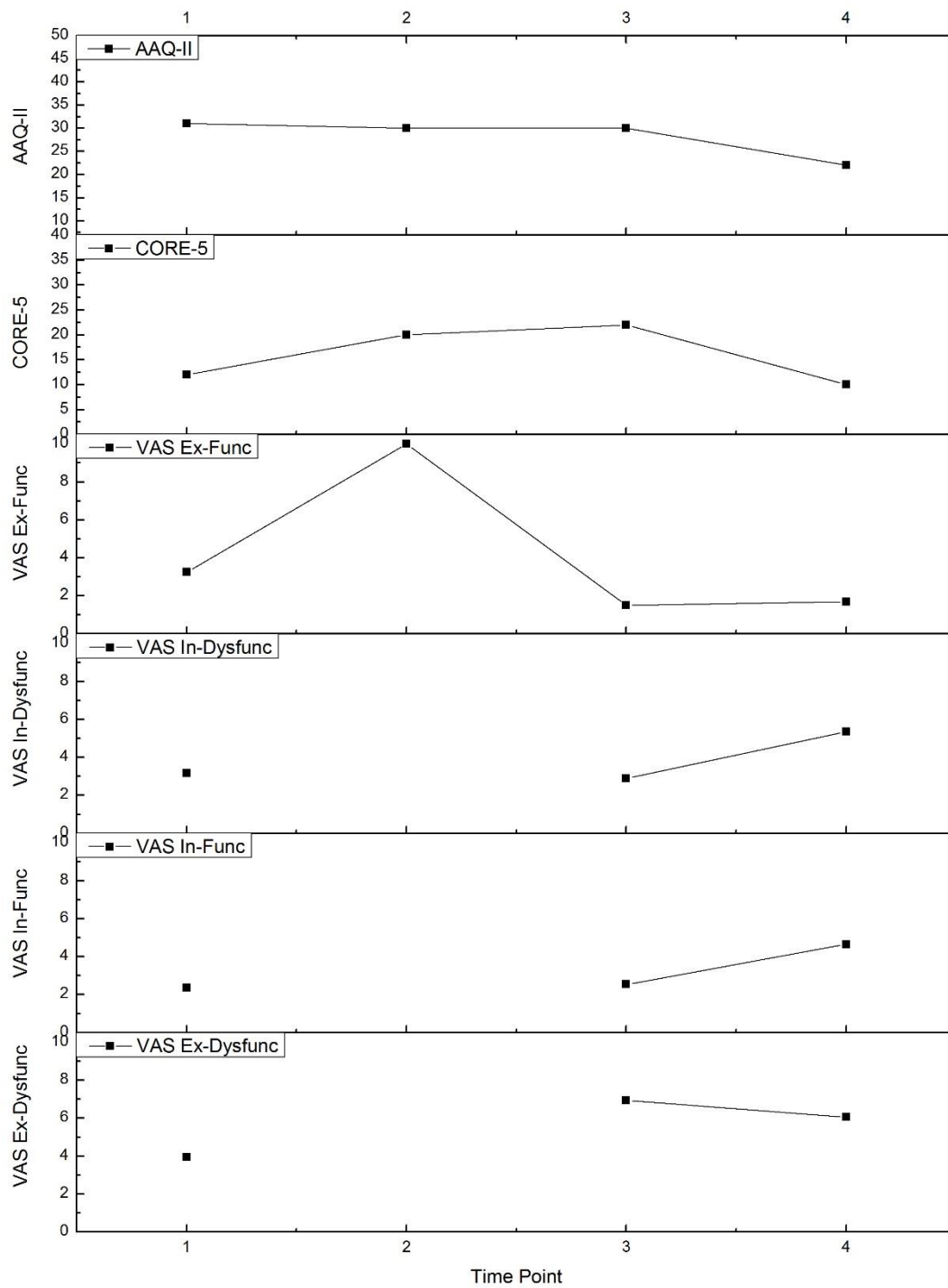
P7 Session By Session Graph



Participant (gender)	Pre	Post	DERS norms†	Change	Change \geq norm SD
7 (m)	94	94	81 (SD 19)	0	

†DERS Gender Norms taken from Gratz & Roemer (2004)

P8 Session By Session Graph



Participant (gender)	Pre	Post	DERS norms†	Change	Change ≥ norm SD
8 (f)	Not collected	Not Collected	78 (SD 21)	-	-

†DERS Gender Norms taken from Gratz & Roemer (2004)

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