Process Analysis of Trauma Focused CBT for Individuals with Schizophrenia.

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Thesis declaration form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Signature:

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Date: 06/06/2014

Overview

This volume is in three parts. Part 1 is a meta-analysis and literature review investigating the role of cognitive emotion regulation strategies in schizophrenia, with dissociation and alexithymia as possible mediators. It summarises the evidence on a conceptual link between these variables and their possible importance within schizophrenia in relation to both assessment and treatment. The review and meta-analyses suggested large effects for the maladaptive use of cognitive emotion regulation strategies in schizophrenia compared to healthy controls. The role of dissociation, its sub-categories, and alexithymia are also discussed. Clinical and research implications are then postulated.

Part 2 describes an empirical study that investigated in-session process variables in trauma focused CBT for individuals with schizophrenia. The working alliance, emotional processing, affect arousal and primary emotions were investigated at early and late phase of therapy. A subgroup of participants who experienced child trauma (as opposed to adult trauma only) was also explored. The results showed no difficulty in engagement or suitability for this focus of therapy and participants appear to have the capacity to undertake the cognitive-emotional demands inherent in the treatment. The process analysis had limitations and recommendations are given for clinical practice and future research.

Part 3 is a critical appraisal that gives reflections on the application of process analysis within clinical CBT trials. It discusses issues regarding conceptualising specific vs. non-specific variables in CBT research, study design and measurement. It offers some suggestions and recommendations when considering research in this area.

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Part 1: Literature Review

Cognitive Emotion Regulation Strategies, Alexithymia and Dissociation in Schizophrenia, a Review and Meta-analysis

Abstract

Aims: Many individuals with schizophrenia are reported to have maladaptive expression and processing of emotion. This may take the form of conscious and implicit processes. Potential regulatory processes underlying schizophrenia are reviewed. We aimed to estimate effect sizes, potential heterogeneity and publication bias across three areas of measurement: a range of cognitive emotion regulation strategies1 (CERS), alexithymia and dissociation.

Method: Data were pooled from 47 case–control studies involving measures of experiential avoidance, attentional deployment, cognitive reappraisal, emotion management, dissociation and alexithymia. All studies were rated for quality, risk of bias and publication bias.

Results: The following effect sizes (g) were observed: emotion management: 0.96 [0.77, 1.14] and cognitive reappraisal: 0.49 [0.32, 0.66] were negatively associated with schizophrenia. Experiential avoidance: −0.44 [−0.59, −0.29], attentional deployment −0.96 [−1.18, −0.75], dissociation: −0.86 [−1.13, −0.60] and alexithymia: −1.05 [−1.45, −0.65] were positively associated with schizophrenia. Subgroups of dissociation and attentional deployment were also analysed. Meta-analyses revealed potential publication bias and heterogeneity in the study of CERS in schizophrenia.

Conclusions: A marked difference in the implementation of CERS is associated with schizophrenia compared to controls. Dissociation variables and alexithymia are also indicated and may be implicated in adaptive cognitive emotional regulation. Theoretical and research implications are discussed.

Introduction

Emotion regulation in schizophrenia may begin to shed new insights into the disorder (Kelleher & Cannon, 2014; Strauss et al., 2013) where mood instability may form a prominent feature of schizophrenia (Marwaha, Broome, Bebbington, Kuipers, & Freeman, 2014). Indeed, the DSM-5 (American Psychiatric Association, 2013) points out the lack of evidence separating schizoaffective disorder as a distinct nosological category separate from schizophrenia (Malhi, Green, Fagiolini, Peselow, & Kumari, 2008; Owen, Craddock, & Jablensky, 2007; Peralta & Cuesta, 2008). This is clinically relevant given that the severity of affective disturbance/mood pathology may inform prognosis and treatment (Barch et al., 2013).

There has also been a call to identify cognitive processes underlying psychological difficulties, in order to develop process-specific interventions rather than disorder specific ones (Emmelkamp et al., 2014). This appears particularly relevant to schizophrenia given the variance in symptom clusters and response to treatments between individuals (van Os, 2009). We investigate the evidence for an underlying role of emotional regulation in schizophrenia and posit that alexithymia and dissociation need to be considered as potential mediators of affective processes which may inform future developments in psychological treatment.

Emotion Regulation

Emotion regulation has been defined as a set of processes responsible for maintaining optimal homeostatic arousal in order to facilitate goal orientated functioning (Gross, 2001; Schore, 2003; Thompson, 1994). Several theories of emotion have identified core features of emotion generation and regulation (Arnold, 1960; Buck, 1980; Cicchetti, Ackerman, & Izard, 2009; Frijda, 1986; Lazarus, 1991; Levenson, 1994; Plutchik, 1980). The ‘process model' (Gross, 1998) unifies the core processes with a focus on cognitive emotion regulation. This temporal model

consists of contextual antecedents (situation selection and situation modification), attention, appraisal, and response modulation. Contextual antecedents can be triggered by external or internal stimuli that need to be attended to in order for an emotional response to occur. Subsequent appraisal of the situation involves assessing the stimuli against prevailing factors (e.g. goals, social, cultural and familial influences, personality etc.) and current motivations. This elicits a response tendency with varying degrees of interaction between subjective experience, physiology and behaviour (Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005).

Gross suggested five strategies relating to emotion regulation (CERS) that can be grouped into antecedent focused (situation selection, situation modification, attentional deployment, cognitive change) and response focused (response modulation) strategies. These strategies have adaptive and maladaptive qualities which need to be evaluated in relation to the context (Aldao, 2013). Studies of the use of these strategies by individuals with schizophrenia have used both global and individual measures of emotion management which enabled an integrated examination of regulatory strategies in relation to context.

Other models of emotion regulation emphasise the importance of implicit (automatic) emotion regulation (Gyurak, Gross, & Etkin, 2011). Implicit processing may relate to unconscious learning or memory related processing (Panksepp, 2003) and can be conceptualised as a secondary level of emotion regulation, possibly the result of effective practice and mastery (Mauss, Cook, Cheng, & Gross, 2007). In schizophrenia, implicit emotion processing mechanisms may be particularly relevant due to the disjuncture between individuals' subjective appraisal or awareness and their experience. We suggest that two further constructs: dissociation and alexithymia may be of relevance to emotion regulation in this context and may mediate emotional regulation. We now describe CERS, dissociation and alexithymia in more detail.

Cognitive Emotion Regulation Strategies

CERS (see Gross, 2006; Kring & Sloan, 2010 for an in-depth view) are mostly categorised in terms of maladaptivity and are as follows:

Contextual antecedents (situation selection/modification) involve selecting to enter or avoid an evocative situation thereby modifying the likelihood of an emotion.

Attentional Deployment (rumination, worry, mindfulness) comes after situation modification in the emotion trajectory and tends to be activated when it is not possible to change or modify the situation. Individuals focus on aspects of situations in order to influence their emotions. Mindfulness has been postulated as an alternative adaptive learned strategy (Chambers, Gullone, & Allen, 2009) in which the individual engages in an awareness of affect and cognitive processes without engagement. It has been posited as self-regulation of attention (Bishop et al., 2006).

Cognitive Change (reappraisal) involves changing how we appraise the external or internal situation or our capacity to manage the demands it poses, altering its emotion significance and emotion impact (Gross & Thompson, 1997).

Response Modulation (experiential avoidance: suppression, distraction, or acceptance), occurs late in the process, the aim is to influence experiential, behavioural, or physiological reactions once they have been elicited. There are various strategies: expressive suppression (efforts to inhibit on-going emotion-expressive behaviour) (Gross, 1998), and experiential avoidance (efforts to inhibit the emotion experience itself). Distraction is a cognitive avoidance of distressing or unwanted events or experience.

More recently acceptance has been viewed as an adaptive response (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). This is a metacognitive process utilising mindfulness to develop a distancing awareness of internal processes combined with an acceptance of the experience (Chadwick, Hughes, Russell, Russell, & Dagnan, 2009).

Adaptive emotion regulation involves choosing and implementing regulation strategies that are appropriate for the context, appropriate for how controllable the internal and external events are, and are in accordance with one's long-term goals (Berenbaum, Raghavan, Le, Vernon, & Gomez, 2003; Gross & John, 2003; Mennin & Farach, 2007). Such regulation often involves the following four steps: (1) pausing, (2) noticing, (3) deciding how controllable the emotion and situation are, and (4) acting in line with long-term goals (Kring & Sloan, 2010).

Emotion Regulation in Schizophrenia

Current neurobiological and psychosocial models conceptualize schizophrenia as a complex multidimensional disorder. The heterogeneity of schizophrenia is well established, with high rates of co-morbidity (Buckley, Miller, Lehrer, & Castle, 2009). This will inevitably result in variations in presentation and symptomatology. However it is likely that a wide range of emotional regulation difficulties are implicated.

Among negative symptoms, diminished emotion expression (previously referred to as affective flattening: DSM-IV) is considered core, suggesting individuals with schizophrenia experience less expansive and less intense emotions. Diminished emotional expression may also overlap with features of alexithymia. Individuals with schizophrenia are also considered to have impaired emotion perception (Kring & Elis, 2013). In contrast they have also been found to experience higher levels of negative emotion than controls (Cohen & Minor, 2010) – this may relate more closely to hallucinations and delusions. It has been suggested that diminished emotion expression in schizophrenia may reflect overuse of suppression as a strategy (Ellgring, Smith, Flack Jr., & Laird, 1998; Henry et al., 2007). Suppression may reduce the ability to identify emotion which may lead to maladaptive reappraisal of emotion (van der Meer, van't Wout, & Aleman, 2009). However Henry et al. (2008) found no association between use of suppression and clinical ratings of diminished emotion expression.

Different cognitive theories of schizophrenia attempt to integrate emotion regulation within their models. Emotion dysregulation has been related to cognitive biases (Garety & Freeman, 1999), deficits in Theory of Mind and emotion processing affecting social cognition (Green, Olivier, Crawley, Penn, & Silverstein, 2005). Attentional deployment strategies, experiential avoidance and cognitive reappraisal are clearly indicated in cognitive models, in the onset, maintenance and distress associated with positive symptoms (Birchwood, 2003; Bentall & Swarbrick, 2003; Freeman, Garety, Kuipers, Fowler, & Bebbington, 2002; Morrison & Wells, 2007; Morrison, 2001). Freeman & Garety (2003) conceptualised positive symptoms as arising directly through the influence of emotion on triggers, maintenance and distress. Subsequent appraisals are involved in maintaining the hallucinatory experience (Morrison, Haddock, & Tarrier, 1995) with interpretations of experiences associated with emotion responses (Goldstone, Farhall, & Ong, 2011; Morrison et al., 2012; Morrison, Nothard, Bowe, & Wells, 2004; Udachina et al., 2009). Wells & Matthews (1996) suggest a model, whereby metacognitive beliefs determine CERS used in relation to psychotic experiences. Attentional deployment strategies may activate metacognitive beliefs to the detriment of employing helpful cognitive appraisal, thereby maintaining distress. The role of meta-cognitive beliefs, however, is only weakly associated with hallucination-proneness (Varese, Barkus, & Bentall, 2011). It has also been postulated that psychotic experiences evoke metacognitive beliefs (Goldstone, Farhall, Thomas, & Ong, 2013) relating more to maintenance than onset.

There have been calls for a greater focus on emotional distress rather than the reduction of positive symptoms with cognitive psychological treatments (Birchwood et al., 2007). While there are some cognitive treatments emphasising emotion regulation (Chadwick, 2006) it is still early in understanding the use of such strategies (Khoury & Lecomte, 2012).

There is now a large body of evidence for deficits across cognitive domains in schizophrenia (Schaefer, Giangrande, Weinberger, & Dickinson, 2013) especially processing speed, which is associated with maladaptive cognitive appraisal (Lysaker, Campbell, & Johannesen, 2005). The quality of cognitive appraisals may also be impeded by working memory deficits (Chambers et al., 2009; Garety et al., 2013). Deficits in executive functions have been reported in neuropsychological and imaging studies (Kerns, Nuechterlein, Braver, & Barch, 2008). A deficit in inhibitory systems has been implicated in emotion dysregulation in schizophrenia (Cohen & Minor, 2010). An altered neurodevelopmental trajectory in schizophrenia may impact on the processing of emotions and hence emotional regulation. Given the central role of metacognition, selective attention, working memory and inhibitory control, this suggests that individuals with schizophrenia may have maladaptive use of CERS.

Alexithymia

Alexithymia may play an important role in emotion regulation. Difficulties in identifying and describing one's own emotion state (Alexithymia: Sifneos, 1972), are suggested to be associated with maladaptive emotion processing, and have also been linked with poorer ability to mentalise (Moriguchi et al., 2006). High levels of alexithymia have been associated with impoverished emotion awareness which may be compromised by cognitive demands (Henry, Bailey, von Hippel, Rendell, & Lane, 2010; Herbert, Herbert, & Pollatos, 2011).

Where regarded as a learned behaviour (Darrow & Follette, 2014) it may reflect experiential avoidance of subjectively threatening emotions and also expressive suppression (Luminet, Rimé, Bagby, & Taylor, 2004). Given the prevalence of trauma histories and/or invalidating or under-stimulating environments this may possibly reflect an adaptive behavioural response for individuals with schizophrenia. Conceptualised in this form alexithymia may overlap with core negative symptoms.

Alexithymia measures have broken the construct down into subtypes (see outline of TAS and BVAQ below) with a suggestion of up to five separate alexithymia types (Moormann et al., 2008). Rather paradoxically, accurate completion of a self-report measure of alexithymia necessitates, to some degree at least, the accurate identification and appraisal of emotions. As such these measures may be measuring an awareness of difficulties rather than actual ability (Müller, Bühner, & Ellgring, 2004).

Given the lack of clarity underlying the concept of alexithymia, its formal measurement appears to assess multiple processes. Therefore conclusive links to the process model are tentative at this stage.

Dissociation

This term is also used to describe a range of concepts within different theories (for a detailed overview see Braude, 2009; van der Hart & Dorahy, 2009). Conceptualised along a continuum, it can be viewed as an adaptive coping strategy at milder levels (e.g. daydreaming) to being similar to a form of experiential avoidance.

At pathological levels, dissociative disorders are viewed as a disruption in the integration of "consciousness, memory, identity, emotion, perception, body representation, motor control, and behaviour" (American Psychiatric Association, 2013). As a psychological defense against overwhelming emotion or adverse experiences, this may be an adaptive early developmental response to on-going adverse experiences (Van Ijzendoorn & Schuengel, 1996) or, within the context of PTSD, a learned response to avoid integrating negative experiences in order to reduce emotional and physical pain (Brewin, Dalgleish, & Joseph, 1996; Briere, 2006). This suggests maintenance of ongoing avoidance of having or expressing particular feelings (experiential avoidance).

Three components of dissociation are often mooted and form the basis for measurement. 1. Absorption reflects a high level of focus on inner cognitive

processes; self-focused attention (Vogel, Spitzer, Barnow, Freyberger, & Grabe, 2006) therefore reflecting an attentional deployment strategy. Absorption and depersonalisation may also contribute to the predisposition for hallucinations (Glicksohn & Barrett, 2003; Morrison & Petersen, 2003; Perona-Garcelan et al., 2008).

2. Dissociative amnesia is an inability to recall important autobiographical information, usually of a traumatic or stressful nature (American Psychiatric Association, 2013). It has been postulated as a deficit in memory retrieval, and also as an encoding deficit (Allen, Console, & Lewis, 1999) possibly mediated by inattention, absorption or anxiety.

3. Depersonalisation/derealisation relates to several symptom clusters: anomalous body experiences; emotional/physical numbing and temporal distortions with anomalous subjective recall (American Psychiatric Association, 2013). Dual mechanisms of emotional processing inhibition and self-focused attention have been postulated as underlying associated symptoms (Hunter, Phillips, Chalder, Sierra, & David, 2003; Sierra & Berrios, 2000).

Dissociation may be functional, providing a source of resilience against, a risk factor for, or a response to schizophrenia, mediating or maintaining symptoms (Morrison, Frame, & Larkin, 2003; Sar et al., 2010).

The meta-analysis aims to clarify which aspects of emotional regulation differ between individuals with schizophrenia and healthy controls. Dissociation and alexithymia play a role in the individual's experience of affect and may mediate the use of CERS. The degree to which these phenomena occur is not fully understood and are also investigated.

Method

Search Method for inclusion of studies

Published and unpublished studies were considered, restricted to those written in English. No date restrictions were applied.

Search terms were compiled into three concepts (Appendix A). Searches were conducted using the following databases (concept 2 and 3): Ovid MEDLINE, Ovid PsycINFO and Ovid Embase (all years to 01 May 2014). A broader search was completed on the following databases (concept 1 and 2): The Cochrane Central Register of Controlled Trials (CENTRAL) and Google Scholar (all years to 01 May 2014).

References from related meta-analyses and from articles retrieved during the search were examined for additional studies.

Selection of studies

The first author screened titles and abstracts to determine which were eligible for inclusion. We were not blind to study authors, institutions, journal of publication or results. Any questions regarding eligibility were resolved by seeking additional information and through discussion with the other authors. Figure 1. outlines a flow diagram of the systematic review.

Inclusion/exclusion criteria for the study:

- In terms of populations, we included studies recruiting adults, as well as from various demographic groups as long as the majority of the patients had a diagnosis of schizophrenia, schizoaffective or non-affective functional psychosis, clinically or according to diagnostic criteria.
- We excluded treatment studies without a healthy control group that would allow us to draw comparisons with the schizophrenia group. Studies with

previously collected normative samples were excluded. Datasets referred to in several published reports were included once based on the fullest description given.

- We included a study if it reported base-line cross-sectional analysis on a measure of an emotion regulation strategy regardless of a study's specific aims.
- While grey literature was included in the literature search (dissertations, conference presentations and book chapters) to reduce publication bias these were omitted if the full study was not available.
- Miettunen & Raevuori, (2012) and Ohi et al., (2012)conducted meta-analyses of the Temperament and Character Inventory (TCI) in relation to schizophrenia. Studies solely using the TCI were excluded from the meta-analysis.

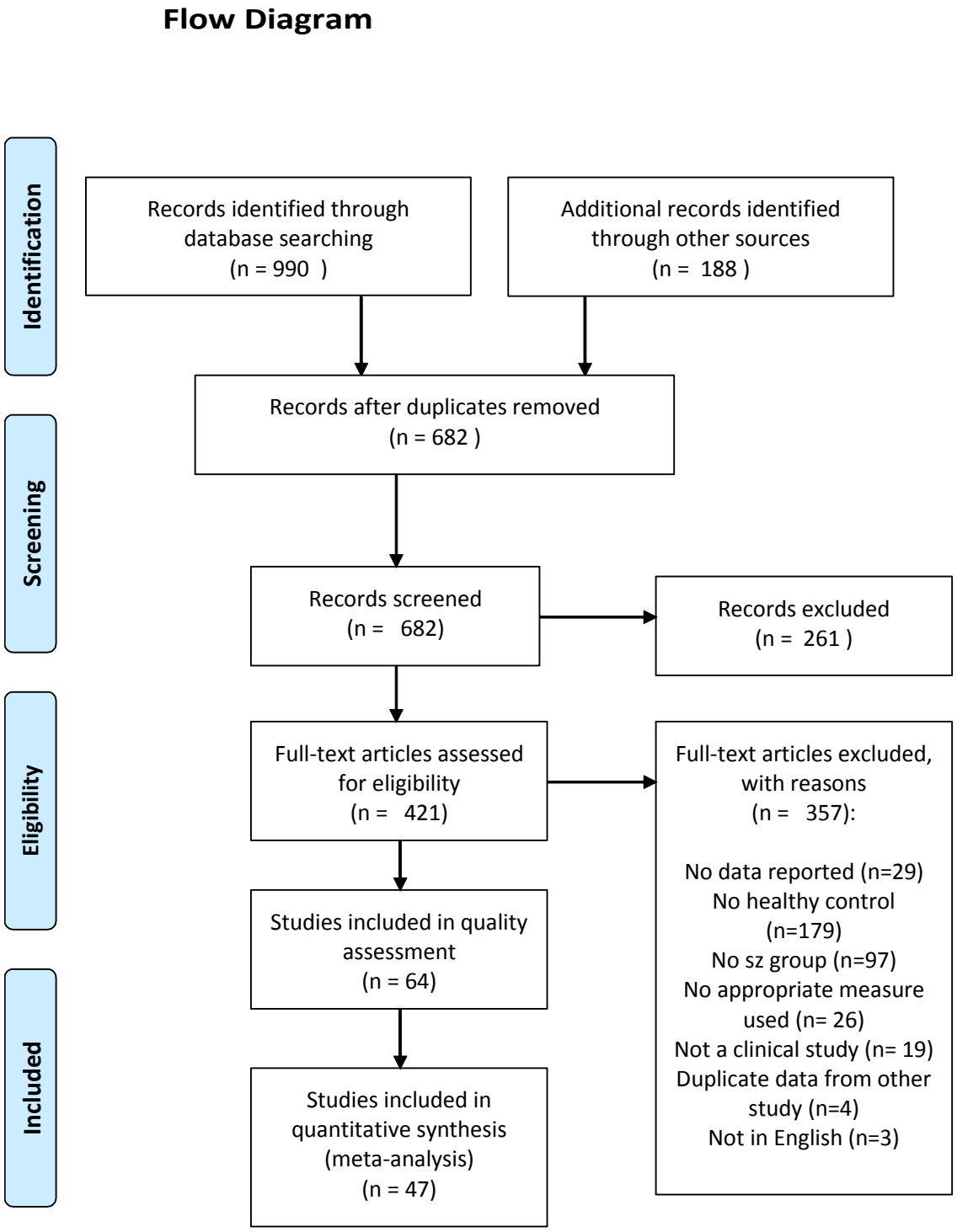

Figure 1: Flow diagram of systematic review

Quality Appraisal

Data regarding methodology was extracted independent of authorship and rated for quality independently by two review authors. Each study was assessed for quality against a checklist based on the Newcastle Ottawa Quality Assessment Scale (NOS) (Wells et al., 2011). Any disagreements were resolved by a third reviewer. There is, as yet, no internationally established quality assessment tool for case control studies, the NOS has not been validated (Stang, 2010). Thus, the tool we used aimed to help identify potential methodological weaknesses rather than provide a definitive quality score for each study.

The areas appraised were rated as good, fair or poor (Appendix B) with a graph summarising quality in Figure 2.

The quality appraisal examined case definition, appropriateness of sample, selection of controls, definition of controls and how well the cases and controls were matched (Appendix C). Where data on matching was not clear, indices were calculated using chi-sq. and t-tests as appropriate to verify significant differences. Papers rated as poor on three or more criteria were removed from the table. After quality rating five papers were excluded from the meta-analysis.

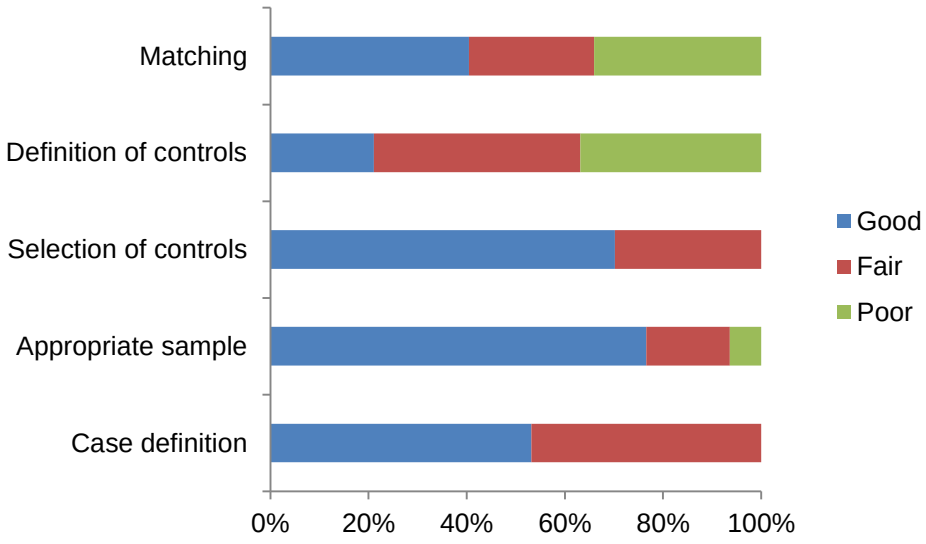

Figure 2: Quality appraisal: review authors' rating of each quality item presented as percentages across all included studies.

Data extraction

Data regarding outcome measures was extracted into Review Manager 5.2 (RevMan, 2012) for analysis. We gave preference to data that involved the least manipulation, extracting raw values at endpoint (e.g. means, standard deviations) rather than calculated effect sizes (e.g. Cohen's d).

Where required data had not been published (17 studies), authors were contacted for additional data (i.e. missing data, subscale data and raw data where there were multiple eligible intervention groups) for analysis. As such data presented in this meta-analysis may differ from that published in the original papers. Seven authors did not respond, 3 studies were removed as the authors no longer had data or had incomplete data, 1 study was removed as data in the paper was calculated incorrectly and original data was no longer available.

Data synthesis

Standardised mean differences (SMD; Hedges' (adjusted) *g*) and 95% CIs were calculated for continuous measures and were combined by using inverse variance methods. Since all of the papers selected for meta-analysis involve group contrasts, Hedges' (adjusted) *g* appeared to be the most appropriate formula for the current meta-analysis as it is based on the standardised difference between two means. With small samples, Hedges' g provides a superior estimate of the standardized mean difference (to Cohen's D), but the superior performance fades as the sample size increases. Standardized mean difference for continuous outcomes also supports the analysis of studies varying in their measurement of outcomes. The method assumes that the differences in standard deviations among studies reflect differences in measurement scales and not real differences in variability among study populations (Higgins, 2008).

SMD method does not correct for differences in the direction of the scale as such, where appropriate the mean values from one set of studies were multiplied by –1 to ensure that all the scales point in the same direction.

Random-effects models were used because studies included different measures and populations, as such interpreting the summary result as an estimate of the average effect rather than the common effect. Random effects models are generally considered to be more appropriate than fixed effects models when analysing behavioural, social and health science data (Field & Gillett, 2010).

The specific measures included in each analysis for each study are listed in Appendix B.

For all analyses, the area to the left of the 'line of no effect' indicates greater use of the strategy for the schizophrenia groups (favours schizophrenia).

Subgroup Analysis

Within the primary analysis of emotion regulation strategies we also looked at defined subgroups of rumination and worry within attentional deployment and absorption, amnesia and derealisation/depersonalisation within dissociation. It was not possible to conduct subgroup analysis for any of the other constructs due to the absence of sufficient data.

Assessment of heterogeneity

Heterogeneity between studies was assessed using a chi-squared test of the null hypothesis (that all studies are evaluating the same effect) together with the I^2 statistic which describes the percentage of observed variance which is accounted for by true heterogeneity rather than sampling error (Higgins, Thompson, Deeks, & Altman, 2003).

A p value of 0.1 or less indicates significant heterogeneity when considering Chi². We assigned adjectives of low, moderate, and high to I^2 values which were considered as low at 25%, moderate at 50% and high at 75%.

Sources of heterogeneity which may affect the meta-analysis included: study designs, different statistical methods/models used, sources of bias and study quality. The heterogeneity of the diagnosis of schizophrenia was also considered to affect the studies.

Where present, heterogeneity will be discussed qualitatively as moderator analysis was not possible within the remit of the data available.

Assessment of risk of bias in included studies

Two raters coded each included study using a classification scheme (see Appendix D) based on Cochrane Collaboration's tool for assessing risk of bias (Higgins et al., 2011). We judged whether each study was at low, high or unclear risk of bias in relation to selection bias, confounders and measurement bias. Disagreements were resolved through discussion and by seeking further information.

Potential risk of bias on other factors was deemed low as the data being reviewed reflected baseline data as opposed to outcome data. Also, the measures being used for many of the studies were not their primary outcome measure. It should be noted that none of the studies were blind.

Seventeen studies met all three methodological criteria at a low level of risk of bias. Twelve studies met two of the criteria at a low level and one where risk was considered unknown or high and were categorised as studies with moderate risk of bias. The final 18 studies met one or no risk of bias criteria at a low level and were considered high risk of bias. The ratings for each study are included in the characteristics table (Appendix B) with a graph representing risk of bias in Figure 3.

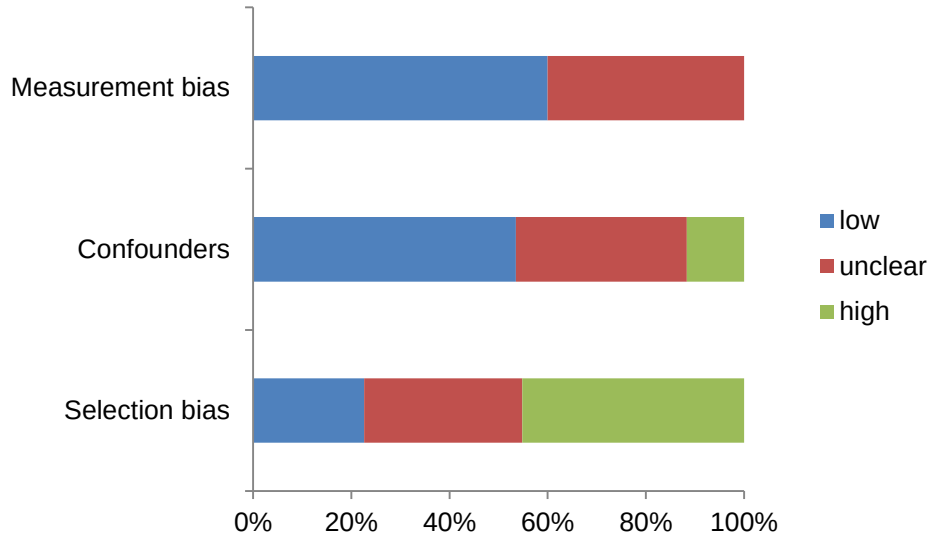

Figure 3: Risk of bias graph: review authors' ratings of each risk of bias item presented as percentages across all included studies.

Sensitivity analysis

We conducted the following sensitivity analyses to determine whether findings were robust to methodological decisions made throughout the review process.

1. Poor studies were omitted from the analysis.

2. To control for the influence of bias, we assessed and excluded studies at high risk of bias.

3. We assessed the impact of each study on the combined effect and reported where one study had a large influence on heterogeneity.

Publication bias

Publication bias (significant findings are more likely to be published) is a potential bias in meta-analysis (Field & Gillett, 2010; Rosenthal, 1995). The literature search aimed to find both published and grey literature; however only published studies met the criteria for inclusion. The measures assessed were not necessarily the primary outcome measures for the studies also reducing potential for publication bias. Studies of similar sample size make assessment for bias more difficult to assess.

The studies were estimated for publication bias by funnel plot asymmetry, trim and fill (Duval & Tweedie, 2000) and Egger's regression test (Egger, Smith, Schneider, & Minder, 1997) to support inferences drawn from visual inspection of the funnel plot. The funnel plot and statistics were calculated using comprehensive meta-analysis (Borenstein, Hedges, Higgins, & Rothstein, 2005). Where multiple effect sizes were used from individual studies, these were combined and effect sizes averaged. Direction of effect was corrected so they all went the same way. Publication bias for studies was statistically investigated across all studies due to weak power for statistical investigation on fewer than 10 studies.

In the aggregate analysis Egger's regression intercept was significant (p =0.006, 1-tailed) however the application of the trim and fill method identified no missing studies within the random effects model. Visual inspection also displays asymmetry. Considering the factors above protecting against publication bias, the occurrence of asymmetry may be attributed to the studies being mostly of similar size or between study heterogeneity rather than publication bias. However bias cannot be discounted and 'small study effects' may be present. While the statistical findings suggest some publication bias they did not suggest that it has significant influence on estimated effect sizes. In line with heterogeneity findings this supports use of confidence intervals over mean effects as the main method of analysis.

Psychometric properties of measures used in the meta-analysis

While a large range of measures were identified in the literature search (Appendix A) the following were used in the studies investigated. As many of the emotion regulation strategies are measured by self-report measures, the construct validity and reliability of each measure is reported.

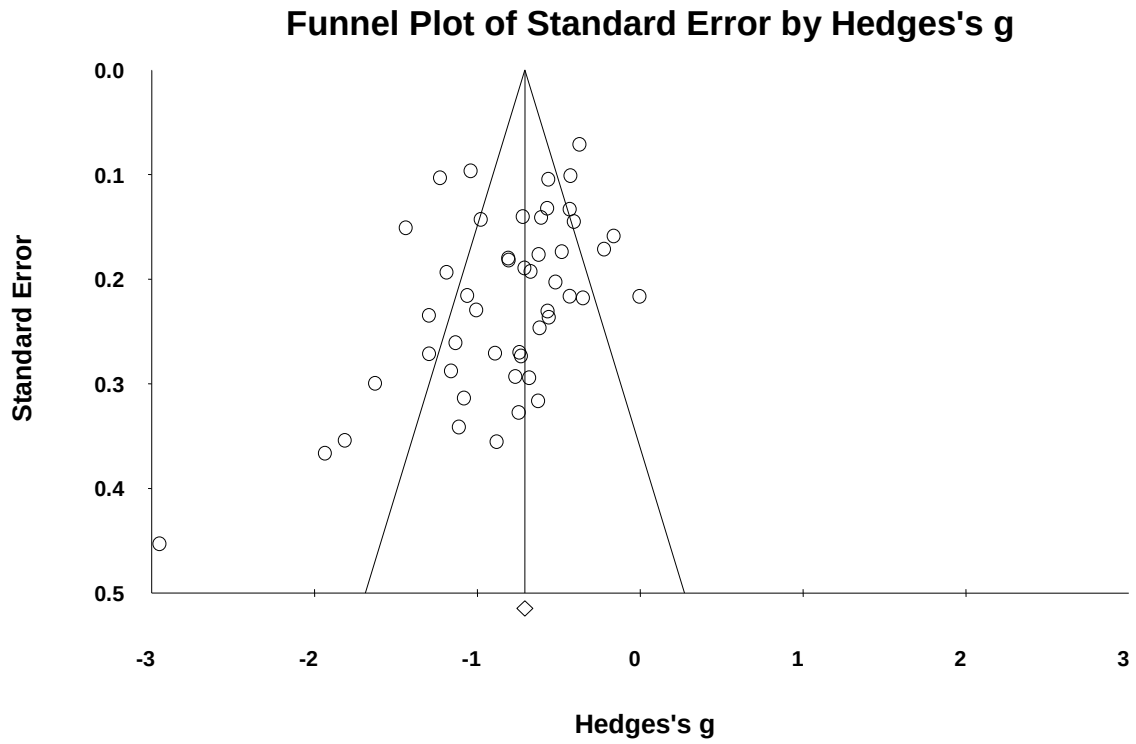

Figure 4: Funnel Plot of standard error by Hedge's g in meta-analysis

Bermond–Vorst Alexithymia Scale (BVAQ; Bermond, B., Oosterveld, P., Vorst, 1994) has five subscales (1) 'emotionizing', (2) 'fantasizing', (3) 'identifying' emotions, (4) 'verbalizing' emotions, and (5) 'analyzing' emotions. Vorst & Bermond, (2001) reported internal consistency (Cronbach's alpha) ranging from 0.67 to 0.87. Morera, Culhane, Watson, & Skewes, (2005) found significant inter-subscale correlations among the TAS-20 subscales and among the BVAQ-40. Müller et al. (2004) reported that the measures total scores were also correlated considerably (***r***=0.62).

The *Cognitive Emotion Regulation Questionnaire* (CERQ; Garnefski & Kraaij, 2007) has nine conceptually separate emotion regulation strategy subscales; self-blame, other blame, rumination, catastrophizing, putting into perspective, positive refocusing, positive reappraisal, acceptance, and planning. However these don't all

relate to the emotion regulation strategies as quantified in this study. Positive reappraisal and rumination subscales were chosen, catastrophizing which could measure worry was not included due to poor internal reliability. Internal reliability for positive reappraisal and rumination has been reported as 0.87 and 0.74, respectively (Jermann, Van der Linden, d'Acremont, & Zermatten, 2006).

Coping Inventory for Stressful Situations (CISS; Endler & Parker, 1990) has three subscales, task-oriented, emotion-oriented, and avoidance-oriented coping. Good psychometric properties were identified in several validation samples (Endler & Parker, 1997). Construct validity was documented by appropriate correlations with the Ways of Coping Questionnaire (Folkman & Lazarus, 1988) and various personality traits. A moderate correlation exists between emotion-oriented and avoidance-orientated coping. Avoidance-coping also comprised of distraction and social diversion (which could include seeking emotion support). As such only the Task-orientated factor was used within cognitive reappraisal analysis.

Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986). A meta-analysis (Van Ijzendoorn & Schuengel, 1996) reported the internal consistency as 0.93. The reported test-retest reliability ranged between 0.79-0.93 across studies. As they highlight the validity of the DES, of course, is limited by the validity of the dissociation theory on which it is based. The DES has 3 subscales (amnesia, absorption, derealisation/depersonalisation). The DES-Taxon (Putnam, Carlson, Ross, & Anderson, 1996) may not discriminate between pathological dissociation between clinical and non-clinical samples (Giesbrecht, Merckelbach, & Geraerts, 2007; Modestin & Erni, 2004) and was not investigated.

The *Emotion Regulation Questionnaire* (ERQ; Gross & John, 2003) is comprised of a reappraisal scale and a suppression scale which were both used within the meta-analysis. Alpha coefficients averaged 0.79 for reappraisal and 0.73 for suppression.

Mayer-Salovey-Caruso Emotion Intelligence Test (MSCEIT; Mayer, Salovey, & Caruso, 2002) is a measure of Emotion Intelligence. The tasks in MSCEIT involve vignettes of various situations, along with ways to cope with the emotions portrayed in the vignettes. The managing emotions component is reported in the meta-analysis. The internal consistency of the managing emotion branch has been reported as r = 0.83 and .81, for general and expert scoring, respectively (Mayer, Salovey, & Caruso, 2004).

The *Metacognitions Questionnaire* (MCQ; Cartwright-Hatton & Wells, 1997) has five subscales: (1) positive beliefs about worry; (2) negative beliefs about the uncontrollability of thoughts and corresponding danger; (3) cognitive confidence; (4) negative beliefs about thought in general; and (5) cognitive self-consciousness. The negative beliefs about the uncontrollability of thoughts and corresponding danger subscale was included in the meta-analysis as the association between MCQ uncontrollability/danger and pathological worry was large showing 53% shared variance (Wells & Cartwright-Hatton, 2004), and 57% shared variance with the 60-item MCQ (e.g. Wells & Carter, 2001). Internal consistency for the subscales was adequate (Cronbach's alpha range: 0.70–0.82).

Need for Closure Scale (NFCS*;* Kruglanski, Webster, & Klem, 1993) was designed to measure the desire for a definite answer. Two subscales were used for the meta-analysis; discomfort with ambiguity, and preference for predictability, as they are associated with the construct of intolerance of uncertainty. These two subscales have demonstrated good to very good internal consistency (discomfort with

ambiguity subscale = .67 to .80, Preference for Predictability subscale = 0.72 to 0.79; Webster & Kruglanski, 1994). Correlations with the Intolerance of Uncertainty Scale (IUS; Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994) subscales were 0.32 to 0.47 for Preference for Predictability and 0.35 to 0.55 for discomfort with ambiguity (Berenbaum, Bredemeier, & Thompson, 2008).

The *Penn State Worry Questionnaire* (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) has been reported to have high internal consistency in both non-clinical (Cronbach's alpha range: 0.90 - 0.95) and clinical samples (Cronbach's alpha range: 0.86 to 0.93).

Ruminative Response Scale (RRS; Nolen-Hoeksema & Morrow, 1991; Treynor, Gonzalez, & Nolen-Hoeksema, 2003), is part of the Response Styles Questionnaire (RSQ) containing rumination and distraction subscales with high internal consistency (0.89). RSQ has been reported in multiple studies to have high internal consistency, with Cronbach's alpha range: 0.88 to 0.92 (Luminet, 2003).

State Trait Anger Expression Inventory (STAXI; Spielberger, 1988). Subscales including State Anger, Trait Anger, Anger-in, Anger-out, and Anger Control. Subscale anger-in was used in the meta-analysis (suppression); it measures the frequency with which angry feelings are suppressed. Internal consistency of the subscale, Cronbach's alpha range: 0.64 to 0.78 (Jacobs, Latham, & Brown, 1988).

Thought Control Questionnaire (TCQ; Wells & Davies, 1994) subscales of distraction, worry and reappraisal were investigated. Wells & Davies reported subscale inter-correlations range from r = -0.02 to r = 0.27, with the highest correlation being between the punishment and worry sub-scales (r= 0.27). However, as the coefficients were generally low it suggests that each sub-scale is

measuring a distinctly different dimension. Internal consistency was found to be acceptable to good (a = .67 for reappraisal, a = .71 for worry and a = 0.72 for distraction). Subscale worry was shown to correlate with the PSWQ (r = 0.49).

Toronto Alexithymia Scale (TAS-20 and TAS-26; Bagby, Parker, & Taylor, 1994). TAS-26 has four subscales) (1) difficulties in identifying feelings and distinguishing between emotion and physical sensations (DIF), (2) difficulties in describing feelings (DDF), (3) diminished daydreaming, and (4) externally oriented thinking (EOT). TAS-20 removed the diminished day dreaming subscale. In a review of the literature (Kooiman, Spinhoven, & Trijsburg, 2002) reported test – retest reliability to be good (***r***=.71–.86), as was internal consistency except for subscale EOT.

Results

The summary effect is from a Z test of the null hypothesis that there is no effect on average (random-effects meta-analysis). Sixty-three studies fulfilled our inclusion criteria, of which 47 met quality criteria and provided data for meta-analyses.

Analysis was conducted on each construct and where applicable on subgroups of that construct. Since the outcomes were measured with similar, but not identical instruments, SMD was calculated (Hedges' (adjusted) *g*).

In order to facilitate interpretation we have followed the rule of thumb for estimated effect sizes: 0.2 represents a small effect, 0.5 a moderate effect and 0.8 a large effect (Cohen, 1992). The confidence interval describes the uncertainty inherent in this estimate, and describes a range of values within which we can be reasonably sure that the true effect actually lies. A 95% confidence interval (CI) was used for analyses and interpretation of the mean is considered in respect of the lower and upper limits. Where there is moderate or high heterogeneity in meta-analysis', confidence intervals are discussed rather than the average effect. Heterogeneity,

within a random-effects model, increases confidence intervals, assuming a distribution of effects (Higgins, 2008). As such the average effect is not a particularly accurate measure of effect.

Moderator Analysis

While there are many possible interacting factors (e.g. across phases of illness) we were only able to conduct a moderator analysis for age given the data available. Age related differences have been observed in the use of CERS (Blanchard-Fields, Stein, & Watson, 2004).

Tests for moderator effects are less powerful than tests for average effects in meta-analysis (Hedges & Pigott, 2004) and given the small sample sizes in subgroups, a test for age as a moderator variable would have low power. A mixed effects model analysis was run on constructs where there were more than 10 studies (experiential avoidance, attentional deployment, cognitive reappraisal and emotion management). However age was not shown to be a significant moderator for any of these variables. This is not surprising as the age range across studies was not consistently broad across domains.

Emotion Management

Thirteen studies were selected with the loss of two for whom data could not be obtained upon request. For the 10 studies (1204 participants) comparing schizophrenia group (579) with healthy controls (625), the primary outcome of emotion management was g = 0.96 (95% CI; 0.77 to 1.14). This indicated a large effect, negatively associated with schizophrenia. There was moderate heterogeneity (I^2 = 45%). Excluding Kern et al., (2011) reduced heterogeneity to I^2 = 4%; g = 0.86 (95% CI; 0.71 to 1.02). However this study had the largest sample with no marked concerns regarding quality or risk of bias and the heterogeneity observed from inclusion of this study may be more related to specific sample characteristics.

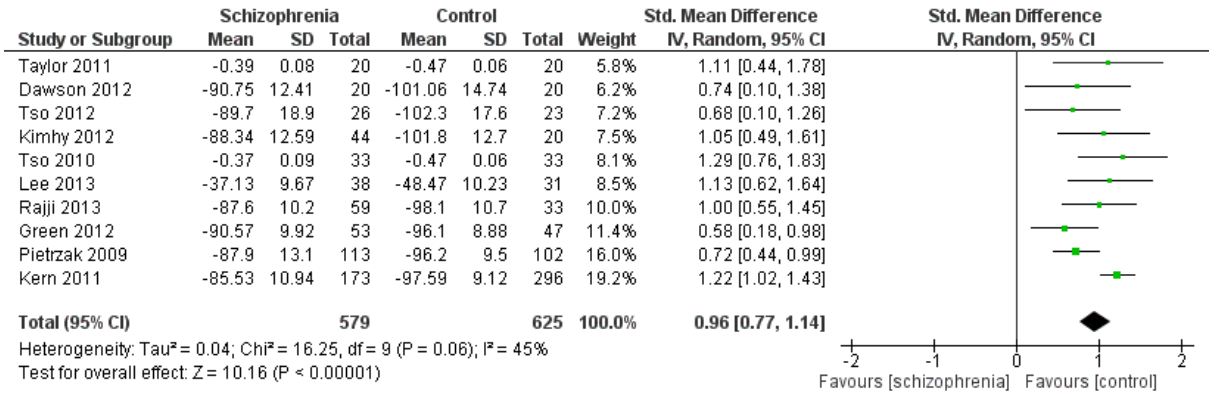

Figure 5: Comparison data and forest plot for Emotion Management

Experiential Avoidance

For the 9 studies (713 participants) measuring suppression and distraction, comparing schizophrenia group (335) with healthy controls (378), for the primary outcome of experiential avoidance was *g* = -0.44 (95% CI: -0.59, -0.29). This indicated a small to moderate effect, positively associated with schizophrenia. There was low heterogeneity (I^2 =1%). While this was a significant effect, it should be noted that four of the nine studies showed zero-order low end confidence intervals.

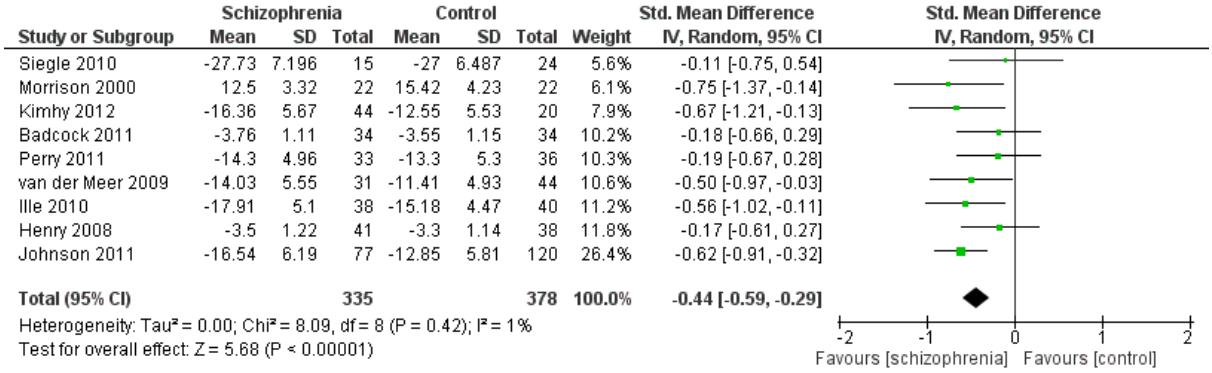

Figure 6: Comparison data and forest plot for Experiential Avoidance

Attentional Deployment

For the 17 studies (2001 participants) comparing schizophrenia group (939) with healthy controls (1062), the primary outcome of attentional deployment was *g* = -0.96 (95% CI; -1.18 to -0.75). This indicated a large effect, positively associated with schizophrenia. There was high heterogeneity (I^2 = 76%).

Rumination

For the 5 studies (442 participants) comparing schizophrenia groups (237) with healthy controls (205), the secondary outcome of rumination was *g* = -0.67 (95% CI; -0.86 to -0.47). This indicated a moderate to large effect, positively associated with schizophrenia. There was no heterogeneity (I^2 = 0%).

Worry

Sixteen studies were selected with the loss of four for whom data could not be obtained upon request. For the 12 studies (1559 participants) comparing schizophrenia group (702) with healthy controls (857), the secondary outcome of worry was *g* = -1.06 (95% CI; -1.33 to -0.79). This indicated a large effect, positively associated with schizophrenia. There was high heterogeneity (I^2 = 80%) which did not appear to be strongly related to use of different measures (when studies using PSWQ were isolated they still produced high heterogeneity).

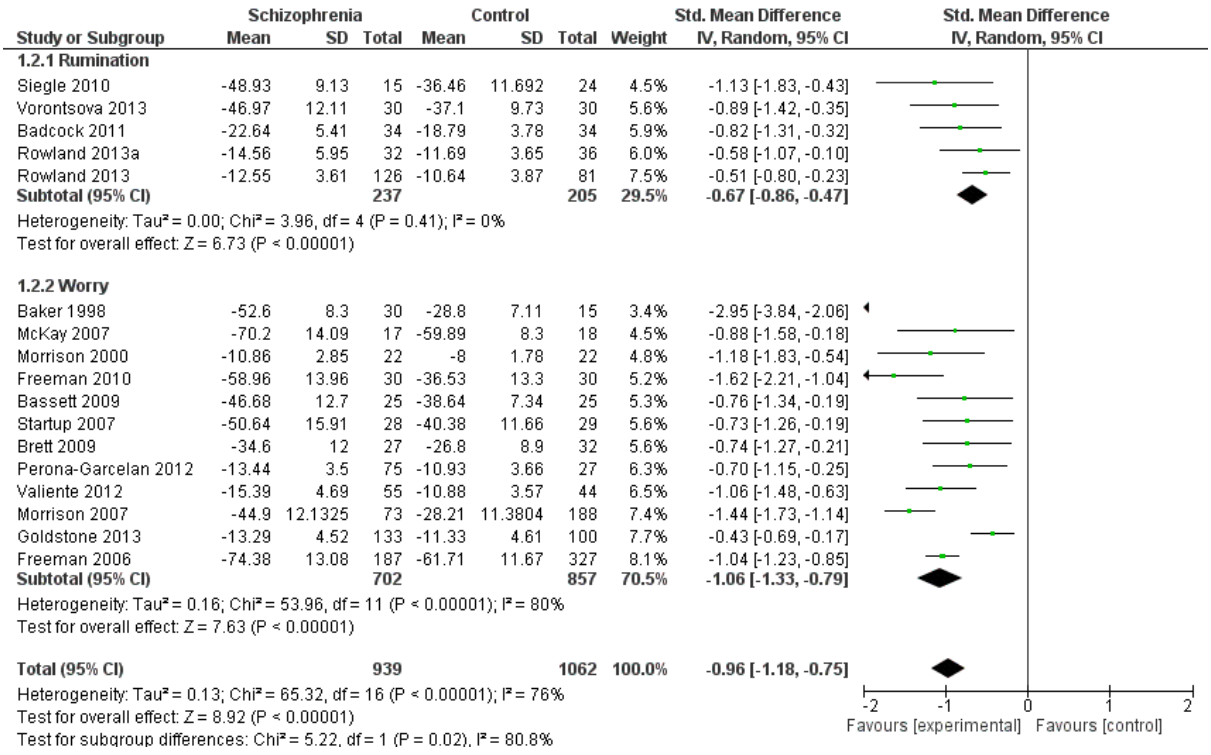

Figure 7: Comparison data and forest plot for Attentional Deployment

Cognitive Reappraisal

For the 11 studies (1395 participants) comparing schizophrenia groups (728) with healthy controls (667), the primary outcome of cognitive reappraisal was *g* =0.49 (95% CI; 0.32 to 0.66). This indicated a small to moderate effect, negatively associated with schizophrenia. There was moderate heterogeneity (I^2 = 51%). Excluding Ritsner et al. (2006) reduced heterogeneity to I^2 = 0%; *g* =0.43 (95% CI; 0.30 to 0.56). Six studies reported zero-order low end confidence intervals.

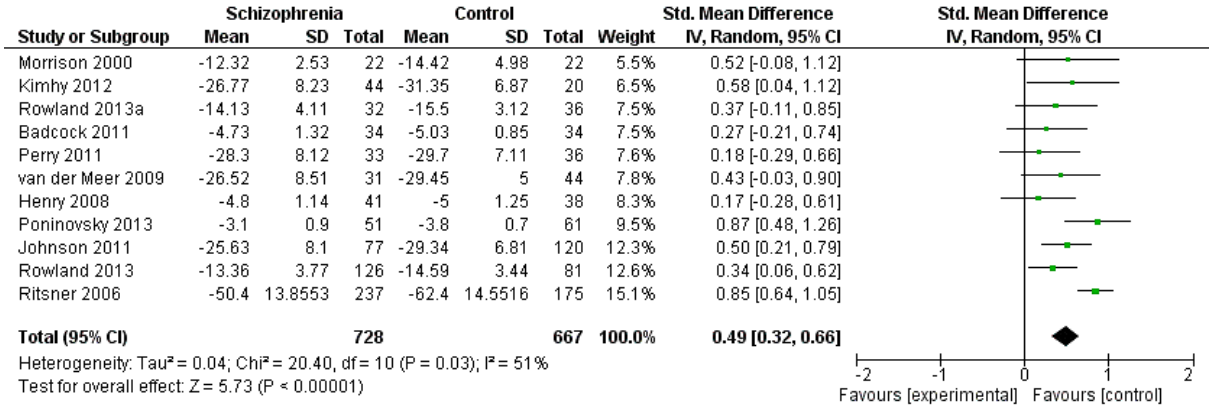

Figure 8: Comparison data and forest plot for Cognitive Appraisal

Dissociation

For the 7 studies (767 participants) comparing schizophrenia groups (293) with healthy controls (474), the primary outcome of dissociation was *g* = -0.86 (95% CI; -1.13 to -0.60). This indicated a moderate to large effect, positively associated with schizophrenia. There was moderate heterogeneity (I^2 = 50%), this was unlikely to be due to measurement as the DES was the sole measure. Excluding Modestin, Hermann, & Endrass, (2007) reduced heterogeneity to I^2 = 10%; *g* = -0.96 (95% CI; -1.17 to -0.75).

Amnesia

Four studies (545) reported data for the amnesia subscale. Comparing schizophrenia groups (169) with healthy controls (376), *g* = -0.73 (95% CI; -1.03 to -0.44). This indicated a small to large effect, positively associated with schizophrenia. There was moderate heterogeneity (I^2 = 36%).

Absorption

Five studies (587) reported data for the absorption subscale. Comparing schizophrenia groups (191) with healthy controls (396), *g* = -0.70 (95% CI; -1.03 to -0.37). This indicated a small to large effect, positively associated with schizophrenia. There was moderate heterogeneity (I^2 = 54%).

Depersonalisation/derealisation

Four studies (545) reported data for the depersonalisation/derealisation subscale. Comparing schizophrenia groups (169) with healthy controls (376), *g* = -0.95 (95% CI; -1.19 to -0.72). This indicated a large effect positively associated with schizophrenia. There was no heterogeneity (I^2 = 0%). While there was no heterogeneity, these DES items may overlap with psychotic symptoms. Interestingly, Perona-Garcelan et al. (2012) replicated the results without overlapping items.

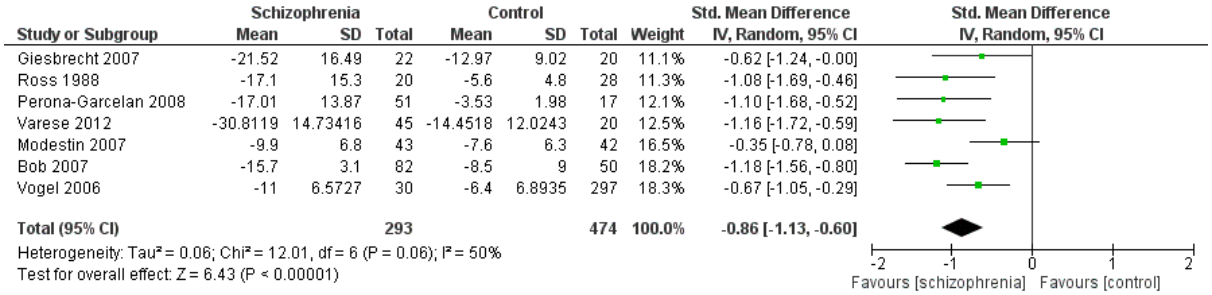

Figure 9: Comparison data and forest plot for Dissociation

Alexithymia

Nine studies were selected with the loss of one for whom data could not be obtained upon request. For the 8 studies (710 participants) comparing schizophrenia group (369) with healthy controls (341), the primary outcome of alexithymia was *g* = -1.05 (95% CI; -1.45 to -0.65). This indicated a moderate to large effect, positively associated with schizophrenia. There was high heterogeneity (I^2 = 83%).

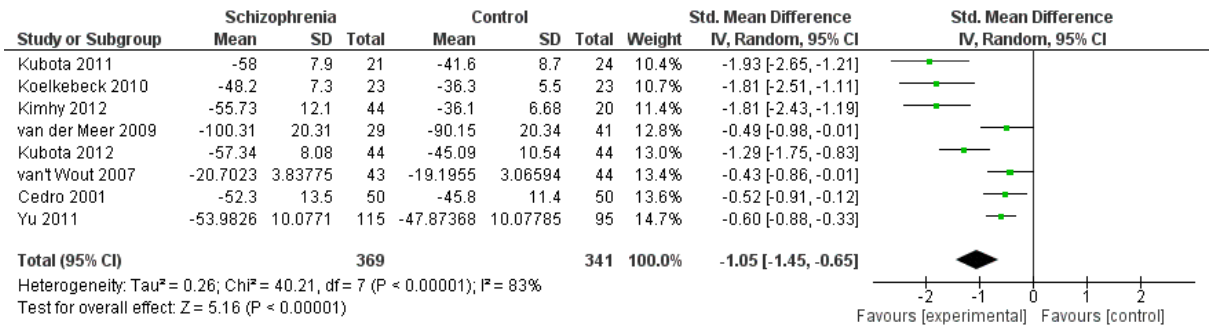

Figure 10: Comparison data and forest plot for Alexithymia

Discussion

Overall the meta-analysis suggests that individuals with schizophrenia may engage in more maladaptive CERS with greater global emotion regulation difficulties. Alexithymia and dissociation were also indicated.

Attentional deployment

There were only five studies which investigated rumination in schizophrenia (relative to healthy controls). This is perhaps surprising given strong associations between depression and rumination (Aldao, Nolen-Hoeksema, & Schweizer, 2010), and how cognitions relating to persecution (common in psychosis) may relate to anxious and depressive concerns (Garety & Freeman, 2013). Indeed, Vorontsova, Garety, & Freeman (2013) found a moderate to large effect size when controlling for clinical depression. While this meta-analysis strongly supports the role of both worry and rumination, co-morbid depression or anxiety disorders may play a moderating role that could not be fully examined here.

Experiential avoidance

Experiential avoidance has been postulated as negatively reinforcing worry and rumination processes (Pankey & Hayes, 2003). While experiential avoidance was not as strongly associated with schizophrenia as other strategies, the hypothesis that it increases rumination and worry could implicate a circular process where the focus of the individual is on distressing internal processes rather than strategies to avoid them. Experiential avoidance of unpleasant thoughts and feelings may impact upon the use of, or may be inversely related to, cognitive appraisal or acceptance.

Cognitive reappraisal

The results for cognitive reappraisal were in favour of controls but not as highly reliable due to heterogeneity and the number of studies with zero order low end confidence intervals. Cognitive reappraisal, as measured by the scales in this meta-analysis, was separate to the construct of problem-solving. As such it may be that context plays a large role (Troy, Shallcross, & Mauss, 2013). Cognitive reappraisal may be linked to affective variables including factors such as 'psychological defeat' - feelings of defeat in response to failure, (Johnson, Gooding, Wood, Taylor, & Tarrier, 2011) which may facilitate rumination.

Dissociation

Dissociation is not specific to schizophrenia and may be more related to experiences of trauma within this population. Three of the studies explicitly investigated traumatic dissociation within their samples (Bob, Glaslova, Susta, Jasova, & Raboch, 2007; Varese, Barkus, & Bentall, 2012; Vogel et al., 2006). Vogel et al. isolated those with and without self-reported PTSD. This indicated a large effect (g= 0.74) in favour of those with co-morbid PTSD and may suggest trauma history as a potential mediator of dissociation within schizophrenia. While not investigated, trauma exposure may have been a factor in the other studies, and indeed, standard deviations were large suggesting marked variation within samples.

Both amnesia and absorption showed small to large effect sizes with moderate heterogeneity. The depersonalisation/derealisation subscale showed a large effect size. Two studies emphasize the role of depersonalisation as a predictor of hallucinatory experience (Kilcommons & Morrison, 2005; Perona-Garcelan et al., 2008). This strategy may be a response to trauma or possibly a source of anomalous experiences (Perona-Garcelan et al., 2011) interpreted in a delusional form due to cognitive biases and dysfunctional emotion regulation processes (Freeman, 2007). Attentional deployment has been indicated as a focus for altering

the strength by which depersonalisation may facilitate more maladaptive and inhibit more adaptive response modulation (Stephan, 2012).

Alexithymia

The significant finding regarding alexithymia is noteworthy; though whether this is a core deficit in identifying or describing emotional experience is unclear. However, both measures (BVAQ and TAS) have subscales that are worthy of more detailed investigation.

The maladaptive use of CERS may imply greater attention to cognitive processes over emotional experience (Chambers et al., 2009) and subsequently individuals may not learn skills in identifying and describing emotions. This has important implications for accurate psychiatric assessment given the reliance on self-report. It is also a pertinent consideration for psychological interventions.

Conclusion

Our meta-analysis showed a greater use of maladaptive and less use of adaptive CERS in schizophrenia compared to healthy controls. Potential mediating constructs of alexithymia and dissociation (at least as instantiated in these self-report measures) are also more evident in individuals with schizophrenia. However heterogeneity in results makes it difficult to identify distinct processes or the contribution of co-morbid pathology. These findings suggest a significant role of emotion dysregulation in schizophrenia although the exact nature of which remains unclear.

While the component strategies may be independent, the way in which strategies are implemented is likely to be interactional. The sole focus on specific strategies in the literature undermines the ability to investigate these relationships and further develop cognitive-affective models in psychosis. The role of variables incorporated within dissociation and alexithymia while still unclear, appear to be significant. For

individuals with schizophrenia, models of cognitive emotion regulation, beyond the 'process model', may benefit from consideration of dissociation and alexithymia.

Limitations

This meta-analysis was unable to consider the course of emotion regulation strategies at different phases of illness in schizophrenia which could reveal state specific CERS. The samples also included individuals with an array of chronicity and symptoms. We were also unable to look at relationship between different dimensions of schizophrenia (positive, negative symptoms) and CERS. At present, the available literature does not allow this kind of analysis. However it may be an interesting focus for future reviews.

Inferences of causality or linking effects is beyond this meta-analysis due to the cross sectional design. However the majority of studies do not look at CERS as a whole, but rather separate strategies. The measures which attempt to cover all CERS tend to have poorer validity. Based on a review of the psychometric properties we would suggest that a battery of CERS measures be used. Sixty-two CERS questionnaires were identified in our literature search. A thorough review of measures and a factorial analysis to identify the most reliable and valid factors involved would benefit emotion regulation research.

The main drawback within the literature, in respect of our aim, was the omission of a comparison group of healthy controls with over-reliance on norms that may not be appropriate control data. Considering this is the least problematic group to recruit it is important that researchers recognise the importance of the inclusion of this control when researching psychopathology.

Theoretical, methodological and clinical implications

Despite the heterogeneity of schizophrenia, it is important to identify patterns of CERS associated with paranoia, grandiosity and other psychotic processes or

presentations. Equally comorbid depression or anxiety may well have a moderating impact on emotion regulation with knock on effects for distress and coping, and the maintenance cycles of psychotic symptoms.

Given the cognitive deficits implicated in schizophrenia and the current evidence for compromised emotional regulation, future emotional regulation research should incorporate neuropsychological variables and social cognition as relevant factors.

Future research could further explore a wider taxonomy of emotion regulation strategies (Webb, Miles, & Sheeran, 2012) to identify more specific cognitive processes associated with schizophrenia.

Difficulties identifying and verbalizing emotions is an important consideration within the process of therapy and may prove more challenging or stressful for individuals with schizophrenia. The process of developing adaptive responses requires developing awareness of emotional responses. Being unable to label the emotional experience could lead to greater distress and reliance on maladaptive strategies. As such, acquiring adaptive skills may need to be carefully facilitated in order to assure the individual had achieved mastery and becomes a more implicit process. Over reliance on a particular CERS or the presence of dissociative symptoms may also compromise efficacy of CBT skills training. These may be useful factors to consider given the modest effect size for CBT on the core symptoms of schizophrenia (Turner, van der Gaag, Karyotaki, & Cuijpers, 2014) and adverse events following CBTp (Klingberg et al., 2012). It has been suggested that more focused CBT interventions are yielding larger effect sizes (Turner et al., 2014). Emotional processes are key within cognitive models of psychosis (Garety, Kuipers, Fowler, Freeman, & Bebbington, 2001; Morrison, 2001). Including more explicit emotion regulation skills training and psycho-education for emotions may facilitate the development of this capacity and aid cognitive appraisal. Clinicians should screen for prominent maladaptive patterns but given the array of measures it is not currently clear which provide the best measure.

Given the marked dependence on maladaptive strategies, individuals with schizophrenia may experience increases in levels of distress before tolerance of negative emotions is acquired through experience.

Third wave cognitive behavioural therapies may be suitable adjunctive therapies to consider. Congruent with an emotion dysregulation focus, there is an emphasis on the function of symptoms and the individual's relationship to experiences using acceptance and mindfulness strategies. While the evidence for third wave therapies for psychosis is currently limited, it is a promising area of future research and treatment.

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Part 2: Empirical Paper

Process Analysis of Trauma Focused CBT for Individuals with Schizophrenia.

Abstract

Aim: Therapeutic alliance, modality and ability to engage with the process of therapy have been the main focus of research into what makes psychotherapy successful. Individuals with complex trauma histories or schizophrenia are suggested to be more difficult to engage and may be less likely to benefit from therapy. This study explores the in-session 'process' of working alliance and emotional processing of trauma memories for individuals with schizophrenia.

Method: Observer measures of working alliance, emotional processing and affect arousal were rated at early and late phases of Trauma Focused CBT (TF-CBT) for individuals with schizophrenia (N=26). Correlation analysis was undertaken for process measures. Baseline symptomatology and childhood trauma subgroup are explored. Temporal analysis of expressed emotions is also reported.

Results: Working alliance is established and maintained throughout therapy however agreement on goals reduced at late phase. The sample appeared to be able to engage in emotional processing but possibly not to the required level for successful cognitive restructuring. Expressed emotions were in line with trauma theory.

Conclusion: This study undertakes novel exploration of process variables not usually explored in CBT. It is also the first study of process for TF-CBT with individuals with schizophrenia. This complex clinical sample showed no difficulty in engagement or suitability and appeared to have the capacity to undertake the cognitive-emotional demands of this new focus of therapy for individuals with schizophrenia. Clinical and research implications and potential limitations of these methods are considered.

Introduction

Attempts to understand what makes psychotherapy successful have focused on many aspects of the process of therapy including the therapeutic relationship, modality and clients' ability to engage with the process of therapy. In-session mechanisms of change (leading to successful outcome) are suggested to reflect development of insight, in-session emotional regulation, processing and expression (Hayes et al., 2007; Missirlian, Toukmanian, Warwar, & Greenberg, 2005; Pos, Greenberg, Goldman, & Korman, 2003). Emotional processing has been described as a process which involves both exposure to distressing stimuli and the assimilation of new information into an existing memory structure (Foa & Kozak, 1986). Cognitive restructuring with trauma focused cognitive behavioural therapy (TF-CBT) may facilitate emotional processing through re-appraisals of shattered beliefs about the self, world and/or others (Grey, Young, & Holmes, 2002). This study explores the role of the 'process' in a complex serious mental illness (SMI) sample; schizophrenia with co-morbid PTSD.

The therapeutic alliance in therapies following trauma

The therapeutic alliance has been a central focus of psychotherapy 'process' research and is a critical common factor across psychotherapy modalities. A recent meta-analysis (Del Re, Flückiger, Horvath, Symonds, & Wampold, 2012) sourcing data from 1973 to 2009, has shown the contribution of the alliance to outcome holds regardless of the measures used to assess alliance and outcome, the perspective of the evaluation, the stage of assessment or the therapy involved. The moderate effect sizes and potential confounding variables suggest that alliance may support the possibility of improved outcome even if it's doesn't bring that outcome about.

In the treatment of PTSD, therapeutic alliance during first phase has been suggested to predict successful decrease in PTSD symptoms during exposure therapy in the second phase (Marylene Cloitre, Stovall-McClough, Miranda, &

Chemtob, 2004). Especially for those who have experienced childhood abuse, the alliance appears to be an important area for consideration given the interpersonal context in which their trauma occurred.

Therapeutic alliance in CBT for psychosis

There is a disparity in reports in the literature regarding the relationship between symptomatology and working alliance in psychosis interventions. While some research indicates greater severity of psychotic symptoms associated with poorer working alliance (Couture et al., 2006; Johnson, Penn, Bauer, Meyer, & Evans, 2008; Jung, Wiesjahn, & Lincoln, 2014; Wittorf et al., 2009) this is contested by others (Evans-Jones, Peters, & Barker, 2009; Lysaker, Davis, Buck, Outcalt, & Ringer, 2011).

Higher levels of attachment anxiety has been associated with individuals with a history of childhood trauma and psychosis, and also between avoidant attachment and severity of symptoms (Berry, Barrowclough, & Wearden, 2009) suggesting difficulties in engaging in positive interpersonal relationships. Equally, the onset of paranoid auditory hallucinations could be interpreted as negative interpersonal events and lead to modification of early attachment models or support current insecure representations (Gumley & Schwannauer, 2006).

A combination of comorbid difficulties, emotional and personality factors suggest many potential variables impacting on the therapeutic alliance (Beretta et al., 2005; Michail & Birchwood, 2009; Waller, Evans, & Stringer, 2012). Cognitive disorganisation (Lysaker, Gumley, et al., 2011; Lysaker, Olesek, et al., 2011) is also a salient consideration, influencing illness chronicity, emotion regulation processes and social cognition.

Meta-analysis of CBTp have also suggested that there is most probably a modest effect (95 % CI; g = 0.15 - 0.69) for all symptoms compared to befriending (Turner,

van der Gaag, Karyotaki, & Cuijpers, 2014). However no studies have explored specific treatment of co-morbid disorders within this sample.

Individuals with schizophrenia with trauma histories may experience higher levels of positive symptoms and hold positive beliefs related to psychotic experiences which are consistent with coping strategies related to their experiences of trauma (Read, van Os, Morrison, & Ross, 2005). Participants who are more symptomatic may find it more difficult to engage. Conversely those with more symptoms may also have higher motivation to reduce distress.

Cognitive emotional processing

While the therapeutic alliance has been the main area of focus for in-session process analysis, investigators have explored other relevant variables, primarily emotion regulation.

In-session emotion regulation may affect cognitive processing in TF-CBT. Emotional arousal has been suggested as a necessary in-session process required for cognitive-emotional processing (Greenberg, Auszra, & Herrmann, 2007). While this has primarily been explored in emotion focused therapy, it is similar to the focus on "hot spots" in TF-CBT (Grey et al., 2002). It has been suggested that CBT therapists consider a reduction of emotional expression as a positive occurrence in therapy (Blagys & Hilsenroth, 2002) with CBT clients more detached from their emotional experience than in other investigated psychotherapies (Watson & Bedard, 2006). However, the client's emotional experience in CBT has also been found to be positively related to outcome (Castonguay, Goldfried, Wiser, Raue, & Hayes, 1996).

The theory underlying emotional processing suggests a level of expressed emotion may be required to activate the limbic structures and habituation of fear then leads to corrective learning (Foa & Kozak, 1986). Alternatively there is the retrieval competition hypothesis (Brewin, 2006) whereby new non-threatening associations compete with fearful associations.

While the arousal of emotion may be an essential aspect of exposure therapy (Foa & Kozak, 1986), high level affect arousal (high anxiety or dissociation) may interfere with the cognitive demands in cognitive restructuring of trauma memories. This would not only affect information processing and memory consolidation but also working alliance. This is of primary importance in the treatment of PTSD where the primary mechanism underlying the disorder is poor contextualised integration of trauma into memory (Brewin, Dalgleish, & Joseph, 1996; Ehlers & Clark, 2000). This is factored into the early phase of therapy where grounding and affect regulation strategies are practiced.

The depth of emotional processing or engagement has also been suggested to predict changes in an individual's capacity to regulate affect (Castonguay et al., 1996). There is little in the literature identifying emotions which are more or less helpful in trauma focused therapy. Literature suggests that while fear is the main emotion behind PTSD, expressed anger and sadness expression helpful facilitate resolution (Greenberg & Foerster, 1996; Holowaty & Paivio, 2012). Shame and guilt have been identified as being particularly problematic, hampering emotional processing of trauma (Lee, Scragg, & Turner, 2001). However identification of these emotions can inform formulation and adaptations to treatment.

Diminished emotion expression is considered to be a core negative symptom in schizophrenia (American Psychiatric Association, 2013). This suggests individuals with schizophrenia experience less expansive and less intense emotions. Individuals with schizophrenia are also considered to have impaired emotion perception (Kring & Elis, 2013). They have also been indicated as experiencing higher levels of emotion than controls (Cohen & Minor, 2010). This may be even greater for those with trauma histories. Efforts to suppress internal stimuli and avoidance of external stimuli associated with traumatic events are a criteria for diagnosis of PTSD (American Psychiatric Association, 2013). Diminished emotion expression in schizophrenia may reflect overuse of suppression as a strategy (Ellgring, Smith,

Flack Jr., & Laird, 1998; Henry et al., 2007). Suppression may reduce the ability to identify emotion and being unable to identify the experienced emotion may lead to impaired reappraisal of emotion (van der Meer, van't Wout, & Aleman, 2009).

Emotion and cognition are highly integrated in cognitive models of both PTSD and psychosis (Ehlers & Clark, 2000; Garety, Kuipers, Fowler, Freeman, & Bebbington, 2001). The assimilation of interactions between emotion and cognition play a significant role in both implicit and explicit emotion regulation processes (Milad & Quirk, 2012; Phan, Wager, Taylor, & Liberzon, 2002; Zotev, Phillips, Young, Drevets, & Bodurka, 2013).

A deficit in inhibitory systems has been implicated in emotion dysregulation in schizophrenia (Cohen & Minor, 2010). Within co-morbid schizophrenia and PTSD, emotional dysregulation may trigger information processing abnormalities and psychosis (where the individual fails to identify the intrusion as a memory). Alternatively, individual vulnerability to development of post traumatic intrusions may influence the onset and maintenance of psychotic symptoms (Smith & Steel, 2009).

Given the central role of metacognition, selective attention, working memory and inhibitory control in cognitive-emotional processing (Chambers, Gullone, & Allen, 2009; Garety & Freeman, 2013; Kerns, Nuechterlein, Braver, & Barch, 2008; Lysaker, Campbell, & Johannesen, 2005; Schaefer, Giangrande, Weinberger, & Dickinson, 2013) individuals with schizophrenia may rely on more maladaptive cognitive emotion regulation strategies (O'Driscoll, Laing & Mason, 2014). Given the requirement in TF-CBT to co-currently attend to emotional experience and cognitive reappraisal as necessary components of emotional processing (Foa & Kozak, 1986), it might be suggested that individuals with schizophrenia may have greater difficulty with this process.

A dynamic association has been postulated between therapeutic alliance and client emotion regulation (Owens, Haddock, & Berry, 2013). During the early phase of TF-CBT, the working alliance is developed and strategies are implemented. During late

phase the strategies and working alliance are tested by the emotional demands of exposure and cognitive restructuring of trauma memories.

Influence of Childhood trauma

Problems in self and interpersonal functioning and marked alexithymia has been associated with childhood abuse but not adult sexual assault (M Cloitre, Scarvalone, & Difede, 1997; Lysaker, Gumley, et al., 2011). As such, the mental states of others may be experienced as threatening, or alternatively, childhood trauma may disrupt the acquisition of adaptive regulatory abilities (Bak et al., 2005).

Childhood cumulative trauma but not adulthood trauma may predict increasing symptom complexity in adults (Marylene Cloitre et al., 2009) with greater trauma exposure associated with more complex symptom presentation (Lu et al., 2013).

The therapeutic alliance for individuals who experience childhood abuse may be considered tantamount given the interpersonal context of their trauma. Overall, individuals with schizophrenia and history of childhood trauma, present with a more complex profile with poor social functioning, adherence to treatment and greater cognitive impairment (Lecomte et al., 2008; Schäfer & Fisher, 2011).

Aim of current study and hypothesis

Factors relating to process and alliance have not been investigated within TF-CBT for individuals with schizophrenia and co-morbid PTSD. This study aims to examine the potential in-session cognitive-emotional processing within this complex sample.

The original hypothesis of the study was to investigate the influence of childhood trauma on the process of TF-CBT for individuals with schizophrenia and co-morbid PTSD. The childhood trauma group were to be compared with those without a childhood trauma history. However, subsequent exploration of the data set revealed highly unequal group sizes (Table 1) which rendered this study under-powered.

The objectives of this study were to conduct an exploratory investigation of process variables involved in TF-CBT with individuals with schizophrenia and co-morbid PTSD taking part in an RCT. The process variables of working alliance, emotional processing, affect arousal were measured as these were considered the primary mechanisms implicated. Given that process difficulties may be influenced by different emotions, the primary expressed emotion was also investigated. The analysis was taken at two stages; early (initial engagement) and late (cognitive restructuring) phase of therapy.

Method

Setting

The study utilised raw data collected as part of an open randomised clinical trial comparing a cognitive-behavioural intervention to treatment as usual for individuals who had co-morbid PTSD and schizophrenia (The acceptability and effectiveness of cognitive behaviour therapy for the treatment of posttraumatic stress disorder within schizophrenia: UKCRN 6683, C.I. Dr. Craig Steel; Appendix E). Initial screening assessments were conducted by research assistants before random allocation. Therapeutic sessions were audio-taped; permissions for recordings were obtained from participants prior to the beginning of every session. Of the 30 participants involved in the treatment arm of the trial, 26 consented to audio recording.

Procedure

Observer ratings were completed by the author on 52 audio recordings of sessions, measuring working alliance and in-session emotional processing. These measures were taken for 26 participants at both the early (session 3) and late (session 10) phases of treatment. Session 3 was chosen as the earliest session therapeutic alliance could be measured as prior sessions were primarily focused on psychometrics. Where session 10 was not available due to consent, the next closest

session was chosen. The later session needed to involve cognitive restructuring of trauma related cognitions.

Inter-rater reliability for the WAI was measured with another clinical psychology doctorate student. The format of the WAI scoring manual was agreed (Appendix F) and training took place over two days. Inter-rater reliability for the Experiencing Scale and Client Emotional Arousal Scale-III (CEAS) was measured with a graduate psychology student. The training for the CEAS (12 hours) and Experiencing Scale (50 hours) was completed by both raters achieving acceptable agreement in line with training manuals. Observer raters were blind to both therapist and client, and the outcome of therapies. While participant trauma history did not necessarily reflect the primary trauma being treated, it was not possible to be completely blind to trauma type as this could be evident from the content of sessions.

CBT program

The cognitive behavioural treatment was based on a CBT program from a previous study (Mueser et al., 2008). The treatment comprises of 12-16 weekly individual sessions within a six month period focusing on cognitive restructuring.

Participants

Participants were recruited from Berkshire and North East London Foundation Trust in Inpatient, Outpatient and CMHT settings. Inclusion criteria for participation: (1) have a diagnosis of schizophrenia or schizo-affective disorder and having symptoms indicating a diagnosis of posttraumatic stress disorder; (2) aged between 18 to 65 years old. Exclusion criteria (1) written and spoken English to take part in therapy (2) organic schizophrenia (3) a learning disability (4) no fixed abode.

To be eligible for the study, participants were assessed using the PTSD checklist (PCL) as an initial screen requiring them to score 44 or above in order to be eligible. Participants proceeding to further assessment were then assessed for posttraumatic

stress disorder diagnoses and symptom severity based on the Clinician-Administered PTSD Scale (CAPS).

Measures

Observer process measures.

The *Working Alliance Inventory – Observer – Short Version* (WAI-O-S) is a pan-theoretical measure of the quality of the alliance between the client and therapist. The original WAI (Horvath & Greenberg, 1989), has been adapted to be rated by observers (WAI-O). A 12 item WAI-S (Tracey & Kokotovic, 1989) where items that loaded highest on each of the subscales were retained from the WAI. It consists of three subscales: bond, agreement on tasks and agreement on goals each with 12 items rated on 7-point Likert scales.

The use of the observer version of the WAI may have particular advantages over the self-report versions (client and therapist). Relying on an observer to code the alliance would likely increase the probability that the interactional component of the therapeutic relationship would be assessed rather than individual client differences. Furthermore, two of the three components of the alliance specifically code for mutual agreement between client and therapist. The client and therapist behaviours in session are equally responsible for observed ratings of these components (i.e. agreement on tasks and goals).

The *Experiencing Scale* (EXP; Klein, Mathieu, Gendlin, & Kiesler, 1969) assesses clients' in-session emotional processing. At the lower stages of EXP, the client talks about events, ideas, or others (Stage 1); refers to self but without expressing emotions (Stage 2); or expresses emotions but only as they relate to external circumstances (Stage 3). At higher stages, the client focuses directly on emotions and thoughts about self (Stage 4), engages in an exploration of inner experience (Stage 5), and gains awareness of previously implicit feelings and meanings (Stage 6). The highest stage (7) refers to an on-going process of in-depth self-understanding, which provides new perspectives to solve significant problems.

Client statements are given a peak (the highest stage that the participant reached) and a modal rating (stage at which the participant was for the majority of the segment) on the EXP scale. Inter-rater reliability coefficients range from .76 to .91, with rating–rerating correlation coefficients around .80 (Klein et al., 1986).

The *Client Emotional Arousal Scale-III* (CEAS—III; Warwar & Greenberg, 1999; Appendix G) is a 7-point process measure that was developed to assess the intensity of observable, expressed emotional intensity, based on the evaluation of audio or videotapes of psychotherapy sessions. Using this scale, an expressed emotion is indicated when a person acknowledges having experienced an emotion (e.g. I feel afraid) or when a person demonstrates an emotion action tendency (e.g. crying). The higher levels of the scale indicate higher emotional arousal intensities. The primary emotion is identified and overall level of intensity of the emotion (modal intensity) recorded. Missirlian et al., (2005) reported inter-rater reliability coefficient of 0.75.

Baseline measures

The following baseline measures were available within the data set.

PTSD symptoms.

The *PTSD Checklist* (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993) a self-report rating scale for assessing the 17 DSM-IV PTSD symptoms and their severity. Only part 1 was used in analyses, recording types of trauma experienced. The measure was revised to include traumatic hospital admissions and psychotic episodes.

The *Clinician-Administered PTSD Scale* (CAPS; Blake et al., 1995) a widely used semi-structured interview for the assessment of PTSD providing overall severity scores and intensity scores for the PTSD symptoms. Diagnostic eligibility was

assessed on the basis of four main PTSD criteria: (a) presence of a traumatic event (b) intrusive symptoms (c) avoidance behaviours (d) hyper-arousal and numbing.

The *Post Traumatic Cognitions Inventory* (PTCI; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999) was used to assess posttraumatic cognitions. It is a 33 item inventory to assess the negative cognitions induced by traumatic experiences. The PTCI includes three factors: negative cognitions about self, negative cognitions about the world, and self-blame. These factors have been shown to have excellent internal consistency and good test retest reliability.

Schizophrenia symptoms.

The *Positive and Negative Syndrome Scale* (PANSS; Kay, Fiszbein, & Opler, 1987) is a 30 item rating scale completed by the researchers providing scales of positive symptoms, negative symptoms and general psychopathology.

The *Psychotic Symptom Rating Scales* (PSYRATS; Haddock, McCarron, Tarrier, & Faragher, 1999) measure dimensions of delusional beliefs and auditory hallucinations and used to measure the emotional and functional impact of the symptoms of psychosis.

Mood and Quality of life

The *Beck Depression Inventory* (BDI; Beck, Steer & Garbin, 1988) is a 21 item inventory, for measuring the severity of depression focusing on cognitions.

The *Quality of life scale* (QLS; Henrich et al., 1984) a 7 item version, to assess for deficit symptoms in schizophrenia.

Global Assessment of Functioning scale (GAF; DSM-IV-TR, p. 34.) is a numeric scale (0 through 100) rated with respect to psychological, social, and occupational functioning.

Results

Power and Preliminary Analyses

Power analysis for this study was informed by prior work by Lysaker, Davis, Outcalt, Gelkopf, & Roe (2010). In this study the authors used the WAI in a similar manner in a population of individuals with schizophrenia comparing sexual assault with other trauma measured at repeated time points. Power calculation was carried out using the "G*Power 3" computer program (Faul, Erdfelder, Lang, & Buchner, 2007), specifying alpha = 5% and desired power = 80%. Using approximately similar time points, the required sample size varied between 16 and 30 based on balanced group size. As the sample size of the pre-existing data set was known to be 26 with two time points, this was deemed acceptably powered to detect an effect.

Parametric statistics were used for within group analysis. Whole group and subgroup (child trauma: CT) statistics are reported. As the adult trauma (AT) group comprised eight individuals, no between group analyses was feasible. Mean scores for measures of psychopathology are shown in Table 1. No imputations were made for missing data as the dataset is limited: where baseline measures were missing the exact n is indicated.

Baseline characteristics

There was no dropout among the 26 participants between early and late sessions however there were 4 individuals within the trial who did not consent to recording.

As early process scores may be a function of initial levels of pathology, correlations between process rating and pre-treatment scores on outcome measures were calculated. None of the relationships were significant for whole or subgroups. Therefore, capacity for early processing was not considered a function of clients' psychosis symptomatology (PANSS and PSYRATS), depression (BDI), anxiety (BAI) or general functioning (QOL and GAF). Subgroups did not differ significantly

on baseline measures of severity of psychotic or traumatic symptoms. There was no difference observed across measures due to gender.

The mean number of trauma types experienced for the whole group was 7 (SD=3.5) (see Appendix H). Those in the CT group reported experiencing twice as many types of trauma compared to the AT subgroup. Within the CT subgroup, 13 reported childhood sexual abuse. While the temporal sequence of traumatic experiences could not be established from the measure, it appears that all of the CT subgroup reported additional adult traumas.

Reliabilities

Two pairs of raters overlapped on the data (52 sessions) to determine inter-rater reliability. The first pair of raters, which included the first author as the primary rater and a graduate student, overlapped on 16 sessions for the EXP scale and CEAS. The second pair, consisting of the first author and a doctoral student, overlapped on 14 sessions for the WAI. Raters were blind to trauma type, participants, baseline and outcome data. The primary coder's ratings were used for the analysis. Reliability sampling included an equal ratio of early and late therapy sessions.

Krippendorff's alpha coefficient (interval) was used to calculate reliability between raters: Modal EXP: 0.80, Peak EXP: 0.69, CEAS: 0.79 and WAI: 0.88.

Table 1.

Patient clinical characteristics

	Total N=26 M (SD)	**CT N=18 M (SD)**	**AT N=8 M (SD)**
Age	46 (10)	46.5 (11.5)	44.5 (6)
No. of trauma types	7.08 (1.56)	8.33 (3.09)	4.15 (2.19)
PTCI	158.24 (42.83)	161.76 (46.75)*	150.75 (34.64)
PSYRATS	26.3 (20.02)	27.06 (21.15)	24.63 (18.46)
Delusions	10.92 (8.22)	11 (8.63)	10.75 (7.76)
Hallucinations	15.38 (14.96)	16.06 (15.05)	13.88 (15.66)
PANSS	73.08 (18.52)	75.56 (19.95)	67.5 (14.39)
Positive	18.65 (5.89)	19.56 (6.61)	16.63 (3.29)
Negative	16.42 (6.07)	16.89 (6.53)	15.38 (5.15)
BAI	26.88 (12.61)	29.77 (13.54)*	20.75 (7.92)
BDI	30.32 (10.53)	30.59 (10.69)*	29.75 (10.89)
QOL	24.83 (7.48)	24.88 (7.82)**	24.75 (7.27)
GAF	56.96 (10.01)	57.39 (8.83)	56 (12.91)
	Percent (N)	**Percent (N)**	**Percent (N)**
Female	42 (11)	50 (9)	25 (2)
Male	58 (15)	50 (9)	75 (6)
Ethnicity			
White	69 (18)	67 (12)	75 (6)
Black	15 (4)	22 (4)	0
South Asian	15 (4)	11 (2)	25 (2)
Diagnosis			
Schizophrenia	69 (18)	61 (11)	88 (7)
Schizoaffective	31 (8)	39 (7)	12 (1)
Employment			
Unemployed	85 (22)	89 (16)	75 (6)
Employed	4 (1)	0	12 (1)
Retired	4 (1)	5 (1)	0
Student	8 (2)	5 (1)	12 (1)

*Note: *n=17, ** n=16.*

Emotional Processing and Working Alliance: Early and Late in Therapy

The inter-correlations among working alliance and the subscales therein, emotional processing and affect arousal are presented in Table 2 (early phase) and Table 3 (late phase).

Correlations between measures at early and late phase therapy. All factors of the WAI were highly correlated at both early and late sessions, indicating no distinct area of the working alliance is stronger or weaker for this sample. Emotional

processing (EXP: modal and peak) were correlated with the WAI at the early session but only the modal level was correlated at late. Level of affect arousal was correlated with emotional processing at the early session but not at the late session.

Table 2.

Pearson correlations for whole group at early session

Measure	1	2	3	4	5	6	7
1. Goal Early	-						
2. Task Early	.885**	-					
3. Bond Early	.759**	.792**	-				
4. EXP (M) Early	.665**	.73**	.756**	-			
5. EXP (P) Early	.534**	.563**	.564**	.821**	-		
6. CEAS Early	.145	.106	.392*	.502**	.62**	-	
7. WAI Early	.951**	.963**	.888**	.76**	.589**	.206	-

*Note: * sig at p<0.05, **sig at p<0.01 (2-tailed)*

Table 3.

Pearson correlations for whole group at late session

Measure	1	2	3	4	5	6	7
1. Goal Late	-						
2. Task Late	.535**	-					
3. Bond Late	.433*	.835**	-				
4. EXP (M) Late	.591**	.585**	.702**	-			
5. EXP (P) Late	.555**	.319	.397*	.84**	-		
6. CEAS Late	.446*	.014	.000	.243	.335	-	
7. WAI Late	.513**	.969**	.914**	.640**	.368	-.044	-

*Note: * sig at p<0.05, **sig at p<0.01 (2-tailed)*

Within measure correlations between early and late phase therapy. Correlations between early and late phases for individual measures are presented in Table 4. Overall WAI was correlated for whole group and CT subgroup with Task and Bond proving significant. However for Goal there was a significant difference, with early phase Goal rated higher than late phase, t(25) = 3.51, p = 0.002, *d*= 0.8

for the whole group (Table 5). This was not sustained within the CT subgroup suggesting that this effect may be influenced by the AT subgroup.

Modal EXP was highly correlated for both whole group and CT subgroup however peak EXP correlations were non-significant. Affect arousal was significantly correlated for both whole group and CT subgroup.

Table 4.

Pearson correlations (early/late) for whole and sub group.

Measure	Whole group	Child trauma
Goal	0.32	0.433
Task	0.571**	0.51*
Bond	0.43*	0.588*
EXP (M)	0.517**	0.644**
EXP (P)	0.271	0.433
CEAS	0.539**	0.705**
WAI	0.551**	0.528*

*Note: *p<0.05, **p<0.01 (2-tailed)*

Table 5.

Means and standard deviations for measures at early and late phase.

	Early phase M(SD)	Late phase M(SD)
Goal	20.77(5.19)	17.27(3.39)
Task	20.58(5.49)	22.04(5.52)
Bond	23(3.75)	23.58(3.91)
EXP (M)	2.73(.72)	2.69(.84)
EXP (P)	3.65(.85)	3.77(1.03)
CEAS	3.42(1.21)	3.35(.94)
WAI	64.35 (13.6)	66.27(14.09)

Expressed Emotion

The relationship between early and late phase primary expressed emotion are represented in Graph 1 using network visualisation (Butts, Handcock, & Hunter, 2014). Thickness of lines represents the number of cases with arrows representing direction of change. The size of each bubble reflects the number of cases where there was no change in emotion expressed. All individuals in the AT group had a

shift in focus of emotion by the late session. However 5/18 (28%) in CT group did not.

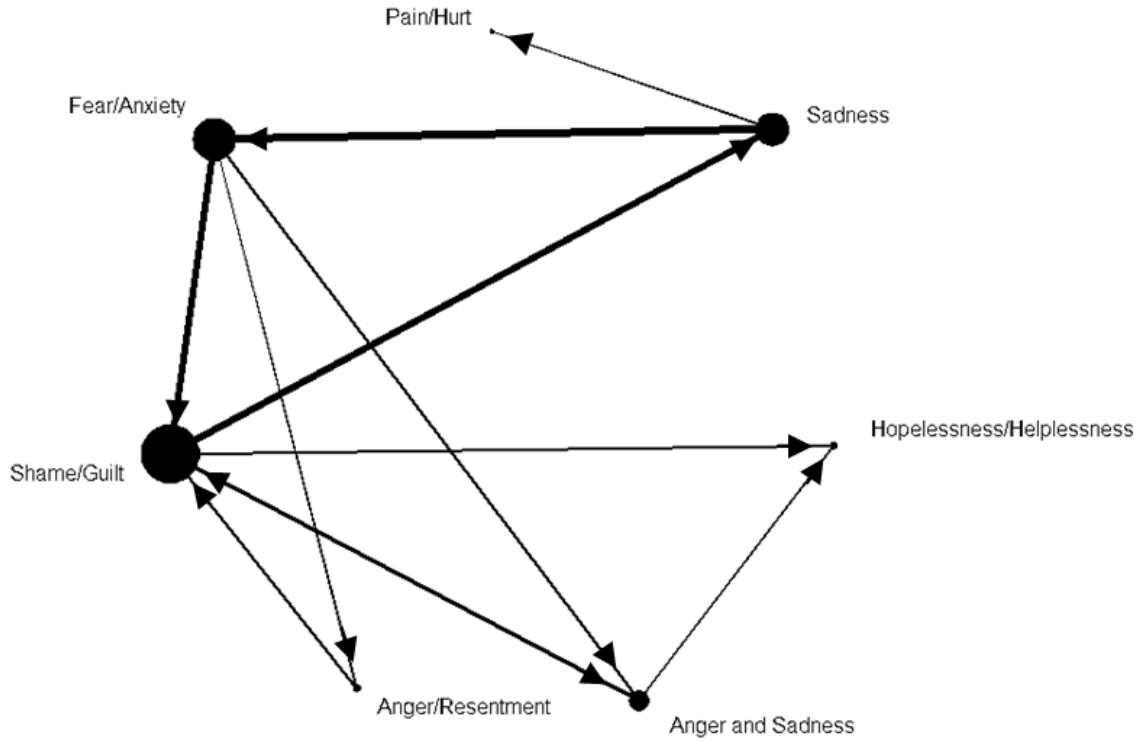

Figure 1: Relational data for emotions expressed at early and late stage.

Discussion

WAI subscales correlated highly at both early and late sessions indicating no distinct area of the working alliance stronger or weaker with this clinical group. In line with other psychopathologies and modalities (Horvath et al., 2011), working alliance remains relatively constant during treatment. However, when individual subscales were compared across phases, while the relationship between Task and Bond at early and late phases persists; it does not for Goal. As a whole group Goal was poorer at late phase than early. It is possible that early acquiescence during socialisation to the model phase masked ambivalence. Equally the great demand placed on the individual at late phase during cognitive restructuring will likely

challenge any ambivalence. The presence of delusional ideation or assumptions around insight may also create a disparity between maintaining a shared goal and understanding of the 'real problem' as assessed by the WAI (Johansen, Iverson, Melle & Hestad 2013). Overall WAI ratings were comparable to those seen in CBT for PTSD (Keller, Zoellner, & Feeny, 2010) and psychosis alone (Johansen et al., 2013) suggesting that psychosis *per se* does not offer greater barriers to alliance when treating PTSD symptoms. While it is difficult to compare to other studies, where the therapist and client version are used, they were similar to that in a similar study (Gottlieb, Mueser, Rosenberg, Xie, & Wolfe, 2011) using the client version. Working alliance was not associated with symptomatology, in line with previous research in this area (Picken, Berry, Tarrier, & Barrowclough, 2010).

Emotional processing correlated with the working alliance and levels of affect arousal at the early phase. While the relationship between emotional processing and working alliance is maintained at late phase, the level of affect arousal no longer correlated with emotional processing. Surprisingly, there was no improvement in emotional processing. The process underlying cognitive restructuring should conceptually take place at EXP stage 5 upwards. However this has not been empirically investigated before. It is interesting that emotional processing (peak) no longer correlates with overall working alliance, in particular Task. Poorer agreement on Goal at late phase may also be a factor affecting the depth of cognitive emotional processing.

In regards emotional processing, modal ratings correlate at early and late phase as does affect arousal. This is especially evident when looking specifically at the child trauma subgroup. However this did not suggest that heightened level of emotional arousal is necessary for emotional processing (Missirlian et al., 2005). The CEAS measure, as used in previous studies, uses a ordinal scale (1 to 7), where level 1 to 3 are low level expression and 7 is 'interfering'. It has also been suggested that level 4 relates to poorer outcome (Carryer & Greenberg, 2010) therefore an optimal level

of arousal for emotional processing would appear to be 5/6. It is therefore likely that the mean of items within this measure is a poor index of facilitative affect arousal. At the same time it would be expected that cognitive restructuring around trauma related cognitions would elicit greater emotional arousal. This was not the case in this sample. This cannot be attributed to 'diminished emotional expression' associated with negative symptoms as the ratings at early and late are representative of those seen in other process studies (Boritz, Angus, Monette, Hollis-Walker, & Warwar, 2011; Missirlian et al., 2005). Indeed, Henry et al. (2008) found no association between use of suppression and clinical ratings of diminished emotion expression. It is possible that cognitive restructuring may not facilitate emotional processing to the degree experienced in reliving (Grey et al., 2002): peri-traumatic emotions and thoughts are not identified or consolidated within the context of the trauma memory.

Individuals with CT reported experiencing twice as many types of traumatic events as AT. However this does not capture the number of events, duration etc. and could not be formally statistically tested due to sample size. Interestingly symptom severity was not greater for the CT group. While the study was underpowered to perform a between group analysis, the data points in the direction of poorer working alliance at both early and late phase for the CT subgroup.

It is interesting to consider the emotions expressed during sessions and how they shifted (if at all), where shame/guilt, fear/anxiety and sadness were predominant. While there was no linear direction of change, there was a pattern of emotional processing, however for many the themes remained constant. It was beyond this study to identify how expressed emotion and shifts may facilitate cognitive-emotional processing of trauma. However, the identification of these central expressed emotions appears to be in line with trauma theory (Lee et al., 2001). Given the role of experiential (or emotional) avoidance implicated in PTSD (Hayes, Luoma, Bond, Masuda, & Lillis, 2006), the identification of shifts in emotions may be a useful

marker of successful resolution. A collaborative conceptualisation of experienced emotion needs to be agreed as this may either obstruct or assist emotional processing as reflected within the therapeutic relationship (Leahy, 2007).

In TF-CBT participants are actively encouraged to persist in focusing on traumatic memory content despite increased affect arousal. Even if cognitive restructuring is likely to be less distressing than prolonged exposure; the process of addressing distortions in appraisals requires attending to the trauma memory triggering affect. The alternative is avoidance, the most direct form of which is disengagement Within the sample studied, participants who were less likely to engage effectively with cognitive restructuring appeared likely to disengage due to 'distress'. There may also have been therapist collusion with avoidance of increased affect arousal, in particular because exacerbating psychotic symptoms is often extremely concerning to clinicians. Indeed concerns about sensitivity to stress has been cited as a rationale for using cognitive restructuring rather than prolonged exposure in this sample (Mueser et al., 2008). As the WAI is designed to measure collaboration, this would not be captured by the measure. A measure of treatment fidelity for each of the phases may have revealed any substantive concerns in this area.

Auditory hallucinations may also have complicated the process of cognitive restructuring, where trauma related cognitions and 'voice' content overlapped or where the process triggered 'voice' responses to appraisals. Negotiating these obstacles requires therapeutic adjustments to standard TF-CBT treatment. Equally where beliefs relating to trauma overlapped with delusional beliefs this posed a challenge for the cognitive restructuring component as it required the individual to associate the development of the belief with the experience of prior trauma. Indeed, the process of cognitive restructuring may be experienced as invalidating (Zayfert & Becker, 2006) where challenging perceptions of trauma appraisals is related to prior experiences of having their delusions challenged.

Dissociation as a possible feature of PTSD may also interfere in cognitive restructuring, Given that dissociation would be addressed within TF-CBT, it was noteworthy that there was no indication that this was occurring (within the selected recordings).

Limitations

Clear conclusions about the reciprocal effects between process variables could not be drawn from the findings within the study due to sample size. The likelihood of a between group analysis being underpowered meant that discriminating differences, which could have revealed clinical useful process variables, could not be explored. Data presented in the current article were gathered in a larger RCT, therefore instruments and tools used were not refined with regard to the hypotheses under investigation. It would have been more advantageous to also include self-report measures of WAI and subjective appraisals of cognitive-emotional processing. The study was also unable to assess the role of childhood adverse experiences (e.g. in terms of severity, frequency, timing, duration etc.) or the developmental stage of exposure to trauma. Incorporating the childhood trauma questionnaire (CTQ; Bernstein et al., 2003) could have assessed for types of maltreatment and severity.

The study only presents baseline data, therefore no inferences between the process variables measured and what might be more conducive to successful outcome were possible. This would arguably be of more clinical value.

The correlation analyses were completed without statistical adjustment (e.g. Bonferroni) which would have minimised many of the associations. It also is not known to what extent those who declined to be recorded may have influenced the strength of the associations we reported.

The study of processes in therapy are highly subjective, reliant on the perception of observers and can produce different but equally plausible description of that event (Mintz, Auerbach, Luborsky, & Johnson, 1973). Rater training and adherence to measures can produce reliability however there is still the room for error despite

agreement. Adherence to rating scale may in fact overlook many qualitatively salient aspects of process within the therapy. Observer measurement of psychotherapy processes are reliant on explicit communication, unable to unearth the preverbal and felt aspects of the clients cognitive-emotional processing and interpersonal communication (Schneider, 1999). The reliability of the measures used, for this sample, also became questionable during the study. It is possible that affective arousal may lead to dissociative processes (Schauer & Elbert, 2010) this may objectively come across as a 1 or 7 on the CEAS, depending on the subjective judgment of the rater. This is further complicated by the difficulty of discriminating such phenomenon by audio recordings. Visual affective cues such as facial gestures, posture and gaze could provide rich data not measurable in this study. Such visual cues could also inform rating on the WAI. Video recordings would have provided more reliable and nuanced observational data. The short observer version of the WAI was used. It is possible that the longer original 36 item WAI may have more adequately captured the collaborative process between the client and the therapist.

The process of therapy, as measure in this study, may also have been influenced by other factors. Pertinent to CBT would be the measurement of therapy and homework adherence and competence.

Implications for research

There are a number of clinical implications of the current research. The results underscore the importance of therapists attending to the alliance process within therapy and understanding the relationship between alliance and other process factors which may be implicit in facilitating change.

This exploratory study aimed to identify in-session process variables which may have a practical clinical utility. As research interventions continue to identify the active mechanisms of change the more subtle areas relating to objective emotional

regulation, expression and emotional processing offers an interesting area of investigation. Beyond working alliance, other variables have been overlooked in therapy around how the client is processing and engaging in both the cognitive and emotional content of therapy. The EXP measure may be useful for exploring emotional processing in TF-CBT however research would need to empirically validate what level is ideal for successful cognitive restructuring. While the measures in this study have not been widely used, this study has identified potential utility and also the limitations which may inform future research in this area.

Conclusion

This exploratory study investigated the process of TF-CBT with individuals with schizophrenia. The results show that despite the symptomatic complexity and developmental trauma histories, individuals within the trial engaged well throughout therapy from initial engagement to more demanding phase of cognitive restructuring. The capacity for emotional processing is consistent with that observed in therapy for less severe disorders. Both these results suggest that this client group show no overall difficulty with engagement, and negative symptoms do not appear to influence emotion expression or arousal and should not be of concern when considering client suitability. The depth of emotional processing of experience does not appear to improve over the course of therapy. Considering cognitive restructuring demands a higher level of depth if it is to be successful, this raises questions about the ability of individuals with this co-morbid complexity to fully make use of this strategy. However it may also be related to collaborative agreement on Task or a reduced agreement on the goal of therapy from early to late phase. No causal inference can be made from these results. Despite the limitations of this study, the findings have utility in guiding future process research.

As research interventions continue to identify the active mechanisms of change, emotional regulation, expression and emotional processing variables are likely to be

related both to alliance and outcome. The EXP measure may be useful for exploring emotional processing in TF-CBT: however characterization of what is an optimal level therapeutically needs further work.

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Part 3: Critical Appraisal

The Application of Process Analysis within Clinical CBT Trials.

Introduction

Dismantling studies in CBT aim to identify the active components of treatment that contribute to change. Indeed dismantling randomized controlled trials of CBT are considered to be the focus of future enhancement and dissemination of interventions for specific disorders (Olatunji, Cisler, & Deacon, 2010). However, another direction of psychotherapy development could focus on targeting specific cognitive processes and 'cognitive endophenotypes' rather than disorder specific treatments (Emmelkamp et al., 2014). Complementary to the direction of both trajectories requires the identification of associated mechanisms of change within the process of psychotherapy. This would lead to refining therapies to identify active mechanisms of change and ultimately improve the interventions we have. Focus on what works for whom and recognising individual difference. I argue that this requires greater attention to the 'process' of psychotherapy. I will look at the practicalities of this as an avenue of research, the technical considerations within the therapeutic relationship, participant characteristics and methodological considerations.

Process

Process in psychotherapy, refers to the intra and interpersonal, covert and overt actions of the individual to modulate emotion, cognition and behaviour (Prochaska & Norcross, 2010). From an early stage, process as mechanisms of change, has been considered to take the form of in-session dynamics, awareness/insight or behaviour change (Rosenzweig, 1936; Watson, 1940). However this has also developed to focus on component processes such as cognitive emotion regulation strategies, meta-cognition, motivation and the therapeutic relationship (Wittchen et al., 2014).

Process analysis, used within clinical trials, can help track mediating variables underlying symptom change. Therapy outcome studies, often overlook this beneficial route of investigation, and where they do, mediators are only measured pre and post-treatment, retrospectively carried out on trial data, used for the

development of process measures or within small samples (Maric, Wiers, & Prins, 2012). These approaches tend not to meet the assumption requirements of mediation analysis. As such, much of the research in this area lends little to the evidence base (given the improper use of mediation analysis) and cannot link causal effect of a treatment on an outcome to particular elements of the treatment.

As CBT is generally disorder specific, it involves multiple techniques (differing between trials) to target multiple maladaptive processes within a symptom cluster classified as a diagnostic disorder. As such there are multiple overt variables targeting multiple overt and covert processes within contexts imbued with more overt and covert variables which might influence change. It is a complex system of change. The cognitive models offer clear formulation however the components underlying behaviour change are very difficult to identify (Wittchen et al., 2014).

Process analysis tests specific and non-specific processes as mediators of treatment outcome. Specific processes in CBT refer primarily to cognitive challenges and behavioural change, whereas non-specific processes refer to common factors in all psychotherapy such as the broadly titled, therapeutic alliance. For the purposes of this critical appraisal I shall focus on non-specific processes. As I will highlight, the identification of non-specific factors can lead to them being implemented in both theory and treatment. An example in CBT is the avoidance of providing reassurance (a non-specific factor) which has been identified as safety-seeking behaviour (specific factor) in anxiety disorders.

The Dodo Effect

The dodo effect verdict has led to an impasse in comparative psychotherapy research. It polarises schools of psychotherapy into camps focused on specific vs. non-specific factors rather than the interaction between them both. Non-specific factors are a central component to CBT theory and practice and it is considered necessary but not sufficient for bringing about change (Beck, Rush, Shaw, & Emery,

1979). Gilbert & Leahy, (2007) emphasise the role of emotion, transference, ruptures, internal working models of attachment, schematic mismatch and self reflection within the therapeutic alliance in CBT. Within CBT it's suggested these conditions are accentuated and underplayed with different clients to enable productivity (Dryden, 2012). The use of active collaboration and Socratic questioning are also used to circumvent interpersonal conflict leading to an impasse or rupture in the alliance.

However these factors receive much less attention in CBT research where studies tend to suffer the methodological flaws outlines above. In CBT research and for those critical of psychotherapy effects in general, the dodo effect has been compared to the placebo effect. There is a danger in this; it mitigates the relevance of non-specific factors in successful outcome (Bjornsson, 2011). Trials are now developed to ensure non-specific factors are replicated in control conditions rather than exploring the inherent processes underlying the benefits. The consensus being that if a therapy is to prove if efficacy it needs to prove the value of its unique features are not secondary to the common factors. This tends to attribute everything 'common' to a therapeutic alliance, or to be more specific, the therapeutic bond. Even here there is a suggestion that bond may be concomitant rather causal in symptom change in CBT (Webb et al., 2011).

Those who specifically research the 'therapeutic alliance' rarely make a demarcation between technique and alliance. It is suggested that they are impossible to tease apart being “interwoven in the contextual fabric of psychotherapy” (Prochaska & Norcross, 2010, p. 523). However through comparative exploration of therapies the common factors could be unfolded to reveal specific shared mechanisms. From there the non-specific could shift to identifiable and specific factors influencing behaviour change.

Therapeutic Alliance

The therapeutic alliance is the most influential area of process-outcome research. It has been widely researched and studies have controlled for methodological issues which arise in correlation analyses. Primarily, they control for the influence of prior symptomatic change, dependability of measurement across sessions, and the influence of analysis at patient, therapist, and observer level.

However the main issue arises with the construct which is being measured. More than 30 measure of alliance were used in a recent meta-analysis (Horvath, Del Re, Flückiger, & Symonds, 2011). The underlying constructs are widely different with less than 50% shared variance among the main four measures. As such, there is a lack of specificity when we are referring to the term 'alliance'.

The working alliance inventory (WAI; Horvath & Greenberg, 1989), one of the most common measures of therapeutic alliance has 3 subscales: Task, Goal and Bond. Task and Goal relate to specific processes within CBT: therapist-patient agreement on the goals and tasks of therapy. Bond is therefore the only non-specific component. The Rogerian conceptualisation of Bond has three elements; transference/countertransference, interpersonal style and core conditions (unconditional positive regard, empathy and congruence). Empathy may play a particularly strong role. In a meta-analysis on available research, empathy accounted for about 9% of the variance in outcome (Elliott, Bohart, Watson, & Greenberg, 2011). However, the core conditions correlate highly and may be due to low perceptual difference with other core conditions (Gurman & Gustafson, 1976).

Participant/Therapist Characteristics

The alliance is a relationship, between two people, each of whom brings to therapy his or her own characteristics, personality, and history (Gelso & Carter, 1994). Patient characteristics are an important component of the therapeutic relationship. Their motivation to change may affect engagement (Buckner & Schmidt, 2009).

Their attachment history may affect their ability to foster a strong alliance with their therapist (Mallinckrodt, 2000). They may have high (or low) expectations of therapy which may influence engagement or lead to rupture (Safren, Heimberg, & Juster, 1997). Overreliance on maladaptive emotional regulation strategies may interfere. For instance, experiential avoidance may reduce the contingency for habituation, extinction, and disconfirmation of beliefs (Leahy, 2012).

The individual therapist may be exhibiting a strong influence on successful outcome. Ninety-seven percent of the difference in outcome between therapists has been shown to be due to therapist variability (Baldwin, Wampold, & Imel, 2007) while client variability was unrelated to outcome. Indeed the 'therapist effect' is suggested to be greater than treatment effect (Wampold, 2001). So some therapists are more effective than others.

The therapists micro skills are clearly important, but more often than not, taken as a given in CBT research. As potential moderators they need to be measured, encompassing skills in emotional expression and connection, resolving ruptures and competence in therapeutic modality.

However if we employ a downward arrow questioning approach to this we further need to consider therapist factors relating to insight in the therapeutic alliance. Leahy (2007, p. 244) indicates a number of important dynamic considerations underlying effective therapeutic communication. He suggests that within the transference relationship, the therapist needs to be able to interpret their own and their client's behaviour. This would require an awareness of "inference of motive, seeing the other as provocation or elicitor, self as object of other's experience, and self-other role-taking (systemic relationship perspective) within the current interaction, other relationships with similar patterns, and past relationships". It is clear that this is an area requiring developed intra and interpersonal skills. These skills place a strong responsibility on the CBT therapist to attend to developing insight into their own behaviour and relational patterns. It is of interest that there is

little requirement for CBT therapists to foster a greater awareness of their own schemas.

The area of research looking at matching clients to therapists has also been explored. This would appear to have little clinical utility. Matching clients to therapists based on matching individual variables is bound to be as successful as internet dating. However at least with internet dating you can go on many dates before settling. Within the NHS the choice, for clients, is slimmer. Clarkin & Levy, (2004) identified 100 potential matchmaking markers suggesting this would require a rather complex algorithm. An expert panel attempted to identify specific patient characteristics which could be used to adapt or tailor the therapy relationship. Their more conservative assessment suggested four characteristics (reactance/resistance, preferences, culture, religion/spirituality) to be demonstrably effective in adapting psychotherapy and another two (stages of change, coping style) as probably effective (Norcross & Wampold, 2011). It was not clear how one would adapt or tailor the relationship given these factors however there appeared to be a suggestion that psychotherapists would want to "develop a repertoire of relational styles" to fit the patients characteristics.

On a more clinical applicable note, there has been some more specific research on the best matches between the therapy relationship and patient characteristics. For example, high resistance may require a relationship with minimal therapist direction: nurturing parents and Socratic teachers. Whereas those with better initial engagement may respond better to a directive therapy or coaching (Beutler & Harwood, 2000; Norcross, 2002).

The focus on the dynamics overlooks the influence of external contextual factors. This is also something neglected in process research, where functional impairment (work, social and intimate relationships) can impact on the therapeutic alliance and outcome. While pre and post measures are routinely taken, if impairment emerges

during therapy or as part/consequence of the intervention, it can become a moderating variable.

Technical Factors

While explicit techniques in CBT have been clinically indicated, more non-specific variables have not been given as much attention. Some researchers have attempted to identify principles both in CBT (Follette & Greenberg, 2005) and across modalities (Grencavage & Norcross, 1990). However the non-specific needs to be operationalised and the temporal sequence of change identified. Understanding the sequence of change helps to optimise the processes required at different stages of therapy (Prochaska & Norcross, 2010).

Much continues to be made of learning through the ambiguous 'interpersonal dynamics'. This is assumed to be due to increases in morale, novelty, and esteem that people experience from having others attend to them (Prochaska & Norcross, 2010), also known as the Hawthorne effect. Indeed this may be the real dodo.

While processes of change have been theoretically postulated (Grencavage & Norcross, 1990) there is little empirical evidence. CBT research produces manuals from successful RCT, however the manuals are based on successful outcome rather than reflecting a temporal sequence of cognitive/behavioural change. The changes preceding symptom change remain elusive (Crits-Christoph, Connolly Gibbons, & Mukherjee, 2013).

Methodological Considerations

There is further issue with methodology underlying process analyses as it is used in clinical research. The current tools for identifying non-specific factors are still undergoing a process of their own and there is also a need to factor in bias given the degree of subjectivity involved.

Many studies that have reported mediation analyses do not fulfill the most established requirements for mediation analysis (MacKinnon, 2008). Consequently, the evidence for the mediating effects in these studies is weak, and implications for research and clinical practice therefore inconclusive. For instance, Missirlian, Toukmanian, Warwar, & Greenberg, (2005) conducted a hierarchical regression analysis of three process measures on four outcome measures with a sample of 32. In order to achieve an effect size of 0.15, they would have needed a minimum sample size of 87 (Soper, 2014). Yet they postulate, with some confidence, the predictive value of their research. Further to this it is not even mentioned as a limitation, putting into question whether the authors were aware that their study was underpowered.

This study is not wholly representative. For instance, Kleim et al. (2013) utilized latent growth modeling to investigate temporal precedence in relation to trauma related cognition and symptoms of PTSD highlighting cognitive change as an active mechanism of change. This study had many strengths in relation to the methodology and statistical analyses, however the study was part of a treatment trial and did not control for any other mediators.

Measurement of constructs. Inadequate measures can also lead to type 2 errors (Maric et al., 2012). While reported reliability and validity tends to be high, they tend to be validated across a small number of studies, many of which will involve the designing author(s). As such they are at risk of bias.

Many of the process measures looking at non-specific factors can be complex and difficult to integrate into clinical research. They can involve training manuals can be difficult to ascertain, may require prototypes of ideal treatment to be designed, transcripts of therapy need to be produced and raters often have to go through extensive training to reach an acceptable level of expertise or inter-rater reliability (Godfrey, Chalder, Ridsdale, Seed, & Ogden, 2007).

However the measures used in process research can be adapted to take in multiple views: client, therapist, and observer ratings. So there are three different ways of looking at one construct but they are rarely all used in one study. Also the reported variability, where available, is noteworthy. Client ratings having a stronger correlation between alliance and outcome than therapist ratings (Horvath et al., 2011). Their meta-analysis reported high heterogeneity in effects sizes for both client and therapist suggesting large variability within groups; confidence intervals were not reported. Andrusyna, Tang, DeRubeis, & Luborsky, (2001) are generally cited in regards observer reliability for the WAI-S. However they reported great variability (item-by-item inter-rater reliabilities; 0.14 to 0.65; 2 raters).

This raises a question around the biases that arise from self/other report. For the client, much has been written about the reliability of self-report measures in general. When tracking the process of therapy, we are looking at their view of the utility of therapy, the interpersonal dynamics, insight into their emotional regulation or cognitive appraisals, resolution, internal conflicts etc. This, of course, requires the reflexive capacity to be able to do this. Many individuals in therapy will have poor mentalising capacity, emotional dysfunction, distorted cognitions about themselves and others, difficulties appropriately labeling emotions and self-states and adequately appraising their own thoughts. Using very specific process measures will aid the client in precisely labeling the variable being examined. However, when broad, like the 'alliance', clients are possibly reporting a good rating where therapy has been ego-syntonic and poor when its ego-dystonic (at the point of rating - states would hopefully have fluctuated through therapy).

When we consider the therapist ratings there will always be human bias both implicit and explicit. This could relate to competence, fit with model, expectations etc. Both observers and therapists will also vary in their observational accuracy. Given the cultural variability in the expression and recognition of emotion (Elfenbein & Ambady, 2002), variance in professional's ability to identify facial and vocal emotion

(Scherer & Scherer, 2011) and negative attentional biases in depression and anxiety (Browning, Holmes, & Harmer, 2010) we must assume a large degree of bias.

In clinical research, should we therefore be advocating professional raters undergo emotion identification tests/training, measuring for alexithymia and screening for mood difficulties?

As observer raters rely on multiple raters we would hope to achieve greater reliability, minimising bias. Raters can be trained to an acceptable level. However in practice raters: 1) reach a level of agreement, which means a discussion takes place, compromise may come down to power imbalance. Or 2) rating takes place separately and inter-rater reliability is calculated and primary researcher's rating are used for analysis. This is less prone to bias. Training will improve agreement about what is being measured and how to measure it, however this is a highly subjective process that relies on the principal investigator or other 'expert' leading the training. Then there's the issue with audio-recording vs. video. Video will obviously offer higher quality data however may be considered more intrusive and possibly make the client and therapist more self-aware. This could lead to false deductions on the part of the observers (e.g. client shifts uneasily during a silence, could be interpreted as an internal frustration or unease with a reflection by the therapist, with the silence itself or may have become aware that they are being filmed). Also, where there is refusal for recorded a section of important clients are not being rated. Is there something important being lost from this particular subgroup?

Conclusion

It is clear that further research is needed into processes underlying cognitive and behavioural change within CBT. This could have great utility in making the non-specific specific and guiding the development of more targeted interventions optimizing the formal content and structure of CBT (Emmelkamp et al., 2014).

Process analysis could potentially even offer an insight back into cognitive endophenotypes underlying disorders (Wittchen et al., 2014).

Process analysis can help to identify pertinent non-specific factors within CBT research. This is especially pertinent if CBT is to shake off the dodo feathers. This would need to be built into clinical research alongside well thought out control conditions. However these control conditions have to be specific in what non-specific aspects they are delivering and not just labeling it as the therapeutic alliance. The lack of specificity in current research makes assumptions around the therapeutic alliance and the therapeutic bond. It also requires a clear hypothesis relating non-specific factors to specific mechanisms of change underlying the strategy being employed. For instance, do in-session periods of silence following emotional narrative facilitate cognitive-emotional processing?

As such there is a need for process research to be integrated into trials. Mediating variables should be selected pre-trial so data can be tracked throughout treatment, at multiple points. Video-recording of sessions will provide much richer observational data to voice-recordings. Most importantly, studies should meet the statistical assumptions of analysis.

Working down through the potential variables throughout the dynamic relationship and methodological concerns, there unravels a multitude of vague concepts and variables which have not or are difficult to operationalise. It can become exasperating and maybe it is an elusive endeavour trying to measure micro-skills.

However, the individual practitioner could use these processes as a method of self-reflection; developing the application of technical strategies and attuning micro-skills. Also, there is the rather simple application of routine assessment of the client's experience of the therapeutic alliance being integrated (bi-directional feedback or more formal measures) which when assessed alongside treatment success could help guide psychotherapy (Miller, Duncan, Sorrell, & Brown, 2005).

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Appendix A

Search terms

Concept 1

Alex?thymia or (affect$ adj1 blunt$) or (Emotion$ adj1 blunt$) or Dissociation or (Emotion$ adj process$) or (Emotion$ adj $regulation) or (affect adj regulation) or (mood adj regulation) or (Self adj regulation) or (Emotion adj expression) or (Emotion adj experience) or (experience adj sampling adj method) or (Experiential adj avoidance) or Distract$ or Concentration or (attentional adj deployment) or (*attention adj control) or (*Hyper adj vigilance) or (hypervigilance) or (vigilance) or (hyper adj arousal) or (hyperarousal) or (hypoarousal) or Ruminat$ or Worry or (Problem adj solv$) or Supression or Reappraisal or (Cognitive adj change) or (Cognitive adj appraisal) or Acceptance or Resignation or (coping adj style?) or (coping adj mechanism?) or (coping adj strateg$)

Concept 2

(Schizophren$ or psychos*s or hallucination* or delusion* or (negative adj symptom*)).ti,ab.

Concept 3

(Acceptance adj2 Action adj Questionnaire) or (Acceptance adj2 Action adj Questionnaire) or (Affective adj autonomic adj response adj discrepancy) or (Anger adj Expression adj Inventory) or (Anger adj Expression adj Scale) or (anxious adj thoughts adj inventory) or (Behavio?ral adj Anger adj Response adj Questionnaire) or (Body adj Sensation? adj Questionnaire) or (Bermond adj Vorst adj Alexithymia adj Questionnaire) *or (Body* adj *vigilance* adj *scale)* or (Cognitive adj Behavio?ral adj Avoidance adj Scale) or (Cognit$ adj Checklist) or (Checklist adj2 Emotion adj Avoidance adj Strategy adj2 Engagement) or (Cognitive adj Emotion adj Regulation adj Questionnaire) or (Coping adj2 Health adj Injuries adj2 Problems) or (Coping adj Index) or (Coping adj Inventory adj2 Stressful adj Situations) or (COPE adj Inventory) or (Cognitive adj Responses adj Inventory) or (Coping adj Strategy adj Inventory) or (Coping adj Styles adj Questionnaire) or (Difficulties adj2 Emotion adj Regulation adj Questionnaire) or (Dissociative adj Experience? adj Questionnaire) or (Dissociative adj Experiences adj Scale) or (Dissociative adj Processes adj Scale) or (Emotion adj Avoidance adj Strategy adj Inventory) or (Emotion adj Approach adj Coping adj Questionnaire) or (Experiential adj Avoidance adj Scale) or (Emotion adj Avoidance adj Hierarchy) or (Emotion adj Control adj Questionnaire) or (Endler adj Multidimensional adj Anxiety adj Scales) or (Emotion adj Regulation adj Questionnaire) or (Global adj Rumination adj Scale) or (Interpersonal adj Problem adj Solving adj Questionnaire) or (Mayer adj Salovey adj Caruso adj Emotion adj Intelligence adj Test) or (Metacognition* adj Questionnaire) or (Online adj Alexithymia adj Questionnaire) or (Observer adj Alexithymia adj Scale) *or (Perceptual adj Alteration adj Scale)* or (Penn adj State adj Worry adj Questionnaire) or (Problem-Solving adj Inventory) or (Questionnaire adj2

experiences adj2 dissociation) or (Responses adj2 Depression adj Scale) or (Rumination adj Inventory) or (Rumination adj Sadness) or (Rumination adj Reflection adj Questionnaire) or (Ruminative adj Response adj Scale) or (Ruminative adj Style adj Questionnaire) or (Rumination adj Scale) or (Response adj Style? adj Questionnaire) or (Revised adj Ways adj2 Coping adj Checklist) or (Survey adj2 Coping adj Profile adj Endorsement) or (Scott adj McIntosh adj Rumination adj Index) or (Social adj Problem adj Solving adj Inventory) or (State adj Trait adj Anger adj Expression adj Inventory) or (Silencing adj2 Self adj Scale) or (Toronto adj Alexithymia adj Scale) or (Temperament adj2 Character adj Inventory) or (Thought adj Control adj Questionnaire) or (Trait adj Meta adj Mood adj Scale) or (White adj Bear adj Suppression adj Inventory) or (Ways adj2 Coping adj Questionnaire) or (Young adj Rygh adj Avoidance adj Inventory) or (Stress adj Process adj Questionnaire) or (Need adj for adj closure adj Scale) or (intolerance adj2 uncertainty adj scale) or (Worry adj Domains adj Questionnaire) or (Cognitive adj Avoidance adj Questionnaire) or (why adj worry) or (multidimensional adj2 anger adj2 inventory)

Appendix B

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
(Badcock, Paulik, & Maybery, 2011)	34 individuals with schizophrenia spectrum disorder; 34 healthy controls	SZ: 37.91(9.4) C: 41.35(11.85)	The Diagnostic Interview for Psychosis (DIP; Castle et al., 2006); DSM-IV criteria.	Penn State Worry Questionnaire (PSWQ) Emotion Regulation Questionnaire (ERQ)	Case definition Good Appropriate sample Good Selection of controls Good Definition of controls Good Matching Fair	Selection bias low Confounders unclear Measurement bias low
(Baker & Morrison, 1998)	30 individuals with schizophrenia spectrum disorder (15 experiencing auditory hallucinations, 15 without); 15 healthy controls	SZ: 43.93 (9.9) 42.93 (10.53) C: 38.73 (14.85)	diagnosis according to DSM-IV criteria	Metacognitions Questionnaire (MCQ-65)	Case definition Fair Appropriate sample Good Selection of controls Fair Definition of	Selection bias low Confounders low Measurement bias low

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
					controls Fair Matching Fair	
(Bassett, Sperlinger, & Freeman, 2009)	25 individuals with schizophrenia spectrum disorder (20 SZ, 1 schizoaffective disorder, 4 bipolar affective disorder); 25 non clinical controls	SZ: 43.52 (13.57) C: 41.32 (12.28)	A case note diagnosis.	Penn State Worry Questionnaire (PSWQ)	Case definition Fair Appropriate sample Poor Selection of controls Fair Definition of controls Poor Matching Good	Selection bias high Confounders unclear Measurement bias low
(Bob, Glaslova, Susta, Jasova, & Raboch, 2007)	82 individuals with paranoid schizophrenia; 50 healthy controls	SZ: 28.3(8.3) C: 28.7(8.5)	diagnosis according to DSM-IV criteria	Dissociative Experiences Scale (DES)	Case definition Fair Appropriate sample Good Selection of controls Good Definition of	Selection bias unclear Confounders High Measurement bias low

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
					controls Poor Matching Poor	
(Brett, Johns, Peters, & McGuire, 2009)	27 individuals with schizophrenia spectrum disorder, 32 non-clinical participants reporting no psychotic-like experiences	SZ: 32.4 (11.2) C: 27.7 (7.5)	Clinical sample, existing diagnosis	Metacognitions Questionnaire (MCQ-65)	Case definition Fair Appropriate sample Fair Selection of controls Good Definition of controls Poor Matching Poor	Selection bias unclear Confounders low Measurement bias low
(Cedro, Kokoszka, Popiel, & Narkiewicz-Jodko, 2001)	50 individuals with paranoid schizophrenia; 50 healthy controls	SZ: 42.3(11.0) C: 42.1(10.8)	Clinical sample, existing diagnosis according to DSM-IV criteria	Toronto Alexithymia Scale (TAS-20)	Case definition Fair Appropriate sample Good Selection of controls Good Definition of controls	Selection bias low Confounders unclear Measurement bias low

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
					Poor Matching Good	
(Dawson, Kettler, Burton, & Galletly, 2012)	20 individuals with schizophrenia spectrum disorder; 20 healthy controls	SZ: 43.25 (9.15) C: 38.60 (10.86)	DSM-IV-TR diagnostic criteria	Mayer–Salovey–Caruso Emotion Intelligence Test (MSCEIT) Managing Emotion subscale	Case definition Fair Appropriate sample Fair Selection of controls Good Definition of controls Good Matching Good	Selection bias unclear Confounders unclear Measurement bias low
(Freeman et al., 2006)	187 individuals with schizophrenia spectrum disorder (165 schizophrenia, 20 schizo-affective disorder, and 2 delusional disorder); 327 healthy controls	SZ: 37.5 (10.9) C: 22.6 (5.9)	ICD-10 diagnostic criteria for non-affective psychosis (F20)	Need for closure scale (NFCS)	Case definition Fair Appropriate sample Good Selection of controls Fair Definition of controls Poor	Selection bias high Confounders low Measurement bias unclear

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
					Matching Poor	
(Freeman, Pugh, Vorontsova, Antley, & Slater, 2010)	30 individuals with persecutory delusions (24 schizophrenia, 4 schizoaffective disorder, and 2 delusional disorder); 30 healthy controls	SZ: 44.2 (11.7) C: 44.2 (11.2)	Present State Examination—10 (World Health Organization, 1992) and case-note diagnoses	Penn State Worry Questionnaire (PSWQ)	Case definition Fair Appropriate sample Good Selection of controls Good Definition of controls Poor Matching Fair	Selection bias high Confounders low Measurement bias low
(Giesbrecht, Merckelbach, & Geraerts, 2007)	22 individuals with schizophrenia spectrum disorder; 20 healthy women	SZ: 38.95 (11.50) C: 41.50 (12.01)	DSM-IV criteria	Dissociative Experiences Scale (DES)	Case definition Good Appropriate sample Good Selection of controls Good Definition of controls Poor Matching	Selection bias high Confounders high Measurement bias low

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
					Poor	
(Goldstone, Farhall, Thomas, & Ong, 2013)	100 individuals with schizophrenia spectrum disorder (82 reported a primary diagnosis of schizophrenia, 18 indicated a diagnosis of schizoaffective disorder. Comorbid diagnoses noted included: 44 major depressive disorder, 39 substance abuse/dependency, and 37 anxiety disorders) 133 non clinical controls	-	Clinical sample, self report	Metacognitions Questionnaire (MCQ-30)	Case definition Fair Appropriate sample Fair Selection of controls Good Definition of controls Fair Matching Poor	Selection bias unclear Confounders unclear Measurement bias low
(Green et al., 2012)	53 individuals with schizophrenia spectrum disorder (48 schizophrenia, 5 schizoaffective disorder	SZ: 34.77 (7.89) C: 33.02 (5.32)	DSM- IV (SCID-P)	Mayer–Salovey–Caruso Emotion Intelligence Test (MSCEIT) Managing Emotion subscale	Case definition Good Appropriate sample Good Selection of	Selection bias low Confounders low Measurement bias

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
	depressive type); 47 comparable healthy controls				controls Good Definition of controls Good Matching Good	low
(Henry, Rendell, Green, McDonald, & O'Donnell, 2008)	41 individuals with schizophrenia spectrum disorder (32 schizophrenia and 9 schizoaffective disorder); 38 healthy controls	SZ: 37.5 (10.67) C: 36.1 (11.99)	DSM-IV criteria	Emotion Regulation Questionnaire (ERQ)	Case definition Fair Appropriate sample Good Selection of controls Good Definition of controls Fair Matching Good	Selection bias unclear Confounders low Measurement bias low
(Ille, Schöny, Kapfhammer, & Schienle, 2010)x	38 individuals with schizophrenia spectrum disorder; 40 healthy controls	SZ: 39.7 (12.9) C: 35.5 (14.1)	Mini-DIPS: ICD-10 criteria	State-Trait- Anger Expression Inventory (STAXI) –Anger in (suppression)	Case definition Good Appropriate sample Good Selection of controls	Selection bias unclear Confounders low Measurement bias low

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
					Good Definition of controls Good Matching Fair	
(Johnson, Gooding, Wood, Taylor, & Tarrier, 2011)	77 individuals with schizophrenia spectrum disorder (69 schizophrenia, 5 schizoaffective disorder, 2 psychosis NOS and 1 atypical psychosis); 120 non clinical controls	SZ: 20.53 (2.82) C: 42.3 (11.9)	ICD-10 or DSM–IV criteria	Emotion Regulation Questionnaire (ERQ)	Case definition Fair Appropriate sample Good Selection of controls Fair Definition of controls Poor Matching Poor	Selection bias unclear Confounders unclear Measurement bias low
(Kern et al., 2011)	173 individuals with schizophrenia spectrum disorder (schizophrenia or schizoaffective disorder, depressed subtype);	SZ: 44.0 (11.2) C: 42.6 (11.6)	DSM-IV (SCID)	Mayer–Salovey–Caruso Emotion Intelligence Test (MSCEIT) Managing Emotion subscale	Case definition Good Appropriate sample Fair Selection of controls Good	Selection bias unclear Confounders unclear Measurement bias low

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
	296 healthy controls				Definition of controls Fair Matching Fair	
(Kimhy et al., 2012)	44 individuals with schizophrenia spectrum disorder (35 schizophrenia, 3 schizoaffective, 3 schizophreniform, and 3 psychosis NOS); 20 healthy controls	SZ: 30.33 (8.08) C: 24.20 (4.62)	DSM-IV diagnosis of schizophrenia spectrum disorder. Diagnostic Interview for Genetic Studies (DIGS)	Toronto Alexithymia Scale (TAS-20) – excluded the EoS subscale Mayer–Salovey–Caruso Emotion Intelligence Test (MSCEIT) Managing Emotion subscale Emotion Regulation Questionnaire (ERQ)	Case definition Good Appropriate sample Good Selection of controls Good Definition of controls Fair Matching Poor	Selection bias unclear Confounders low Measurement bias low
(Koelkebeck et al., 2010)	23 individuals with first-episode schizophrenia spectrum disorder; 23 healthy controls.	SZ: 24.5 (5.6) C: 26.8 (4.2)	DSM-IV (SCID)	Toronto Alexithymia Scale (TAS-26)	Case definition Good Appropriate sample Fair Selection of controls Good Definition of	Selection bias low Confounders low Measurement bias low

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
					controls Good Matching Good	
(Kubota et al., 2011)	21 individuals with schizophrenia spectrum disorder; 24 healthy controls	SZ: 37.4 (11.5) C: 35.3(9.4)	DSM-IV (SCID)	Toronto Alexithymia Scale (TAS-20)	Case definition Good Appropriate sample Good Selection of controls Good Definition of controls Good Matching Good	Selection bias low Confounders low Measurement bias low
(Kubota et al., 2012)	44 individuals with schizophrenia spectrum disorder; 44 healthy controls	SZ: 36.3 (10.1) C: 34.4 (12.4)	DSM-IV (SCID-P)	Toronto Alexithymia Scale (TAS-20)	Case definition Good Appropriate sample Good Selection of controls Good Definition of controls	Selection bias low Confounders low Measurement bias low

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
					Good Matching Good	
(Lee et al., 2013)	38 individuals with schizophrenia spectrum disorder; 31 healthy controls	SZ: 44.7 (9.1) C: 41.4 (9.9)	DSM-IV (SCID)	Mayer–Salovey–Caruso Emotion Intelligence Test (MSCEIT) Managing Emotion subscale	Case definition Good Appropriate sample Good Selection of controls Good Definition of controls Good Matching Good	Selection bias low Confounders low Measurement bias low
(McKay, Langdon, & Coltheart, 2007)	22 individuals with schizophrenia spectrum disorder (18 schizophrenia, 2 bipolar disorder, 2 schizoaffective disorder); 22 healthy controls	SZ: 40.36 (10.16) C: 35.89 (11.71)	diagnosis according to DSM-IV criteria	Need for Closure Scale (NFCS)	Case definition Fair Appropriate sample Poor Selection of controls Good Definition of controls Good	Selection bias unclear Confounders low Measurement bias unclear

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
					Matching Good	
(Modestin, Hermann, & Endrass, 2007)	43 individuals with schizophrenia spectrum disorder (19 schizophrenia, 12 schizoaffective disorder, 8 delusional disorder, 3 schizotypal disorder and 1 with acute polymorphic psychotic disorder); 42 healthy controls	SZ: 30 (9) C: 35 (10)	ICD-10 criteria	Dissociative Experiences Scale (DES)	Case definition Fair Appropriate sample Good Selection of controls Fair Definition of controls Fair Matching Poor	Selection bias unclear Confounders unclear Measurement bias low
(Morrison & Wells, 2000)	22 individuals with schizophrenia spectrum disorder; 22 non patient controls	SZ: 44.1 (14.35) C: 39.8 (8.81)	DSM-IV criteria	Thought Control Questionnaire (TCQ)	Case definition Fair Appropriate sample Fair Selection of controls Fair Definition of controls Poor Matching	Selection bias unclear Confounders unclear Measurement bias unclear

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
					Fair	
(Morrison, French, & Wells, 2007)	73 individuals with schizophrenia spectrum disorder; 43 individuals who met the criteria for ARMS; 188 students	SZ: 41.2 (10.3) C: 27.6 (11.1)	DSM-IV diagnosis, clinical interview and examination of case notes	Metacognitions Questionnaire (MCQ-65)	Case definition Good Appropriate sample Good Selection of controls Fair Definition of controls Poor Matching Poor	Selection bias unclear Confounders low Measurement bias low
(Perona-Garcelan et al., 2008)	52 individuals with schizophrenia spectrum disorder - split into 3 groups (51 schizophrenia and 1 schizoaffective disorder); 17 healthy controls	SZ: 38.65 (9.04) C: 41.35 (10.21)	DSM-IV criteria	Dissociative Experiences Scale (DES-II) Spanish version	Case definition Fair Appropriate sample Good Selection of controls Fair Definition of controls Fair Matching Poor	Selection bias low Confounders unclear Measurement bias low

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
(Perona-Garcelan et al., 2012)	75 individuals with schizophrenia spectrum disorder - split into 4 groups (27 current auditory hallucinations, 20 with delusions but not hallucinations, 20 diagnosed with schizophrenia but recovered from positive symptoms); 27 healthy controls	SZ:37.84 (8.06) C: 39.32 (12.8)	DSM-IV TR criteria, confirmed by clinical interview and reference to medical records	Metacognitions Questionnaire (MCQ-30)	Case definition Good Appropriate sample Good Selection of controls Good Definition of controls Fair Matching Poor	Selection bias unclear Confounders unclear Measurement bias low
(Perry, Henry, & Grisham, 2011)	33 individuals with schizophrenia spectrum disorder (20 schizophrenia and 13 schizoaffective disorder); 36 healthy controls	SZ: 43.7 (9.89) C: 40.8 (11.49)	Pre-existing diagnosis made by treating psychiatrist SANS SAPS	Emotion Regulation Questionnaire (ERQ)	Case definition Fair Appropriate sample Good Selection of controls Good Definition of controls Fair Matching Good	Selection bias low Confounders low Measurement bias low

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
(Pietrzak et al., 2009)	113 individuals with schizophrenia spectrum disorder (schizophrenia or schizoaffective disorder); 102 healthy controls	SZ: 40.4 (11.1) C: 39.2 (11.0)	DSM-IV (SCID) PANSS	Mayer–Salovey–Caruso Emotion Intelligence Test (MSCEIT) Managing Emotion subscale	Case definition Good Appropriate sample Good Selection of controls Good Definition of controls Good Matching Good	Selection bias low Confounders low Measurement bias low
Poninovsky et al 2013)	51 individuals with schizophrenia (27 paranoid type, 10 undifferentiated type, 7 disorganized type, and 7 with residual type); 61 healthy controls	SZ: 33.8 (10.5) C: 35.7 (11.3)	DSM-IV (SCID)	Coping Inventory for Stressful Situations (CISS)	Case definition Good Appropriate sample Good Selection of controls Fair Definition of controls Fair Matching Fair	Selection bias unclear Confounders unclear Measurement bias low
(Rajji et al.,	59 individuals with	SZ: 63.5 (6.8)	DSM-IV (SCID)	Mayer–Salovey–Caruso Emotion	Case definition	Selection bias

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
2013)	schizophrenia (schizophrenia or schizoaffective disorder); 33 healthy controls	C: 63.4 (7.7)		Intelligence Test (MSCEIT) Managing Emotion subscale	Good Appropriate sample Good Selection of controls Good Definition of controls Good Matching Fair	low Confounders low Measurement bias low
(Ritsner et al., 2006)	237 individuals with schizophrenia spectrum disorder (176 paranoid type, 38 residual type, 11 disorganized type, 11 undifferentiated type, and 1 catatonic type); 175 healthy controls	SZ: 37.9 (9.9) C: 38.4 (10)	DSM-IV criteria	Coping Inventory for Stressful Situations (CISS)	Case definition Fair Appropriate sample Good Selection of controls Fair Definition of controls Good Matching Poor	Selection bias unclear Confounders low Measurement bias low
(Ross, Norton, & Anderson, 1988)	20 individuals with schizophrenia	SZ: - C: -	DSM-III-R criteria	Dissociative Experiences Scale (DES)	Case definition Fair	Selection bias unclear

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
	spectrum disorder; 28 medical students (control)				Appropriate sample Fair Selection of controls Fair Definition of controls Poor Matching Poor	Confounders unclear Measurement bias low
(Rowland, Hamilton, Lino, et al., 2013)	126 individuals with schizophrenia spectrum disorder: 81 healthy controls (other than anxiety disorders)	SZ: 45.46 (10.96) C: 44.65 (12.86)	DSM-IV diagnosis Diagnostic Interview for Psychosis (Castle et al., 2006)	Cognitive Emotion Regulation Questionnaire (CERQ)	Case definition Good Appropriate sample Good Selection of controls Good Definition of controls Poor Matching Poor	Selection bias unclear Confounders low Measurement bias Unclear
(Rowland, Hamilton, Vella, et al., 2013)	32 individuals with schizophrenia spectrum disorder;	SZ: 44.57 (10.37) C: 33.91 (12.24)	DSM-IV criteria	Cognitive Emotion Regulation Questionnaire (CERQ)	Case definition Fair Appropriate	Selection bias unclear Confounders

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
	36 healthy controls (other than anxiety disorders)				sample Good Selection of controls Good Definition of controls Poor Matching Poor	unclear Measurement bias unclear
(Siegle, Condray, Thase, Keshavan, & Steinhauer, 2010)	15 individuals with schizophrenia spectrum disorder; 24 healthy controls	SZ: 41.5 (5.6) C: 30.2 (11.4)	DSM-IV (SCID)	Ruminative Response Scale (RRS)	Case definition Good Appropriate sample Good Selection of controls Fair Definition of controls Fair Matching Poor	Selection bias unclear Confounders unclear Measurement bias low
(Startup, Freeman, & Garety, 2007)	30 individuals with current persecutory delusions (22 schizophrenia, 3	SZ: 34.67 (10.22) C: 36.53 (10.25)	Present State Examination-10 (WHO, 1992) Diagnostic	Penn State Worry Questionnaire (PSWQ)	Case definition Fair Appropriate sample	Selection bias high Confounders low

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
	schizoaffective disorder, 1 delusional disorder, 3 bipolar affective disorder and 1 personality disorder); 30 healthy controls		assignments were made from case note data.		Poor Selection of controls Good Definition of controls Fair Matching Fair	Measurement bias low
(Taylor, Chen, Tso, Liberzon, & Welsh, 2011)	20 individuals with schizophrenia spectrum disorder (schizophrenia or schizoaffective disorder); 20 healthy controls	SZ: 40.7 (9.3) C: 39.8 (10.3)	DSM-IV (SCID)	Mayer–Salovey–Caruso Emotion Intelligence Test (MSCEIT) Managing Emotion subscale	Case definition Good Appropriate sample Good Selection of controls Good Definition of controls Fair Matching Good	Selection bias low Confounders low Measurement bias low
(Tso, Grove, & Taylor, 2010)	33 individuals with schizophrenia spectrum disorder (schizophrenia or schizoaffective	SZ: 38.5 (11.3) C: 38.2 (9.6)	DSM-IV (SCID)	Mayer–Salovey–Caruso Emotion Intelligence Test (MSCEIT) Managing Emotion subscale	Case definition Good Appropriate sample Good	Selection bias low Confounders low Measurement

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
	disorder); 33 healthy controls.				Selection of controls Good Definition of controls Good Matching Good	bias low
(Tso et al., 2010)	26 individuals with schizophrenia spectrum disorder (Schizophrenia or schizoaffective disorder); 23 healthy controls	SZ: 43.9 (12.5) C: 43.5 (13.1)	DSM-IV (SCID)	Mayer–Salovey–Caruso Emotion Intelligence Test (MSCEIT) Managing Emotion subscale	Case definition Good Appropriate sample Good Selection of controls Good Definition of controls Good Matching Good	Selection bias low Confounders low Measurement bias low
(Valiente, Prados, Gomez, & Fuentenebro, 2012)	55 individuals with participants schizophrenia spectrum disorder (28 schizophrenia paranoid type, 9	SZ: 34.64 (11.14) C: 37.41 (13.06)	DSM-IV criteria, Present State Examination (PSE-10), MINIPLUS	Metacognitions Questionnaire (MCQ-30)	Case definition Good Appropriate sample Good Selection of	Selection bias low Confounders low Measurement bias

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
	schizophreniform disorder, 6 schizoaffective disorder, 8 delusional disorder, 2 brief psychotic disorder, and 2 psychotic disorder NOS); 44 healthy controls				controls Good Definition of controls Good Matching Fair	low
(van der Meer, van't Wout, & Aleman, 2009)	31 individuals with schizophrenia spectrum disorder; 44 healthy controls	SZ: 32.3 (8.0) C: 29.2 (8.6)	DSM-IV diagnosis of schizophrenia, confirmed with Comprehensive Assessment of Symptoms and History (CASH) PANSS	Emotion Regulation Questionnaire (ERQ) Bermond–Vorst Alexithymia Scale (BVAQ)	Case definition Good Appropriate sample Fair Selection of controls Good Definition of controls Good Matching Good	Selection bias low Confounders low Measurement bias low
(van't Wout, Aleman, Bermond, & Kahn, 2007)	43 individuals with schizophrenia spectrum disorder (33 schizophrenia,	SZ: 31.14 (7.30) C: 31.98 (9.16)	DSM-IV diagnosis of schizophrenia, confirmed with	Bermond–Vorst Alexithymia Scale (BVAQ)	Case definition Good Appropriate sample	Selection bias low Confounders low

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
	1 schizoaffective, 6 undifferentiated, and 3 schizophreniform disorder); 44 healthy controls		Comprehensive Assessment of Symptoms and History (CASH)		Good Selection of controls Good Definition of controls Good Matching Good	Measurement bias low
(Varese et al., 2012)	45 individuals with schizophrenia spectrum disorder (34 schizophrenia, 11 schizoaffective and 1 delusional disorder; - split into 3 groups); 20 healthy controls	SZ: 45.6 (12.2) 39.4 (13.3) 48.3 (12.2) C: 39.5 (14.6)	DSM-IV-TR (elements from SCID); (SCI-PANSS; Opler et al. 1992)	Dissociative Experiences Scale (DES)	Case definition Fair Appropriate sample Good Selection of controls Good Definition of controls Fair Matching Good	Selection bias low Confounders unclear Measurement bias low
(Vogel, Spitzer, Barnow, Freyberger, & Grabe, 2006)	30 individuals with schizophrenia spectrum disorder; 297 healthy controls	SZ: 34.3 (12.7) C: 39.5 (13.2)	Clinical sample (existing diagnosis);	Dissociative Experiences Scale (DES)	Case definition Fair Appropriate sample Good	Selection bias unclear Confounders low Measurement

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
					Selection of controls Fair Definition of controls Poor Matching Fair	bias low
(Vorontsova, Garety, & Freeman, 2013)	30 individuals with schizophrenia spectrum disorder and a current persecutory delusion (without comorbid depression); 30 non-clinical controls	SZ: 40.1 (10.7) C: 40.4 (13.1)	Schedules for Clinical Assessment in Neuropsychiatry (SCAN v2.1)	Avoidance and Action Questionnaire (AAQ) Ruminative Response Scale (RRS)	Case definition Good Appropriate sample Good Selection of controls Good Definition of controls Fair Matching Fair	Selection bias unclear Confounders low Measurement bias low
(Yu et al., 2011)	Published: 60 individuals with paranoid schizophrenia (36 first episode schizophrenia); SZ: 24.83 (8.96)	SZ: 25.85 (9.10) C: 23.17 (7.58)	ICD-10 criteria	Toronto Alexithymia Scale (TAS-20)	Case definition Fair Appropriate sample Good Selection of	Selection bias low Confounders low Measurement bias

Author Name	Sample details for meta-analysis	Age M(SD)	Diagnostic Measures for Schizophrenia	Emotion Regulation Measures	Quality	Risk of Bias
	60 healthy controls. Unpublished data used (115 individuals with schizophrenia; 95 healthy controls)	C: 24.8 (7.66)			controls Fair Definition of controls Fair Matching Good	low

Table: *Study characteristics, quality and risk of bias ratings*

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Appendix C

Quality of the studies was assessed on rating checklist based on:

Case definition

DSM/ICD clinical interview - good
From records only or met DSM criteria but no evidence of assessment - fair
No description - poor

Appropriate sample
Schizophrenia spectrum – full description Good
Schizophrenia spectrum – no evidence of mixing- fair
Mixed with personality disorder and/or bipolar or no full description - poor

Selection of controls
Community controls or evidence of good matching - good,
Hospital staff/students (opportunity sample) - fair,
Clinical sample - poor

Definition of controls
No history of Axis 1 or Axis 2 disorder as formally assessed - good
No history reported but not formally assessed (both Axis 1 and 2) - fair
No description - poor

Matching

Study matching individual cases and controls for age, gender, and education/IQ, or parental education/socioeconomic status - good
Study matched for age and one other - fair
not described, or age only - poor

Appendix D

Classification scheme for bias

Type of bias	Description	Domains
Selection bias.	Systematic differences between baseline characteristics of the groups that are compared.	• Study population definition • Controls represent the population from which the cases arose.
Confounders.	Estimate of the association between an exposure and an outcome is mixed up with the real effect of another exposure on the same outcome.	• Matching • Have they *adjusted* or *controlled* for the effects of the confounder?
Measurement bias	Where self report measure is poorly measuring the outcome.	• Poor measure, subscale use not validated for construct.

Risk of bias	Interpretation	Within a study	Across studies
Low risk	Plausible bias, unlikely to seriously alter the results.	Low risk of bias for all domains	Most information is from studies at low risk of bias.
Unclear	Plausible bias that raises some doubt about the results.	Unclear risk of bias for one or more key domains.	Most information is from studies at low or unclear risk of bias
High risk	Plausible bias that serious weakens confidence in results.	High risk of bias for one or more key domains	The proportion of information from studies at high risk of bias is sufficient to affect the interpretation of results.

Appendix E

North East London NHS
NHS Foundation Trust

Research and Development Office
North East London NHS Foundation Trust,
1st Floor Maggie Lilley Suite,
Goodmayes Hospital,
Barley Lane,
Goodmayes,
Essex, IG3 8XJ

Date: 29th November 2012

Dear Ciaran O'Driscoll,

Letter of access for research

As an existing NHS employee you do not require an additional honorary research contract with the North East London NHS Foundation Trust. We are satisfied that such checks as are necessary have been carried out by your employer. This letter confirms your right of access to conduct research through the North East London NHS Foundation Trust for the purpose and on the terms and conditions set out below. This right of access commences on 29th November 2012 and ends on 30th November 2013 unless terminated earlier in accordance with the clauses below.

You have a right of access to conduct activities associated with such projects as you have received authorisation confirmed in writing from the Research and Development Director of the North East London NHS Foundation Trust. Please note that you cannot start the research until the Chief Investigator for the research project has received a letter from us giving permission to conduct the project.

You are considered to be a legal visitor to the North East London NHS Foundation Trust premises. You are not entitled to any form of payment or access to other benefits provided by this organisation to employees and this letter does not give rise to any other relationship between you and this Trust, in particular that of an employee.

While undertaking research through the North East London NHS Foundation Trust, you will remain accountable to your employer Camden and Islington NHS Foundation Trust but you are required to follow the reasonable instructions of your nominated manager Dr Oliver Mason in this Trust or those given on his behalf in relation to the terms of this right of access.

You must act in accordance with the North East London NHS Foundation Trust policies and procedures, which are available to you upon request, and the Research Governance Framework.

We may terminate your right to attend at any time either by giving seven days' written notice to you or immediately without any notice if you are in breach of any of the terms or conditions described in this letter or if you commit any act that we reasonably consider to amount to serious misconduct or to be disruptive and/or prejudicial to the interests and/or business of this NHS organisation or if you are convicted of any criminal offence. Your substantive employer Camden and Islington NHS Foundation Trust is responsible for your conduct during this research project and may in the circumstances described above instigate disciplinary action against you.

You are required to co-operate with the North East London NHS Foundation Trust in discharging its duties under the Health and Safety at Work etc Act 1974 and other

health and safety legislation and to take reasonable care for the health and safety of yourself and others while on North East London NHS Foundation Trust premises. Although you are not a contract holder, you must observe the same standards of care and propriety in dealing with patients, staff, visitors, equipment and premises as is expected of a contract holder and you must act appropriately, responsibly and professionally at all times.

You are required to ensure that all information regarding patients or staff remains secure and *strictly confidential* at all times. You must ensure that you understand and comply with the requirements of the NHS Confidentiality Code of Practice (http://www.dh.gov.uk/assetRoot/04/06/92/54/04069254.pdf) and the Data Protection Act 1998.

Furthermore you should be aware that under the Act, unauthorised disclosure of information is an offence and such disclosures may lead to prosecution.

The North East London NHS Foundation Trust will not indemnify you against any liability incurred as a result of any breach of confidentiality or breach of the Data Protection Act 1998. Any breach of the Data Protection Act 1998 may result in legal action against you and/or your substantive employer.

Where any third party claim is made, whether or not legal proceedings are issued, arising out of or in connection with your right of access, you are required to co-operate fully with any investigation by the North East London NHS Foundation Trust in connection with any such claim and to give all such assistance as may reasonably be required regarding the conduct of any legal proceedings.

Please also ensure that while on the premises you wear your NHS ID badge at all times, or are able to prove your identity if challenged. Please note that this Trust accepts no responsibility for damage to or loss of personal property.

If your circumstances change in relation to your health, criminal record, professional registration or any other aspect that may impact on your suitability to conduct research, or your role in research changes, you must inform your employer through its normal procedures. You must also inform the Research and Development Department and your nominated manager in North East London NHS Foundation Trust.

Yours sincerely

[redacted]

Sandeep Toot

Research and Development Manager North East London NHS Foundation Trust

Appendix F

SFU SIMON FRASER UNIVERSITY
THINKING OF THE WORLD

Mr Ciaran O'Driscoll
University College London
Research Dept of Clinical, Educational and Health Psychology
3 Chesterfield Gardens
London London, City of
N4 1LJ
United Kingdom

May 16, 2014

LIMITED COPYRIGHT LICENSE (ELECTRONIC) # 2014165.48

Dear Mr O'Driscoll

You have permission to use the Working Alliance Inventory (WAI) for the investigation:

"Process Analysis of trauma focused CBT for individuals with schizophrenia"

This limited copyright release extends to all forms of the WAI for which I hold copyright privileges, but limited to use of the inventory for not-for-profit research, and does not include the right to publish or distribute the instrument(s) in any form.

I would appreciate if you shared the results of your research with me when your work is completed so I may share this information with other researchers who might wish to use the WAI. If I can be of further help, do not hesitate to contact me.

[redacted]

Dr. Adam O. Horvath
Professor
Faculty of Education and
Department of Psychology

e-mail: horvath@sfu.ca
Internet: http://wai.profhorvath.com

TABLE 1. All items on WAI-O-S as organized by the three subfactors of the General Therapeutic Alliance factor

Goal	
Item 4:	There are doubts or a lack of understanding about what participants are trying to accomplish in therapy.
Item 6:	The client and therapist are working on mutually agreed upon goals.
Item 10:	The client and therapist have different ideas about what the client's real problems are.
Item 11:	The client and therapist have established a good understanding of the changes that would be good for the client.
Task	
Item 1:	There is agreement about the steps taken to help improve the client's situation.
Item 2:	There is agreement about the usefulness of the current activity in therapy (i.e., the client is seeing new ways to look at his/her problem).
Item 8:	There is agreement on what is important for the client to work on.
Item 12:	The client believes that the way they are working with his/her problem is correct.
Bond	
Item 3:	There is a mutual liking between the client and therapist.
Item 5:	The client feels confident in the therapist's ability to help the client.
Item 7:	The client feels that the therapist appreciates him/her as a person.
Item 9:	There is mutual trust between the client and therapist.

Note: WAI-O-S = Working Alliance Inventory, shortened observer-rated version.

Andrusyna TP, Tang TZ, DeRubeis RJ, Luborsky L. The factor structure of the working alliance inventory in cognitive-behavioral therapy. J Psychother Pract Res. 2001;10(3):173–8..

Appendix G

Client Emotional Arousal Scale-III

Before a segment can be rated on arousal, it first must be categorized according to the following emotion list. If the segment does not fit into any of the categories, it is considered unclassifiable and cannot be rated using the Emotional Arousal Scale-III:

1. Pain/Hurt
2. Sadness
3. Hopelessness/Helplessness
4. Loneliness
5. Anger/Resentment
6. Contempt/Disgust
7. Fear/Anxiety
8. Love
9. Joy/Excitement
10. Contentment/Calm/Relief
11. Shame/Guilt
12. Pride/Self-confidence
13. Anger and Sadness (both present simultaneously)
14. Pride (Self-assertion) and Anger (both present simultaneously)
15. Surprise/Shock

1	Person does not express emotions. Voice or gestures **do not** disclose any emotional arousal
2	Person may acknowledge emotions, but there is **very little** arousal in voice or body ▪ there is no disruption of usual speech patterns ▪ any arousal is almost **completely restricted**
3	At this level of arousal as well as higher levels, the person acknowledges emotions Arousal is **mild** in voice and body ▪ very little emotional overflow ▪ any arousal is still **very restricted** ▪ usual speech patterns are only **mildly disrupted**
4	Arousal is **moderate** in voice and body ▪ emotional voice is present: ordinary speech patterns are **moderately** disrupted by emotional overflow as represented by changes in accentuation patterns, unevenness of pace, changes in pitch ▪ although there is some freedom from control and restraints, arousal may still be **somewhat restricted**
5	Arousal is **fairly intense and full** in voice and body ▪ emotion overflows into speech pattern to a great extent: speech patterns deviate **markedly** from the client's baseline, and are fragmented or broken ▪ elevated loudness and volume ▪ arousal seems **fairly unrestricted**
6	Arousal is **very intense and extremely full** as the person is freely expressing emotion, with voice and body. ▪ usual speech patterns are **extremely disrupted** as indicated by changes in accentuation patterns, unevenness of pace, changes in pitch, and volume or force of voice ▪ spontaneous expression of emotion and there is **almost no sense of restriction**
7	Arousal is **extremely intense and full** in voice and body ▪ usual speech patterns are **completely disrupted** by emotional overflow ▪ the expression is **completely spontaneous and unrestricted** ▪ arousal appears uncontrollable and enduring. ▪ falling apart quality: although arousal can be a completely unrestricted therapeutic experience, it may also be a disruptive negative experience in which the clients feels like they are falling apart **<u>control = containment in contrast to control = restriction</u>** * The distinguishing feature between level 6 and level 7 is that in level 6 there is the sense that although a person's expression may be fairly unrestricted, this individual would be able to contain or control his or her arousal, whereas in level 7, a person's expression is completely unrestricted and there is the sense that emotional arousal would not be within this person's control.

Appendix H

PCL (traumatic experiences)	Occurrence	Primary trauma
Were you involved in a motor vehicle accident for which you received medical attention or that badly injured or killed someone?	5	
Have you been involved in any other kind of accident where you or someone else was badly hurt (for example, a plane crash, an explosion or fire, or someone almost drowning)?	6	
Were you ever exposed to warfare or combat?	2	
Have you experienced the sudden and unexpected death of a close friend or loved one due to an accident, illness, suicide or murder?	19	7
Have you been robbed or been present during a robbery where the robber(s) used or displayed a weapon?	6	
Have you ever been hit or beaten up and badly hurt by a stranger or by someone you didn't know very well?	15	
Have you seen a stranger (or someone you didn't know very well) attack or beat up someone and seriously injure or kill them?	6	
Has anyone threatened to kill you or seriously hurt you?	12	1
While growing up, were you physically punished in a way that caused bruises, burns, cuts, or broken bones?	13	1
Did you see or hear family fighting (such as any family member beating up or causing bruises, burns or cuts on another family member)?	10	
Have you ever been slapped, punched, kicked, beaten up, or otherwise physically hurt by your spouse (or former spouse), a boyfriend or girlfriend, or some other intimate partner?	8	
Before your 16th birthday, did anyone who was at least 5 years older than you touch or fondle your body in a sexual way or make you touch or fondle their body in a sexual way?	11	5
Before your 16th birthday, did anyone close to your age touch your sexual parts or make you touch their sexual parts against your will?	7	
After your 16th birthday, did anyone touch your sexual parts or make you touch their sexual parts against your will?	5	
Has anyone stalked you, in other words, followed you or kept track of you causing you to feel scared or worried for your safety?	6	
Have you experienced or seen any other events that were life threatening, caused serious injury, or were highly	15	7

disturbing or distressing (for example, being lost in the wilderness, kidnapped or held hostage, or seeing a mutilated body or body parts)?		
Have you experienced any psychiatric treatment that you found threatening, either when in the hospital or when in the community (such as involuntary hospitalization; being forced to take, or injected with medications against your will; being put in seclusion or restraints)?	17	
Have you had experiences which are now considered psychotic (either by yourself or the medical profession) in which you felt threatened or feared for your life (such as hearing threatening voices, believing someone or something was out to harm you, any other unusual beliefs or experiences)?	22	5