## Abstract

**Objective:** Emotional distress, including depression and anxiety is commonly reported amongst individuals experiencing severe mental health difficulties (e.g., psychosis). The beliefs individuals hold about the meaning of their mental health difficulty may explain the distress experienced. The current meta-analysis aimed to review the association between beliefs about severe mental health difficulties and emotional distress. **Method:** Three electronic databases (PsycINFO, Medline and CINAHL) were searched using keywords and controlled vocabulary (e.g., Medical Subject Headings) from date of inception to August 2019. A total of 19 eligible papers were identified.

**Results:** Our random-effects meta-analysis revealed that depression and anxiety held moderate association with beliefs about severe mental difficulties, with perceptions concerning a lack of control over experiences having the strongest association with distress. Longitudinal studies suggest that negative beliefs at baseline are associated with depressive symptoms at follow-up. **Conclusions:** The results suggest that the endorsement of negative beliefs about severe mental health difficulties is associated with current level of depression and anxiety. The results are consistent with theories of emotional distress in psychosis. However, the small number of longitudinal papers limits what can be concluded about the direction or other temporal characteristics of these relationships. Therapies that target unhelpful beliefs about psychosis may be beneficial.

**Keywords: Psychosis; Health Beliefs; Depression; Review; Meta-Analysis**

**Practitioner Points**

Negative beliefs about experiences of severe mental health difficulties (e.g., psychosis) are associated with greater emotional distress such as depression and anxiety

Beliefs about a lack of control over experiences had the strongest association with distress

Interventions that aim to modify or prevent the formation of unhelpful beliefs about severe mental health difficulties may be beneficial.

**Introduction**

Severe mental health difficulties (SMHD) can encompass a range of mental health experiences including psychosis and bipolar disorder. For many individuals these experiences can have an impact on their social and occupational life, with evidence suggesting that they can result in reduced opportunity for work, social engagement and increased health risks (Aguinaga-Ontoso,Brugos-Larumbe, & Guillén-Aguinaga, 2019; Chang, Huang, Chiu, Tang & Su, 2016; Rinaldi et al., 2010; Smith, Langan, Mclean, Guthrie, & Mercer, 2013; Stain et al., 2012). In addition, emotional distress appears common in individuals experiencing SMHD, with many having co-occurring difficulties with depression, anxiety and self-harm (Challis, Nielssen, Harris, & Large, 2013; Heald, Morris, & Soni, 2008; Jones et al., 2018; Pallanti, Cantisani, & Grassi, 2013; Pavlova, Perlis, Alda, & Uher, 2015; Saraf et al., 2017). Research suggests that for those diagnosed with schizophrenia-spectrum disorders, comorbid depression is present in approximately 50% of patients (Buckley, Miller, Lehrer, & Castle, 2009), while comorbid anxiety disorders are estimated to occur in 38.3% of individuals (Achim et al., 2011) and the lifetime prevalence of self-harm (with or without intent to die) is approximately 30% (Mork et al., 2013). For those diagnosed with bipolar disorder, evidence suggests that up to 60% of individuals will engage in self-harm at least once during their lifetime (Jones et al., 2018) with the lifetime prevalence of anxiety disorder said to be at 45% (Pavlova et al., 205). Whilst depressive symptoms are an intrinsic part of bipolar disorder, it could still be suggested that the way individuals make sense of these difficulties could contribute to the risk of further, secondary depression or the exacerbation of current depressive symptoms (Birchwood, Mason, MacMillan, & Healey, 1993). Given the prevalence of depression, anxiety, and self-harm in individuals experiencing SMHD, it is important to better understand the factors which may contribute to these problems. The personal beliefs individuals develop about the meaning and consequences of their severe mental health difficulty (e.g., psychosis) have been suggested as one factor that might explain the emotional distress individual’s experience (Birchwood, Iqbal & Upthegrove, 20005). A synthesis of the literature concerning the association between beliefs about SMHD and emotional distress is needed to determine the weight of the evidence regarding the role of these beliefs in distress. This information will in turn inform the focus of interventions for those with SMHD.

There is evidence that individuals affected by psychosis engage in a process of trying to understand and make sense of these experiences (Byrne & Morrison, 2010; Walsh, 2015). This process can lead individuals to endorse negative beliefs about the meaning of their experience (e.g., “I will not be able to work again”; Taylor, Pyle, Schwannauer, Hutton, & Morrison, 2015a). In a series of qualitative studies, those experiencing SMHD (e.g., psychosis and bipolar disorder) reported that their experiences had affected their personal development (e.g., occupational roles were maintained or achieved; Granek, Danan, Bersudsky, & Osher 2016; Wagner and King, (2005). The literature investigating beliefs about SMHD suggests that individuals can endorse a number of negative attributions, such as viewing their experience as inhibiting future opportunities (e.g., for employment) and viewing the self as inferior and defective (e.g., “my experiences may mean that I should be kept away from others”; Pyle et al., 2015a; Taylor et al., 2015a). Psychosis is also often appraised as a source of loss, humiliation and external shame (e.g., feeling embarrassed to talk about experience; Rooke & Birchwood, 1998; Taylor et al., 2015a). Similar meaning making processes have also been reported in those at risk of developing psychosis (At Risk Mental State; ARMS; Yung et al., 2003), with individuals reporting concerns around the meaning of their experiences and ‘going mad’ (Byrne & Morrison, 2010). The latter study also reported that participants felt that perceiving themselves as ‘not normal’ was related to social anxiety, suggesting a possible link between beliefs about psychosis experiences and emotional distress.

It has been argued that the way in which we think about health and illness may have an impact upon our emotional and behavioural responses to such experiences, which can then in turn impact on health and social outcomes (Leventhal Nerenz & Steele 1984). The Self-Regulation Model (SRM; Leventhal et al., 1984) has been successfully applied to understanding health beliefs, behaviours and outcomes across a number of physical health problems (see Hagger & Orbell 2003 for a review). A number of studies (Lobban, Barrowclough, & Jones, 2004; Lobban, Barrowclough, & Jones, 2005; Watson et al., 2006)﻿ have applied this model to explore illness representation (the way illness and health is represented by the individual, including the beliefs held about a particular condition) in psychosis. However, Kinderman, Setzu, Lobban and Salmon, (2006) suggest that we need to be cautious in applying understandings about physical health models to mental health. They note that physical illness can typically be viewed as being separate from the self, whereas mental health difficulties are closely bound up with one’s sense of self.

Drawing on constructs from self-identity (Estroff, 1989) and social rank theory (Gilbert & Allan, 1998) Birchwood and colleagues (2005) have developed a theory that focuses more specifically on mental health and how these problems interact with one’s sense of self. In the current review we use Birchwood and colleagues framework and focus on measures of belief linked to this underlying theoretical framework. Birchwood, Iqbal and Upthegrove, (2005) suggest that certain life events can be viewed as depressogenic, especially when events are appraised as resulting in loss, humiliation and feelings of entrapment. Experiences such as psychosis, they argue can be viewed as such a life event which can encompass all these potential qualities. Specifically, they make reference to the potential impact of psychosis on individuals’ relationships and personal achievements, where psychosis is seen to result in a loss of future aspired goals or roles and can leave the individual struggling to assert their identity. Depression may therefore result from the way in which individuals appraise their psychosis experiences, especially where psychosis is seen negatively in terms of loss. Similarly, anxiety may be exacerbated by threat related appraisals associated with experiences of psychosis. These could include social threats, for example loss of social standing (Gilbert, 2000) or fear of stigma leading to negative reactions from others (Birchwood et al., 2007). Appraisals of experiences that relate to a greater sense of uncertainty, lack of control or further adverse events (e.g., hospitalization or “going mad”) could also contribute to anxiety (Grupe & Nitschke, 2013).

While the main focus of intervention has often been on treating psychotic symptoms, depression and anxiety in the context of SMHD are also important clinical outcomes because they can impact on symptoms severity and can have a negative impact on wider wellbeing (Hartley, Barrowclough, & Haddock, 2013). The current meta-analysis aimed to help identify beliefs most strongly associated with distress, which can in turn inform interventions aimed at reducing the emotional distress associated with SMHD.

To the best of our knowledge, the current meta-analysis is the first of its kind. It aimed to investigate whether i) negative beliefs about SMHD (conceptualised within the current review as psychosis and bipolar disorder) are associated with emotional distress (defined as depression diagnosis/symptoms, anxiety diagnosis/symptoms and self-harm with and without suicidal intent) and ii) to quantify the direction and magnitude of this relationship. We hypothesised that negative beliefs about SMHD will have a positive association with depression, anxiety and self-harm. A further narrative synthesis aimed to summarise evidence from longitudinal studies, where available. We also reviewed whether associations between beliefs and distress held when adjusting for psychotic symptoms severity. We adopted a definition of SMHD, which encompassed those in the ARMS population and those diagnosed with bipolar disorder as well as schizophrenia-spectrum disorders. This approach was informed by the early work on beliefs about psychosis, which considered this a process common to those with schizophrenia and bipolar diagnoses (Birchwood et al., 1993). In line with this broad approach we also included studies of individuals with diagnoses of schizoaffective disorder, delusional disorder, and psychosis not-otherwise-specified*.* Taking this broad approach also allowed us to consider whether evidence was stronger for some populations than others, and if there was any indication of differences in results between populations. We acknowledge that not all individuals in the ARMS population will go on to develop psychosis. We therefore also ran meta-analyses that excluded ARMS samples to ascertain how this affected the overall results. We also carried out a separate narrative synthesis of the studies involving the ARMS and bipolar populations.

The population of interest included all adults and young people with a diagnosis of schizophrenia, or bipolar or those meeting criteria for early intervention service or who are deemed at risk of developing psychosis (i.e., ARMS). Only publications exploring beliefs about psychosis using either the Personal Beliefs about Illness Questionnaire (PBIQ; Birchwood et al.,1993), Personal Beliefs about Illness Questionnaire- Revised (PBIQ-R; Birchwood, Jackson, Brunet, Holden, & Barton, 2012) or Personal Beliefs about Experience Questionnaire (PBEQ; Pyle et al., 2015a) were included in this review. These measures were developed specifically to address beliefs about psychosis (including ARMS) and bipolar disorder (rather than being adapted from physical health models). The review adheres to PRISMA guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009).

## Method

### **­Search Strategy**

The review protocol was registered via PROSPERO (CRD42018103398) after electronic databases had been searched and author ER had completed the screening process. A change to the original protocol was the addition of further assessment of outcomes based on the GRADE approach (see below). Electronic databases PsychINFO, Medline and CINAHL were all searched by ER from the earliest available date up to April 2018. These searches were repeated for the period between January 2018 and August 2019. Search terms were developed, in consultation with an information retrieval expert based at a University library, using both keywords, and controlled vocabulary (e.g., MeSH terms) individual to each database.

The following keywords were used: Psychos\*, schizo\*, Bipolar, Manic, mania, cyclothymi\*, UHR, ARMS, “at risk”, “clinical high risk” AND “illness perception”, “illness appraisals”, “health beliefs”, “Personal beliefs”, PBIQ, “illness beliefs”, PBEQ, PBIQ-R AND “Self-harm”, suicid\*, “self-injury”, “suicidal ideation”, “self-mutilation”, DSH, NSSI, Overdose, “Self-cutting”, “Self-poisoning”, depress\*, “low mood”, dysphoria, “emotional dysfunction”, hopelessness, anxi\*, phobia, PTSD, “stress disorder”. Abbreviations of terms (e.g., UHR) were also searched for in full (e.g., “Ultra High Risk”), see Supplementary Table 1 for full list of search terms.

After removing duplicates, publications were then independently screened against the inclusion/exclusion criteria by authors ER and ZG. Discrepancies were resolved via discussion. The process began by first screening titles, followed by abstracts and then the full text of remaining papers. Secondary sources (conference abstracts, dissertation thesis) were searched for electronically as part of the main search strategy, and unpublished data was sought through emailing corresponding authors of each of the included publications, however no additional data was received. The reference lists of included papers were also hand searched by ER to identify any further eligible publications.

### **Inclusion and Exclusion Criteria.**

To be included in the review each study needed to be looking at beliefs in the following groups i) at risk mental state (ARMS; Yung et al., 2003) for psychosis as confirmed through standardised assessments (e.g., CAARMS), ii) adults and young people with a diagnosis of schizophrenia or bipolar disorder, iii) individuals meeting criteria for care of early intervention service. Only measures linked to Birchwood and colleague’s theoretical framework were included, namely the Personal Beliefs about Illness Questionnaire (PBIQ; Birchwood et al., 1993), Personal Beliefs about Illness Questionnaire-Revised (PBIQ-R; Birchwood et al., 2012) or Personal Beliefs about Experience Questionnaire (PBEQ; (Pyle et al., 2015a). The PBEQ has been validated for use with ARMS populations, while the PBIQ has been validated for use in bipolar disorder (Taylor et al., 2015a, Pyle et al., 2015a), however further psychometric work is needed. Publications also needed to be measuring psychological distress operationalised as i) depressive symptoms/depression diagnosis, ii) anxiety symptoms/anxiety diagnosis, iii) self-injurious thoughts and behaviours including those with and without suicidal motive or intent. Studies that involved a co-morbid diagnosis where there was a comparison group without this comorbidity were included (e.g., psychosis and social anxiety compared with psychosis without social anxiety). Books, book chapters, qualitative studies and publications not written in English were excluded. No restrictions were placed on the age of included sample.

### **Data Extraction and Outcomes.**

Data regarding study characteristics (e.g., type of distress and belief measures) sample characteristics (age, gender, primary diagnosis), study design, and effect size data was extracted by author ER using a pre-specified extraction form. All data pertinent to meta-analytic calculations was also extracted independently by author AJ. All disagreements were resolved through discussion with a third author (PJT). The primary outcomes were i) depression diagnosis/symptoms, ii) anxiety diagnosis/symptoms, iii) self-injurious thoughts and behaviours including those with and without suicidal intent. The correlation coefficient (*r*) was used as the metric of effect size. The included studies either reported associations (as a within-group correlation) between beliefs and outcomes or reported mean difference in outcomes of interest. Where mean differences were reported, the mean and SD values for each group were extracted, these were then transformed at a later stage to correlation coefficients (*r*) using guidance provided by Borenstein, Hedges, Higgins and Rothstein (2009).

### **Risk of Bias Assessment.**

Studies were assessed for risk of bias using a tool for observational research, adapted from the Agency for Healthcare Research and Quality (AHRQ; Williams, Plassman, Burke, Holsinger & Benjamin, 2010), used widely in other reviews of observational research (e.g., Taylor, Hutton, & Wood, 2015b). This tool allows for the assessment of study quality parameters which include, recruitment procedures, sample size and the quality of predictor and outcomes measures utilised. Risk of bias assessments were carried out by ER and AJ, with disagreements addressed through consultation with a third author (PJT). Due to the small number of studies included in any one meta-analysis formal statistical assessment of publication bias could not be undertaken.

### **Data Synthesis and Analysis.**

A random effects model was chosen in advance as studies were expected to differ in regard to their use of distress and belief measures, sample and the participant characteristics. The Restricted Maximum Likelihood (REML) estimator was used, as it has been suggested this may be more suitable for continuous outcomes compared to the widely used Dersimonian and Laird (DL; 1986) estimator (Veroniki et al., 2014). A sensitivity analysis repeating all meta-analyses using the DL estimator did not lead to any substantive differences in results.

Correlation coefficients were converted to Fisher’s *z* before the random-effects meta-analysis was conducted, and the resulting aggregate effect and confidence intervals were converted back into a correlation coefficient, following the procedures outlined by Borenstein and colleagues (2009). The *I2* statistic is used as an estimate of inconsistency, capturing the proportion of variance across studies that is due to heterogeneity rather than sampling error (Higgins, Thompson, Deeks, & Altman, 2003). A value of 25% is indicative of low heterogeneity and *I2* > 75% is considered to indicate the presence of a ‘high’ degree of inconsistency (Higgins et al., 2003). Meta-analyses were performed on STATA (version 14; StataCorp, 2015) using the Metaan command.

We undertook separate meta-analysis to examine the aggregated association between each cluster (e.g., subscales of stigma/shame) and each outcome (e.g., depression). Whilst the same family of scales were used in all studies (starting with the PBIQ; Birchwood et al., 1993) the specific labels used to describe the subscales of these measures differed across the different versions. Therefore, before data extraction began the subscales were clustered together based upon common item content and theoretical overlap. Subscales which appeared to be capturing similar constructs were grouped (clustered) together. For example, the subscales ‘shame’ and ‘stigma’ appeared to have items which captured similar beliefs around psychosis being a social judgment and so were group together within the same analyses (see Table 1).Effect sizes for individual studies are reported in Supplementary Table 2.

TABLE ONE ABOUT HERE

**3.3.7 Quality Assessment of Meta-Analysis Outcomes**

In addition to study-level ratings of risk of bias a rating is also provided of the overall quality of each meta-analysis estimate. This was done by drawing on the GRADE approach (Guyatt et al., 2011; Guyatt et al., 2008). Following GRADE guidelines, each meta-analysis estimate was given an overall rating (high, moderate, low, very low) reflecting the level of confidence we have in this effect estimate (https://gdt.gradepro.org/app/handbook/handbook.htm). All estimates start at “high” but then are down rated based on the following domains: risk of bias; inconsistency of results; imprecision. Notably, the GRADE system also uses criteria relating to indirectness (i.e. how directly the estimate addresses the research question), but this domain was deemed redundant since the inclusion and exclusion criteria of the review meant all studies were equally relevant to the research question. Similarly, the small number of studies included in the meta-analyses precluded formal test of publication bias, and so this domain was also not used in the assessment of quality. Quality ratings were made by the first author but reviewed and discussed by the wider research team.

For risk of bias, estimates were down rated one level (e.g., from high to moderate) if two or more domains within the risk of bias tool were marked as not being met (a rating of “no”) in the risk of bias tool for > 50% of studies contributing to that estimate. Quality ratings were down rated two steps if three or more domains in the risk of bias tool were not met for > 50% of studies. Risk of bias domains that did not relate to the meta-analysis estimate (i.e. control for confounding variables) were not counted in this assessment. For inconsistency, estimates were down rated one level when the *I2* statistic suggested a high level of inconsistency (*I2* > 75%). For imprecision, estimates were down rated one step if the upper and lower confidence intervals were so broad as to create uncertainty about the likely size and clinical meaning of the association. In practice we considered this the case if the upper and lower confidence intervals differed by *r* > .20. This interval was chosen as it represents the difference between what might classes as a small and a moderate effect (*r* = .10 vs. .30), or a moderate and large effect size (*r* = .30 vs. .50).

**Results**

**Study Characteristics**

The results of the literature search are presented in Figure 1. A total of 19 studies, contributing 65 effect sizes, were included in this review. A summary of study characteristics is presented in Table 2. Eleven studies employed a cross sectional design and nine studies employed a cross-section/longitudinal design. The majority of studies took place in Europe (k=17) followed by USA/Canada (k=2). Across studies there was a greater number of male participants compared to female participants. The PBIQ was used most frequently to capture beliefs (k=12) with two of these studies utilising only the ‘self as illness’ subscale. Samples varied in terms of clinical status, including schizophrenia spectrum disorder (k=10), First Episode Psychosis (k=4), ARMS (k=2), Bipolar disorder (k=1), mixed sample; schizophrenia and At Risk Mental State (k=1), dual diagnosis; schizophrenia and substance use disorder (k=1), mixed sample; schizophrenia and bipolar disorder (k=1).

FIGURE ONE ABOUT HERE

TABLE TWO ABOUT HERE

### **Risk of Bias Assessment**

The risk of bias assessment is presented in Table 3. A common issue amongst the papers included in this review was a lack of information relating to missing data. Whilst it was clear that missing data was evident across some studies, no comments were made as to how this was managed (e.g., the use of imputation strategies to minimize bias). Missing data can bias results, particularly if this is not missing at random (e.g., those who endorse more negative beliefs or who experience higher levels of depression might be more likely to produce missing data; Ibrahim, Chu, & Chen, 2012). A number of studies failed to clearly articulate how the sample was selected and so we are not able to appropriately assess the potential risk of self-selection. Overall, valid methods were utilised for assessing outcomes, however a number of studies used cut-off criteria to group individuals into depressed vs. non-depressed groups. This can be a problem as measures such as the Beck’s Depression Inventory (Beck & Steer, 1993) were not designed as diagnostic tools and may not group participants appropriately. Finally, many of the studies failed to address confounding variables and given the nature of the study designs used, the presence of confounding variables cannot be dismissed. This can impact upon the conclusion which can be drawn about the association between beliefs about psychosis spectrum disorders and emotional distress.

TABLE THREE ABOUT HERE

**Bivariate Association between Beliefs about SMHD and Emotional Distress**

Meta-analyses of the bivariate association between beliefs about SMHD and depression, anxiety or suicidal ideation were conducted separately for each cluster of subscales. The results of these meta-analyses are reported in Tables 4, 5 and 6. Inconsistency was greater for analyses where the outcome was anxiety compared to depression. The higher inconsistency for anxiety suggests other factors likely moderate the associations. However, the small number of studies contributing to any one meta-analysis precludes the testing of such moderator effects (Borenstein et al., 2009). The number of studies included in each meta-analysis ranged from two to 11. Overall the quality of meta-analysis estimates was mostly moderate where the outcome was depression, largely down-rated due to an increased risk of bias (lack of blinding of assessment and sample size justification). The quality of estimate where anxiety and suicidal ideations were the outcomes of interest was poorer. This was in part due to fewer studies, resulting in wider confidence intervals and also increased heterogeneity. Further studies with large samples, clear sample size justification and blinding of assessments, would help lead to higher quality meta-analysis estimates. Where the outcome was depression the pooled effect size for the association across the subscales ranged from *r* = .31 - .56. The ‘negative appraisals of experiences’ had the strongest effect size (*k* = 2, *N* = 482, *r* = .56, 95% CI .54-.72; low quality) but this was based upon only two studies and so results are preliminary (as they may rely too much on individual studies). The findings for ‘control over illness’ (*k* = 9, *N* =732, *r* = .47, 95% CI .44-.58; moderate quality) were more robust as this meta-analysis contained more studies (*k* = 9). For anxiety, associations ranged from *r* = .24 - .38 with ‘control over illness’ having the strongest association with anxiety (*k* = 3, *N* = 281, *r* = .38, 95% CI .28-.52; low quality) and subscales relating to social marginalisation/humiliation having the weakest correlation. Finally, associations between negative appraisal of experiences and suicidal ideation (*k* = 2, *N* = 356, *r* = .35, 95% CI .26, .47; very low quality) were also found to be significant.

TABLE FOUR ABOUT HERE

TABLE FIVE ABOUT HERE

TABLE SIX ABOUT HERE

### **Longitudinal studies**

A total of nine studies examined whether beliefs were prospectively associated with outcomes. Overall there was some suggestion of an association between beliefs about SMHD and distress experience, however this association is only evident for depression. One study found changes in depression scores over 6 months correlated with changes in all PBIQ-R subscales (Birchwood et al., 2012). Others highlight the role of specific beliefs in predicting distress. Noyman-Veksler and colleagues (2013) report a significant association between ‘self as illness’ and depression at six weeks follow-up, whilst Rooke and Birchwood (1998) found ‘entrapment’ at baseline to be predictive of depression at a 30-month follow-up. Iqbal, Birchwood, Chadwick and Trower, (2000) found that entrapment, social humiliation, loss, and self as illness were significantly more negative in individuals who later went on to develop post-psychotic depression compared to those who did not (12-month follow-up). Similarly, Upthegrove and colleagues (Upthegrove, Ross, Brunet, McCollum & Jones, 2014) reported that perceived loss (OR = 1.38; 95% CI 1.11, 1.74), though not beliefs about shame or control, were associated with a greater risk of post-psychotic depression 12 months later, adjusting for prodromal and acute phase depression, current psychotic symptoms, perceived need for treatment and duration of untreated psychosis. Utilising the PBEQ, Pyle and colleagues (2015a, 2015b) found that baseline scores on the ‘negative appraisals of experience’ and ‘expectations’ subscales were predictive of depression at three and six-month follow-up respectively. Three studies investigated the association between negative beliefs and suicidal ideation or risk over periods between 6 and 18 months, but no significant relationships were reported (Hutton, Di Renzo, Turkington, Spencer & Taylor, 2018; Pyle et al., 2015a; Stip, Caron, Tousignant & Lecomte, 2017). However, small samples in two of these studies likely limited power (*n* = 45-68). Overall, studies seemed to suggest that appraisals of entrapment, loss and attributing illness to self are associated with depression scores longitudinally.

### **Adjusting for Psychosis Symptoms**

A small number of studies controlled for psychosis symptoms (Birchwood et al., 2007; Hutton et al., 2018; Karatzias, Gumley, Power, & O’Grady, 2007; Rooke & Birchwood, 1998; Shahar, Weinberg, McGlashan, & Davidson, 2010; Upthegrove et al., 2014). These publications reported that when controlling for psychosis symptoms, cognitive appraisals (e.g., entrapment, loss) remained significantly associated with depression, anxiety, and (in one study; cross-sectional association in Hutton et al., 2018) suicidal ideation, while psychosis symptoms (e.g., positive symptoms) were not found to significantly predict emotional distress.

### **Studies Involving ARMS and Bipolar Populations.**

Three studies examined appraisals held by those at risk of developing psychosis. Consistent with the overall pattern of results, these studies revealed that appraisals of experience are significantly associated with depression and anxiety (Pyle et al., 2015a; Stowkowy, Perkins, Woods, Nyman, & Addington, 2015; Taylor et al., 2015a). Similarly, studies involving bipolar population revealed that negative beliefs about bipolar were associated with depressive symptoms (Birchwood et al., 1993; Taylor et al., 2015a).

**Discussion**

The aim of this meta-analysis was to investigate whether negative beliefs about SMHD were associated with emotional distress (specifically depression, anxiety and self-harm), and if so, to determine the direction and strength of this relationship. A total of 19 eligible papers were identified, with 17 contributing to meta-analyses. The resulting meta-analyses suggest that negative appraisals of SMHD (e.g., less perceived control over experiences or perceiving psychosis as stigmatising or resulting in loss) are associated with greater depression, anxiety and suicidal ideation. These findings are in line with the emotional dysregulation hypothesis put forward by Birchwood and colleagues (2005). Research suggests that a perceived loss of social rank, entrapment, and shame may be important in the development of depression (Gilbert & Allan, 1998; Griffiths, Wood, Maltby, Taylor, & Tai, 2014; Sloman, Gilbert, & Hasey, 2003). However, the role of such perceptions in the development of anxiety is less well defined. This is mirrored in the current meta-analysis, as associations between negative beliefs and depression were stronger than those between beliefs and anxiety. Very low-quality evidence suggests that negative beliefs were associated with current suicidal thinking, but this was based on only two studies, and no prospective association between negative beliefs and suicidal ideation were significant.

The results of the review are consistent with cognitive models of distress (e.g., Becks cognitive theory; Beck, 2008) which argue that our appraisals of events are important in shaping our emotional responses to them. A perceived lack of control over experiences had the strongest associations with depression and anxiety. Similar results have been reported for an external locus of control, whereby viewing events as controlled by external forces is associated with problems like suicidal ideation in individuals with psychosis (Chang et al., 2014). Seeing the challenges posed by psychosis as outside of one’s control may engender feelings of helplessness and hopelessness, which may increase the risk of depression and anxiety (Birchwood, Iqbal, Chadwick & Trower, 2000; Chang et al., 2014). Beliefs about SMHD (e.g., psychosis) that pose a threat to one’s social status and standing (including beliefs that experiences are a social judgement on oneself or indicative of internal failings and defectiveness) may also be problematic due to an evolved sensitivity to social rank, in line with predictions from the social rank theory (Gilbert, 2000).

The results of the review are consistent with a wider body of research those obtained using measures derived from the Self-Regulation Model (Leventhal et al., 1984) to capture illness representations in a number of populations (e.g., psychosis and eating disorders). These studies have found that having a strong illness identity, reporting poor coherent understanding, perceiving difficulties as chronic, and viewing experience as having many negative consequences is associated with greater anxiety and depression in those experiencing psychosis (Lobban et al., 2004; Lobban et al., 2005; Watson et al., 2006), with perceptions of chronicity being linked to greater levels of distress amongst those experiencing an eating disorder (see Baines & ﻿Wittkowski, 2013 for a review). The results in this review also mirror those in the physical health literature, whereby the way individuals perceive their physical health difficulties are associated with physical and mental health outcomes (e.g. Broadbent et al., 2015).

It is important to note that whilst negative appraisals may contribute to emotional distress it is also very possible that pre-existing depression and anxiety could result in more negative appraisals of mental health difficulty, for example, by making an individual’s difficulties seem more pronounced. Depression and anxiety are common in the prodromal period prior to episodes of psychosis (Fusar-Poli, Nelson, Valmaggia, Yung, & McGuire,2012; McGorry, Hartmann, Spooner, & Nelson, 2018). It is therefore plausible that pre-existing depression and anxiety may also contribute to negative beliefs about a given SMHD. However, there was evidence that even when adjusting for prodromal depressive symptoms, certain beliefs remained associated with the risk of later post-psychotic depression (e.g. loss; Upthegrove et al., 2014).

The review included studies with individuals diagnosed with bipolar disorder, or in the ARMS population, as well as those diagnosed with schizophrenia-spectrum-disorders. It is possible that there are important differences between these groups in terms of the beliefs they hold about their difficulties. For example, the lack of formal diagnosis in the ARMS population may result in different experiences (although qualitative research suggests similar concerns exist between those in the ARMS population and those diagnosed with schizophrenia-spectrum-disorders; Byrne & Morrison, 2010; Wagner & King, 2005). The very small number of studies including bipolar disorder samples (*k* = 2) or ARMS samples (*k* = 3, with *k* = 2 eligible for inclusion in the meta-analysis) precluded any direct statistical comparison of results. Within these samples there was evidence consistent with the wider results, with negative beliefs being positively correlated with emotional distress. Future research focussed on the development and impact of negative beliefs about experiences in these under-studied populations would be beneficial.

One of the main limitations of the studies included in this review was the use of cross-sectional design. Such a design can present difficulties in ascertaining causality, the direction, or the temporal qualities of the relationship identified. However, longitudinal studies do appear to suggest that beliefs about psychosis, for example, predict the onset of post psychotic depression (Iqbal et al., 2000). While longitudinal research design cannot prove causality, it does help increase the plausibility of a causal effect. The hypothesis that negative beliefs lead to distress is further supported by evidence that the association between these variables cannot be explained by psychotic symptoms severity. This suggests that the association between negative beliefs and emotional distress is not confounded by symptom severity. This review has established that there is a relatively consistent cross-sectional association between beliefs about SMHD and emotional distress, however longitudinal designs or interventionist-causal randomised control trials, which can better aid the identification of causal effects, are needed to further understand this relationship.

Given the well documented overlap between depression and anxiety (McLaughlin & Nolen-Hoeksema, 2011) a failure to account for the relative impact of depression upon the association between beliefs and anxiety and vice versa may have biased effect sizes. Additionally, the small number of studies and the lack of large-scale studies meant that a formal examination of moderator effects and publication bias could not be carried out. We recognise that while these meta-analyses revealed a potential association between beliefs and distress, such findings should be treated with caution due to the small number of studies included.

Other measures, such as the Illness Perception Questionnaire for Schizophrenia (Lobban et al., 2005) have been utilised to capture beliefs about SMHD, however there are a number of issues associated with using measures derived from models of physical health (see Kinderman et al., 2006 for a discussion). Therefore, in this analysis we only included the PBIQ, PBIQ-R and the PBEQ, as these three measures were developed specifically to address beliefs about psychosis (including ARMS) and bipolar disorder and choosing to focus on only three measures allowed us to reduce heterogeneity. There are, however, a number of issues associated with the measures we selected to include in this meta-analysis. Whilst there is evidence of the reliability and validity of the PBIQ-R and PBEQ, this was not the case for the earlier version (PBIQ). In addition, whilst being brief measures may have clinical benefits, the small number of items included, especially in the PBEQ could present issues with content validity (Taylor et al., 2015a). We acknowledge that there are wider definitions of psychological distress and tools to measure this. Therefore, different findings might have emerged if a broader definition of distress was used.

The focus of evaluations of therapies for psychosis has tended to be on psychotic symptoms, however, we argue that focusing on the associated emotional distress (e.g., depression) is important. The current review revealed that a number of subscales (beliefs) held moderately strong associations with depression, anxiety and suicidal ideation. Interventions targeting these specific beliefs (e.g., internal and external shame) may be important in enhancing current treatments focused on targeting emotional distress in psychosis. Cognitive-Behavioural Therapy (CBT) is the recommended treatment for psychosis and bipolar in the UK (National Institute for Health and Care Excellence, 2014). Evidence suggests that CBT is effective in targeting depression in psychosis and bipolar (Salcedo et al., 2016; Singer, Addington, Dobson, & Wright, 2014). Furthermore, CBT has been found to be effective in modifying negative beliefs about psychosis (e.g., loss; Gumley et al., 2006; Singer, et al., 2014). Consistent with current research, a tailored CBT approach to treatment may be helpful. This would begin with an assessment of an individual’s beliefs about their experiences of their mental health difficulty, followed by interventions designed to modify the beliefs hypothesised to underlie the individual’s distress. For example, psychoeducation and sharing of stories of recovery may help modify beliefs about future expectations, whilst behavioural experiments and verbal reattribution techniques might be useful for challenging beliefs about the degree of control a client has over their difficulties. This type of work may also be important as research has suggested that beliefs about SMHD (e.g., psychosis) including fear of relapse, may be an important factor increasing the risk of relapse in the future (Gumley et al., 2015). As such therapeutic work around the belief’s individuals hold about their mental health difficulties may also be an important part of relapse prevention planning. Further research into whether therapeutic work with beliefs about SMHD could help reduce the risk of relapse is needed.

Finally, the messages and narratives implicit within the treatment culture an individual is exposed to may also have a role in affecting the beliefs they develop (e.g. the message that difficulties will be chronic and enduring). Therefore, a recovery-focused treatment framework, that encourages more positive narratives around individuals’ difficulties (e.g. that recovery is possible) may be helpful (Leamy, Bird, Le Boutillier, Williams, & Slade, 2011). Overall, results suggest that services that encourage a more positive outlook on SMHD might be helpful where they modify beliefs individuals hold. Our findings also highlight a potential need for services to promote control over such experiences and adopt a recovery focused approach.

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Table 1

*Clustering of the Subscales of the Beliefs Measures (PBIQ, PBIQ-R & PBEQ)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Cluster** | **Subscales included** | **Definition** | **Example items** |
| Self-as-illness | Self as illness (PBIQ);  Attribution of behaviour to self or illness (PBIQ); Self-as abnormal/self as experiences (PBIQ-R); Internal shame and defectiveness (PBEQ) | Assess the extent to which the experience is perceived as reflecting a problem with the self. | “There is something about my personality that causes my illness”. |
| Control over illness | Control over illness (PBIQ; PBIQ-R); Entrapment (PBIQ); Control over experiences (PBEQ) | Assess the extent to which individuals feel able to control their experience. | “I am powerless to influence or control my illness” |
| Shame | Stigma (PBIQ); Shame (PBIQ, PBIQ-R, PBEQ); External shame (PBEQ) | Captures the perception that the experience is a social judgment upon the individual. | “I am embarrassed by my illness” |
| Social containment | Social containment (PBIQ, PBEQ); Humiliation (PBIQ); Social marginalisation (PBIQ-R); Group fit (PBIQ; PBIQ-R) | Captures the perception of needing to be contained (kept away from others) as a result of experience. | “Society needs to keep people like me who have this illness, apart from everyone else” |
| Negative expectations | Expectations (PBIQ); loss ((PBIQ, PBIQ-R); Loss of expectations (PBEQ) | Captures perceived loss of autonomy and social roles. | “My illness is too brittle or delicate for me to work or keep a job” |
| Negative appraisals of experiences | Negative appraisals of experiences (PBEQ) | Captures negative appraisals relating to impact of experience on current/future self | “I am capable of very little as a result of my experiences” |
| Entrapment | Entrapment (PBIQ-R) | Captures perceptions of being entrapped by experience, unable to plan for the future. | “I feel trapped by my illness” |

PBIQ, Personal Beliefs about Illness Questionnaire; PBIQ-R, Personal Beliefs about Illness Questionnaire-Revised; PBEQ, Personal Beliefs about Experiences Questionnaire

Table 2

*Characteristics of Included Studies (n = 19)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Author(s)**  **Year**  **Country** | **Design** | **Sample** | **Sample Characteristics** | **Beliefs Measure** | **Distress Measure** |
| Acosta et al.  2013  United Kingdom | Cross-sectional, within | ICD-10 Schizophrenia | N= 60 (45 males)  Mean age = 31.1 years  SD = (8.1) | PBIQ (Birchwood et al., 1993) | Calgary Depression Scale for Schizophrenia (CDSS; Addington et al., 1993)  Suicide attempt history (measure not stated) |
| Birchwood et al. 1993  United Kingdom | Cross-sectional, between | Schizophrenia and Bipolar Disorder | N= 84  Depressed group:  Mean age = 43 years  SD= (14.3)  Not depressed group:  Mean age = 48.2 years SD= (14.3) | PBIQ (Birchwood et al., 1993) | Becks Depression Inventory (BDI; Beck & Steer, 1993) |
| Birchwood et al. 2005  United Kingdom | Cross-sectional, within | Acute First Episode Psychosis conforming to ICD-10 criteria for Schizophrenia. | N= 26 | PBIQ (Birchwood et al., 1993) | Calgary Depression Scale for Schizophrenia (CDSS; Addington et al., 1993) |
| Birchwood et al. 2007  United Kingdom | Cross-sectional, between | ICD-10 Schizophrenia or Related Disorders | N= 79 (61 males) | PBIQ (Birchwood et al., 1993) | The Social Interaction Anxiety Scale (SIAS; Mattick and Clarke, 1998) |
| Birchwood et al. 2012  United Kingdom | Cross-sectional, within and longitudinal | First Episode psychosis- ICD-10 Diagnosis of Schizophrenia or Related Disorder | N= 66 (49 males)  Mean age = 23.3 years  SD= (4.6) | PBIQ-R (Birchwood et al., 2012) | Calgary Depression Scale for Schizophrenia (CDSS; Addington et al., 1993) |
| Hutton et al., 2019  United Kingdom | Cross-sectional, within and longitudinal | ICD-10 Diagnosis of Schizophrenia or Related Disorder, no antipsychotic medication for past 6 months | N= 68 (37 male) Mean age = 31.0 years  SD = 12.75 | PBEQ (Pyle et al., 2015a) | Becks Depression Inventory for Primary Care (BDI-PC; Beck, et al., 1997). |
| Iqbal et al. 2000  United Kingdom | Cross-sectional, between and longitudinal | ICD-10 criteria for Schizophrenia or a Related Disorder | N= 59 | PBIQ (Birchwood et al., 1993) | Becks Depression Inventory (BDI; Beck and Steer, 1993) |
| Karatzias et al. 2007  United Kingdom | Cross-sectional, between | DSM-IV Schizophrenia Spectrum Disorder | N= 138 (99 males)  Mean age = 36.5 years  SD= (9.7) | PBIQ (Birchwood et al., 1993) | DSM-IV criteria for Anxiety and affective Disorders (American Psychiatric Association, 2000) |
| Michail &  Birchwood 2013  United Kingdom\* | Cross-sectional, between | First Episode Psychosis- ICD-10 Diagnosis of Schizophrenia or Related Disorder | N= 80 (53 males)  Anxious group:  Mean age = 24.4 years SD = (5.1)  Non-anxious group:  Mean age= 24.6 years SD= (4.5) | PBIQ (Birchwood et al., 1993) | ICD-10 Social Anxiety Diagnosis based on SCAN (WHO, 1993) |
| Noyman-Veksler et al. 2013  Israel | Cross-sectional, within and longitudinal | ICD-10  Schizophrenia Spectrum Disorder | N= 98 (59 males)  Mean age = 42.43 years  SD= (11.02) | PBIQ- ‘Self as Illness’ subscale only (Birchwood et al., 1993) | Calgary Depression Scale for Schizophrenia (CDSS; Addington et al. ,1993) |
|  |  |  |  |  |  |
| Pyle et al. 2015a  United Kingdom | Cross-sectional, within and longitudinal | At Risk Mental State | N= 288 (180 males)  Mean age = 20.74 years  SD= (4.34) | PBEQ (Pyle et al., 2015a) | The Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998)  Becks Depression Inventory for Primary Care (BDI-PC; Beck, et al., 1997). Comprehensive Assessment of At Risk Mental State (CAARMS; Yung et al., 2005) |
| Pyle et al. 2015b  United Kingdom | Cross-sectional, within and longitudinal | ICD-10 Schizophrenia Spectrum or meeting criteria for Early Intervention Service | N= 66 (36 males)  Mean age = 31.36 years  SD= (12.4) | PBEQ (Pyle et al., 2015a) | The Social Interaction Anxiety Scale (SIAS; Mattick and Clarke, 1998) |
| Rooke & Birchwood 1998  United Kingdom | Longitudinal | Schizophrenia | N= 47 (38 males)  Mean age = 42.1 years  SD= (12.7) | PBIQ (Birchwood et al., 1993) | Beck Depression Inventory (BDI; Beck and Steer, 1993) |
| Shahar et al. 2010  Not specified | Cross-sectional, within | Schizophrenia-Spectrum Disorder and Substance Use Disorder | N= 55 (35 males)  Mean age =37.74 years  SD= (10.58) | PBIQ- ‘Self as Illness’ subscale only (Birchwood et al., 1993) | The Centre for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977) |
| Stipe et al., 2017  Canada | Cross-sectional, within and longitudinal | DSM-IV-TR Schizophrenia-Spectrum Disorder | N= 45 (22 males)  Mean age = 32.3 years  SD= 9.62 | PBIQ-R (Birchwood et al., 2012) | Beck Scale for Suicidal Ideation (BSS; Beck, Kovacs & Weissman, 1979) |
| Stowkowy et al. 2014  Canada and USA | Cross-sectional, within | Clinical High Risk (CHR) | N= 153 (88 males)  Mean age = 19.82 years  SD= (4.48) | PBEQ (Pyle et al. 2015a) | Calgary Depression Scale for Schizophrenia (CDSS; Addington et al., 1993) |
| Taylor et al. 2015a study 1  United Kingdom | Cross-sectional, within | DSM-IV Bipolar Disorder | N= 202 (98 males)  Mean age = 36.56 years  SD= (10.6) | PBIQ (Birchwood et al., 1993) | Beck Depression Inventory (BDI-II; Beck et al., 1996) |
| Taylor et al. 2015a study 2  United Kingdom | Cross-sectional, within | *Sample 1*- ICD-10 Schizophrenia Spectrum Disorders.  *Sample 2*- At Risk Mental State (ARMS) | N= 362 (219 males)  Mean age = 22.96 years  SD= (7.99) | PBEQ (Pyle et al., 2015a) | Becks Depression Inventory for Primary Care (BDI-PC; Beck, et al.,1997). |
| Upthegrove et al. 2014  United Kingdom | Cross-sectional, between and longitudinal | First Episode Psychosis-  ICD-10 category of psychotic illness: | N= 92 (69 males)  Mean age = 22.5 years  SD= (4.89) | PBIQ-R (Birchwood et al., 2012) | Calgary Depression Scale for Schizophrenia (CDSS; Addington et al., 1993) |
| White et al. 2007  United Kingdom | Cross-sectional, within | DSM IV- Schizophrenia | N= 100 (78 males)  Mean age = 39.4 years  SD= (11.2) | PBIQ (Birchwood et al., 1993) | Calgary Depression Scale for Schizophrenia (CDSS; Addington et al., 1993) |

ICD-10: International Classification of Diseases-10, DSM-IV: Diagnostic and Statistical Manual of Mental Diseases. CHR and ARMS both capture the same sample; individuals in the prodromal phase of psychosis.

Table 3

*Risk of Bias Assessment*

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Unbiased selection of the cohort?** | **Sample size calculated** | **Adequate description of the cohort?** | **Validated method for ascertaining clinical status or participant group** | **Validated methods for assessing predictor or risk variables** | **Validated methods for assessing outcome or criterion variable** | **Outcome assessments  blind to diagnostic/**  **clinical/**  **participant status** | **Missing data is minimal** | **Analysis controls for confounding** | **Analytic methods appropriate** | **Adequate follow-up period** |
| Acosta et al.  2013\* | No | No | Yes | U | P | Yes | No | U | No | Yes | N/A |
| Birchwood et al. 1993 \* | Yes | No | Yes | P | P | No | U | U | No | Yes | N/A |
| Birchwood et al. 2005 \* | Yes | U | U | Yes | P | Yes | U | U | U | Yes | N/A |
| Birchwood et al. 2007 \* | U | No | Yes | No | P | Yes | No | U | No | Yes | N/A |
| Birchwood et al. 2012 \* | Yes | No | Yes | No | Yes | Yes | No | U | No | Yes | Yes |
| Hutton et al. 2018\* | No | No | P | No | Yes | No | No | No | Yes | Yes | Yes |
| Iqbal et al. 2000 \* | Yes | No | No | U | P | No | No | U | No | Yes | Yes |
| Karatzias et al. 2007 \* | Yes | No | P | Yes | P | Yes | No | U | No | Yes | N/A |
| Michail & Birchwood 2013 \* | Yes | No | Yes | Yes | P | Yes | U | U | No | Yes | N/A |
| Noyman-Veksler et al. 2013 \* | U | No | P | U | P | Yes | No | No | No | Yes | No |
| Pyle et al. 2015b \* | No | No | Yes | Yes | Yes | Yes | No | U | No | Yes | P |
| Pyle et al. 2015a\* | No | No | Yes | Yes | Yes | P | No | U | Yes | Yes | P |
| Rooke & Birchwood 1998 | Yes | No | Yes | P | P | No | No | Yes | No | Yes | Yes |
| Shahar et al. 2010 \* | U | No | P | U | P | Yes | No | U | No | Yes | N/A |
| Stip et al.2017 | No | No | Yes | No | Yes | Yes | N/A | No | No | Yes | Yes |
| Stowkowy et al. 2014 \* | U | No | Yes | Yes | Yes | Yes | No | U | No | Yes | N/A |
| Taylor et al. 2015a  study 1\* | U | No | P | Yes | Yes | Yes | U | Yes | No | Yes | N/A |
| Taylor et al. 2015a  study 2\* | No | No | Yes | Yes | Yes | Yes | No | Yes | No | Yes | N/A |
| Upthegrove et al. 2014 \* | Yes | No | Yes | Yes | Yes | Yes | P | Yes | No | Yes | Yes |
| White et al. 2007 \* | U | No | Yes | Yes | P | Yes | No | U | No | Yes | N/A |

\* included in the meta-analysis, U = Unsure, P= Partial, N/A= not applicable

Table 4

*Results of the Meta-Analysis when Outcome was Depression*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Subscales | Number of studies/  participants (K/N) | *r*  (95% CI) | *I*2 | Risk of bias | Overall quality |
| Self as illnessa | 9/1114 | .35\*  (.31, .42) | 68% | Down-rated due to blinding and sample size justification | moderate |
| Control over illness | 9/732 | .47\*  (.44, .58) | 55% | Down-rated due to blinding and sample size justification | moderate |
| Stigma | 11/1214 | 36\*  (.32, .43) | 0% | Down-rated due to blinding and sample size justification | moderate |
| Social containment | 7/646 | .31\*  (.24, .40) | 47% | Down-rated due to blinding and sample size justification | moderate |
| Expectations | 8/579 | .44\* (.39,.55) | 51% | Down-rated due to blinding and sample size justification | moderate |
| Entrapment (PBIQ-R) | 2/158 | .54\*  (.45, .76) | 31% | Down-rated due to clinical status identification, blinding and sample size justification | very low |
| Negative appraisal of experiences | 2/482 | .56\*  (.54, .72) | 72% | Down-rated due to sample selection, blinding and sample size justification | low |

Note: When we removed studies that included an ARMS sample, the results of the meta-analyses were as follows: Self as illness (*r* =.32, 95%CI .26,.41); Control over illness (*r* =.48, 95%CI .44,.60); Stigma (*r*=.36, 95%CI .31,.45); Social containment (*r* =.30, 95%CI .22,.40). Finally, a meta-analysis for negative appraisals of experiences could not be ran as there was only one study using this subscale. a We struggled to determine the sample size for one study(Noyman-Veksler et al., 2013) and as such the smallest possible value was selected. \**p*<.05

Table 5

*Results of the Meta-Analysis when Outcome was Anxiety*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Subscales | Number of studies/  participants (K/N) | *r*  *(*95% CI) | *I*2 | Risk of bias | Overall quality |
| Self as illness | 2/186 | .35\*  (.22,.51) | 82% | Down-rated due to sample selection, blinding and sample size justification | very low |
| Control over illnessa | 3/281 | .38\*  (.28,.52) | 0% | Down-rated due to blinding and sample size justification | low |
| Stigma | 4/345 | .36\*  (.27,.48) | 46% | Down-rated due to blinding and sample size justification | low |
| Social containment | 3/281 | .24  (.13,.36) | 84% | Down-rated due to blinding and sample size justification | very low |
| Expectations | 3/266 | .31\*  (.20, .44) | 36% | Down-rated due to blinding and sample size justification | low |

aThis represent the effect size when scores from two subscales (control and entrapment) were aggregated. When the meta-analysis was run with the control subscale only (*r* =.36, 95%CI .31,.54), Entrapment only: (*r* =.40, 95%CI .26,.49). \* *p*<.05.

Table 6

*Results of the Meta-Analysis when the Outcome was Suicidal ideation.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Subscale | Number of studies/  participants  (K/N) | *r*  *(*95% CI) | *I*2 | Risk of bias | Overall quality |
| Negative appraisal of experiences | 2/356 | .35\*  (.26, .47) | 85% | Down-rated due to sample selection, blinding and sample size justification | very low |

Two correlation coefficient values were reported for the association between negative appraisal of experience and suicidal ideation in the paper by the Pyle et al., 2015a, the smaller correlation coefficient was selected. \* *p*<.05

Updated database search, 2018-August 2019

(*N* =353)

Records identified through database search up until April 2018  
(*N* = 2644)

Records after duplicates removed   
(*N* =331)

Records after duplicates removed   
(*N* = 2385)

Records excluded   
(*N* = 2668)

Records screened   
(*N* = 2716)

Additional records identified through reference list scanning   
(*N* =4)

Other sources

(N =1)

Full-text articles excluded for:

No access to study data

(*N* =4)  
Secondary analysis of the same data

(*N* = 6)

not all variables of interest were explored

(N = 3)

not using measures of interest to capture beliefs

(N = 16)

Full-text articles assessed for eligibility   
*(N* = 48)

Studies included in the review   
(*N* = 19)

Studies included in meta-analysis   
(*N* = 17)

*Figure 1:* Flowchart Detailing Literature Search Process and Results