

An Evaluation of Novel Psychological Interventions for Depression and the Anxiety  
Disorders within Community-Dwelling Adults

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## **Thesis Portfolio Summary Abstract**

### **Background**

Depression and anxiety are both highly prevalent and debilitating disorders. Whilst current treatments for depression and the anxiety disorders are efficacious, there remain high relapse rates and frequently a high level of residual symptoms.

Additionally, current diagnosis-specific treatments do not account for the high levels of comorbidity seen between disorders. Therefore, in order to augment treatment efficacy and clinical utility, novel transdiagnostic interventions have been developed.

### **Method**

This portfolio evaluated the efficacy of two types of novel transdiagnostic intervention in community-dwelling adult populations with symptoms of depression or anxiety. A systematic review evaluated the efficacy of rumination-focused interventions on reduction of both rumination and severity of symptoms of depression and anxiety. A meta-analysis evaluated the efficacy of positive psychological interventions (PPIs) on increasing wellbeing and reducing depressive symptoms.

### **Results**

Rumination-focused interventions were shown to be efficacious at reducing rumination in populations with depression, however there was not evidence for their efficacy in the anxiety disorders. There was evidence for the potential efficacy of positive psychological interventions in increasing wellbeing and reducing symptoms of depression with medium effect sizes found for both outcomes, however there was a high level of heterogeneity present, therefore these results must be interpreted

cautiously.

### **Conclusions**

Although currently small, the evidence-base suggests there are clinical benefits of specific rumination-focused interventions in depression, especially those that work on underlying cognitive processes. There is also emerging evidence for the efficacy of positive psychological interventions however the high heterogeneity found raises questions about the constructs of PPIs suggesting further clarification is required.

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## **Chapter One: Systematic Review**

This chapter includes a systematic review written for the journal *Clinical Psychology and Psychotherapy*. This paper is formatted according to the journal's author guidelines for submission (Appendix A). The abstract for this review is 212 words (journal limit is 250). Key practitioner messages and key words are also provided. The word count for this review is 9545.

Are interventions focused on reducing ruminative cognitions efficacious in affective disorders in a community dwelling adult population?

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### Abstract

Rumination is characterised by continued mental repetition of a thought or issue without finding a solution. It accounts for a significant proportion of the overlap between the anxiety disorders and depression and is a vulnerability factor for depression, predicting onset and severity. In order to augment the efficacy of depression treatments, a number of psychological interventions have been developed to specifically target rumination. The aim of this review is to provide clarity as to the efficacy of rumination-focussed interventions for depression and anxiety disorders and to obtain a more detailed understanding of the key components of these interventions. To be accepted for inclusion in this review, studies had to evaluate a therapeutic intervention specifically targeting rumination, be conducted in an adult community-dwelling population with a depressive or anxiety disorder, to report outcomes using robust measures of rumination and to include a comparator condition. Seven studies met the inclusion criteria for this review. The results suggest rumination-focused interventions are efficacious in reducing rumination and depression. The strongest evidence for this was seen in populations with depressive symptoms. The results also suggest that a key component of these interventions is the focus on underlying cognitive processes. Whilst the evidence base is currently small, this review suggests there are clinical benefits of specific rumination-focused interventions.

#### *Key Practitioner Message:*

- There is preliminary evidence that rumination-focused interventions may be an efficacious treatment option for reducing rumination and improving depression symptoms.

- In particular, treatments working at a process level, using imagery and teaching individuals alternative responses to rumination or that help people to become more indifferent to their rumination appear most helpful.
- The evidence from this current review does not provide support for the efficacy of rumination focus in the treatment of anxiety disorders.

*Keywords:* Rumination, Depression, Anxiety, Systematic review

Anxiety disorders and major depressive disorder are common mental health problems that are highly prevalent global disorders. A meta-analysis conducted by Steel et al., (2014) examined 157 studies from 59 countries and found that 29.2% of respondents had experienced a common mental health disorder at some point during their lifetime and 15.4% of respondents met the criteria for a mood or anxiety disorder in the 12-months prior to their assessment. While anxiety disorders rarely spontaneously remit, depressive disorders are characterised by a relapsing and remitting pattern. These common mental health problems cause significant distress, impair quality of life and have a significant economic burden at an individual and societal level. As such there is a great need to examine how to tackle these problems. The extent of this problem is also increasing, with the number of people suffering from depression and anxiety disorders increasing by almost 50% between 1990 and 2013 (World Health Organisation, 2017; WHO) and depression has become the leading cause of disability worldwide.

Depression is characterised by persistent low mood and a loss of interest and pleasure in day-to-day activities. Anxiety disorders (e.g. generalised anxiety disorder, panic disorder, obsessive-compulsive disorder) are characterised by an excessive or unreasonable, persistent fear of an object, person, situation or sensation (e.g. Norton, 2006) and these fears tend to be future orientated (Ehring & Watkins, 2008). Anxiety disorders markedly impair quality of life and psychosocial functioning (Mendlowicz & Stein, 2000).

Cognitive Behavioural Therapy (CBT) is an established evidence-based first line treatment for anxiety disorders and depression (National Institute for Health and Care Excellence; NICE; 2013, 2016). Whilst there is a well-established evidence base for CBT in the treatment of depression and the anxiety disorders (Bessell,

Watkins, & Williams, 2008; Cuijpers et al., 2013; Hofmann & Smits, 2008; Olatunji, Cisler, & Deacon, 2010), it is not effective for everyone (Bockting, Hollon, Jarrett, Kuyken, & Dobson, 2015; Olatunji et al., 2010) and it has been shown that for patients with depression there is approximately a 30% relapse rate in the first year post treatment and that 30-50% of patients show residual symptoms at the end of therapy (Cuijpers et al., 2013). Brown and Barlow (1995) evidenced that 27% of people who were panic-free after receiving CBT also needed to complete an additional panic management treatment over a two year follow up period.

The majority of treatments developed since the 1960s have tended to focus on targeting negative symptoms in specific disorders using treatment protocols (Barlow, Allen, & Choate, 2004). As such this has resulted in the a proliferation of numerous, often overlapping, and in some cases, competing, treatment protocols making it difficult for practitioners' to choose the most appropriate treatment and to be proficient in all protocols (Wilamowska et al., 2010). However, this focus on disorder specific interventions overlooks the high level of co-morbidity between anxiety disorders and depressive disorders, with individuals who are diagnosed with an anxiety or mood disorder having a current and lifetime comorbidity with other anxiety or mood disorders of between 55% and 76% (Brown, Campbell, Lehman, Grisham, & Mancill, 2001). This is a trend that is seen in mental health services with a high proportion of individuals being treated in secondary care services presenting with comorbid depression and anxiety disorders.

Following an increased recognition of the fact that people rarely present in clinical settings with a monosymptomatic profile of disorders (i.e. it is very unusual for practitioners to meet people presenting with a depression or an anxiety disorder, and where there is no overlap), researchers have started to examine transdiagnostic

factors to enhance treatments to address the complex multilevel processes underlying mood disorders (McEvoy, Nathan, & Norton, 2009). It has been suggested that a transdiagnostic protocol that addresses the core features of affective disorders may be more efficacious than single diagnosis treatment protocols (Wilamowska et al., 2010). There is initial evidence for this idea, for example, Norton and Barrera (2012) conducted a randomised clinical trial in which they compared a transdiagnostic CBT group to a disorder specific CBT group therapy for or panic disorder, social anxiety disorder, and generalised anxiety disorder (GAD). They found that the transdiagnostic CBT group was at least as effective as the disorder specific CBT group at reducing symptom severity.

A transdiagnostic approach has the advantage of both addressing co-morbidity and residual symptoms and of encouraging the transfer of developments in theory or treatments between the disorders (Harvey, Watkins, Mansell, & Shafran, 2004). A limitation of the approach is that it currently cannot explain the extent of variation in presentations in different disorders, although some explanations of this are proposed (Harvey et al., 2004). There is still a need to establish efficacy of transdiagnostic treatments the populations that they are most suited for (Clark, 2009).

Some of the underlying transdiagnostic processes that have been suggested in emotional disorders are attentional bias, avoidance, repetitive negative thinking (RNT), biased reasoning processes and selective memory (Mansell, Harvey, Watkins, & Shafran, 2008; McEvoy, Watson, Watkins, & Nathan, 2013). The current systematic review focuses on repetitive negative thinking, which has been identified as a core process across both the anxiety and depressive disorders (Ruscio, Seitchik, Gentes, Jones, & Hallion, 2011). Elevated levels of RNT has been shown

to be present in as many as 13 different disorders (Ehring & Watkins, 2008) including depression (e.g. Thomsen, 2006), social phobia (e.g. Joormann, Dkane, & Gotlib, 2006) and obsessive–compulsive disorder (OCD; e.g. Abramowitz, Whiteside, Kalsy, & Tolin, 2003).

Repetitive negative thinking can be defined as repetitive thinking that is hard to control and focuses on one or more negative topic (Ehring & Watkins, 2008). Both worry and rumination have been identified as forms of RNT (e.g. Harvey et al., 2004). There is some debate as to whether worry and rumination should be treated as the same process due to their overlapping characteristics (e.g. Segerstrom, Tsao, Alden, & Craske, 2000) however, whilst it has been shown that worry and rumination have some overlap, for example both being abstract in nature and having a negative self-focus (Holmes & Mathews, 2010) there is evidence that they are distinctly separate concepts requiring different treatment approaches. Worry and rumination have different temporal orientations, with rumination focusing on past events and worry predominantly focusing on future events (Ehring & Watkins, 2008). Rumination has also been found to have less verbal content, have a longer duration, be associated with less motivation to act, and reduced confidence and effort in problem-solving when compared to worry (Papageorgiou & Wells, 1999a, 1999b; Papageorgiou & Wells, 2004).

An important symptom in relation to rumination and rumination-focused treatments is overgeneral autobiographical memory. This is a key feature in many affective disorders and has been shown to be closely associated with depressive disorders (Williams et al., 2007). Overgeneral autobiographical memory is seen when individuals asked to recall a specific cue-related memory recall a more general, less specific memory. Williams et al. (2007) proposed the CaR-FA-X model as a

way of explaining this. This suggests that the three underlying mechanisms for this phenomenon are: Capture and Rumination, in which emotional words activates self-conceptual information which is then focused in on, taking cognitive resources and preventing the progression to specific memory retrieval; Functional Avoidance, in which individuals avoid recalling specific memories of negative experiences in order to regulate their affect and Impaired Executive Control, in which reduced cognitive capacity affects generative retrieval. This model was tested by Sumner et al., (2014) whose findings provided support for a link between overgeneral autobiographical memory and both the capture and rumination, and impaired executive control mechanisms. Support for the functional avoidance mechanism was minimal, however the authors note that there were limitations in how this was measured and therefore it does not provide conclusive evidence to suggest that this mechanism does not contribute to overgeneral autobiographical memory.

Although rumination has traditionally been considered primarily as a feature of depression (Nolen-Hoeksema, 1991), there is growing evidence to support the suggestion that it is a transdiagnostic concept, as rumination has been shown to also be present in the anxiety disorders (McEvoy et al., 2013). For example, Rachman, Gruter-Andrew & Shafran (2006) found high levels of post-event rumination for people high in social anxiety and longitudinal studies have also shown that rumination accounts for a significant proportion of the overlap between anxiety disorders such as GAD and depression (McLaughlin & Nolen-Hoeksema, 2011).

Rumination in its simplest definition is repetitive thinking, in psychology it is often described as thinking over and over about a negative event (Smith & Alloy, 2009). It involves the individual repeatedly thinking about the causes, meanings and implications of negative symptoms, whilst at the same time being unable to initiate

problem solving that might lessen their distress (Nolen-Hoeksema, 1991). As well as reduced problem solving ability, rumination has been associated with prolonged and more severe depressive symptoms, negatively biased thinking and impaired motivation and concentration (Lyubomirsky & Tkach, 2003). Rumination has been shown to be a vulnerability factor for depression as well as predicting onset and severity of symptoms (Nolen-Hoeksema, Stice, Wade, & Bohon, 2007; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). It has also been shown to play an important role in relapse and remission (Michalak, Hölz, & Teismann, 2011). Studies have also shown that even controlling for baseline level of symptoms, individuals who report high levels of rumination show higher levels of anxiety over time (e.g. Ehring & Watkins, 2008).

Whilst rumination is traditionally considered a negative process, both adaptive and maladaptive rumination styles have been identified. For example, Treynor, Gonzalez and Nolen-Hoeksema (2003) differentiate different styles of cognitive appraisal of situations or stimuli. They noted a distinction in style and outcome when taking account of reflective vs brooding rumination. They describe reflective rumination as involving a purposeful inward focus in which the individual engages in problem solving to reduce their depressive symptoms and found that this style of rumination decreases depression symptoms over a year. Brooding rumination is described as involving the individual passively comparing their current situation to an unachievable standard, which they found increased depression symptoms.

Watkins and Moulds (2005) noted an important distinction between abstract vs concrete rumination. Abstract rumination involves thinking about a past event in an evaluative self-focused way (e.g. why did this happen). This is linked to more

over-general recall of memories (e.g. Watkins & Moberly, 2009) and has been shown to reduce problem solving. Concrete thinking involves thinking about past memories in an experiential, process-orientated self-focused way (e.g. How did this happen, moment-by-moment), which has been shown to aid problem solving. Finally, Cann et al. (2011) note that an important difference in intrusive vs deliberate rumination in a study examining post-traumatic growth. Intrusive rumination is defined as unwanted and intrusive thoughts that were involuntary whereas deliberate rumination is voluntary and focused on purposefully trying to make sense of events and their implications. This distinction between types of rumination is important as it highlights the existence of both constructive repetitive thinking (i.e. that improve outcomes) and unconstructive repetitive thinking (i.e. negatively affects outcomes; Watkins, 2008).

Due to the key role that rumination has been shown to play in both depression and the anxiety disorders (McLaughlin & Nolen-Hoeksema, 2011) treatments have increasingly started to focus on reducing rumination as a primary treatment aim. A number of these treatments include interventions such as concreteness training (CNT; Watkins & Moberly, 2009) Rumination-focussed CBT (RfCBT; Watkins, et al., 2007), CBT for depressive rumination (CBT-DR; Teismann et al., 2014), competitive memory training (COMET; e.g. Ekkers et al., 2011), cognitive control training (e.g. Moshier & Otto, 2017) and metacognitive therapy (e.g. Wells et al., 2012).

These interventions all aim to work on underlying ruminative processes and focus on teaching people alternative ways of responding to emotionally salient autobiographical memories, however they do this in different ways. CNT teaches people to think in a more concrete, specific way to reduce rumination and

overgeneralisation. RFCBT understands rumination as a form of avoidance and uses functional analysis to help people recognise unhelpful rumination and to do something different. This includes teaching individuals to use absorption and compassion techniques. Competitive memory training focuses on teaching individuals to overlearn memories of earlier successes in acceptance or letting go (Ekkers et al., 2011). Similarly to COMET, metacognitive therapy addresses beliefs about the usefulness of rumination in order to help people to disengage from it. CBT-DR combines elements of both RFCBT and metacognitive therapy and works on similar processes.

Whilst there is evidence of the efficacy for these treatments in individual studies, these treatments are in their infancy, and as such there are limitations as to the current evidence-base. The majority of studies have not included an active control group and therefore it is not possible to determine whether their efficacy is the result of active rumination-focused ingredients, or due to other common factors. Further to this, a number of the CBT-based rumination-focused interventions incorporate elements of traditional CBT, without comparing this directly to a CBT intervention it is not possible to ascertain what the active ingredient are and whether the rumination-focused components add any benefit to the existing treatments. There is also a lack of research into the efficacy of these interventions in populations with anxiety disorders. Despite these limitations, there is growing evidence that these treatments are effective (Querstret & Cropley, 2013) at reducing rumination and worry however this must be interpreted with caution at this time.

Querstret and Cropley (2013) conducted the first substantive systematic review of seven types of treatment focused on reducing rumination and/or worry. They included 19 studies (N = 1778), 15 randomised control trials

(RCTs), two waiting list controlled designs (WLC), and two randomised designs with no control group. Studies were included if they psychometrically and robustly measured rumination or worry as a primary or secondary outcome aim. The inclusion of studies in which rumination was not the primary target was due to the lack of published studies examining rumination specific interventions at the time that Querstret and Cropley conducted their review. However, this resulted in a less focused review and as such, their review is less able to answer the question of whether rumination-focused treatment are efficacious. Their study also used a limited measure of study quality that did not assess allocation concealment or baseline data, however the data suggested that a number of studies had flaws in their statistical analysis.

Querstret and Cropley (2013) provide evidence that mindfulness-based and cognitive behavioural interventions may be effective at reducing both rumination and worry regardless of whether this was delivered in a traditional face to face environment or whether it was delivered via a computer/internet based protocol. It remained unclear whether online mindfulness interventions were effective as the majority of the online interventions included in their review were CBT based. Querstret and Cropley speculate that treatments designed to help individuals change thinking style may be helpful as interventions that included concreteness training or encouraged individuals to restructure their thinking were found to be efficacious.

While Querstret and Cropley (2013) produced a good review there are a number of methodological and procedural limitations, such as a lack of robust inclusion and exclusion criteria and studies' heterogeneity meant a wide variety of populations such as clinical, general adult and student were mixed together in the review. It is evident that there are fundamental differences in working with

rumination in clinical and non-clinical populations. This therefore reduced the clinical usefulness of the review.

The purpose of the current systematic review is to replicate and elaborate on the review by Querstret and Cropley (2013) and to address the identified methodological shortcomings. The current systematic review will adopt a more focussed sampling frame (such as only including interventions focused on reducing rumination) and will only include studies recruiting clinical populations in order to reduce population heterogeneity and increase clinical relevance. The current systematic review will also update the review by Querstret and Cropley (2013) by including more recently published empirical papers up and including November 2017.

The current systematic review will examine and definitively assess the efficacy of rumination-focussed psychological interventions for depression and anxiety disorders.

### **Research Questions**

1. Are interventions focused on reducing ruminative cognitions efficacious in treating anxiety and depressive disorders in community dwelling adult populations.
2. Is efficacy of rumination-focussed interventions moderated by intervention characteristics (e.g., intervention type or length, group vs individual, self-help vs clinician led)?

## **Method**

### **Protocol**

The protocol for this systematic review was developed in line with the PRISMA-P checklist (Moher et al., 2015) and in accordance with Cochrane review guidelines (Higgins & Green, 2011).

### **Eligibility Criteria**

The inclusion and exclusion criteria for individual treatment studies that have been included in this systematic review are as follows:

#### **Inclusion Criteria**

- Participants must be over 18
- Participants must have a clinically significant level of depression or anxiety and the study must use a validated screening method (e.g. SCID) to establish this
- Participants must be from a community dwelling sample
- The study must include a comparator condition and participants must be randomised to the conditions
- The study must evaluate a therapeutic intervention specifically focussed on reducing rumination
- The study must include validated measures of rumination and depression or anxiety. These measures must be administered pre and post intervention.
- The study must be in the English language

### **Exclusion Criteria**

- In order to increase generalisability, studies were excluded if they were conducted solely in populations with chronic health difficulties (e.g. diabetes)
- Studies were excluded if they were non-randomised and did not adhere to treatment protocols.
- Studies whose primary treatment aim was not to reduce depression or anxiety symptoms were excluded.
- Studies that did not measure rumination using robust standardised psychometric tools were excluded.

### **Search Strategy**

A systematic key word search was carried out by the primary researcher (JC) of databases up to November 2017. PsycINFO, PubMed, Cochrane Central Register of Controlled Trials and EMBASE were searched using the following key words (Ruminat\* OR repetitive thinking) AND (Depress\* or Anx\* or transdiagnostic) AND (Intervention OR random\* OR RCT OR Controlled trial OR Cohort OR Quasi-experimental OR cognitive control OR treatment OR Rumination-focused CBT OR concreteness) AND Adult\*. Reference lists from relevant papers were also cross-checked and reviewed. This included the reference lists from the previous systematic review (Querstret & Cropley, 2013) and reference lists from the included studies. A hand search of unpublished studies and pre-publication articles in relevant journals was also conducted.

### **Selection Process**

All studies identified through searches were imported into reference management software (EndNoteWeb) and duplicates were removed. Study titles and abstracts were initially examined by the primary researcher (JC) and studies that did not meet the eligibility criteria were excluded. The full texts of the remaining articles were retrieved and these were read by the primary researcher. All studies that did not meet the eligibility criteria were excluded. Where there was doubt about the inclusion or exclusion of a study, the study was discussed with the primary research supervisor (KL) and a collaborative decision was reached. The flow of information from identification to inclusion of studies is represented in Figure 1 using the PRISMA flow diagram (Moher et al., 2015).

### **Inter-rater reliability of study quality assessment and risk of bias assessment**

The quality of the eligible studies and risk of bias were assessed by the researcher (JC) and research supervisor (KL). The RCT of Psychotherapy Quality Rating Scale (RCT-PQRS; Kocsis et al., 2010; Appendix B) was used to assess the quality of the studies and the Cochrane Risk of Bias Tool (Higgins et al., 2011; Appendix C) was used to assess risk of bias. Study quality was assessed in relation to Description of subjects, Definition and delivery of treatment, Outcome measures, Data analysis, Treatment assignment and Overall quality of study. Risk of bias was assessed in relation to the randomization process, deviations from intended interventions, missing outcome data, the measurement of the outcome or selection of the reported result and overall risk of bias rating for the study. In order to index inter-rater reliability the researcher and supervisor took one of the included studies and discussed this in relation to quality parameters and risk of bias. Following this,

three studies were randomly selected from the papers included in this systematic review and were independently rated on bias by the researcher and the research supervisor. Inter-rater reliability (kappa) was calculated as 0.75 which is considered to reflect excellent agreement (Orwin, Cooper, & Hedges, 1994). The remaining studies were then rated by the researcher and stored in an Excel spreadsheet accessible to both the researcher and supervisor should further ratings be needed.

### **Data Items**

Data were coded by the primary researcher. The data extracted included the study source (including author, publication and date), study design and how participants were randomised, participant details (including number, gender, age range), intervention (included type, duration, format of delivery and level of support provided) and outcomes (standardised measures used to assess rumination and anxiety or depression, effect sizes *d*). When effect sizes were not reported these were calculated from the data available.

## **Results**

### **Description of included studies**

Following the search strategy previously described, 4731 studies were identified. After duplicates were removed 3870 titles and abstracts were screened. This resulted in 3800 studies being excluded. The full texts of the remaining 70 studies were then accessed to determine eligibility. This resulted in the identification of seven eligible studies (N = 499) published between 2009 and November 2017 that were included in this review. The results from the search and selection process are shown in Figure 1. The majority of the studies (n = 6) were Randomised Control

Trials (RCTs; Ekkers et al., 2011; Moshier & Otto, 2017; Teismann et al., 2014; Wanmaker, Geraerts, & Franken, 2015; Watkins et al., 2011; Watkins et al., 2012) and one was a cohort-randomised trial (Seigle et al., 2014). See Table 1 for an overview of the study characteristics.

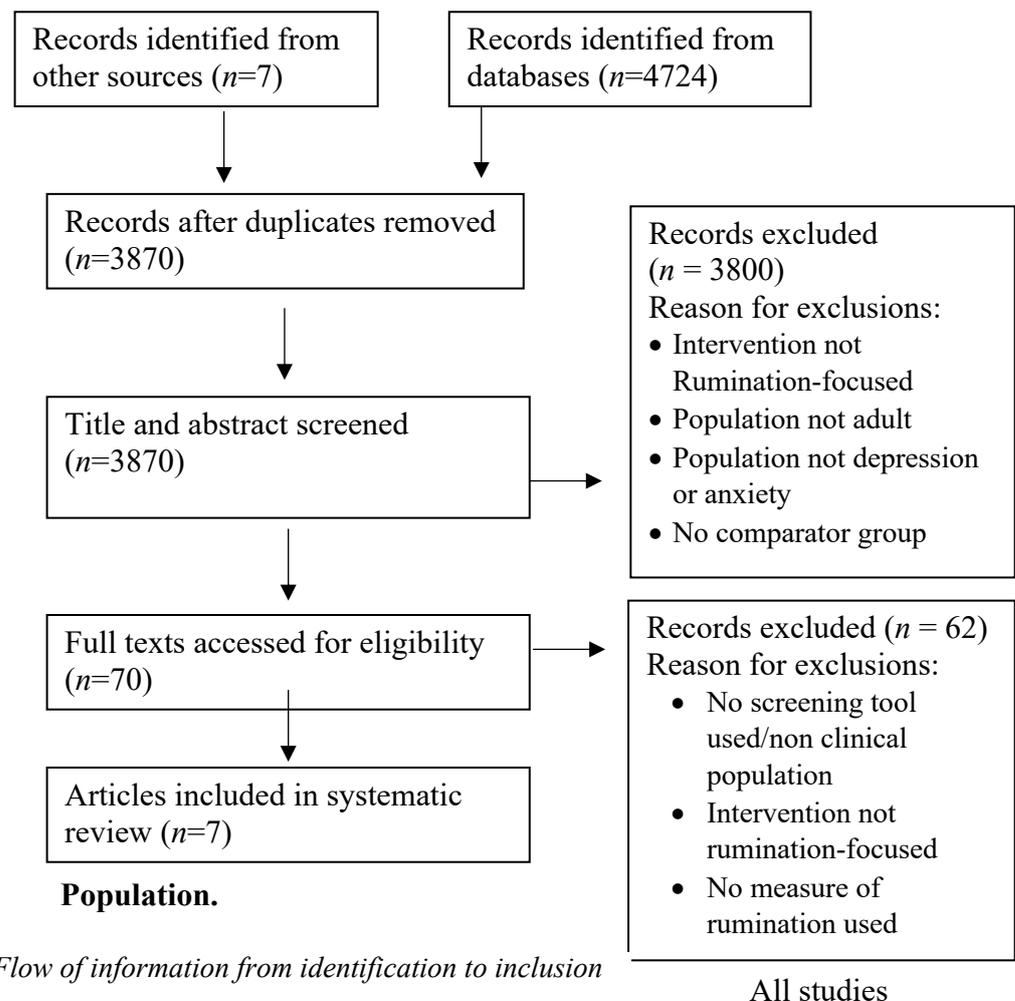


Figure 1: Flow of information from identification to inclusion

included examined their interventions in clinical populations. Five studies recruited solely from clinical populations (Ekkers et al., 2011; Moshier & Otto, 2017; Siegle et al., 2014; Watkins et al., 2011; Watkins et al., 2012). Teismann et al. (2014) recruited from the community through articles in newspapers and magazines and via letters to clinicians and Wanmaker et al. (2015) recruited from the community through online adverts, paper adverts and email. All studies reported a mixture of male and female participants with a range of 46.5% females (Watkins et al., 2012) to

77.4% (Ekkers et al., 2011). The mean age ranged from 35.6 (SD = 14.6; Moshier & Otto, 2017) to 74.21 (SD = 5.73; Ekkers et al., 2011). Six studies examined depressed populations and one examined individuals with depression and anxiety (Wanmaker, et al., 2015).

### **Screening Tools.**

All studies included psychometrically derived methods to screen participants for diagnostic criteria for depression or anxiety. Three studies used the Structured Clinical Interview for Depression (SCID; Moshier & Otto 2017; Teismann et al., 2014; Wanmaker et al., 2015), one used the SCID and the Patient Health Questionnaire (PHQ9; Kroenke & Spitzer, 2002; Watkins et al., 2012) one used a structured clinical interview (Siegle et al., 2014), one used the Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996) and the Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960; Watkins et al., 2011) and one used the Quick Inventory of Depressive Symptomatology-Self Report (QIDS- SR) and the Geriatric Depression Scale (GDS; Ekkers et al., 2011).

### **Treatment Intervention and Comparator.**

Five of the seven studies utilised traditional face to face methods of delivery although some used a blended computer based task and psychotherapy approach. Two studies adopted group interventions (Teismann et al., 2014; Ekkers et al., 2011) while the remaining five studies adopted one to one interventions.

Two studies examined CBT based interventions. Teismann et al. (2013) compared a cognitive-behavioural group program for depressive rumination (CBT-DR;  $n = 31$ ) to a waiting list control group ( $n = 29$ ) and Watkins et al., (2011)

compared RFCBT plus treatment as usual (TAU;  $n = 21$ ) to TAU ( $n = 21$ ) on its own.

Two studies examined the efficacy of Cognitive Control Training (CCT) in reducing rumination in depression. Moshier and Otto (2017) compared behavioural activation plus CCT ( $n = 21$ ) to a peripheral vision task (PVT;  $n = 13$ ) and Siegle et al. (2014) compared CCT ( $n = 27$ ) to TAU ( $n = 26$ ).

In the three remaining studies, Watkins et al. (2012) compared guided self-help CNT plus TAU to guided self-help relaxation therapy (RT) and to TAU, Ekkers et al. (2011) compared competitive memory training (COMET) plus TAU with TAU alone and Wanmaker et al. (2015) compared the efficacy of Working Memory Training (WMT) with bogus training.

### **Outcome Measures.**

All studies included self-report measures of rumination. Five studies (Ekkers et al., 2011; Moshier & Otto, 2017; Wanmaker et al., 2015; Watkins et al., 2012; Watkins et al., 2011) used the Ruminative Response Scale (RRS) from the Response Styles Questionnaire (RSQ; Nolen-Hoeksema, 1991), the study by Teismann (2014) used both the Brooding Scale of the Response Styles Questionnaire (RSQ-B) and the Perseverative Thinking Questionnaire (PTQ; Ehring et al., 2011) and Siegle et al. (2014) used the RSQ. All of these measures have been shown to be valid and reliable, however the variation in measures used in these studies means that it is not possible to make direct comparisons between their outcomes.

### **Attrition/Drop out.**

As may be expected, the level of attrition varied between the studies. Teismann et al. (2014) report the lowest dropout rate at 6.7% whereas Wanmaker et al., (2015) report the highest at 58%. Overall, the average dropout rate was high (24.4%) with almost one in four participants not completing treatment. Dropout rate may be important as an indicator of acceptability of the intervention and also of the accuracy of the results presented. High dropout rates can also introduce bias (Dumville, Torgerson, & Hewitt, 2006), and therefore it is important to consider the impact of attrition on baseline imbalances and on the outcomes reported (Hewitt, Kumaravel, Dumville, & Torgerson, 2010). This will be considered further in the discussion section.

### **Study Quality and Risk of Bias**

There were no quality concerns for any of the studies included in this review. All studies received a rating of average or above (Table 2 & Appendix D). With regard to bias, all of the studies scored low risk of bias in relation to the randomization process, deviations from intended interventions, missing outcome data, the measurement of the outcome or selection of the reported result and overall risk of bias except for the study by Siegle et al. (2014) which was scored as some concerns due to possible bias resulting from deviations arising from intended interventions (Table 3). This was rated as a possible concern as participants were randomised at a cohort level and medication prescribing patterns changed over the course of the study meaning that co-interventions were not balanced across the groups.

Table 1: Study Characteristics

Author/Date	Study Type	Therapy	Comparison group	Format of delivery	Treatment duration (weeks)	<i>n</i>	Attrition	Gender (% Female)	Mean Age (SD)	Clinical Population	Rumination Measures
Ekkers et al. (2011)	RCT	COMET	TAU	Group	7	93	26%	71.5%	72.85 (5.75)	Depression	RRS
Moshier & Otto (2017)	RCT	CCT	PVT	individual	4	34	23.5%	52%	35.6 (14.6)	Depression	RRS
Siegle et al. (2014)	Cohort	CCT	TAU	individual	2	51	19%	68.5%	39.55 (10.55)	Depression	RSQ
Teismann et al. (2014)	RCT	CBT-DR	WLC	group	11	60	6.7%	71.6%	47.1 (11.87)	Depression	PTQ RSQ-B
Wanmaker et al. (2015)	RCT	WMT	Bogus Training	Individual	4	98	58%	48.9%	47.03 (11.98)	Depression and Anxiety	RRS
Watkins et al. (2012)	RCT	CNT	RT+TAU and TAU	Individual	6	121	28.1%	64.7%	46.27 (12.20)	Depression	RRS
Watkins et al. (2011)	RCT	RFCBT	TAU	Individual	6-12	42	9.5%	57.5%	44.15 (10.22)	Depression	RRS

RCT=Randomised Control Trials, COMET=Competitive Memory Training, CCT=Cognitive Control Training, CBT-DR=Cognitive Behavioural Therapy for Depressive Rumination, WMT=Working Memory Training, CNT=Concreteness Training, RFCBT=Rumination Focused Cognitive Behavioural Therapy, TAU=Treatment as Usual, PVT=Peripheral Vision Task, WLC=Waiting List Control, RRS=Ruminative Response Scale, RSQ=Response Styles Questionnaire, RSQ-B=Response Styles Questionnaire-Brooding, PTQ=Perseverative Thinking Questionnaire



*Table 3: Risk of Bias Ratings*

Study	Year	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall Bias
Ekkers et al.	2011	Low	Low	Low	Low	Low	Low
Moshier & Otto	2017	Low	Low	Low	Low	Low	Low
Siegle et al.	2014	Low	Some Concerns	Low	Low	Low	Some Concerns
Teismann et al.	2014	Low	Low	Low	Low	Low	Low
Wanmaker et al.	2015	Low	Low	Low	Low	Low	Low
Watkins et al.	2012	Low	Low	Low	Low	Low	Low
Watkins et al.	2011	Low	Low	Low	Low	Low	Low

## An Evaluation of Novel Psychological Interventions

### **Effect of Treatment on Self-Reported Rumination**

All of the studies included in this review examined the efficacy of interventions designed to target rumination in depressed and/or anxious populations. However, the studies vary both in the interventions used and in the efficacy of these interventions. In order to allow for a more in-depth analysis of the content of the interventions, their similarities and differences and any differences in efficacy, a narrative synthesis was conducted as opposed to a quantitative synthesis. The results are therefore summarised below in narrative form (for a summary of study results see Table 4).

#### **Competitive Memory Training.**

Ekkers et al. (2011) compared the efficacy of competitive memory training (COMET) plus TAU, to TAU on its own in an older adult population. Competitive memory training aims to help participants accept or to become indifferent to their negative memories instead of ruminating on them. This is achieved by participants selecting counter-themed memories (i.e. memories of something they can detach from or are indifferent about) and overlearning these counter-theme memories so that they move up the retrieval hierarchy and can be used to inhibit dominant ruminative networks. It is designed to change cognitive processes and how participants engage with their memories as opposed to changing the cognitive content. The intervention for this study consisted of seven, weekly group sessions lasting 60 minutes. The results from this study showed that participants who were assigned to the COMET plus TAU condition had lower levels of rumination post treatment compared to the participants assigned to TAU only. Ekkers et al. (2011) reported a medium effect ( $d = 0.51$ ) for treatment on rumination outcome and found that 27% of participants in the COMET plus TAU condition achieved clinically

significant reduction in rumination compared to 5% in the TAU only condition. Ekkers et al. (2011) also showed a medium effect on depression outcome ( $d= 0.54$ ). This suggests that competitive memory training is an effective treatment for depressive rumination. The study also showed a significantly greater reduction in post treatment depressive symptoms in the COMET plus TAU condition compared to the TAU group. It is also important to note that this study scored Moderately Good on the quality rating, which suggests that the results are likely to be valid.

One weakness of this study however is that there was high attrition, with four people dropping out of the COMET condition (7.5%) and 20 people dropping out of the TAU condition (50%). Whilst there was no significant difference on the baseline variables between completers and those who dropped out, this attrition meant that half of the participants who were assigned to the control group withdrew their consent, and consequently this may impact on the reliability of the results. One of the reasons reported for this was that participants who were assigned to TAU were disappointed that they had to wait for the treatment and as a result did not engage with the study. The authors attempted to address this in the intention to treat analysis by using both the last observance carried forward method and a multiple imputation method, which is likely to have limited any bias resulting from the attrition. Another possible limitation of this study is that although a diagnosis of depression was established through assessment by a multidisciplinary team and the use of the Geriatric Depression Scale, unlike other studies included, the authors did not use a standardised clinical interview such as the SCID, which may affect the validity of the diagnosis.

### **Cognitive Control Training.**

Siegle et al. (2014) compared the efficacy of a neurobehavioral intervention (CCT) plus TAU to TAU only. Decreased prefrontal function has been linked to rumination in depression (Kross, Davidson, Weber, & Ochsner, 2009). CCT aims to reduce rumination by targeting the mechanisms of cognitive and emotional dysregulation directly and by increasing prefrontal function, improving selective attention, working memory and executive control. Participants attended six intervention sessions over a two-week period. The CCT intervention consisted of three tasks. An attention-training task, in which participants had to direct their attention to one sound at a time and to switch their attention between sounds; an auditory serial addition task in which participants are asked to add each number presented to the preceding number and an alternating word emotion identification/digit sorting task. In this task participants alternate between a task in which they briefly see a positive, negative or neutral word and have to indicate the valence of the word and a task where they have to put numbers into numerical order. All tasks were presented in a computer-based format.

The results showed that the participants in the intervention condition achieved a greater reduction in rumination than those in the TAU condition. Pre-post change was reported for CCT ( $d = -1.42$ ) and TAU ( $d = -0.04$ ). In particular, participants showed a reduction in the emotional features of rumination such as brooding. Following treatment, only five out of the 23 participants in the intervention group were shown to have residual rumination compared to 16 out of 20 in the TAU group. Depressive symptoms also reduced in both groups (CCT  $d = -1.19$ ; TAU  $d = -0.60$ ), however there was no significant difference between groups in the level of reduction ( $p > 0.05$ ).

Importantly, the results also showed that whilst CCT was efficacious the participants who benefited from it were those who were able to strongly engage with the tasks. This suggests that the intervention may benefit a specific group of people who are able to give a high level of attentional resources to the task. Siegle et al. (2014) had a relatively low attrition rate with four participants (15%) dropping out of the intervention condition and six (23%) dropping out of the treatment as usual condition. However, the study used completer only analysis which did not account for these participants and may have resulted in an exaggerated estimate of treatment effect. The study also randomised at a cohort level as opposed to a patient level which the authors note may have affected the outcomes as there was a change in medication prescribing patterns during the study time frame.

Moshier and Otto (2017) looked at the benefit of augmenting Brief Behavioural Activation Therapy for Depression (BATD) with CCT. They compared the efficacy of BATD plus CCT with BATD plus an active control (Peripheral Vision Training; PVT). Treatment consisted of four individual sessions of BATD conducted weekly and either a CCT or PVT task completed prior to each session. In comparison with data reported by Siegle et al. (2014) the CCT treatment also consisted of two computerized tasks, one was an auditory serial addition task and one was an attention control intervention. Moshier and Otto (2017) reported a moderate attrition rate with seven participants dropping out of the CCT group and one from the PVT group. Whilst this was managed using an intention to treat analysis adopting last observation carried forward method and mixed effects modelling, there was a significantly greater drop out from the CCT (33%) group than the PVT group (7.7%), which may have impacted on the results. Moshier and Otto (2017)'s study obtained a score of Moderately Good for quality suggesting that it

was well conducted. Unlike Seigle et al. (2014), although the results in this study showed a significant reduction in rumination symptoms for both groups (pre-post  $d = 0.5$ ,  $p < 0.05$ ) no significant effect of CCT was found ( $d = 0.45$   $p > 0.05$ ). Both groups showed similar improvements in rumination and symptoms of depression, however there was no significant difference between the CCT and PVT groups suggesting that there was no additional benefit to adding CCT to BATD.

### **CBT for depressive rumination/rumination-focussed CBT.**

Watkins et al. (2012) compared the efficacy of a group rumination-focused CBT intervention with a TAU group. Rumination-focused CBT is designed to help people to shift from unconstructive rumination (that leads to increased depressive symptoms or reduced problem solving ability) to constructive rumination (that leads to improved performance or helpful cognitions of behaviours). As with the Ekkers et al. (2011) intervention, this intervention aims to modify cognitive processes as opposed to the individual content of thoughts. The treatment consists of 12 individual sessions conducted either weekly or fortnightly and lasting for up to 60 minutes.

Results demonstrated RFCBT participants report significantly less depressive rumination and residual depressive symptoms post intervention than the TAU group. A medium effect was found for rumination ( $d = 0.65$ ) and a large effect of treatment was found for depression as measured by the BDI-II ( $d = 1.11$ ). There was a low attrition rate in the TAU group with only two participants dropping out. In the RFCBT group one participant did not adhere to the RFCBT protocol and one did not attend the minimum of six sessions. Intention to treat analysis was conducted on the data so all responses were included. Although the study was limited in its power because the sample sizes in both condition are small (RFCBT = 21; TAU = 21) the

results suggest RFCBT is an efficacious intervention for depressive rumination in this population. It is important to note that unlike the previous two studies, this study was conducted with individuals with residual symptoms of depression. As this is a different population, care needs to be taken when comparing the results.

Teismann et al. (2014) compared the efficacy of CBT for depressive rumination (CBT-DR) to a waiting list control. Similarly to RFCBT, this treatment differentiates between functional and dysfunctional perseverative thought and aims to reduce dysfunctional rumination by training individuals in a variety of functional alternatives. Although the treatment includes behavioural activation aspects of RFCBT such as problem-solving strategies it is distinct from RFCBT as it predominantly uses metacognitive techniques (e.g. recognising and modifying positive beliefs about rumination). Similarly to data reported by Ekkers et al. (2011) and Watkins et al. (2012), the focus of treatment is on changing general cognitive processes as opposed to cognitive content. Consistent with the study by Watkins et al. (2012), Teismann et al. (2014) focused on participants with residual symptoms of depression.

The intervention in Teismann et al. (2014)'s study consisted of 11 group sessions, conducted weekly lasting for up to 60 minutes. The results showed the intervention group had a significantly greater reduction in rumination compared to the waiting list control group. The intervention group also showed significant improvements in depression, perceived control over rumination and metacognitive beliefs. These gains were maintained at a one year follow up. The study found a medium effect of treatment on ruminative brooding ( $d = 0.40$ ) and a large effect of treatment on perseverative thinking ( $d = 1.06$ ) and depression as measured by the BDI-II ( $d = 1.25$ ). Participants also rated their satisfaction with the treatment on a

scale from 0 (not at all) to 5 (completely satisfied). On average the treatment received a satisfaction score of 4.16 (SD = 0.47) suggesting a high level of satisfaction. Teismann et al. (2014) did not adopt an ITT approach but instead chose to report completer data analysis, which meant that it did not account for the participants who dropped out of the study, however attrition was low with only two participants dropping out of each condition.

### **Concreteness Training.**

Watkins et al. (2011) compared the efficacy of a guided, concreteness training intervention (CNT) with both a guided relaxation intervention (RT) and with a TAU group. The study was conducted in a depressed population. CNT is a cognitive bias modification approach designed to reduce the cognitive processes of rumination and overgeneralization. Participants attended an initial individual face-to-face session then were required to practice the intervention exercises at home for at least six weeks. They were provided with audio recordings of the exercises and a workbook and they received up to three telephone support sessions.

The results showed that rumination and overgeneralisation reduced significantly more in the CNT intervention than in either the RT intervention ( $d = 0.5$ ) or the TAU condition ( $d = 0.6$ ) suggesting that CNT is an efficacious intervention. Participants in the CNT condition also reported significantly fewer depressive symptoms post treatment (as measured by the BDI;  $d = 1.07$ ) compared to TAU condition, however, there was no significant difference in reduction of depressive symptoms between the CNT group and the RT group ( $p > 0.05$ ). Whilst this study has the benefit of including an active control to reduce potential bias, the authors note that the study was not powered for comparisons between the CNT and

RT groups due to a small  $n$  (a formal power calculation was not provided).

Following the initial session both interventions were rated on the Credibility Expectancy Questionnaire (CEQ; Devilly & Borkovec, 2000) which provides a score from one to nine, with higher scores showing greater credibility). It was reported that both RT and CNT received positive endorsements from participants in regard to treatment credibility and helpfulness. (CNT  $M = 6.97$ ,  $SD = 1.17$ ; RT  $M = 6.53$   $SD = 1.21$ ). There was some attrition in the study with 10 (25%) participants dropping out of the CNT group and 12 dropping out of each of the RT (30.8%) and TAU (28.6%) groups. This was addressed in the intention to treat analysis using the last observation carried forward method, regression analysis and sensitivity analysis. The quality of this study was rated as Very Good, which is the highest rating given in this review

### **Working Memory Training.**

Finally, Wanmaker et al. (2015) compared the efficacy of a working memory training intervention with a bogus training condition for individuals with depression and/or anxiety disorders. Rumination has been linked to working memory deficits. Therefore this treatment is designed to increase working memory capacity in order to improve cognitive functions like attention and response inhibition and in turn to reduce rumination. Treatment consisted of 10 hours of working memory training and participants were instructed to carry out the training six times a week for four weeks. The results of this study showed that whilst there was a reduction in rumination post intervention for both conditions (pre-post RRS  $d = 0.55$ ), there was no significant difference in the level of rumination for participants in the WM training compared to those in the bogus training condition ( $d = 0.2$ ,  $p > .05$ ). There was also no significant

effect on symptoms of anxiety or depression. These results indicate that WM training on its own is not effective in reducing rumination. This study also had the highest level of attrition with 30 (61.2%) participants dropping out of the WM training condition and 27 (55.1%) dropping out of the bogus training condition.

Rumination Focused CBT (RFCBT)	Rumination Focused CBT aims to change the process of thinking not the content of thoughts. It uses functional analysis to help people recognise unhelpful rumination and to do something different, for example to use techniques such as absorption or compassion.
Competitive memory training (COMET)	Competitive memory training aims to change how participants engage with their memories as opposed to changing the cognitive content. It aims to teach participants to accept or to become indifferent to their negative memories instead of ruminating on them.
Cognitive Control Training (CCT)	Cognitive Control Training aims to reduce rumination by improving selective attention, working memory and executive control. This is achieved through the use of repetitive computer based tasks that require prefrontal activity.
Working Memory Training (WMT)	Working memory training aims to reduce rumination by increasing working memory capacity. Participants complete two computerised working memory training tasks six times a week
Concreteness training (CNT)	Concreteness training teaches people to think in a more concrete, specific way in order to reduce rumination and overgeneralisation.
CBT for Depressive Rumination (CBT-DR)	CBT for Depressive Rumination differentiates between functional and dysfunctional rumination. It aims to reduce dysfunctional rumination by training individuals to use functional alternatives. It teaches metacognitive techniques (e.g. recognising and modifying positive beliefs about rumination) and includes behavioural

activation and problem-solving strategies.				
Study	Study groups	Follow up	Rumination findings	Favours R-F (+) or control (-)
Ekkers, et al. (2011)	COMET plus TAU vs TAU	none	Patients in TAU plus COMET condition showed less depression and ruminations at post-treatment than patients in TAU group. Effect sizes were large in the multiple imputation and completers analysis, and medium when missing data were substituted with the last observation carried forward.	+
Moshier & Otto (2017)	BATD plus CCT Group vs BATD plus PVT Group	1 month	No enhancement was observed on primary and secondary outcomes; both treatment groups demonstrated similar significant improvements in depression symptom severity and rumination, reflecting a large within-group effect size.	-
Siegle et al. (2014)	CCT plus TAU vs TAU	1 year	Data suggested that CCT was associated with a greater reduction in rumination than TAU from pre to post-intervention, particularly emotional features of rumination (brooding).	+
Teismann et al. (2014)	CBT-DR vs WLC	3, 6 & 12 months	Treatment significantly improved depressed mood, rumination, perceived control over rumination and dysfunctional metacognitive beliefs compared with the wait condition. Treatment gains were maintained over the follow-up period of 1 year.	+
Wanmaker, Geraerts & Franken (2015)	WMT vs Bogus Training	2 months	WM training did not lead to increased reduction in rumination, anxiety or depression compared to the placebo training. Results indicated that a stand-alone WM training, without any addition of other treatments, might not be effective in reducing rumination.	-
Watkins et al. (2012)	CNT + TAU vs RT+TAU vs TAU	3 and 6 months	CNT was found to reduce rumination and overgeneralization significantly more than RT or TAU post-intervention.	+
Watkins et al. (2011)	RFCBT vs TAU	6 months	Participants in the rumination-focused CBT group improved significantly more than those in the TAU group	+

Table 4: Summary of Interventions

*Table 5: Summary of Results*

### **Discussion**

The current systematic review set out to evaluate the efficacy of outcome research on rumination-focussed interventions in people with anxiety disorders and/or depression. This review also aims to obtain a more detailed understanding of the key components of these treatments and how much overlap there is between them to clarify the most helpful components.

Although efforts were made to reduce heterogeneity, a wide range of interventions and populations were included in this review. However, as all of the studies in the review examined interventions to reduce rumination in anxious or depressed populations and a high proportion of the studies used the same rumination outcome measures this allowed them to be narratively compared.

Generally the quality of studies was high with all studies entered into the systematic review being rated at average or above. One study (Siegle et al., 2014) was rated as having concerns regarding risk of bias in terms of bias due to deviations from intended interventions, as they did not account for changes in medication prescribing patterns during the course of the study. This suggests results presented in this review represent reasonably accurate findings. However, there are some limitations that need to be considered in interpreting the results. Three of the seven studies included in this review opted to use completer analysis rather than the more robust intention to treat methodology and this limits the conclusions that can be drawn from these studies. For one of the studies (Teismann et al., 2014) there were low levels of attrition (5.7%), therefore the impact of using such a compromised approach to data analysis is mitigated somewhat, however, studies by Siegle et al.

(2014) and Wanmaker et al. (2015) report relatively high levels of attrition (19% & 58% respectively) and did not take account of this in their analyses. Given these are quite recent papers and are published after PRISMA guidelines (Moher, Liberati, Tetzlaff, Altman, & Prisma, 2009) are freely available this is regrettable and as such the value of these studies are lessened.

This means that of the seven studies included in this review (see table 4), only four have reported reliable change supportive of ruminative focussed interventions for depressive and anxiety disorders. The significant difference in attrition between the two computer based studies may be due to the fact that Wanmaker et al. (2015)'s participants had to attend the clinic especially to partake in the research, however Siegle et al. (2014) added CCT sessions to participants regular treatment programme in it's usual location. Additionally compared to the study by Siegle et al. (2014), there was a higher demand of the intervention in Wanmaker et al. (2015)'s study, with participants being asked to train six times a week for four weeks.

### **Efficacy of Rumination-focussed Psychological Interventions**

The results from the studies are mixed, however, three out of the seven included studies present results that reliably suggest rumination-focussed interventions are efficacious at reducing rumination (Ekkers, et al. 2011; Watkins et al. 2011; Watkins et al. 2012). All of the studies that reported significant effects of the interventions were conducted in depressed populations, which suggests that currently the strongest evidence for the efficacy of rumination-focused interventions is within this population. Of the two studies that did not find significant effects, one included individuals with anxiety disorders. Participants included in the study

conducted by Wanmaker et al. (2015) presented with a wide range of anxiety disorders including agoraphobia with and without panic, panic disorder, social phobia, specific phobia, obsessive–compulsive disorder, GAD and anxiety disorder not otherwise specified. This is likely to introduce a high level of variance in outcome, however it was not possible from the results and to differentiate between types of anxiety disorder to determine whether this had any impact on efficacy.

Due to the limited number of studies available at this time, and the fact that this review included only one study that included individuals with anxiety disorders, it is not possible to conclude that these interventions are not efficacious in this population. However, it does suggest that more research needs to be done within anxiety disorder populations to determine whether these interventions are efficacious in this population. Whilst there is evidence in the literature that rumination is a common symptom across the anxiety disorders and depression (e.g. McEvoy et al., 2013) it may be that rumination is more closely associated with depression and that GAD (commonly termed worry) is more closely related to anxiety. Indeed McEvoy et al. found higher total scores on the RRS in depression compared to panic disorder and GAD, but not social anxiety disorders. This may suggest varying levels of rumination in these disorders and that focussing on rumination in certain anxiety disorder populations may not be sufficient on its own and therefore these populations may require adapted interventions.

All of the studies that found significant results used interventions designed to work at a process level, in that they aimed to change response to rumination, not the content of the ruminative thoughts themselves, which supports the suggestions in the transdiagnostic treatment literature of intervening at this level (Ellard, Fairholme, Boisseau, Farchione, & Barlow, 2010).

Of the studies that reported significant results there was also variation in the design of the interventions, with some implemented as stand-alone treatments (e.g. RFCBT and CBT-DR) and others designed as adjuncts to psychological treatment (e.g. CCT). However, from the limited studies available at this time, no firm conclusion can be drawn as to which specific rumination-focused interventions are more efficacious. Many of the studies also provided their interventions in addition to TAU (e.g. Ekkers et al., 2011; Watkins et al., 2012). From studies available for inclusion in this review it is currently unclear whether these treatments are most effective when added to TAU or whether the same effects would be found if they were provided as standalone treatments. This could be an interesting area to look at in future research.

There were also differences in the comparison groups used, with four studies using TAU or WLC and four using a placebo treatment or active control condition. One limitation of this is that what is considered TAU can vary significantly making it an inconsistent comparator. Furthermore, although the TAU conditions are likely to include people on medication or receiving some therapeutic support, making it a useful comparator, none of the studies compared rumination-focussed interventions specifically to active treatments such as CBT. This is a limitation of the current research (Watkins, 2015) and as such of this review. It also means that caution needs to be applied in interpreting the results and it suggests an important area of further research in this field. The researcher is currently aware of one study protocol that has been published that would attempt to address this gap (Hvenegaard et al., 2015) however the data for this study was not published at the time of writing this review and although an email was sent to the lead author in order to request access to the data no response was received.

There was some discrepancy between the efficacy of CCT in the studies by Moshier and Otto (2017) and Siegle et al. (2014). Moshier and Otto (2017) propose a number of reasons for this. One proposal is that unlike Siegle et al. (2014) they provided CCT as an add-on to an active treatment and they argue that the efficacy of BATD may have masked any effects that the CCT had. They also suggest, similarly to Siegle et al. (2014), that there is a certain subset of people who are less able to commit the attentional resources required to engage in CCT and depending upon the make-up of a sample this may impact on efficacy.

### **Moderator Variables in the Efficacy of Rumination-focussed Interventions**

Due to the characteristics of the studies included in this review it is not possible to comment on all the moderator variables. For example, only one of the included studies provided an intervention in a guided self-help format (Watkins et al., 2012). Whilst the results from this study suggest that the CNT interventions are efficacious as a guided self-help intervention, the data comes from just one study (Watkins et al. 2012). It is not therefore possible to generalise conclusions about this method of intervention.

There is a growing body of evidence for the efficacy of guided self-help interventions in general (e.g. Cuijpers, Donker, van Straten, Li, & Andersson, 2010), and these interventions can provide a cost effective, efficient means of providing treatment. It would therefore be a strength of these interventions if they can be provided in a self-help format. There is no reason to think that rumination-focused treatments would not be efficacious in a guided self-help format however it would be necessary to establish enhanced efficacy of rumination-focused treatments to justify their provision over other existing guided self-help interventions. Guided self-help

rumination-focused interventions would also need to be set up carefully to ensure that people did not become stuck ruminating.

Of the seven studies included in the review, two offered interventions in a group format (Watkins et al., 2011 & Teismann et al., 2014) and five offered interventions on a 1:1 basis. The results showed that both of the group based interventions were successful at reducing rumination suggesting that rumination-focused interventions are efficacious in a group format. Teismann et al. (2014) also observe that as these interventions work at a cognitive process level as opposed to a cognitive content level they are well suited to group formats. The results also showed that three out of the five 1:1 interventions were successful in reducing rumination suggesting that this format is also efficacious. The mixed results for individual therapy suggest that it is the content not the format that is impacting on efficacy.

Whilst some of these interventions by their nature do not lend themselves to being provided in a group format (e.g. CCT) this review suggest that rumination-focused interventions can be efficacious in a group format. This is important as there are a number of benefits to treatments being offered in group formats such as cost effectiveness (Vos, Corry, Haby, Carter, & Andrews, 2005), reduction in waiting times and increased number of patients treatment can reach in a shorter time period (Morrison, 2001).

With regards to the type of interventions offered, the evidence in this review suggests that interventions that focus on the underlying cognitive processes are most likely to reduce rumination. The interventions that were found to be efficacious (e.g. RFCBT, CBT-DR, CNT and COMET) have a number of commonalities. For example, they all distinguish between functional and dysfunctional rumination, they

all focus on teaching and strengthening alternative ways of responding to ruminative thoughts and they all use imagery to counter negative memories in order to reduce the negative effects of rumination. However, the approaches they take do differ in their focus and how they access cognition, for example, CBT-DR draws on a metacognitive approach and includes techniques such as challenging beliefs about rumination and detached mindfulness, CNT aims to teach participants to recall memories in specific detail in order to reduce overgeneralisation, COMET focuses on helping people to let go of negative rumination through acceptance or being indifferent and RFCBT uses imagery to help people to recall times that they were able to use more functional thinking for example by recalling a time they were completely absorbed in an activity. CCT also focuses on cognitive control of information in working memory but instead of working directly on the rumination it aims to work on cognitive control which it proposes is linked to rumination (Siegle, Ghinassi, & Thase, 2007).

These combined results show that rumination based therapies for depression may hold promise as an efficacious adjunct for evidence-based psychotherapies such as CBT. Data suggests there may be value in working at a cognitive process level for the alleviation of depression, and for using imagery and teaching people alternative ways of responding to ruminative thoughts. However, there is a lot of variation in the way the interventions are delivered and there is currently not enough research into each of these methods to conclude which are most efficacious. The effectiveness of the intervention by Teismann et al. (2014) also suggests that targeting individuals' response to rumination may be important, with rumination and mood improving when people were able to become more indifferent towards their memories.

The inclusion of neurobehavioural interventions in this review is important as historically there has been a divide between behavioural neuroscience and clinical research (Sanislow et al., 2010). These results suggest the clinical relevance of including neurobehavioural interventions in order to reduce rumination. The inclusion of this range of techniques is a strength of this review and it helps to highlight the overlap between outwardly separate types interventions.

### **Limitations**

There are a number of limitations to this review that are important to note. Due to this being a relatively new field of research and this review adopting robust inclusion and exclusion criteria, there were only a small number of studies eligible for inclusion. Whilst all studies were rated as average quality or above, this does limit the conclusions that can be drawn.

It is also important to note that whilst rumination-focused treatments are designed to be transdiagnostic, the majority of the research has focused on treating rumination in depression. This was reflected in the nature of the studies that met the criteria for inclusion in this review, with only one study including individuals with both anxiety and depression. There is also a wide variety of treatments that can be considered as a rumination-focused intervention, and as such it is difficult to establish difference between each.

This review also only included studies that were included in peer-reviewed journals. Research has shown that studies with significant results are more likely to be published (Dickersin, 2005) which means that there is the possibility of publication bias in this review. It is therefore possible that contradictory results have been missed out of this review. However, the studies included contain a mixture of

significant and non-significant results suggesting that they represent a balanced picture.

## **Conclusions**

Overall this review provides preliminary evidence that rumination-focused interventions for depression may hold promise as an efficacious treatment option for reducing rumination and improving depression symptoms. In particular, treatments that work at a process level, that use imagery and teach individuals alternative responses to rumination and that help people to become more indifferent to their rumination appear to be the most helpful. The evidence from this current review does not provide support for the efficacy of rumination focus in the treatment of anxiety disorders, and particularly generalized anxiety disorder.

In order to increase the clinical usefulness of these results, only studies that examined clinically anxious or depressed populations were included in this review. Due to the role that rumination appears to have in both residual depression and in the recurrence of depression symptoms these findings are highly clinically relevant. The results suggest the benefit of clinicians working on underlying processes such as rumination. However, caution is required in interpreting these findings due to the small number of studies available to include in the review, the lack of active treatment comparators and the small sample sizes of some studies.

Given the high number of rumination-focused interventions already developed (this review alone included six different treatments) it is important for future research to clarify the most effective intervention. This will help to ensure that the criticism regarding the volume of disorder specific intervention protocols cannot also be applied to transdiagnostic treatments.

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## **Chapter Two - Bridging Chapter**

This chapter is a bridging chapter to present the links between the systematic review and meta-analysis. It provides an overview of the similarities and differences of the two types of intervention examined in this ClinPsyD portfolio. This chapter is formatted according to the APA guidelines. The word count for this chapter is 1723.

Both papers in this ClinPsyD portfolio focus on contemporary, novel interventions for affective disorders that are in early stages of development. The systematic review and meta-analysis papers explore the efficacy of these interventions in adult, community dwelling populations with clinically significant symptoms.

The systematic review focuses upon innovative developments that target cognitive and affective symptoms of rumination that have to date been largely unaddressed by traditional treatment approaches such as behaviour therapy and cognitive-behaviour therapy. For the purposes of this portfolio, ‘traditional’ psychological treatments for anxiety and depressive disorders are defined as treatments that follow the medical model, in that they are diagnosis specific and their primary aim is symptom reduction. The recognition of limitations in traditional treatments with regard to relapse rates and treating comorbidity, has motivated researchers to explore other approaches and theoretical understandings. This has in turn been supportive of and benefitted from interventions such as third wave interventions, transdiagnostic interventions (which work on the underlying processes of disorders) and positive psychological interventions.

The meta-analysis, which forms the second paper in this ClinPsyD thesis portfolio, is focused on positive psychological interventions, which move away from the traditional focus of reducing negative symptoms, towards a focus of improving positive wellbeing.

Traditional psychology treatments have focused on disorder specific interventions such as CBT for panic disorder or CBT for social anxiety. Whilst these treatments have been shown to be efficacious (Cuijpers et al., 2013; Hofmann & Smits, 2008) there continue to be high relapse rates (Bockting, Hollon, Jarrett,

Kuyken, & Dobson, 2015) and it has been shown that less than 50% of patients achieve complete remission following psychotherapy treatment (e.g. Casacalenda, Perry, & Looper, 2002).

There are also a number of criticisms that have been levelled at traditional treatments. One such criticism is that traditional treatments overly focus on the negative symptoms in disorders, ignoring the fact that wellbeing is about more than just the absence of negative symptoms (Seligman & Csikszentmihalyi, 2000). That said, it is acknowledged that interventions such as CBT, do improve wellbeing albeit with more of a focus on symptom reduction (Johnson & Wood, 2017) and that a focus on negative symptoms does result in positive affect. An approach such as CBT also includes elements such as behavioural activation, which encourages individuals to engage in more positive, enjoyable activities and to build these into their routine (Lewinsohn, Biglan, & Zeiss, 1976), which has been shown to increase wellbeing (Mazzucchelli, Kane, & Rees, 2010).

Another criticism that has been levelled at traditional treatments is that due to the proliferation of disorder specific treatment protocols and manuals published, often with few differences in methodology, it is not possible for clinicians to be aware of all available treatments let alone to become familiar enough with them to provide them to high standards of competency and avoiding therapeutic drift and bleed between different elements of the numerous protocols (McHugh & Barlow, 2010; Wilamowska et al., 2010). The high number of different treatment models available also has a clinical impact in the need for extended assessments in order to distinguish between often small differences in disorders specific outcomes so that specific treatment outcomes can be indexed accurately.

In addition, there is increasing debate as to the utility of using separate diagnostic criteria such as the Diagnostic and Statistical Manual-5 (DSV-5; American Psychiatric Association, 2013; e.g. Brown & Barlow, 2009; Watkins, 2015). There is a benefit of classifying mental health disorders in that it provides a shared language for clinicians which aids communication within the health care system (First, 2010). The development and use of a diagnostic criteria has also generally been successful in increasing diagnostic reliability (Brown, Di Nardo, Lehman, & Campbell, 2001) and in aiding clinicians to differentiate between clinical populations and to select interventions that are efficacious and appropriate for the population they are working with (American Psychiatric Association, 2013). However limitations in diagnostic reliability are still evident, and disagreements are seen between assessors in a number of areas, for example in regard to whether symptoms cause a sufficient level of distress to meet the threshold for a clinical disorder or whether symptoms are the result of a co-occurring disorder and there is also disagreement due to a lack of clarity in the diagnostic criteria (Brown et al., 2001).

Diagnostic manuals such as the DSM-5 also do not take into consideration the high level of comorbidity between disorders (Widiger & Samuel, 2005) or the fact that similar patterns and characteristics are seen across many disorders, for example, worry and rumination, avoidance, and difficulties with emotional regulation are present across many psychological disorders (Brown et al., 2001; McLaughlin & Nolen-Hoeksema, 2011). This therefore limits the clinical utility of these criteria. Whilst the importance of some measure of clinical cut off is acknowledged, given the evidence of transdiagnostic processes, the utility of these

using these diagnosis based criteria and models has been questioned (Brown & Barlow, 2009).

Due to the aforementioned limitations of the traditional medical model there is a move to develop treatments in a different way and to examine underlying processes (e.g. Norton & Philipp 2008; Wilamowska et al., 2010; Fairburn, 2003; Waller, 2008). This has the benefit of being less pathologising, and less stigmatising as these underlying processes are viewed as processes that are normal human processes (Watkins, 2015). It also potentially has the benefit of producing more effective treatments. The interventions included in this portfolio are two examples of the ways in which research has moved away from traditional treatments.

Both papers in this portfolio include interventions that separately address the concept and implementation of transdiagnostic approaches to the management of affective disorders. The systematic review targets rumination, which is a form of repetitive negative thinking (Barlow et al., 2004; Brown & Barlow, 2009) and the meta-analysis addresses treatments primarily aimed at increasing wellbeing (Taylor, Lyubomirsky, & Stein, 2017). Both types of intervention can therefore be applied to a wide range of disorders. However, most of the research examining the efficacy of these interventions in clinical populations has been conducted within affective disorders. Therefore, the systematic review focused on populations experiencing anxiety and depression, and in order to reduce heterogeneity, the meta-analysis focuses on studies conducted within depressed populations only.

Research has also shown that both rumination and poor psychological wellbeing/quality of life, can predict onset of depression (Nolen-Hoeksema, 2000; Thunedborg, Black, & Bech, 1995; Wood & Joseph, 2010). As a result, both types of intervention in this portfolio have also been proposed as preventative

interventions (Dozois, Seeds, & Collins, 2009). There is growing evidence that both interventions can be efficacious in preventing the onset of depression and anxiety disorders (e.g. Reiter & Wilz, 2016; Topper, Emmelkamp, Watkins, & Ehring, 2017). Prevention is an area that is receiving growing recognition and becoming a higher priority for services (e.g. Department for Health & Department for Education, 2017; NHS England, 2014). This suggests the importance of the development and evaluation of interventions such as those in this portfolio.

Both of these interventions are also highly relevant to clinical services. Research has shown that more than half of the adults who meet the criteria for diagnosis of a mental health disorder, present with mixed anxiety and depression (McManus, Meltzer, Brugha, Bebbington, & Jenkins, 2014). The high level of comorbidity seen in both primary and secondary services means that clinicians are often required to make decisions about which symptoms to treat first (Watkins, 2016). Treatments that are designed to treat multiple disorders such as those in this portfolio are therefore highly relevant clinically and if efficacious are likely to strongly benefit both clinicians and patients. There are suggestions that transdiagnostic interventions may be particularly conducive to dissemination in clinical settings (McHugh, Murray, & Barlow, 2009). Reviews such as those in this portfolio play a key role in ensuring that the most efficacious treatments are disseminated to clinicians.

Although the interventions examined in this portfolio share a number of commonalities, they are also distinct from each other in both their rationale and their primary aims. The systematic review looked specifically at interventions designed to reduce rumination, which is seen as a key transdiagnostic process (Ehring & Watkins, 2008). In rumination-focused interventions, as with traditional

interventions, the primary aim is to reduce negative symptomology (i.e. rumination). The rationale behind focussing on rumination is that it is a transdiagnostic and common residual symptom of depression (Riso et al., 2003) and that targeting this process can reduce multiple emotional disorders simultaneously and can improve the efficacy and longevity of depression treatments (Watkins, 2016). In contrast, positive psychological interventions are based on the idea that people want more than to just reduce their negative symptoms, they want to lead meaningful and fulfilled lives. Positive psychology includes a strong emphasis on increasing positive wellbeing and this works on three levels, improving how the individual feels, for example increasing feelings of contentment and happiness, strengthening personal traits such as compassion and resilience, and at a community level increasing factors such as altruism, tolerance, social responsibilities (Seligman & Csikszentmihalyi, 2000).

Although these two fields of research have developed from different rationales and aims, there is a growing emphasis in both the literature and in clinical practice for more holistic treatments that can account for the identified limitations of existing interventions. These two types of intervention have been included together in this ClinPsyD portfolio as although they are both in the early stages of their development, both types of intervention move towards a broader more encompassing treatment that taps into underlying processes and acknowledges the multi-faceted and comorbid nature of mental health and the fact that mental health is about more than just alleviation of negative symptoms (WHO, 1995). Both of these are active areas of research that are continuing to produce an increasing volume of publications. However to date, there has been limited evaluation of their efficacy in the form of rigorous scientific reviews and no systematic reviews or meta-analyses

have been conducted that evaluate the efficacy of these types of intervention specifically within clinical populations. In order to establish the clinical utility of these developing interventions, it is essential for high quality evaluation of their efficacy to be conducted. Therefore this ClinPsyD portfolio aims to evaluate the efficacy of both types of intervention through a systematic review and a meta-analysis in order to address this current gap in the literature.

### **Chapter Three – Meta-Analysis**

This chapter includes a meta-analysis written for the journal *Clinical Psychology Review*. This paper is formatted according to their author guidelines for submission (Appendix E). The abstract for this review is 198 words (journal limit is 200). There is no word limit for this journal however it allows a maximum of 50 pages for each manuscript. Key words and highlights are also provided. The word count for this review is 8103.

Are positive psychological interventions efficacious for depression in community dwelling adults? A Meta-analysis

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### Abstract

Depression is a highly prevalent and debilitating disorder. Whilst numerous interventions for depression have been developed, these have a number of limitations and there remain high relapse rates. There is growing evidence of the importance of wellbeing and recognition that mental health is more than just the absence of negative symptoms. Consequently positive psychological interventions (PPIs) have developed with increased focus on improving wellbeing. The aim of this meta-analysis was to update previous findings with the most recent published research and to provide clarity as to the efficacy of PPIs in a clinical population. To be eligible for inclusion, studies had to examine the efficacy of a PPI in an adult community-dwelling population with depressive symptoms, and to report pre-post scores on validated measures of wellbeing and depression. Seven studies met the inclusion criteria and were reviewed. The results showed a medium effect size for increases in wellbeing ( $g = 0.51, p < 0.001$ ) and reduction in depression symptoms ( $g = 0.60; p = 0.004$ ) however, due to high levels of heterogeneity these results must be interpreted cautiously. The results suggest that PPIs may be efficacious in clinical populations but also raise questions about the construct of PPIs.

*Keywords:* depression, positive psychology, intervention, meta-analysis, efficacy

#### Highlights:

- The results suggest that PPIs may be efficacious in clinical populations but also raise questions about the construct of PPIs.
- A medium effect size was found for both increases in wellbeing and reduction in depression symptoms

- Due to high levels of heterogeneity these results must be interpreted cautiously as
- The variety of PPIs in this analysis shows the lack of a consistent construct of PPIs and limits the conclusions that can be drawn from the analysis.
- PPIs show promise however further research needs to address the lack of clarity as to the definitions and constructs of PPIs and which clinical populations they are efficacious in

Depression is a highly prevalent and debilitating global disorder that is thought to affect more than 300 million people world-wide (World Health Organisation, 2017). Research suggests that the lifetime prevalence of major depressive disorder could be up to 28.2% (Vandeleur et al., 2017). Depression has a significant impact at both an individual and societal level (World Health Organization, 2017) and is characterised by persistent low mood, loss of interest and pleasure.

A significant amount of research has been conducted to develop efficacious evidence-based psychological treatments for depressive disorders, such as Cognitive Behavioural Therapy (CBT; Cuijpers et al., 2013), Interpersonal Psychotherapy (IPT; Cuijpers et al., 2011) and Problem Solving Therapy (Bell & D'Zurilla, 2009). Whilst these treatments have developed a strong evidence base, they do not work for everyone (Bockting, Hollon, Jarrett, Kuyken, & Dobson, 2015). Approximately 30% of people treated for symptoms of depression, relapse in the first year after treatment and 30-50% show residual depression symptoms at the end of a treatment with CBT (Cuijpers et al., 2013). Whilst it is unrealistic to expect one treatment to work for everyone, these limitations in efficacy show the importance of continuing to develop these treatments and also of developing alternative interventions for those who do not benefit from current treatments.

Common treatments for depressive disorders such as CBT focus primarily on mental illness and on alleviating depressive symptoms, not on increasing positive resources (Dunn, 2012). That is not to say that these approaches do not consider positive emotions, or do not enhance wellbeing. However, the extent of this focus is inconsistent, with some treatments having a very limited focus on this and others, for

example, Behavioural Activation (BA) focusing strongly on engagement in positive activities.

It has long been recognised that health is more than just the absence of illness (World Health Organization, 1946) and more recently that mental health is also more than just the absence of mental disorders or disabilities (World Health Organization, 2016). Research has indicated the importance of wellbeing and its potential value in treatment. For example, it has been shown that quality of life scores can predict recurrence of depression (Thunedborg, Black, & Bech, 1995). Additionally, people who score lower on measures of psychological wellbeing (such as self-acceptance and purpose in life; Ryff, 1989) have been shown to be up to seven times more likely to meet the cut-off for clinical depression 10 years later, even when current and previous depression are statistically controlled for (Wood & Joseph, 2010). Research also shows that there can be a discrepancy between patients' therapeutic goals and their practitioners' goals, with patients believing that treatment should focus on increasing wellbeing and life satisfaction and practitioners believing it should focus on reducing symptoms (Demyttenaere et al., 2015a). This discrepancy in turn can negatively affect patients' response to treatment (Demyttenaere et al., 2015b).

Keyes (2005) has shown that mental illness and mental health are not mutually exclusive, and that it is possible for people to experience mental illness and also have a moderate level of mental wellbeing. This has led to suggestions for health services to increase their focus on promoting well-being (Slade, 2010) which fits with the recovery-focused approach already taken by NHS mental health services which aims not just to reduce symptoms, but to help people live meaningful lives

with their symptoms (National Institute for Mental Health in England; NIMHE, 2005).

Although there is evidence of past research into positive psychological interventions (PPIs), for example, Fordyce's happiness program (Fordyce, 1977), significantly more research has been conducted examining negative symptoms than positive ones. Rand and Snyder (2003) used dialectic pairs to examine the ratio of positive and negative subjects (e.g. happiness vs sadness; hope vs hopelessness) in psychological publications between 1872 and 2003 and found a ratio of more than 2:1 in favour of negative subjects.

Positive psychology gained recent prominence through Seligman and Csikszentmihaly (2000) who called for an increased focus on building positive subjective experience, positive individual traits and positive institutions to re-address this balance. Seligman and Csikszentmihaly's aim was for positive psychology to change the focus of psychology from predominantly focusing on repairing negative aspects to also building positive qualities. It has been argued that positive psychology is not in itself categorically different to clinical psychology, as positive and negative characteristics can be seen as existing on the same continuum, with clinical and positive psychology working to achieve wellbeing from different ends of this continuum (Wood & Tarrrier, 2010). This has led to suggestions that research into positive functioning could compliment clinical psychology by providing an equal focus on reducing negative symptoms and increasing wellbeing (Johnson & Wood, 2017).

Since 2000 there has been a growing focus on positive wellbeing as seen by the increase in positive psychology research papers published, with 67 positive psychology papers published in 2012-13, compared to 23 in 2011-12 and nine in

2000 (Donaldson, Dollwet, & Rao, 2015). Subsequently, some existing interventions such as BA have been re-examined and shown to be efficacious in improving wellbeing (Mazzucchelli, Kane, & Rees, 2010), and other PPIs have been developed such as Forgiveness Therapy, Optimism Therapy, Gratitude Therapy, Wellbeing Therapy packages and Resilience Therapy (Hone, Jarden, & Schofield, 2015).

PPIs have been developed in online, face to face, group and individual formats and have been tested with varying levels of support (e.g. guided, self-help and therapist led). Research into other interventions such as CBT has shown that these different formats can be equally efficacious (e.g. Wagner, Horn, & Maercker, 2014). However, whilst there is initial evidence for the efficacy of PPIs in each format (e.g. Boiler & Abello, 2014; Hone et al., 2015) research has yet to examine whether or not these formats of delivery are equally efficacious.

Positive psychology has been criticised for focussing solely on increasing positive wellbeing and ignoring the reality and value of negative emotions (e.g. Wong, 2011). However more recently, it has developed a more holistic approach, explicitly advocating an equal focus on both wellbeing and on negative symptoms (Donaldson et al., 2015).

Studies examining these interventions in non-clinical populations have suggested that PPIs can be efficacious at reducing depression symptoms as well as enhancing wellbeing (Duckworth, Steen, & Seligman, 2005). However, there has been a lack of research examining the efficacy of PPIs in treating depressive disorders, and very few studies comparing the efficacy of PPIs to other active interventions. There is therefore a lack of research examining how PPI outcomes compare to existing evidence-based treatment, which limits the conclusions that can

be drawn regarding their efficacy. However, positive psychology continues to be an active area of research (Donaldson et al., 2015), and there is evidence that some of this research is attempting to address these limitation, for example by comparing PPIs to CBT (e.g. Chaves, Lopez-Gomez, Hervas, & Vazquez, 2017).

A number of theories have been proposed in the development of PPIs such as the Broaden and Build Theory (Fredrickson, 2001) and self-determination theory (Ryan & Deci, 2000) and some specific mechanisms have been proposed such as psychological flexibility (Kashdan & Rottenberg, 2010), orientation towards the positive (Wood, Froh, & Geraghty, 2010), and increased positive affect (Garland et al., 2010), however there is currently no unified empirically-based framework for positive psychological interventions (Parks & Biswas-Diener, 2013) and researchers have yet to define the mechanisms by which many of these interventions work. For a summary of interventions and the theories on which they are based, please see Table 6.

There are also a number of therapies that whilst not developed from a Positive Psychology background, incorporating many of the same ideas and values. One of these is Acceptance and Commitment Therapy (ACT). Historically ACT and Positive Psychology have been considered as separate areas of psychology, however with positive psychology including a more balanced focus on both wellbeing and negative factors (Wong, 2011) they have become more closely aligned. Both perspectives focus on human strengths and aim to promote flourishing and to make changes at the individual, organisational and cultural levels (Kashdan & Ciarrochi, 2013). It is also suggested these interventions are aligned in their focus on meaning and purpose in life which comes from a mixture of both the negative and positive elements of life (Steger, Sheline, Merriman, & Kashdan, 2013). Whilst not from a

positive psychology background it is argued that ACT can be considered a positive psychological intervention.

The positive psychology literature includes a variety of approaches and constructs which has led to the development of a wide variety of interventions. There is also a lack of a consistent definition of PPIs, however attempts have been made to rectify this (e.g. Parks & Biswas-Diener, 2013). Both of these aspects are problematic for the field and are a challenge when trying to conduct research in this area. However, evaluating the efficacy of these interventions in clinical populations is an important step in the development of PPIs and there are definitions available to do this, such as those employed by previous meta-analyses.

There have been two previous meta-analyses conducted in this area examining the efficacy of PPI trials. Sin and Lyubomirsky (2009) reviewed 49 intervention trials involving a total of 4235 participants between 1977-2008. They defined PPIs as interventions that aimed primarily to increase positive behaviours, feelings or cognitions and included interventions such as mindfulness, gratitude therapy, wellbeing therapy and forgiveness therapy. Their results suggested that PPIs had a small to medium effect on improving wellbeing and a medium effect on reducing depressive symptoms compared to waiting list control (WLC), treatment as usual (TAU) and placebo. There were some limitations of this study however, such as the lack of a robust inclusion and exclusion criteria which introduced a high level of heterogeneity for both depression and wellbeing outcomes as shown by a significant chi squared score ( $I^2$  was not reported so the scale of this dispersion is unknown). There were also problems with methodology quality parameters such as random allocation, blinding and use of appropriately robust psychometric evaluation. In addition, the authors also only reported unweighted averaged effect sizes, which

are less accurate than weighted effects as they do not take into account the size of the studies.

Bolier et al. (2013) conducted a meta-analysis evaluating the efficacy of PPIs in 39 randomised control trials. The studies including 6139 participants from studies published between 1998 and 2012. 16 of these studies overlapped with those included by Sin and Lyubomirsky (2009). Bolier et al., had narrower inclusion criteria than Sin and Lyubomirsky, stating that the PPIs had to have been explicitly developed in line with the theoretical tradition of positive psychology. This has however been criticised (Schueller, Kashdan, & Parks, 2014) as it has been suggested that this would result in many positive psychological studies (that are conceptually aligned with positive psychology) being missed. Their inclusion criteria were narrowed further as they excluded interventions on which individual meta-analyses had been conducted, such as mindfulness and forgiveness therapy. The review by Bolier et al., (2013) included interventions such as hope therapy, optimism and gratitude therapy and wellbeing therapy. They reported small to medium effects on improving subjective wellbeing, psychological wellbeing and reducing depressive symptoms. However, these findings must be interpreted cautiously as there was a lack of quality studies examined, with 20 out of 40 studies rated as low on criteria established by the Cochrane collaboration. Both meta-analyses also shared the same methodological limitations of including individuals with a codifiable disorder (e.g. depression) and non-depressed participants which both increases heterogeneity and reduced the clinical usefulness of the meta-analyses and due to the available research at the time, neither meta-analysis included studies with active comparators.

Due to the limitations of previous meta-analyses and the increase in peer reviewed empirical publications since 2012 there is a need to conduct a fresh meta-analysis to fully address the question of the efficacy of PPIs. The aims of this meta-analysis are to replicate and to expand upon previous meta-analyses conducted, whilst correcting for methodological flaws of previous peer reviewed analysis of outcome. The current paper will do this by focusing on clinical populations, and having clear inclusion and exclusion criteria for the range of PPIs under examination and by presenting a comprehensive and contemporary review of the evidence-base by including papers published up to August 31<sup>st</sup> 2017.

It is hypothesised that PPIs are efficacious in reducing symptoms of depression as measured by the Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996) or the Centre for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), and increasing indices of wellbeing as measured by the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) or the Mental Health Continuum-short form (MHC-sf; Keyes, 2002) in community dwelling adults compared to both waiting list controls and active treatments (e.g. CBT).

*Table 6: Summary of theoretical orientation and interventions in included studies*

Theory/ Intervention	Explanation
Broaden and Build Theory	This theory states that in the same way negative emotions can narrow thought action repertoires (e.g. in threatening situations this reduces to fight/flight responses) positive emotions can increase the number of thoughts and actions that come to mind. This in turn opens opportunities for increasing psychological, physical, social and intellectual resources.
Self-determination Theory (SDT)	SDT is a theory of motivation and personality. It states that there are three basic psychological needs; competence, relatedness to others and autonomy. It provides a framework for understanding intrinsic and extrinsic motivation in relation to these needs.
Psychological Flexibility	Psychological Flexibility involves being in touch with the present moment and acting on long-term values as opposed to short term impulses. It includes the ability to adapt to changing demands, to shift perspective and to balance competing needs and desires.
Orientation towards the positive	In contrast to Beck's negative triad view of depression, in which individuals are more likely to attend to negative aspects of the self, world and others, this theory suggest that wellbeing is related to a life orientation towards noticing the positive.
Fordyce's happiness training program	This training program was developed in 1977 to increase people's level of happiness. It uses both cognitive and behavioural techniques and aims to build 14 traits such as being more active, focusing on the present, reducing worry and increasing optimistic/positive thinking.
Forgiveness Therapy	Forgiveness therapy aims to help people let go of painful emotions related to an injustice. It supports people to explore the injustice and the possible benefits of forgiveness and to decide whether or not to forgive. It helps people to find meaning in what was suffered and to let go of resentment.
Optimism Therapy	This therapy aims to increase optimism in order to lower avoidance and increase coping and resilience. It includes tasks such as writing about you best possible future self and recognising and writing about the good things life.
Gratitude Therapy	Gratitude Therapy aims to increase gratitude by teaching individuals gratitude techniques. These can include techniques such as listing things that the individual is grateful for and expressing gratitude behaviourally.
Resilience Therapy	This therapy aims to increase people's capacity to manage and to grow from stressful circumstances that they experience. It draws on techniques based on the broaden and build model.

### **Research Questions**

1. Are positive psychology interventions efficacious in increasing wellbeing and reducing depression in community dwelling adults?
2. Are positive psychology intervention outcomes (measures of wellbeing and depression) moderated by intervention characteristics (e.g., intervention type, group vs individual, self-help vs clinician led)?

## **Methods**

### **Protocol and Registration**

The protocol for this meta-analysis was developed in line with the PRISMA-P checklist (Moher et al., 2015) and in accordance with Cochrane review guidelines (Higgins & Green, 2011). The protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO; Appendix F).

### **Definition of Positive Psychological Intervention**

Although defining PPIs is problematic, for this study they were defined in line with the definitions employed by Sin and Lyubomirsky (2009) in their meta-analysis. In response to the aforementioned criticisms, a slightly broader definition was employed than that used by Boiler et al., (2013). PPIs are defined as interventions that primarily aim to increase either positive traits such as positive emotion, positive behaviour or positive cognition or to increase wellbeing or meaning in life and that operate by a positive mechanism or primarily target wellbeing. Studies whose primary aim is to reduce negative symptoms of common emotional disorders fall outside the domain of PPIs for the purposes of this review.

In order to be eligible for entry into this meta-analysis, wellbeing must have been measured using a validated, psychologically robust scale such as the SWLS or the MHC-sf.

### **Eligibility Criteria**

The inclusion and exclusion criteria for the individual treatment studies that have been included in this meta-analysis are as follows:

**Inclusion Criteria.**

- Participants must be over 18
- The study must evaluate a positive psychology intervention
- Participants must have a clinically significant level of depression and the study must use either use a validated diagnostic method to establish this (e.g. the Structured Clinical Interview for Depression; First, Spitzer, Gibbon, & Williams, 1996) or a validated measure of symptom severity (e.g. BDI-II; Beck, Steer, & Brown, 1996)
- Participants must be from a community dwelling sample
- The study must include a comparator condition (active or inactive), and participants must be randomised to conditions
- The study must include validated measures of depression and of wellbeing
  - To reduce heterogeneity, when measuring severity of depression symptoms, all studies must use either the BDI (Beck et al., 1996) or the CES-D (Radloff, 1977). When measuring wellbeing, all studies must use either the SWLS (Diener et al., 1985) or the MCH-sf (Keyes, 2002). These measures were chosen as they are validated, psychologically robust measures (Cooke, Melchert, & Connor, 2016) and were found to be the most commonly used measures when the initial literature search was conducted.
- The study must administered validated psychometrics pre and post intervention
- The study must be in the English language

**Exclusion Criteria.**

- In order to increase generalisability, studies were excluded if they were conducted solely in populations with chronic health difficulties (e.g. diabetes)
- Studies were excluded if their primary aim was negative symptom reduction

**Search Strategy**

A systematic key word search was carried by the primary researcher (JC) of databases up to August 2017. PsycINFO, PubMed, Cochrane Central Register of Controlled Trials and EMBASE were searched using the following key words (positive psychology OR wellbeing OR happiness OR happy OR optimism) AND (depression OR anxiety OR stress OR low mood OR depressive symptoms OR mental health) AND (effect OR impact OR eval\* OR effic\*) AND (treatment OR intervention OR therapy) AND (adult\*). Reference lists from relevant papers were also cross-checked and reviewed. This included the reference lists from the two previous meta-analyses (Bolier et al., 2013) and (Sin & Lyubomirsky, 2009) the review paper by (Hone et al., 2015) and reference lists from the included studies. A hand search was also conducted of unpublished studies and pre-publication articles in relevant journals.

**Selection Process**

All studies identified through searches were imported into reference management software (EndNoteWeb) and duplicates were removed. The primary researcher (JC) examined study titles and abstracts and studies that did not meet the eligibility criteria were excluded. The full texts of the remaining articles were retrieved and were read and reviewed against eligibility criteria by the primary

researcher. Where there was doubt about the inclusion of a study, it was discussed with primary research supervisor (KL) and a collaborative decision was reached.

The flow of information from identification to inclusion of studies is represented in Figure 2 using the PRISMA flow diagram (Moher, Liberati, Tetzlaff, Altman, & Prisma, 2009; Moher et al., 2015).

### **Inter-rater reliability of quality assessment and risk of bias assessment**

The eligible studies were assessed for study quality and risk of bias by the primary researcher (JC) and the research supervisor (KL). Studies that are high in quality and low in risk of bias are more likely to provide an accurate representation of the effect of an intervention, due to increased methodological rigor.

The RCT of Psychotherapy Quality Rating Scale (RCT-PQRS; Kocsis et al., 2010) was used to assess the quality of the studies (Appendix B). This is a 25-item scale that assesses study quality on six domains: Description of subjects, Definition and delivery of treatment, Outcome measures, Data analysis, Treatment assignment and Overall quality of study. Each study also receives an overall rating ranging from one (exceptionally poor) to seven (exceptionally good).

The Cochrane Risk of Bias Tool (Higgins et al., 2011) was used to assess risk of bias (Appendix C). This tool examines whether each study contains a risk of the results being biased based on five domains: the randomization process, deviations from intended interventions, missing outcome data, the measurement of the outcome or selection of the reported result, and provides an overall risk of bias rating for the study.

In order to index inter-rater reliability the researcher and supervisor used one of the included studies to jointly assess quality parameters and risk of bias.

Following this training case, three studies were randomly selected from the papers included in this meta-analysis and were independently rated by the researcher and the research supervisor. Inter-rater reliability (kappa) for quality ratings was calculated as 0.82. The primary researcher then rated the remaining studies. Where multiple papers were published from the same study, one quality rating and bias assessment form was completed combining this information.

### **Data Items**

Data were coded by the primary researcher. The data extracted included the study source (author, publication and date), study design, participant details (number, gender, age range), intervention (type, duration, format of delivery, support provided and control group used) and outcomes (standardised measures used to assess wellbeing and depression, means, standard deviations and sample sizes for outcomes) and type of analysis (completer or intention to treat; ITT). Where multiple papers were published from the same study, data were extracted from all papers into one form ensuring that the data were only counted once. Follow up scores were not available for all studies and were therefore not extracted.

Comprehensive Meta-Analysis software was used to analyse the data and the method outlined in (Borenstein, Hedges, Higgins, & Rothstein, 2009) was followed using a random-effects model. This model was used as the studies selected were not identical (for example in the methods and interventions they use) and were expected to contain considerable heterogeneity. Using a random-effect method reduces the chance of type-2 errors and is the preferred model in mental health research (Cuijpers, 2016).

### Summary Statistics

Effect sizes were calculated to determine the scale and direction of the difference in outcomes between the groups in the studies (Borenstein et al., 2009). The standardised mean difference (SMD) was calculated for each study in the analysis by dividing the difference in mean between the two groups by their pooled standard deviation.

$$\bar{d} = \frac{\bar{M}_e - \bar{M}_c}{SD_{pooled}}$$

The SMD was used as the included studies assessed the same outcomes (depression and wellbeing), but measured them in a variety of ways (i.e., using different measures). The SMD aggregates the effect sizes from different studies and is often used in meta-analyses of controlled trials (Durlak, 2009). This created a new index and allowed for scores from different measures to be compared, which the raw mean difference would not. The most frequently used standardised effect sizes are Cohen's 'd' (Cohen, 1988) or Hedges 'g'. As Cohen's *d* is known to have a slight bias, tending to overestimate the value of the effect size when there are small samples (Cuijpers, 2016). This meta-analysis calculated Hedges *g* effect size using correction factor 'J' (Borenstein et al., 2009). A positive value of *Hedges' g* indicates that the intervention group obtained higher mean scores than the control group, and a negative value indicates the opposite effect direction.

The formula for adjusted *Hedges' g* is:

$$g_{adjusted} = 1 - \left( \frac{3}{4df-1} \right)$$

Pre-post data were used to calculate effect sizes as this has been shown to have greater precision (Morris, 2008). To calculate effect sizes for change in depression severity, scores from the BDI-II and CES-D were used, to calculate effect

sizes for change on the psychological construct of wellbeing, scores on the SWLS and MCH-sf were used. Pre and post intervention scores are not independent of each other and therefore it is important to factor in the correlation between the scores. If the assigned correlation is significantly different from the true correlation this, will affect the accuracy of the SMD. As the studies did not report pre-post correlations, the recommendations from Rosenthal (1993) were followed and a conservative estimate of 0.7 was used to try and reduce this risk.

Effect sizes obtained from individual studies will vary in precision (as seen by larger confidence intervals and standard errors). Studies with large samples will have higher power and therefore a more accurate effect size (Sánchez-Meca & Marín-Martínez, 2010). Therefore, in order to pool the effect sizes from the individual studies each study was first weighted by the inverse of its variance (Borenstein et al., 2009) and then the pooled mean was calculated using the random effects model. A 95% confidence interval was also computed around the pooled effect size. Effect sizes were considered as small (0.20), moderate (0.50) or large (0.80; Cohen, 1988).

### **Heterogeneity**

A high level of heterogeneity was expected in this current meta-analysis as PPIs include a broad range of interventions and within each study there are multiple intervention targets measured by different indices.

A forest plot was completed to show the effect sizes and 95% confidence intervals of each study (Figures 3 & 4). A visual inspection of the forest plot was used to initially assess heterogeneity and to identify any outliers. Heterogeneity was then calculated using the Q-statistic to determine whether the observed effect sizes

differed significantly from what would be expected due to chance (Cuijpers, 2016) or whether there was a common effect size across the studies. A significant p value on a Q-statistic provides evidence that the true effects do vary, however it cannot estimate the scale of the dispersion. The strength of this test depends on how well it is powered and if underpowered for example due to small sample sizes or number of studies (Borenstein et al., 2009) it may produce an erroneous non-significant result. Therefore, the  $I^2$  statistic (Higgins, Thompson, Deeks, & Altman, 2003) was also computed, as was the 95% confidence interval around  $I^2$  (Ioannidis, Patsopoulos, & Evangelou, 2007). The  $I^2$  statistic indicates the proportion of observed variance that reflects real differences in effect sizes from across individual studies and provides a metric for how much consistency can be assumed with the reported overall effect size.  $I^2$  calculates a percentage of variance that is accounted for by heterogeneity with a higher value indicating a higher level of heterogeneity. It has been suggested that a value of 25% could be described as low, 50%, could be described as moderate and 75% could be described as high (Higgins et al., 2003).

### **Subgroup Analysis**

It is advised to limit the number of subgroup analyses conducted when the meta-analysis is small (Cuijpers, 2016). Therefore the planned subgroup analyses were intervention type, comparator, format of delivery and quality rating of studies. The effect sizes and heterogeneity indices were calculated for each subgroup and for each outcome (depression severity and wellbeing) in order to explore sources of heterogeneity and to examine the impact of potential moderators of the efficacy of PPIs.

Type of intervention and format of delivery were chosen as these factors

directly relate to the utility of the interventions and inform their clinical application. Comparator was chosen in order to examine the efficacy of these interventions compared to existing treatments. Study quality was chosen as these interventions are in an early stage of development, therefore the quality of studies was expected to vary and it has been shown that low quality studies can lead to an over-estimation of effect size (Cuijpers, van Straten, Bohlmeijer, Hollon, & Andersson, 2010). Due to the small number of studies, there is likely to be limited power in these comparisons. In order to increase the power in the quality subgroups studies were split into high or low quality based on their overall quality rating (with score average or above considered high) and comparators were split into active and inactive controls.

### **Publication Bias**

Research has shown that studies with significant results are more likely to be published (Dickersin, 2005). This leads to a bias in the published literature, which then affects meta-analyses conducted on this literature (Borenstein et al., 2009). To examine publication bias, funnel plots were completed with the effect size on the horizontal axis and the standard error on the vertical axis (Cuijpers, 2016). Small studies will appear towards the bottom of the graph and tend to be spread across a broader value of ranges and large studies appear at the top and tend to be closest to the mean effect therefore the pattern forms a funnel shape (Light & Pillemer, 1984). A visual inspection of the funnel plot was undertaken to assess symmetry and to determine if any studies with non-significant results were missing from the analysis. If studies are missing the pattern will be asymmetrical. Egger's regression intercept (Egger, Smith, Schneider, & Minder, 1997), was calculated to test statistically whether the funnel plot was symmetrical.

Additionally, to observe a conservative approach to assessing effect sizes, Orwin (1983)'s fail-safe 'N' was calculated to determine how many missing non-significant studies there would need to be to bring the overall effect size down to a non-significant level. If the fail-safe plot were asymmetrical, the trim and fill (Duval & Tweedie, 2000) method would be applied. This method uses an algorithm to impute the studies that are missing from the funnel plot and then calculates a new effect size. This in theory yields an unbiased estimate of the effect size (Borenstein et al., 2009).

### **Attrition**

High dropout rates can introduce bias (Dumville, Torgerson, & Hewitt, 2006) therefore it is important to consider the impact of attrition on baseline imbalances and on the outcomes reported (Hewitt, Kumaravel, Dumville, & Torgerson, 2010). Bias resulting from attrition is more likely to be a problem for studies that do not use ITT analysis as these studies will not statistically account for the missing data or non-compliance and may overestimate the size of effect.

## **Results**

### **Summary of Included Studies**

The results from the search and selection process are shown in Figure 2. 3930 articles were identified through the database searches and a further 140 were identified from reference lists. After duplicates were deleted, 3843 titles and abstracts were screened for eligibility. Full text articles were retrieved for 154 potentially eligible studies and these were checked against the inclusion criteria. Seven of these studies met the eligibility criteria and were included in this meta-

analysis. One of the identified studies published their results in multiple papers (Asl et al., 2016; Asl et al., 2014). The relevant outcomes were extracted from both papers however the sample was only included once.

One study included two positive psychology conditions, one with high support and one with minimal support (Fledderus, Bohlmeijer, Pieterse, & Schreurs, 2012) and one study compared one positive psychology intervention to two different comparison groups (Pots et al., 2016). Data from these studies were extracted and groups combined to calculate one overall intervention-control effect size as recommended in the Cochrane Handbook (Higgins & Green, 2011). This is to prevent a unit-of-analysis error in which a study contributes multiple, correlated, comparisons.

The characteristics of the studies included are described in Table 5. The studies evaluated a total of 1085 subjects. From the data available, the mean age was calculated as 42.55 (SD = 10.04). Four of the seven studies entered in this current meta-analysis examined packages of PPIs. These packages included multiple interventions such as identifying positive emotions, focusing on strengths, increasing positive activities and mindfulness (Appendix G). One PPI package was used by two of the studies with both studies comparing it to 'no treatment' control groups (Asl et al., 2016; Asl et al., 2014; Seligman, Rashid, & Parks, 2006). Although there was overlap between the interventions included in the other packages they all differed on some elements. One study compared a PPI package to CBT (Chaves et al., 2017) and one compared another PPI package to a no treatment control (Bolier et al., 2013). Two studies compared the same Acceptance and Commitment Therapy (ACT) intervention to a no treatment control (Fledderus et al., 2012; Pots et al., 2016). The final study compared a gratitude/optimism intervention with an active

control group (Pietrowsky & Mikutta, 2012).

In regards to outcome measures, four studies (Chaves et al., 2017; Pietrowsky & Mikutta, 2012; Seligman et al., 2006; Asl et al., 2016) used the BDI-II to measure depressive symptoms and the SWLS to measure wellbeing. The other three studies used the CES-D to measure depressive symptoms and the MHC-sf to measure wellbeing.

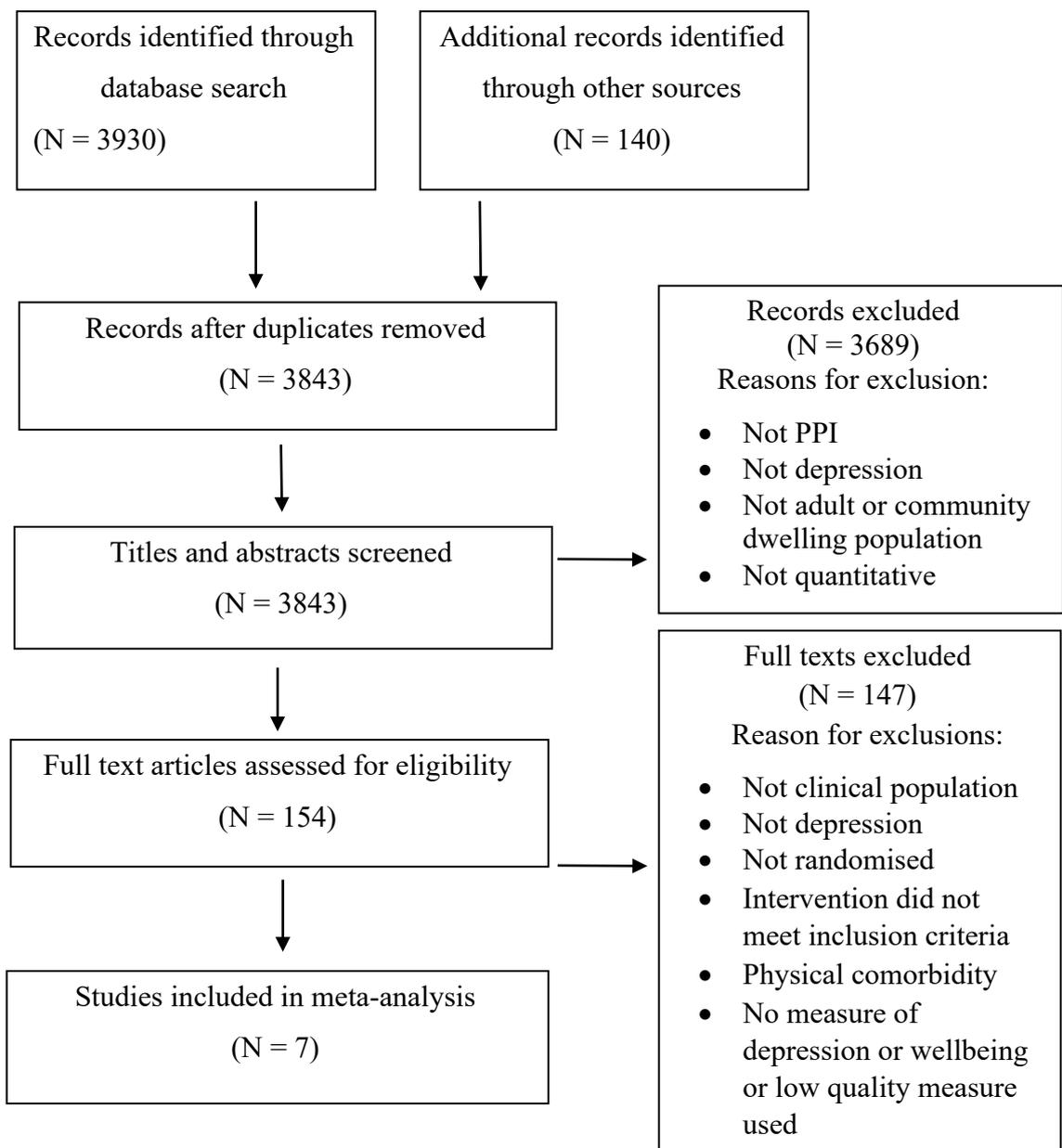


Figure 2: Flow of information from study identification to inclusion

## An Evaluation of Novel Psychological Interventions

Table 7: Characteristics of included studies

Author/Date	Therapy	Format of delivery	no. sessions	No. participants (n)	Attrition (%) pre-post	Gender (% Female)	Mean Age (SD)	Comparison group type	Depression & Wellbeing Measures	Study Quality
Chaves, et al., (2017)	PPI Package1	group	10	96	20.8%	100%	51.64 (10.41)	CBT	BDI-II; SWLS	Very good
Pietrowsky & Mikutta (2012)	Gratitude/optimism	individual	3	17	23.5%	53%	38.65 (8.62)	Active control	BDI-II, SWLS	Average
Fledderus et al., (2012)	ACT	online guided self help	9	376	9.6%	70%	42.45 (11.11)	No treatment	CES-D, MHC-sf	Moderately good
Bolier et al., (2013)	PPI Package1	Online Self Help	24	284	24.7%	80%	43.2 (11.8)	No treatment	CES-D, MHC-sf	Moderately good
Seligman et al.,(2006)	PPI package	group	6	40	10.8%	42.5%	Not stated	No treatment	BDI, SWLS	Very poor
Asl et al., (2016)	PPI package	group	6	36	13.9%	100%	30.49 (5.68)	No treatment	BDI-II, SWLS	Moderately poor
Pots et al., (2016)	ACT	online guided self help	9	236	16%	75.8%	48.85 (12.60)	1)No treatment 2)Expressive Writing	BDI-II, MHC-sf	Moderately good

PPI=Positive Psychological Intervention, ACT=Acceptance and Commitment Therapy, CBT=Cognitive Behavioural Therapy, BDI=Beck Depression Inventory, SWLS=Satisfaction With Life Scale, CES-D=Centre for Epidemiologic Studies Depression Scale, MHC-sf=Mental Health Continuum-Short Form, Study Quality and Bias

## An Evaluation of Novel Psychological Interventions

The quality of the included studies was variable, (Table 6 & Appendix H) ranging from very poor (Seligman et al., 2006) to very good (Chaves et al., 2017). Two out of the seven studies scored below average on the RCT of Psychotherapy Quality Rating Scale (RCT-PQRS; Kocsis et al., 2010).

With regard to risk of bias (Table 7), five out of the seven studies showed some concerns over risk of bias. For all of these studies the risk of bias came from co-interventions, such as medication, not being balanced across the groups, or this not being reported. This is an important consideration when examining the results as this suggests methodological limitations impacting upon the validity of the conclusions that can be drawn for index of effect calculated by aggregation of these studies.

### **Attrition**

The lowest attrition rate on the pre to post measures was 9.6% (Fledderus et al., 2012) and the highest was 24.7% (Boiler et al., 2013). The mean level of attrition across all studies was 17.04%. Attrition is important when interpreting the results as two studies in this meta-analysis (Seligman, et al., 2006; Asl et al., 2016) did not use ITT instead reporting only completer analysis. However, both these studies had relatively low attrition rates (13.9% & 10.8% respectively) suggesting less risk of bias.

*Table 8: Summary of Study Quality Ratings*

Study	Year	Description of subjects	Definition and delivery of treatment	Outcome measures	Data analysis	Treatment assignment	Study Overall	Overall Quality Rating
Chaves et al.	2017	Good	Good	Average	Good	Good	Good	Very good
Pietrowsky & Mikutta	2012	Average	Poor	Average	Average	Good	Average	Average
Fledderus et al.	2012	Average	Average	Average	Good	Good	Average	Moderately good
Bolier et al.	2013	Average	Good	Average	Good	Good	Good	Moderately good
Seligman et al.	2006	Poor	Poor	Poor	Poor	Average	Average	Very poor
Asl et al.	2016	Poor	Poor	Poor	Poor	Average	Average	Moderately poor
Pots et al.	2016	Good	Average	Average	Good	Good	Average	Moderately good

## An Evaluation of Novel Psychological Interventions

Table 9: Risk of Bias Ratings

Study	Year	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall Bias
Chaves et al.	2017	Low	Low	Low	Low	Low	Low
Pietrowsky & Mikutta	2012	Low	Low	Low	Low	Low	Low
Fledderus et al.	2012	Low	Low	Low	Low	Low	Low
Bolier et al.	2013	Low	Some Concerns	Low	Low	Low	Some Concerns
Seligman et al.	2006	Low	Some Concerns	Low	Low	Low	Some Concerns
Asl et al.	2016	Low	Some Concerns	Low	Low	Low	Some Concerns
Pots et al.	2016	Low	Some Concerns	Low	Low	Low	Some Concerns

### **Meta-analysis Results**

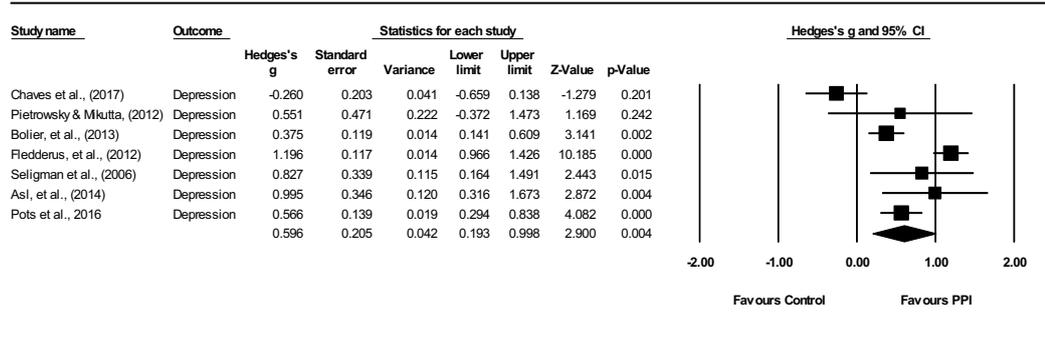
The random effects model found an overall moderate effect size for both measures of wellbeing ( $g = 0.51, p < .001$ ) and measures of depression ( $g = 0.60; p = .004$ ). This suggests that compared to all comparators, PPIs are efficacious at reducing depression symptoms and increasing wellbeing. Only one study (Chaves et al., 2017) showed a non-significant effect of PPI compared to the comparator for depression outcome ( $g = -0.26, p = .201$ ) suggesting equable efficacy. An overview of the results is shown in Table 8 and in the forest plots (Figures 3 & 4).

### **Heterogeneity**

The Q value showed that the level of heterogeneity was significant for both the depression ( $Q(6) = 48.60, p < .001$ ) and wellbeing ( $Q(6) = 20.31, p < .001$ ) outcome data. This showed that the studies did not share a common effect size. The  $I^2$  statistic highlighted a high level of inconsistency in the findings across the studies for effects on both depression ( $I^2 = 87.65\%$ , Confidence Interval (CI) = 76.90-93.40) and wellbeing ( $I^2 = 70.46\%$ , CI = 35.44-86.48) outcomes. This shows that there is high heterogeneity in the effect sizes for depression outcomes across the studies and low to moderate heterogeneity in the effect sizes of the wellbeing outcomes. Therefore a high level of the total variance in effect size can be accounted for by heterogeneity.

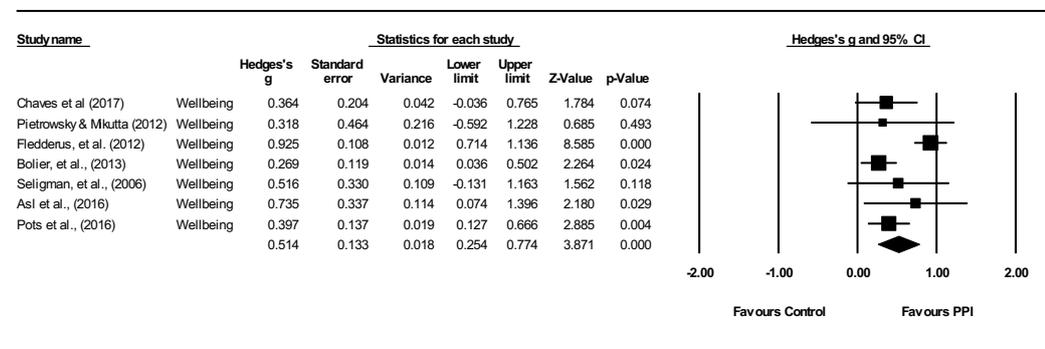
Table 10: Summary of results

Outcome Measure	Analysis	Moderators	Hedge's <i>g</i>	<i>g</i> 95% CI	<i>P</i> value	<i>I</i> <sup>2</sup> %	<i>I</i> <sup>2</sup> 95% CI	
Wellbeing	Overall Results		0.51	0.245-0.774	<.001	70.46%	35.44-86.48	
	Subgroup Analysis: Comparator	Active Control	0.38	0.166-0.600	.001	0.00%	Non-significant	
		No Treatment control	0.61	0.187-1.031	.005	82.26%	54.27-93.12	
	Study Quality	High	0.50	0.157-0.840	.004	84.81%	62.18-93.90	
		Low	0.56	0.148-0.973	.008	0.00%	0.00-88.02	
	Intervention Format	Group	0.48	0.173-0.778	.002	0.00%	0.00-92.59	
		Individual	0.51	0.130-0.890	.009	84.31%	60.66-93.00	
	Depression	Overall Results		0.60	0.139-0.998	.004	87.65%	76.90-93.40
		Subgroup Analysis: Comparator	Active Control	0.26	-0.378-0.890	.428	82.65%	46.92-94.33
			No Treatment control				87.68%	70.73-94.82
Study Quality		High	0.49	-0.054-1.024	.078	93.64%	86.90-96.91	
		Low	0.84	0.412-1.256	<.001	0.00%		
Intervention Format		Group	0.49	-0.384-1.365	.274	85.50%	57.50-95.05	
	Individual	0.69	0.236-1.147	.003	88.51%	73.13-95.09		



**Meta Analysis**

Figure 3: Forest plot of depression outcomes



**Meta Analysis**

Figure 4: Forest plot of wellbeing outcomes

**Subgroup Analysis**

Subgroup analyses examined Intervention Format, Comparator and Study Quality (Table 8 and Figures 5-10). Intervention type was not analysed as only two interventions appeared in multiple studies preventing a statistically meaningful comparison due to the lack of power. Due to the small number of studies in this review the results from the remaining subgroup analysis are likely to be low in power and therefore must be interpreted with caution.

**Intervention Format.**

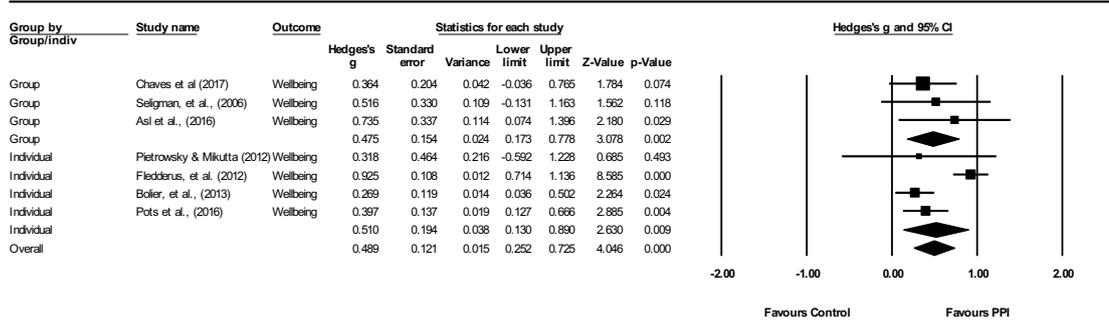
Effect sizes were higher for individual interventions compared to group interventions for both wellbeing ( $g = 0.51, p = .009$ ) and depression outcomes ( $g = 0.69, p = .003$ ), however there was a high level of heterogeneity in the effect sizes for both formats suggesting significant variation in effect.

**Comparator.**

Increased effect sizes were found for both wellbeing and depression outcomes when the comparator was a no treatment control group ( $g = 0.61, p = .005$ ;  $g = 0.83, p = .002$ ). For wellbeing outcomes, heterogeneity was non-significant in the active control group ( $Q = 0.038, p = 0.981, I^2 = 0.00$ ) and high for the no treatment control ( $I^2 = 82.26, CI = 54.27-93.12$ ) but it was high in both subgroups for depression outcomes (Active  $I^2 = 82.65\%, CI = 46.92-94.33$ , No treatment  $I^2 = 87.68, CI = 70.73-94.82$ ). As only one study compared PPIs to CBT it was not possible to meaningfully examine this comparator separately.

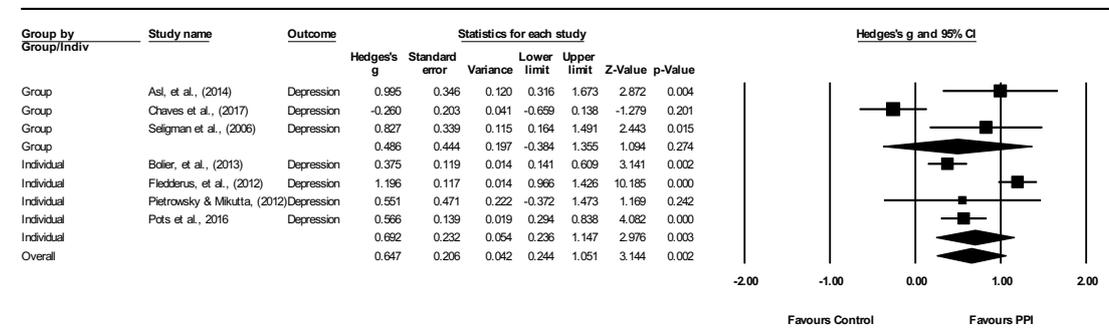
**Study Quality.**

Increased effect sizes were found for studies that were considered low quality for both depression ( $g = 0.83, p < .001$ ) and wellbeing outcomes ( $g = 0.56, p = .008$ ). Higher heterogeneity was found in the outcomes of the high quality studies for both depression (High:  $I^2 = 93.64, CI = 86.90-96.91$ , Low:  $I^2 = 0.00\%, CI = 23.80-92.87$ ) and wellbeing (High:  $I^2 = 84.81\%, CI = 62.18-93.90$ , Low:  $I^2 = 0.00\%, CI = 0.00-88.02$ ) suggesting a higher level of variability in the effect sizes from these studies, however this is inconclusive due to the high confidence intervals for  $I^2$ .



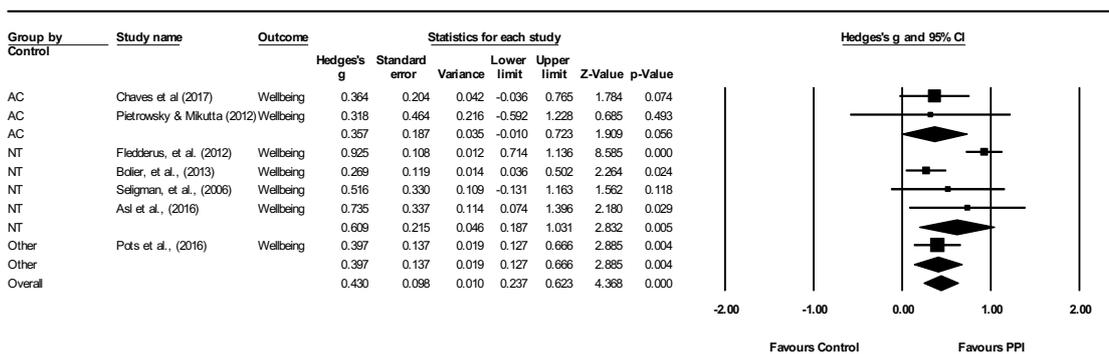
Meta Analysis

Figure 5: Wellbeing Subgroup Analysis - Format of Study



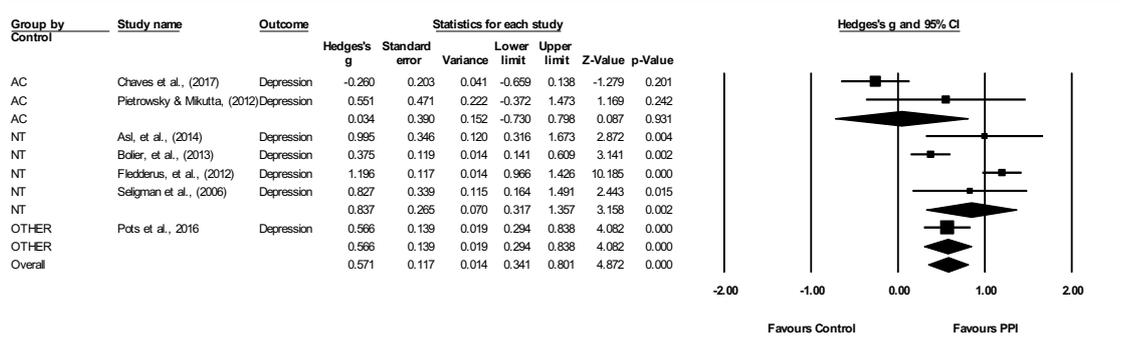
Meta Analysis

Figure 6: Depression Subgroup Analysis - Format of Study



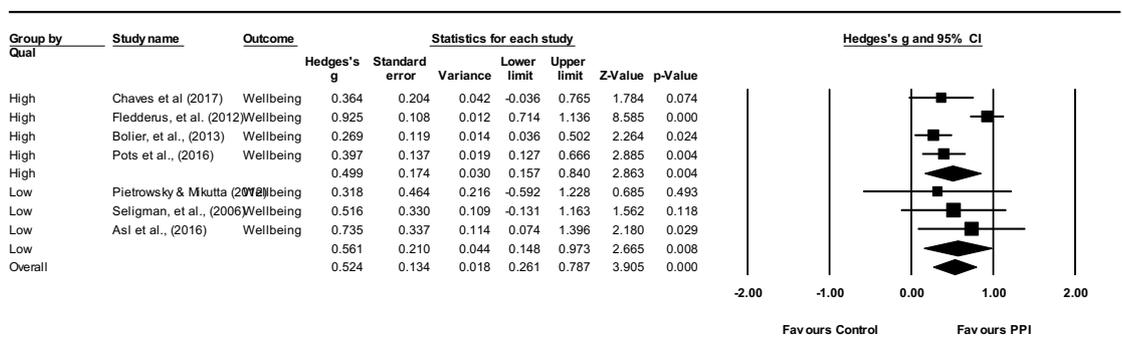
Meta Analysis

Figure 7: Wellbeing Subgroup Analysis - Control Group



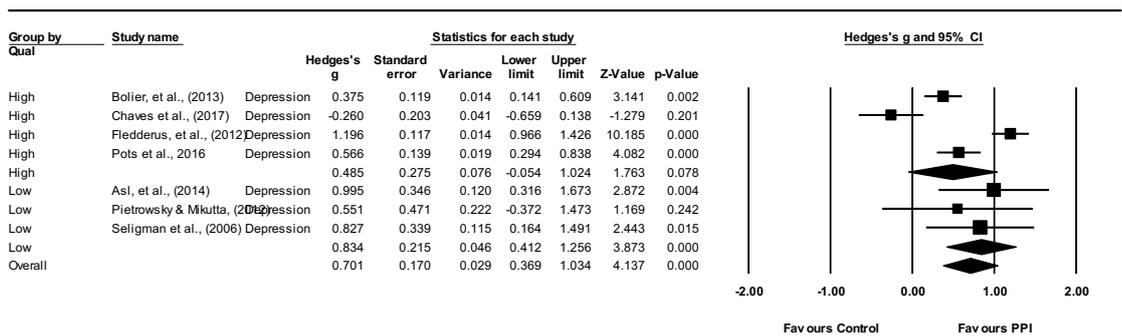
Meta Analysis

Figure 8: Depression Subgroup Analysis - Control Group



Meta Analysis

Figure 9: Wellbeing Subgroup Analysis - Quality of Study



Meta Analysis

Figure 10: Depression Subgroup Analysis - Quality of Study

### Publication Bias

Publication bias was not found to be present in this analysis. The funnel plots showed no indication of asymmetry (Figures 11 & 12) and Egger's regression intercept was non-significant for both wellbeing (intercept = -0.72, CI = -5.07-3.64,  $p=0.35$ ) and depression (intercept = -0.84, CI = -7.78-6.09,  $p=0.38$ ). Orwin's fail-safe N was calculated based on a criterion effect size of 0.20. For the wellbeing data, the results showed that there would need to be 13 missing non-significant studies in order to reduce the overall effect size below 0.2. For the depression data, the number of non-significant studies needed to bring the effect size below 0.2 was 16.

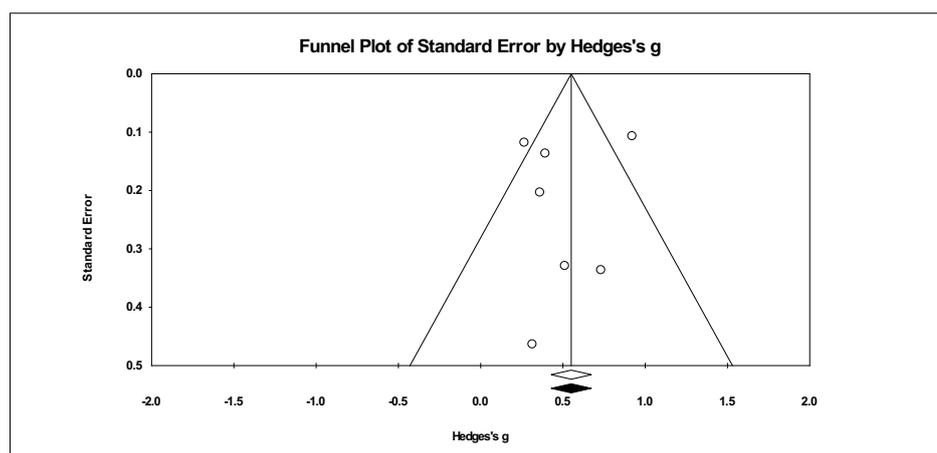


Figure 11: Publication bias funnel plot – Wellbeing

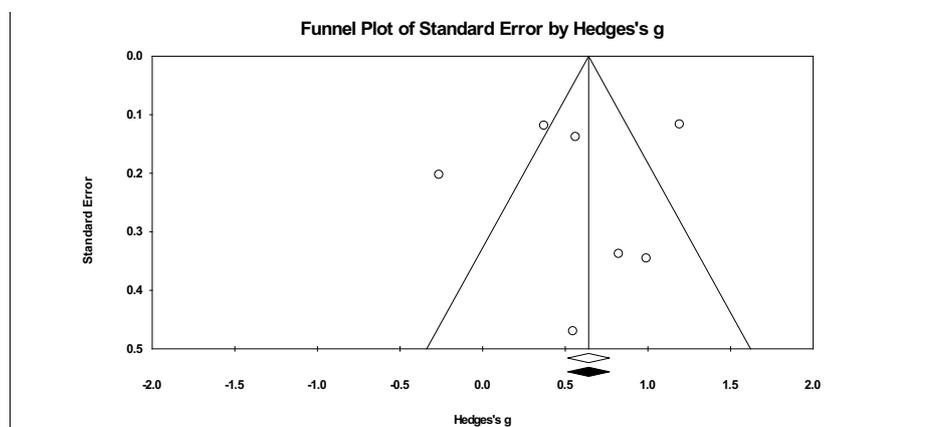


Figure 12: Publication bias funnel plot - Depression

## Discussion

The aim of this meta-analysis was to measure the efficacy of positive psychological interventions in increasing wellbeing and reducing symptoms of depression in community-dwelling adult populations with a clinically significant level of depression (as established through a screening measure of symptom severity). A subgroup analysis was conducted in order to explore sources of heterogeneity and to examine whether potential moderator variables were impacting on efficacy of PPIs.

### **Efficacy of Positive Psychological Interventions in Increasing Wellbeing and Reducing Depression**

In line with the two previous meta-analyses (Bolier et al., 2013; Sin & Lyubomirsky, 2009), the results of this current study suggest that PPIs are efficacious in reducing depression and enhancing wellbeing with medium effect sizes found for both outcomes. However, this finding needs to be viewed with caution, as there was a high level of variance in the effect sizes for both depression and wellbeing outcomes.

Although the studies showed agreement in the direction of effect, the high heterogeneity suggests that the magnitude of effect varied substantially. This, along with the small number of studies eligible for this analysis means that it is not possible to determine the extent to which positive psychological interventions are efficacious. This high level of dispersal of effect size may be seen in part because this is a relatively new field of enquiry and as such there is a lack of consensus on what PPIs are (as shown by five out of the seven studies included testing different interventions) and how to measure wellbeing.

As would be expected, rates of attrition varied across individual studies in this current meta-analysis however the mean level of attrition was 17.04%, which was not substantially different from attrition rates found for other types of psychological intervention. For example, dropout rates for CBT interventions for depression range between 20.4% (Swift & Greenberg, 2014) and 36.4% (Fernandez, Salem, Swift, & Ramtahal, 2015). Treatment acceptability is often identified through client satisfaction and adherence, with high dropout rates suggesting lower satisfaction and acceptability (Kaltenthaler et al., 2008). As the dropout rate found in this analysis is lower than average levels of dropout for CBT interventions this suggests that the PPIs were as acceptable to patients as CBT. This supports recent work by Lopez-Gomez, Chaves, Hervas and Vazquez (2017) that suggested that PPIs and CBT are equally acceptable to patients, with patients showing slightly higher levels of satisfaction with treatment for the PPIs.

### **Moderating Variables in the Efficacy of Positive Psychological Interventions**

Whilst overall higher effect sizes were found for individual interventions for both wellbeing and depression outcomes, group interventions were still found to have significant effect sizes on wellbeing outcomes. This suggests that PPI interventions are efficacious for improving wellbeing in a group format however it is less clear if they are efficacious for depression outcomes. Interestingly, three out of the four individual studies were conducted online and these studies were all highly powered suggesting accurate effect sizes were found. This suggests initial evidence for PPIs being efficacious in an online format supporting previous tentative findings in the literature (Bolier & Abello, 2014).

Four out of seven of the studies used inactive control groups. When comparing an intervention to an inactive treatment, the results show the effect of receiving the intervention compared to not receiving it, but do not show how efficacious an intervention is compared to other interventions (Karlsson & Bergmark, 2015). Not surprisingly, when compared to a no treatment control PPIs showed a higher effect size for depression and wellbeing outcomes than compared to an active control. However it is not possible from no-treatment comparators to determine whether the effect found is due to common factors or to the specific ingredients of the PPIs. When compared to active controls, the effect sizes found for both depression and wellbeing outcome were non-significant, suggesting similar levels of efficacy for both groups. However, it is not possible to draw clear conclusions from this due to the limited number of studies that compared PPIs to active controls.

In line with the literature, study quality was shown to impact on the effect sizes reported. The studies with lower quality ratings showing greater effect sizes on outcomes of both depression severity and wellbeing. Higher effect sizes are often found in lower quality studies because of poor rigour in regards to power, analysis used (e.g. completer not ITT) and randomisation. Cuijpers et al. (2010) examined this phenomena and found that the higher effect sizes seen in poor quality studies were not accounted for by other factors such as intervention type or characteristics of the population. However, although the effect size was lower for wellbeing outcomes in high quality studies, a significant moderate effect size was still found ( $g = 0.50, p = .004$ ). This supports the overall positive effect found for PPIs on wellbeing outcomes. In contrast, the effect found for depression outcomes in high quality studies was non-significant, it is therefore important to be cautious in our

interpretation of the overall effect size found for depression, as this may be an overestimate of the effect. In order to clarify this further, additional high quality research is required.

Due to the lack of power resulting from the small number of studies eligible for this meta-analysis it was not possible to compare the efficacy of the different interventions directly.

### **Study Limitations**

A limitation of this meta-analysis is that there was a high level of heterogeneity meaning that the results must be interpreted with caution. Whilst some heterogeneity is to be expected, the level found in this meta-analysis means that whilst some conclusions can be drawn regarding direction of effect, it is not possible to draw conclusions about the magnitude of this effect.

This was the first meta-analysis to evaluate PPIs within clinical populations and this may explain the high level of heterogeneity found, as this is a developing field and there is currently both a lack of studies in clinical populations and a lack of a consistent approach. It has also been recognised in the literature that there is a lack of clear definition of what PPIs are (e.g. Parks & Biswas-Diener, 2013; Schueller et al., 2014; Hone et al., 2015) and that the term PPI encompasses a wide range of interventions. The results from this analysis highlight the limitations of this, as it restricts the ability to provide conclusive results as to the efficacy of PPIs. The results therefore suggest the need for a more clearly defined PPI construct. Whilst strong conclusions cannot be drawn about the effect sizes found in this analysis, the results suggest a positive effect of PPIs and a value of continued research in this

field. They also highlight the importance of developing a clearer definition of PPIs and of further research being conducted to examine their active ingredients.

The high level of heterogeneity found may have occurred at least in part because of the number of small individual studies entered into the current meta-analyses. It has been shown that bias reduces as the number of studies increases and as such it is recommended that  $I^2$  is interpreted with caution (von Hippel, 2015). Some authors suggest that as long as the eligibility criteria used are sound and the data is correct that any amount of heterogeneity is acceptable (Higgins, 2008). A greater level of heterogeneity was also found in the effect sizes for depression outcomes, which may be the result of symptoms of depression not being the primary target of PPIs.

Whilst the included studies represent those that have been conducted to date, this research is limited, and the quality of the studies entered in a review will inevitably affect the quality of the review itself (Borenstein et al., 2009; Cuijpers et al., 2010). Two out of seven studies were rated as below average on quality and four out of seven showed some concerns over risk of bias, which suggests a lack of methodological rigour in these studies. Subgroup analysis was however used to explore the impact of study quality in this analysis when high quality studies were examined, findings still showed significant effects of PPIs on wellbeing outcomes. The limitations of the studies currently published are indicative of a relatively new area of research and it is likely that as the field continues to grow larger more rigorous studies will be conducted.

Given the breadth of the concept of wellbeing, there is also a lack of consensus over how it should be measured, with numerous outcome measures examining different concepts (Cooke et al., 2016). Whilst some measures are more

widely used and accepted, this makes it difficult to compare the outcome from different studies and to determine whether different studies are measuring the same construct.

### **Clinical Implications**

The results suggest initial support for the efficacy of PPIs in reducing symptoms of depression and increasing wellbeing in clinical populations, which implies that there could be a benefit of implementing these interventions into clinical practice. However, the data is currently not conclusive enough to recommend this at this time. There are a number of challenges that need to be overcome by PPIs such as the lack of clarity as to their active ingredients (and as such a lack of consensus on content of interventions), the lack of a consistent measure of wellbeing and a lack of clarity as to the populations PPIs are most efficacious for. This is seen by the variance in interventions and effect sizes in this review. This review also highlights that despite the increase in publications related to positive psychology (Donaldson et al., 2015) there is a lack of positive psychology research in clinical populations.

Another clinical consideration related to this analysis is the integration of PPIs with other interventions. There are arguments following the growth of positive psychology for clinical psychology and mental health services to include ideas from positive psychological interventions to ensure a more equal focus on positive and negative characteristics (e.g. Johnson & Wood, 2017; Slade, 2010; Wood & Tarrier, 2010). Although the studies included in this review focussed on PPIs as standalone interventions, there have been suggestion of augmenting CBT with PPIs in an attempt to increase its efficacy (e.g. Karwoski, Garratt, & Ilardi, 2008). To my knowledge one study is currently being conducted examining the efficacy of

integrating CBT and PPIs (Carr, Finnegan, Griffin, Cotter, & Hyland, 2017). The interim results showed that more than twice as many of people in the combined CBT and PPI group than in the TAU group (TAU was 20 individual sessions of routinely offered therapies) met criteria for recovery at a three month follow up, with significantly lower treatment costs. This suggests that PPIs could be a beneficial cost-effective addition to existing evidence-based treatments however further research is required to establish if this is the case.

This analysis suggests the potential efficacy of PPIs in both group and online interventions, which has a potentially positive cost implication. There has been limited research to date into cost effectiveness of PPIs and findings are mixed. Carr et al. (2017) demonstrated significantly lower service costs for their combined CBT and PPI intervention than TAU whereas Boiler et al. (2014) showed improved clinical outcomes for online PPIs but increased costs. The wider literature suggests that group and online interventions are more cost effective (e.g. Mitchell, Vella-Brodrick, & Klein, 2010). There is therefore a potential for PPIs to be a cost effective intervention for services.

## **Conclusions**

Although currently most psychological interventions primarily focus on the reduction of negative symptoms, there is growing evidence of the benefit of interventions that focus on increasing positive wellbeing. This meta-analysis suggests there is initial evidence for the efficacy of positive psychological interventions in community-dwelling adult populations with symptoms of depression, however, due to the high heterogeneity on both depression severity and wellbeing outcomes caution is required when interpreting the results. The variety of

PPIs in both this analysis and the two previous meta-analyses (Bolier et al., 2013; Sin & Lyubomirsky, 2009) shows the lack of a consistent construct of PPIs and limits the conclusions that can be drawn from the analysis. This meta-analysis shows that whilst PPIs show promise, in order for their efficacy to be established, further research needs to address the lack of clarity in how the construct of wellbeing is measured, what the definition and main constructs of a PPIs are and which clinical populations they are efficacious in. Further replication of the existing evidence base is also required.

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### **Chapter Four - Discussion and Critical Appraisal**

This chapter provides a discussion and critical evaluation for the whole portfolio. It examines the results presented in this ClinPsyD portfolio both individually and together in relation to the literature. Clinical implications are discussed, as well as strengths and weaknesses of the project, and suggestions for further research into storytelling in mental health. This chapter is formatted according to the APA guidelines. The word count for this chapter is 4456.

## Summary of Results

The results from the systematic review and meta-analysis provide complementary evidence for the broad class of positive psychological interventions and rumination-focused treatments in community-dwelling adults with symptoms of depression and anxiety.

The systematic review provides evidence that rumination-focused interventions have the potential to be efficacious for reducing rumination within depression. In particular, it suggested that the most helpful treatments were those that worked at a process level, using imagery to teach individuals alternative responses to rumination. Process level interventions are those that focus on changing individuals' responses to rumination, not the content of the ruminative thoughts. These interventions work by addressing mechanisms linked to rumination, for example, overgeneral thinking, avoidance or dominant retrieval of dysfunctional memories (Sumner et al., 2014). However, there was a lack of evidence supporting the efficacy of process-based interventions for the anxiety disorders, as there were only a small number of studies eligible for this review from which to draw conclusions.

The results from the meta-analysis suggest that positive psychological interventions can be efficacious at both improving wellbeing and reducing symptoms of depression with moderate effect sizes found overall for both outcomes. However, these results must be interpreted with caution, as there were only a small number of studies eligible for inclusion and a high number of interventions reducing homogeneity. This highlights that these interventions are in the early stages of their development and there is currently a lack of a clear consensus as to what elements PPIs should contain. As a result there was a high level of variation in the effect sizes

found. Whilst there is some evidence for the efficacy of PPIs at reducing depressive symptoms and increasing wellbeing it was not possible to reliably determine efficacy or to determine what the key components of the interventions are efficacious. The interventions included in the meta-analysis proposed to work on a range of processes with most including elements designed to increase psychological flexibility (Kashdan & Rottenberg, 2010), increase acceptance of negative thoughts and emotions (Kashdan & Ciarrochi, 2013) increase engagement in activities (Fredrickson, 2001; Lyubomirsky & Layous, 2013) and influence attentional deployment (Quoidbach, Mikolajczak, & Gross, 2015). However as most interventions were offered as packages, which included multiple interventions it was not possible to identify which mechanisms were efficacious in the interventions.

Overall, the results suggest that there is emerging evidence for the efficacy of novel transdiagnostic interventions at decreasing negative symptoms and increasing positive wellbeing in populations with clinically significant levels of depression. However, this evidence is in its early stages. There is currently stronger evidence for the efficacy of rumination-focused treatments than for PPIs, however both reviews show encouraging initial findings for the efficacy of these interventions suggesting that both types of intervention warrant further attention.

### **Strengths and Limitations**

A strength of both the meta-analysis and the systematic review is that they were conducted in line with the PRISMA statement (Moher et al., 2015) and recommendations set out in the Cochrane Handbook (Higgins & Green, 2011). Both sets of guidance set out criteria to support researchers in conducting and reporting high quality systematic reviews and meta-analyses. Following this guidance ensured

that both reviews were conducted in a high quality and methodologically rigorous manner and that the outcomes were reported explicitly and concisely.

Another strength of this portfolio is that the papers focussed on studies conducted in populations who were experiencing a clinically significant level of symptoms. Much of the research that has been carried out previously into both positive psychological interventions and rumination-focused interventions has been conducted in non-clinical populations which limits its clinical relevance.

The focus on clinical populations is the next logical step in the development of the evidence base for both PPIs and rumination-focussed treatment and ensures that this portfolio is relevant to clinical practice and is able to make a meaningful contribution to these areas of research. Whilst the clinical component of the inclusion criteria increased clinical relevance of the findings, it also limited the number of relevant studies that were available for inclusion in the reviews. The effect of this is twofold, on one hand, it reduces the power of the meta-analysis and means there is a limited number of studies in the systematic review to draw conclusions from (this was particular evident for the lack of rumination-focussed interventions examined in relation to the anxiety disorders). However, on the other hand, the lack of studies available for inclusion in these reviews highlights the gaps where further research is required.

For rumination-focussed treatment the key gaps that this review highlighted was a lack of studies in populations with anxiety disorders and a lack of studies comparing rumination-focused treatments to other active treatments. For PPIs, although there is encouraging emerging evidence of efficacy, the key gaps were a lack of studies conducted in clinical populations, a lack of a clear definition of PPIs and a lack of research into the specific mechanisms by which the interventions work.

The findings in both reviews suggest that this further research would be beneficial to the fields and is merited based on the initial evidence of efficacy. The different gaps highlighted might also show the different approaches that have been taken to these interventions, as unlike other areas of research (such as rumination-focused interventions) that are predominantly theory-driven, a significant amount of PPIs research has been efficacy based, with the research into theory and how the interventions work coming subsequently (Parks & Biswas-Diener, 2013).

It is also important to recognise that although there were a limited number of studies eligible for inclusion in the meta-analysis, it is not uncommon for meta-analyses to consist of a small number of studies, with the median number of studies in a meta-analysis in the Cochrane library reported as seven (von Hippel, 2015).

### **Review the of Systematic Review**

The systematic review examined the efficacy of rumination-focused interventions in populations experiencing symptoms of anxiety or depression. As a number of different interventions have been developed to target rumination it also aimed to obtain a more detailed understanding of the components involved.

Rumination can be seen as a wider process of repetitive negative thinking (RNT) that also includes worry, (e.g. McEvoy, Watson, Watkins & Nathan, 2013) and there is debate about whether rumination and worry can be separated due to the overlap in concepts (e.g. Segerstrom, Tsao, Alden, & Craske, 2000). However, there is evidence that these are distinct concepts (e.g. Papageorgiou & Wells, 1999a, 1999b; Papageorgiou & Wells, 2004) consequently the paper in this portfolio focused solely on rumination focused interventions. This decision was made as it is important to establish the efficacy of interventions targeting rumination in in their

own right, and including interventions that focus on both rumination and worry would increase the variability and limit the ability to draw conclusions from the results as seen in the systematic review conducted by (Querstret & Copley, 2013).

Rumination has been shown to exist as a consistent level across affective disorders including generalised anxiety disorder (GAD), social anxiety disorder (SAD) and depression (as measured by the reflective and brooding scales of the RSQ; McEvoy, Watson, Watkins & Nathan, 2013). Whilst McEvoy et al. do not rule out diagnosis-specific content and processes in RNT, they suggest that specific diagnostic measures may be unnecessary to investigate these processes across disorders, and that a measure of RNT (Mahoney, McEvoy, & Moulds, 2012) might be sufficient. This would support other findings in the transdiagnostic literature (e.g. Harvey et al., 2004) and provide support for proposals to move away from a diagnostic classification (Brown & Barlow, 2009). However, there is mixed evidence for this proposal in the results from this study.

There is not currently evidence for the efficacy of rumination-focused interventions in the anxiety disorders and as such, not evidence to support rumination-focused interventions working transdiagnostically, which does suggest the need for continuing disorder specific assessments. However, the evidence also suggests that the rumination-focused interventions that are most efficacious are those that work on a process level, which would support the theory behind these interventions working at a transdiagnostic level, as they are not focused on the content of thought. Content is a key difference in repetitive negative thought across disorders (e.g. Ehring & Watkins, 2008). Whilst the rumination-focused interventions included in this review were not directly compared to interventions that focused on content, the wider literature suggests that working at a process level and

addressing rumination as a habit appears to be most effective (Watkins, 2015). This would suggest that whilst the evidence is not currently available, interventions focused on a process level should be effective in both depression and the anxiety disorders. Whilst the results show support for the efficacy of rumination-focused interventions in depression this review highlights that there is lack of research into the efficacy of these interventions in populations with anxiety disorders.

### **Review of the Meta-Analysis**

The aim of this review was to replicate and extend the two previous meta-analyses (Bolier et al., 2013; Sin & Lyubomirsky, 2009), improving on methodological limitations and focusing on a clinically relevant population. This review was able to address the methodological limitations highlighted in the previous review, and to provide some evidence for the efficacy of PPIs in a clinical population. However, like the previous analyses, it was limited by the lack of a clear definition of PPIs and as such the variety of interventions included.

As has been acknowledged previously in this portfolio and in the wider literature, that there a lack of clarity over the definition of PPIs and there is a lack of clarity surrounding their construct (e.g. Parks & Biswas-Diener, 2013; Schueller, Kashdan, & Parks, 2014). There has however been an increase in the evidence base in recent years as seen through the increase in publications related to positive psychology (Donaldson, Dollwet, & Rao, 2015) and there are growing attempts to address the question of how PPIs work with emerging theories (e.g. emotion regulation; Quoidbach, Mikolajczak, & Gross, 2015; attentional shift to the positive and savoring positive emotions; Wellenzohn, Proyer, & Ruch, 2016). One of the key findings of this review was that although research is being conducted into the

mechanisms of PPIs, there is still further work to be done and this and it needs translating into PPIs in order to increase their clinical utility.

Despite this acknowledged challenge regarding the definition of PPI, conducting this review was considered important, both as part of a larger examination of novel approaches to improving psychological wellbeing, and as an examination of the current evidence of the efficacy of PPIs in clinically depressed population. An evaluation of their efficacy in clinical populations has not been conducted before and is an important step in their development. This analysis also provided a contemporary examination of the progress in this field with the results also serving to assess progress in the area by reviewing the most up to date literature. A key implication from the results is that in order to be able to robustly research the efficacy of PPIs, there needs to be a clearer set of guidelines for what constitutes a PPI.

However, whilst this problem was acknowledged prior to conducting the review, this lack of clarity is also not surprising given the early stage of development for PPIs. As therapies develop their definition and mechanisms become more clearly defined. For example, over time and through increased research cognitive therapy has developed it has become much clearer in what is meant by CBT and there have now been different CBT models developed for different conditions, which are clearly defined and explained. There were also usable definitions available in the literature and therefore this was not seen as an insurmountable problem.

Due to the breadth of interventions that fit under the current definition of PPIs, this led to a wide range of interventions being included in the analysis. This is a strength, in that it allowed for a broad range of interventions to be evaluated, however it also resulted in a high level of heterogeneity in the outcomes for both

wellbeing and severity of depression symptoms. This is a limitation of the meta-analysis as it limits the interpretation of the results and does not allow us to accurately determine magnitude of effect. This variation is however an informative finding in itself, as the high inconsistency between effect sizes highlights the disparity in the construct and content of PPIs and suggests directions for further research.

As three out of five of the interventions in this meta-analysis were each only examined in one study, there was not the data available to power a meaningful subgroup analysis into the variations in efficacy between the specific interventions themselves. This also highlights the limited replication to date of studies that examine the efficacy of positive psychological interventions in clinical populations. The range of effect sizes found in the meta-analysis highlights the importance of replicating the findings from PPI interventions in order to better establish an accurate effect size. This would also increase the power in order to find more precise effect sizes (e.g. with lower confidence intervals and standard error).

This is another example of this area of research (PPIs) being in its infancy. Established therapies such as CBT allow us to compare disorders and different models, however in the early days of their development assessments of their efficacy are likely to have had similar limitation to those found in this analysis. Whilst this is a weakness of the current meta-analysis, the findings from this analysis are also a reflection of where PPI are in their development.

Interestingly, despite the range of eligible PPIs, a number of known interventions were not represented, for example, gratitude therapy (Wood, Froh, & Geraghty, 2010) forgiveness therapy (Wade, Hoyt, Kidwell, & Worthington Jr, 2014) and reminiscence therapy (Bohlmeijer, Roemer, Cuijpers, & Smit, 2007) were

not included. This was predominantly because of a lack of research having been conducted for these interventions within clinical populations with depression symptomology.

In order to reduce some heterogeneity, only interventions conducted in populations with a clinically significant level of depression were included in the meta-analysis. Given that positive psychology interventions are not disorder specific, it would however have been interesting to include other populations, such as those experiencing general anxiety disorder as there has been some evidence of the efficacy of PPIs in this population (Fava et al., 2005).

Only studies that used particular well-validated and common outcome measures were included in order to reduce heterogeneity, however this may have prevented the inclusion of potentially relevant interventions and as such is a limitation of this analysis.

### **Theoretical Implications**

This portfolio provides varying levels of support for existing theories in the literature and adds some new theoretical and clinical information. In regards to the systematic review the results support the proposals in the literature for working at a cognitive process level to target rumination reduction (Watkins, 2015) and the results suggest that these interventions not only reduced rumination, but were also successful at reducing symptoms of depression.

Whilst research into rumination is best established in depressed populations with evidence showing that rumination is a key factor in the onset, maintenance and severity of depression (Nolen-Hoeksema, Stice, Wade, & Bohon, 2007; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008) there is also growing evidence that

rumination is a transdiagnostic symptom and part of an underlying transdiagnostic process of repetitive negative thinking (e.g. Harvey et al., 2004), and therefore a suitable target for transdiagnostic treatments. The results from this review suggest that there is not currently the empirical support for these interventions working transdiagnostically, due to the lack of research in this area, with only one study conducted in a population experiencing anxiety disorders being eligible for inclusion in this review.

In regards to the meta-analysis, the results support the findings from the previous two meta-analyses in this area (Boiler et al., 2013; Sin & Lyubomirsky, 2009) that suggests PPIs can be efficacious at reducing symptoms of depression and enhancing wellbeing and extends these findings to clinical populations. However, the variability in the results (as seen by the high level of heterogeneity) highlights variation in construct and content and this is a sign of the gaps in the theoretical knowledge of the constructs and mechanisms for change in PPIs. This suggests that further work needs to be done to provide a clear definition of PPIs, (although it is acknowledged that due to the breadth of this construct this is a difficult task).

### **Clinical Implications**

The research in this portfolio suggests the potential benefit of including both of these types of interventions into clinical practice. There is stronger evidence for benefit of including rumination-focused treatments in practice, however, due to the current limitations in the evidence and the fact that these interventions are still in the early stages of their development it is too early to recommend their inclusion at this time.

That said, there could be a number of benefits of offering these interventions in clinical settings in the future should the evidence-base grow. Interventions such

as those examined in this portfolio have the benefit of addressing transdiagnostic symptoms, which allows the focus of treatment to move away from a medical diagnostic model and towards the individual person and their presenting difficulties. They could also provide clinicians with effective treatments that can target underlying symptoms of multiple presenting problems, which would simplify the treatment options and aid clinical practice. In addition, offering positive psychological treatments in clinical settings would also provide an alternative type of treatment for patients, which has been shown to have a high level of acceptability (Lopez-Gomez, Chaves, Hervas and Vazquez, (2017).

These interventions also fit with the recovery model currently used in the NHS (e.g. National Institute for Mental Health in England, 2005). The results of these reviews particularly relate to the potential clinical utility of these interventions in adult or older adult services as these were the populations that the studies included were conducted in. These interventions would fit with the government's increased focus on prevention and on wellbeing and with the proposed future direction of mental health services (NHS England, 2014).

The current focus in clinical settings on reducing negative symptoms is partly due to how services are set up and judged. Most services are set up using a medical model with commissioning often being decided by services' success in reducing negative symptoms on a payment-by-results system based on Health of the Nation Outcome Scales (HoNOS; Wing et al., 1998). Therefore when patients enter services they complete scores of symptom severity and these are then repeated post intervention. This was part of the justification for the inclusion of depression severity measures in this meta-analysis although the interventions were not directly targeting this. As mentioned elsewhere in this portfolio there are growing calls to

move away from a disorder specific, medical model. There has recently been a new framework proposed as an alternative to the more traditional models that are based on psychiatric diagnosis, the Power Threat Meaning Framework (Johnstone, & Boyle, 2018). Both types of intervention evaluated here fit well with the ideas in this framework as they both view symptoms of distress as existing on a continuum as part of the normal range of human experience.

It is also important to recognise that existing interventions that can be considered as positive psychological and transdiagnostic interventions such as ACT and mindfulness are already successfully offered in clinical settings (A-Tjak et al., 2015; Gotink et al., 2015). Given the preliminary evidence for the efficacy of rumination-focused treatments and PPIs in both group and online settings these treatments could also potentially increase cost effectiveness of treatment delivery. Interventions such as mindfulness also provides evidence of the compatibility of the two interventions types included in this portfolio, as it links these concepts, being considered both as interventions that reduce rumination and also one that increase wellbeing.

Reducing negative symptoms and increasing positive wellbeing are equally important aspects of treatment, and equally of importance to our clients and as such a contemporary evidence-based approach to treatment of affective disorders should recognise both aspects this when developing treatments (Johnson & Wood, 2017). It is suggested that developing treatments to include an equal focus on these aspects it would answer the criticisms highlighted in this portfolio that have been levelled at both traditional interventions and positive psychology interventions and that amalgamating that these may result in the most effective treatments. Therefore another area of clinical relevance could be the integration of novel interventions such

as rumination-focussed interventions and PPIs that have an emerging evidence base with existing evidence based treatments.

There is initial evidence that augmenting novel transdiagnostic interventions with existing evidence-based treatments enhances the outcome efficacy of the existing treatments. Carr, Finnegan, Griffin, Cotter and Hyland (2017) compared a combined a group CBT plus positive psychological intervention with treatment as usual. Their research found that after three months more than twice as many people in the intervention group had achieved recovery than the treatment as usual group. They also showed that their intervention cost significantly less per case than the treatment as usual condition. However, this study compared the cost of a group intervention to that of individual treatment, which by its nature is going to be more expensive.

González-Robles, García-Palacios, Baños, Quero, and Botella, (2017) also evaluated the efficacy of a transdiagnostic intervention alone with a transdiagnostic intervention augmented with a component to increase positive affect. Their results suggested an increase in efficacy from augmenting the transdiagnostic treatment with a component to increase positive effect. However this study had very small sample sizes in each group ( $n = 12$ ) and therefore caution must be taken when interpreting these results. To answer this limitation, this intervention is currently being tested in a higher-powered randomized control trial (Díaz-García et al., 2017).

As the research progresses in these areas it is critical that research is disseminated effectively to clinical services as there is often a gap between research and dissemination (McHugh & Barlow, 2010).

### **Implications and recommendations**

There is preliminary evidence for both types of intervention being efficacious. However, given that both of these types of intervention are novel and in the early stages of their development it is not surprising that there is still more research needing to be done to in order establish their efficacy and the specific client groups that they work for

There is a need for further research comparing both of these interventions to active control groups as the most common comparator currently used is waiting list or treatment as usual. Therefore their efficacy in comparison to other treatments is mostly unknown, and this is considered the gold standard in between groups research. There is also very limited research into rumination-focused interventions and the anxiety disorders and this needs to be rectified in order to establish whether rumination-focused interventions can be applied transdiagnostically or if these interventions (having been developed predominately from research into depressive rumination) do not appropriately apply to anxiety based disorders.

In the same vein as PPIs are by their nature, not disorder specific, therefore it would be beneficial for further research to be conducted in populations with other presenting clinical disorders. Whilst there has been some research done with PPIs in other clinical populations (e.g. Fava et al., 2005) similarly to rumination-focused treatments the majority of the research is with depressive symptoms.

Further work also needs to be done to clarify the concept and definition of positive psychology. As recognised in the meta-analysis this is not a clear construct and there is no clear definition with different definitions and focuses proposed. This leads to a lack of consistency in the content of PPIs, which makes it difficult to evaluate their efficacy. This difficulty is exacerbated it unclear how the efficacy of

interventions should be measured, and if measuring the construct of wellbeing, what the best measure is to use for this. Research is also therefore required to establish a consensus on how to measure the outcomes of PPIs as a more universally recognised outcome measure would aid research.

Whilst this portfolio has focused predominantly on the differences between the novel transdiagnostic interventions evaluated in this portfolio and what have been termed traditional interventions, both types of intervention can be viewed on a continuum as opposed to being entirely separate entities (Johnson & Wood, 2017). Johnson and Wood propose that clinical psychology and positive psychology both have the same goal (improving wellbeing) however approach it in different ways and that amalgamating some aspects of them could achieve more balanced interventions that focus explicitly on both reducing negative symptoms and building wellbeing.

This can be seen in examples where traditional interventions that have been re-evaluated and found to be efficacious at enhancing wellbeing (Mazzucchelli, Kane, & Rees, 2010) and where augmenting treatments such as CBT with rumination-focused interventions or PPIs has been shown to enhance treatment efficacy. It has also been proposed that both positive psychological and CBT interventions could benefit from integration as there are a number of conceptual overlaps between the two fields for example a focus on a collaborative approach, the therapeutic alliance, on the here and now, and on discrete goals (Karwoski, Garratt & Ilardi, 2008). Preliminary research also suggests that augmenting these interventions is both efficacious and acceptable, (Carr et al., 2017) however further research needs to be done to establish if this is the case. However this does not supersede research into PPIs in their own right, as it is important to know if and how PPIs work before amalgamating them into existing evidence-based treatments.

**Overall Conclusion**

Both the systematic review and meta-analysis examine novel transdiagnostic interventions that are in the early stages of their development. There is evidence for the efficacy of rumination-focused interventions for populations with depressive disorders however this evidence is currently lacking for their efficacy in the anxiety disorders. There is also emerging evidence supported by this review for the efficacy of positive psychological interventions, however the meta-analysis highlighted the lack clarity regarding a consistent definition of PPIs and the mechanisms they work through which needs to be addressed before efficacy can be established. The results for both papers need to be considered within the context they were conducted which was community-dwelling adults with clinically relevant levels of anxiety or depression. There are currently a wide number of interventions that come under the umbrella terms of positive psychological intervention and rumination-focused treatment, and as the fields develop it will be important to establish which interventions or mechanisms are most efficacious. Unsurprisingly, given the early stage of development of these interventions, whilst there are promising initial findings for PPIs and evidence of efficacy for rumination-focussed interventions in depressive disorders, further research is required to establish the efficacy of PPIs and the efficacy of rumination-focused interventions in other clinical populations.

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## **Appendices**

Appendix A – Journal Guidelines for Systematic Review (Clinical Psychology and Psychotherapy)

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## Appendix A – Journal Guidelines for Systematic Review (Clinical Psychology and Psychotherapy)

### AUTHOR GUIDELINES (updated 28th February 2018)

#### Sections

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#### 1. SUBMISSION

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#### 2. AIMS AND SCOPE

*Clinical Psychology & Psychotherapy* aims to keep clinical psychologists and psychotherapists up to date with new developments in their fields. The Journal will provide an integrative impetus both between theory and practice and between different orientations within clinical psychology and psychotherapy. *Clinical Psychology & Psychotherapy* will be a forum in which practitioners can present their wealth of expertise and innovations in order to make these available to a wider audience. Equally, the Journal will contain reports from researchers who want to address a larger clinical audience with clinically relevant issues and clinically valid research. The journal is primarily focused on clinical studies of clinical populations and therefore no longer normally accepts student-based studies.

This is a journal for those who want to inform and be informed about the challenging field of clinical psychology and psychotherapy.

#### 3. MANUSCRIPT CATEGORIES AND REQUIREMENTS

**Research articles:** Substantial articles making a significant theoretical or empirical contribution.

**Reviews:** Articles providing comprehensive reviews or meta-analyses with an emphasis on clinically relevant studies.

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Reference examples follow:

*Journal article*

Beers, S. R. , & De Bellis, M. D. (2002). Neuropsychological function in children with maltreatment-related posttraumatic stress disorder. *The American Journal of Psychiatry*, 159, 483–486.

doi: [10.1176/appi.ajp.159.3.483](https://doi.org/10.1176/appi.ajp.159.3.483)

*Book*

Bradley-Johnson, S. (1994). *Psychoeducational assessment of students who are visually impaired or blind: Infancy through high school* (2nd ed.). Austin, TX: Pro-ed.

*Internet Document*

Norton, R. (2006, November 4). How to train a cat to operate a light switch [Video file]. Retrieved from <http://www.youtube.com/watch?v=Vja83KLOXZs>

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Endnotes should be placed as a list at the end of the paper only, not at the foot of each page. They should be numbered in the list and referred to in the text with consecutive, superscript Arabic numerals. Keep endnotes brief; they should contain only short comments tangential to the main argument of the paper.

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4. **Trade Names:** Chemical substances should be referred to by the generic name only. Trade names should not be used. Drugs should be referred to by their generic names. If proprietary drugs have been used in the study, refer to these by their generic name, mentioning the proprietary name and the name and location of the manufacturer in parentheses.

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## Appendix B – RCT of Psychotherapy Quality Rating Scale

### Description of subjects

#### *Item 1. Diagnostic method and criteria for inclusion and exclusion*

0	poor description and inappropriate method/criteria
1	full description or appropriate method/criteria
2	full description and appropriate method/criteria

#### 2. Full description and appropriate method/criteria

- The reliable diagnostic assessment procedure is used and cited (e.g., SCID). Detailed information regarding the person who conducted the diagnostic assessment (e.g., trained RA) is provided.

#### *Item 2. Documentation or demonstration of reliability of diagnostic methodology*

0	poor or no reliability documentation
1	brief reliability documentation (documentation in the literature is sufficient, even if it is not explicitly cited)
2	full reliability documentation (documentation of within-study reliability necessary)

#### 1. Brief reliability documentation

- The reliable diagnostic assessment procedure is used and cited (e.g., SCID).

#### 2. Full reliability documentation

- Interrater agreement for the diagnostic assessment is checked and reported to demonstrate the reliability within the study.

#### *Item 3. Description of relevant comorbidities*

0	poor or no description of relevant comorbidities
1	brief description of relevant comorbidities
2	full description of relevant comorbidities

#### 2. Full description of relevant comorbidities

Distribution of coexistent diagnosis is provided (e.g., major depression 28%).

#### *Item 4. Description of numbers of subjects screened, included, and excluded*

0	poor or no description of numbers screened, included, and excluded
1	brief description of numbers screened, included, and excluded
2	full description of numbers screened, included, and excluded

### Definition and delivery of treatment

**Item 5. Treatment(s) (including control/comparison groups) are sufficiently described or referenced to allow for replication**

0	poor or no treatment description or references
1	brief treatment description or references (also if full description of one group and poor description of another)
2	full treatment description or references (manual not required)

2. Full treatment description or references (manual not required)

- Full treatment description is provided to allow for replication (i.e., detailed description for each session) for all conditions (including control/comparison) or
- A well-established treatment manual is used and cited to allow for replication for all conditions

**Item 6. Method to demonstrate that treatment being studied is treatment being delivered (only satisfied by supervision if transcripts or tapes are explicitly reviewed)**

0	poor or no adherence reporting
1	brief adherence reporting with standardized measure or full adherence reporting with non-standardized measure (eg, non-independent rater)
2	full adherence reporting with standardized measure (must be quantitative and completed by an independent rater)

**Item 7. Therapist training and level of experience in the treatment(s) under investigation**

0	poor description and underqualified therapists
1	full description or well-qualified therapists
2	full description and well-qualified therapists

2. Full description and well-qualified therapists

- Detailed description of therapist and therapist training is provided.
- E.G. Therapist needs to be trained CBT therapist or therapist being provided adequate CBT trainings.

**Item 8. Therapist supervision while treatment is being provided**

0	poor description and inadequate therapist supervision
1	full description or adequate therapist supervision
2	full description and adequate therapist supervision

2. Full description and adequate therapist supervision

- Supervision provided throughout the treatment from experts in CBT. Detailed description of supervision being offered (e.g., receiving weekly supervision) need to be provided.

**Item 9. Description of concurrent treatments (eg, medication) allowed and administered during course of study (if patients on medication are included, a rating of 2 requires full reporting of what medications were used; if patients on medications are excluded, this alone is sufficient for a rating of 2).**

0	poor or no description of concurrent treatments
1	brief description of concurrent treatments
2	full description of concurrent treatments

### **Outcome measures**

**Item 10. Validated outcome measure(s) (either established or newly standardized)**

0	poor or no validation of outcome measure(s)
1	brief validation of outcome measure(s) (shown or cited)
2	full validation of outcome measure(s) (shown or cited)

**Item 11. Primary outcome measure(s) specified in advance (although does not need to be stated explicitly for a rating of 2)**

0	poor or no specification of primary outcome measure(s) in advance
1	brief specification of primary outcome measure(s) in advance
2	full specification of primary outcome measure(s) in advance

**Item 12. Outcome assessment by raters blinded to treatment group and with established reliability**

This item applies only when clinician-rated outcome measures (e.g., Hamilton Depression Rating Scale) are used in the study. Established reliability requires the interrater agreement for the assessment.

0	poor or no blinding of raters to treatment group (eg, rating by therapist, non-blind independent rater, or patient self-report) and reliability not reported
1	blinding of independent raters to treatment group or established reliability
2	blinding of independent raters to treatment group and established reliability

**Item 13. Discussion of safety and adverse events during study treatment(s)?**

0	poor or no discussion of safety and adverse events
1	brief discussion of safety and adverse events
2	full discussion of safety and adverse events

**Data analysis*****Item 15. Intent-to-treat method for data analysis involving primary outcome measure***

0	no description or no intent-to-treat analysis with primary outcome measure
1	partial intent-to-treat analysis with primary outcome measure
2	full intent-to-treat analysis with primary outcome measure

***Item 16. Description of dropouts and withdrawals***

0	poor or no description of dropouts and withdrawals
1	brief description of dropouts and withdrawals
2	full description of dropouts and withdrawals (must be explicitly stated and include reasons for dropouts and withdrawals)

***Item 17. Appropriate statistical tests (eg, use of Bonferroni correction, longitudinal data analysis, adjustment only for a priori identified confounders)***

0	inappropriate statistics, extensive data dredging, or no information about appropriateness of statistics
1	moderately appropriate, though unsophisticated, statistics and/or moderate data dredging
2	fully appropriate statistics and minimal data dredging in primary findings

***Item 18. Adequate sample size***

0	inadequate justification and inadequate sample size
1	adequate justification or adequate sample size
2	adequate justification and adequate sample size

***Item 19. Appropriate consideration of therapist and site effects***

0	therapist and site effects not discussed or considered
1	therapist and site effects discussed or considered statistically
2	therapist and site effects discussed and considered statistically

**Treatment assignment*****Item 20. A priori relevant hypotheses that justify comparison group(s)***

0	poor or no justification of comparison group(s)
1	brief or incomplete justification of comparison group(s)
2	full justification of comparison group(s)

**Item 21. Comparison group(s) from same population and time frame as experimental group**

0	comparison group(s) from significantly different population and/or time frame
1	comparison group(s) from moderately different population and/or time frame
2	comparison group(s) from same population and time frame

**Item 22. Randomized assignment to treatment groups**

0	poor (eg, pseudo-randomization, sequential assignment) or no randomization
1	adequate but poorly defined randomization procedure
2	full and appropriate method of randomization performed after screening and baseline assessment

**Overall quality of study****Item 23. Balance of allegiance to types of treatment by practitioners**

0	no information or poor balance of allegiance to treatments by study therapists (eg, therapy in experimental and control groups both administered by therapists with strong allegiance to therapy being tested in the experimental group)
1	some balance of allegiance to treatments by study therapists
2	full balance of allegiance to treatments (eg, therapies administered by therapists with allegiance to respective techniques)

**Item 24. Conclusions of study justified by sample, measures, and data analysis, as presented (note: useful to look at conclusions as stated in study abstract)**

0	poor or no justification of conclusions from results as presented or insufficient information to evaluate (eg, sample or treatment insufficiently documented, data analysis does not support conclusions, or numbers of withdrawals or dropouts makes findings unsupportable)
1	some conclusions of study justified or partial information presented to evaluate
2	all conclusions of study justified and complete information presented to evaluate

**Item 25. Omnibus rating: please provide an overall rating of the quality of the study, taking into account the adequacy of description, the quality of study design, data analysis, and justification of conclusions.**

23 items in total/score range 0-46

1 = exceptionally poor (0-5)

2 = very poor (6-12)

3 = moderately poor (13-19)

4 = average (20-27)

5 = moderately good (28-33)

6 = very good (34-40)

7 = exceptionally good (41-46)

### Appendix C – Cochrane Risk of Bias Tool

#### The RoB 2.0 tool (individually randomized, parallel group trials)

Assessor name/initials

Study ID and/or reference(s)


Study design

- Randomized parallel group trial
- Cluster-randomized trial
- Randomized cross-over or other matched design

Specify which outcome is being assessed for risk of bias

--

Specify the numerical result being assessed. In case of multiple alternative analyses being presented, specify the numeric result (e.g. RR = 1.52 (95% CI 0.83 to 2.77) and/or a reference (e.g. to a table, figure or paragraph) that uniquely defines the result being assessed.

--

Is your aim for this study...?

- to assess the effect of *assignment to intervention*
- to assess the effect of *starting and adhering to intervention*

Which of the following sources have you obtained to help inform your risk of bias judgements (tick as many as apply)?

- Journal article(s) with results of the trial
- Trial protocol
- Statistical analysis plan (SAP)
- Non-commercial trial registry record (e.g. ClinicalTrials.gov record)
- Company-owned trial registry record (e.g. GSK Clinical Study Register record)
- “Grey literature” (e.g. unpublished thesis)
- Conference abstract(s) about the trial
- Regulatory document (e.g. Clinical Study Report, Drug Approval Package)
- Research ethics application
- Grant database summary (e.g. NIH RePORTER, Research Councils UK Gateway to Research)
- Personal communication with trialist
- Personal communication with the sponsor

**Risk of bias assessment for a parallel group trial with interest in the effect of starting and adhering to intervention**

Domain	Signalling questions	Response options	Description/Support for judgement
<b>Bias arising from the randomization process</b>	1.1 Was the allocation sequence random?	Y / PY / PN / N / NI	
	1.2 Was the allocation sequence concealed until participants were recruited and assigned to interventions?	Y / PY / PN / N / NI	
	1.3 Were there baseline imbalances that suggest a problem with the randomization process?	Y / PY / PN / N / NI	
	<b>Risk of bias judgement</b>	Low / High / Some concerns	
	Optional: What is the predicted direction of bias arising from the randomization process?	Favours experimental / Favours comparator / Towards null / Away from null / Unpredictable	
<b>Bias due to deviations from intended interventions</b>	2.1. Were participants aware of their assigned intervention during the trial?	Y / PY / PN / N / NI	
	2.2. Were carers and trial personnel aware of participants' assigned intervention during the trial?	Y / PY / PN / N / NI	
	2.3. <u>If Y/PY/NI to 2.1 or 2.2:</u> Were important co-interventions balanced across intervention groups?	NA / Y / PY / PN / N / NI	
	2.4. Was the intervention implemented successfully?	Y / PY / PN / N / NI	
	2.5. Did study participants adhere to the assigned intervention regimen?	Y / PY / PN / N / NI	

Domain	Signalling questions	Response options	Description/Support for judgement
	2.6. <u>If N/PN/NI to 2.3, 2.4 or 2.5</u> : Was an appropriate analysis used to estimate the effect of starting and adhering to the intervention?	NA / Y / PY / PN / N / NI	
	<b>Risk of bias judgement</b>	Low / High / Some concerns	
	Optional: What is the predicted direction of bias due to deviations from intended interventions?	Favours experimental / Favours comparator / Towards null / Away from null / Unpredictable	
<b>Bias due to missing outcome data</b>	3.1 Were outcome data available for all, or nearly all, participants randomized?	Y / PY / PN / N / NI	
	3.2 <u>If N/PN/NI to 3.1</u> : Are the proportions of missing outcome data and reasons for missing outcome data similar across intervention groups?	NA / Y / PY / PN / N / NI	
	3.3 <u>If N/PN/NI to 3.1</u> : Is there evidence that results were robust to the presence of missing outcome data?	NA / Y / PY / PN / N / NI	
	<b>Risk of bias judgement</b>	Low / High / Some concerns	
	Optional: What is the predicted direction of bias due to missing outcome data?	Favours experimental / Favours comparator / Towards null / Away from null / Unpredictable	
<b>Bias in measurement of the outcome</b>	4.1 Were outcome assessors aware of the intervention received by study participants?	Y / PY / PN / N / NI	
	4.2 <u>If Y/PY/NI to 4.1</u> : Was the assessment of the outcome likely to be influenced by knowledge of intervention received?	NA / Y / PY / PN / N / NI	

Domain	Signalling questions	Response options	Description/Support for judgement
	<b>Risk of bias judgement</b>	Low / High / Some concerns	
	Optional: What is the predicted direction of bias due to measurement of the outcome?	Favours experimental / Favours comparator / Towards null / Away from null / Unpredictable	
<b>Bias in selection of the reported result</b>	Are the reported outcome data likely to have been selected, on the basis of the results, from...		
	5.1. ... multiple outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	Y / PY / PN / N / NI	
	5.2 ... multiple analyses of the data?	Y / PY / PN / N / NI	
	<b>Risk of bias judgement</b>	Low / High / Some concerns	
	Optional: What is the predicted direction of bias due to selection of the reported result?	Favours experimental / Favours comparator / Towards null / Away from null / Unpredictable	
<b>Overall bias</b>	<b>Risk of bias judgement</b>	Low / High / Some concerns	
	Optional: What is the overall predicted direction of bias for this outcome?	Favours experimental / Favours comparator / Towards null / Away from null / Unpredictable	

**Appendix D – Full Quality rating scores for Systematic Review**

Author	Date	Subjects				Definition & delivery of treatment					Outcome measures				
		Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8	Q 9	Q 10	Q 11	Q 12	Q 13	Q 14
Ekkers, et al.	2011	1	1	0	2	1	2	1	1	1	2	0	0	na	na
Moshier & Otto	2017	1	2	2	2	2	0	1	2	1	2	2	1	na	na
Siegle, et al.	2014	1	1	0	2	2	na	0	0	2	2	0	0	na	na
Teismann, et al.	2014	2	1	0	2	2	1	2	1	0	2	1	0	na	na
Wanmaker, et al.	2015	1	1	2	2	2	na	0	0	0	2	2	1	na	na
Watkins, et al.	2012	2	2	1	2	1	1	2	2	2	2	2	2	2	na
Watkins et al.	2011	1	0	1	2	1	1	2	2	2	2	2	2	na	na

Author	Date	Data analysis					Treatment assignment				Overall	
		Q 15	Q 16	Q 17	Q 18	Q 19	Q 20	Q 21	Q 22	Q 23	Q 24	Q 25
Ekkers, et al.	2011	2	2	2	2	1	2	2	2	1	2	5
Moshier & Otto	2017	2	2	2	2	0	1	2	2	1	2	5
Siegle, et al.	2014	0	2	2	1	1	2	0	1	1	2	4
Teismann, et al.	2014	2	1	1	2	1	1	2	2	2	2	5
Wanmaker, et al.	2015	0	2	2	0	0	2	2	1	1	2	4
Watkins, et al.	2012	2	1	2	2	0	2	2	2	1	2	6
Watkin, et al.	2011	2	2	2	2	1	2	2	2	2	2	6

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**Appendix G – Content of PPI Packages**

Chaves et al., (2017)	Based on Keyes (2007), Seligman et al. (2006), Gilbert (2012), among others 10 sessions Orientation, Positive Emotions, Savoring + emotional regulation (mindfulness), Gratitude + Optimism, Positive relationships, Self Compassion, Personal Strengths, Sense of Living (obituary/biography), Resilience, Relapse Prevention
Boiler et al., 2013	6 modules in Psyfit: (1) personal mission statement and setting your goals, (2) positive emotions, (3) positive relations, (4) mindfulness, (5) optimistic thinking, and (6) mastering your life. Each week, the lesson consisted of psycho-education and a practical exercise.
Seligman et al, 2006	1 Using Your Strengths 2 Three Good Things/Blessings 3 Obituary/Biography: Imagine that you have passed away after living a fruitful and satisfying life. What would you want your obituary to say? 4 Gratitude Visit: 5 Active/Constructive Responding: An active-constructive response is one where you react in a visibly positive and enthusiastic way to good news from someone else. At least once a day, respond actively and constructively to someone you know. 6 Savouring
Asl et al., 2016	The sessions contained the following activities: Using their Strengths, Counting Blessings, Biography, Gratitude Visit, Active-Constructive Response, Savouring

## An Evaluation of Novel Psychological Interventions

## Appendix H – Full Quality rating scores for Meta-Analysis

		Subjects				Definition & delivery of treatment				Outcome measures					
Author	Date	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8	Q 9	Q 10	Q 11	Q 12	Q 13	Q 14
Chaves et al., Pietrowsky & Mikutta	2017	2	2	1	2	2	2	2	2	0	2	2	2	0	na
Fledderus et al.,	2012	1	1	0	2	2	0	0	0	1	2	2	na	0	na
Bolier et al., Seligman et al.,	2013	1	1	0	2	2	2	n/a	n/a	1	2	2	na	0	na
Asl, et al.	2006	1	0	0	0	1	0	1	0	0	2	1	na	0	na
Pots et al	2016	1	1	0	1	1	0	0	0	0	2	1	0	0	na
		1	1	2	2	2	0	1	1	1	2	2	0	0	na

		Data analysis						Treatment assignment		Overall		
Author	Date	Q 15	Q 16	Q 17	Q 18	Q 19	Q 20	Q 21	Q 22	Q 23	Q 24	Q 25
Chaves et al., Pietrowsky & Mikutta	2017	2	2	2	2	0	2	2	2	2	2	6
Fledderus et al.,	2012	2	1	2	0	0	2	2	1	0	2	4
Bolier et al., Seligman et al.,	2012	2	2	2	2	1	1	2	2	1	2	5
Asl, et al.	2013	2	1	2	2	1	2	2	2	n/a	2	5
Pots et al	2006	0	0	1	0	0	1	2	1	n/a	1	2
	2016	0	1	1	1	0	1	2	1	1	2	3
	2016	2	2	2	2	1	2	2	1	1	2	5