

# Masters by Research

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## Thesis

A meta-analysis of Cognitive Behavioural Therapy efficacy for depression between working age adults and older people.

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## **Abstract**

This meta-analysis investigated CBT efficacy in depression and compared treatment outcomes between working age adults and older people. The aim was to compare outcomes of CBT for depression between working age adults with older people as definite as can be achieved at this stage. This examination is of particular importance due to the aging population, high prevalence levels of depression, increasing demand on IAPT services and stigma attached with older in psychological treatment.

The analysis examined CBT pre-post treatment outcomes, as well as comparing post treatment outcomes between CBT treatment and alternative psychological treatments. Literature searches completed in both age groups applied the inclusion criteria, which resulted to include 19 articles for the working age adults and 12 articles for older people. Data analysis found an overall significant effect for CBT treatment (including both age groups) between pre and post intervention ( $g = 1.43$ , 95% CI = 1.19 to 1.66,  $Z = 11.67$ ,  $p < .000$ ), with no difference between the two age groups. Comparing CBT treatment with other treatments (including both age groups) found a significant result in favour of CBT ( $g = -0.36$ , 95% CI = -0.49 to -0.22,  $Z = -5.216$ ,  $p < 0.000$ ), and no difference was found in this result between working age adults and older people. CBT was for both age groups significantly more efficacious compared to active psychological treatments ( $g = -0.16$ , 95% CI = -0.29 to -0.03,  $Z = -2.35$ ,  $p < 0.02$ ), and significantly more beneficial compared to non-active treatment ( $g = -0.59$ , 95% CI = -0.82 to -0.36,  $Z = -5.02$ ,  $p < .001$ ). Subgroup analyses on CBT pre and post intervention effect revealed neither intervention format or intervention length influences effect size findings. Quality analyses into the articles included in the meta-analysis showed findings were robust and support the notion of CBT being equally efficacious for depression treatment in older people as in working age adults.

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## **1.0 Introduction**

### **1.1 Depression: an overview**

Depression is a common mental health problem characterised by a lack of interest, motivation and enjoyment that has a significant impact on an individual's overall quality of life. Research into the onset of depression has identified this can be due to a variety of factors which can be categorised into several possible causes. These include interpersonal problems (for example, relationship difficulties), work-related stress and traumatic events (Lauber, Falcató, Nordt, & Rössler, 2003). Genes, coping mechanisms, personality, demographics and lifestyle are also identified factors considered to potentially positively influence the onset of a depressive episode (Srinivasan, Cohen & Parikh, 2003).

During a depressive episode a variety of symptoms may be experienced including increased/decreased appetite, decreased motivation, interest and pleasure, difficulties with sleep, weight changes, concentration difficulties, decreased energy levels, decreased self-esteem, feelings of worthlessness or helplessness, and suicidal thoughts (Beck, 1967; Palazzolo, 2015). Major Depressive Disorder (MDD), can be distinguished from transient mood states such as feeling down for a short period of time (Andrews, Slade & Peters, 1999).

There are a number of classification systems for the diagnosis of depressive disorders. The most widely adopted are the DSM and the ICD systems of classification (Andrews, Slade & Peters, 1999). These are not without their critics and psychologists have sought to consider alternative approaches to identifying and quantifying distress (see Johnstone (2018) for review). The debate around this issue is beyond the scope of this thesis but for the sake of simplicity, this paper will consider the DSM system in most detail as this has been widely adopted in clinical research. According to the Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5), to meet diagnostic criteria for MDD there must be a change to mood from a previous state, symptoms must persist for at least a two week period, and the symptoms must include either a depressed mood, or decreased interest or pleasure. In addition, the diagnostic criteria for

MDD include presenting with five or more of the following symptoms: 1) feeling depressed in your mood, most days for most of the day (e.g. feelings of sadness, hopelessness or emptiness), 2) decreased (sense of) pleasure and interest in most or all activities, most days for most of the day, 3) significant and unintentional changes in weight (losing or gaining more than five percent of body weight in a month) or changes in appetite (increased or decreased) most days, 4) sleeping less more or more than usual for most days, 5) moving less on most days, 6) feeling fatigued, tired or loss of energy for most days, 7) feeling worthless or experiencing feelings of guilt on most days, 8) difficulty concentrating and/or decision making on most days, 9) recurrent suicidal thoughts, suicidal ideation and/or plans with or without attempts to commit suicide. The DSM-5 also states that symptoms must cause significant consequences or impact in the social, occupational, home, and private areas of an individual's life. The changes observed in mood must also not be the result of physiological changes due to substance (mis)use or any medical conditions. Lastly, the symptoms meet the MDD criteria if they are not attributable to another mental health problem such as schizoaffective disorder, schizophrenia, schizophreniform disorder, delusional disorder, or another specified or unspecified schizophrenia spectrum and other psychotic disorder, nor as the result of a manic or hypomanic episode (American Psychiatric Association, 2013).

Demographics on MDD show a lifetime prevalence which can go as high as 17.1%, which is skewed slightly higher for females compared to males (Greden, 2001; Lépine, Gastpar, Mendlewicz, & Tylee, 1997). The symptoms, impact and consequences of MDD are existent in all age groups, from adolescents to working age adults and older people (Beekman, Penninx, Deeg, Beurs, Geerlings, & Tilburg, 2002). The distribution of MDD in different age groups shows an initial peak in prevalence for 25 to 29 year olds. A second incidence peak can be observed in the 60 to 64 and 65 to 69 year olds age groups where prevalence of MDD has been reported in 6.5% of the population (Tsuang, Tohen, & Jones, 2011).

The impact of these symptoms for an individual extends beyond idiosyncratic impacts upon wellbeing. This is evident from the DMS-5 criterion requiring MDD symptoms to have an impact in the social, occupational, home, and private areas of an individual's life.

The extent of the impact of depression on an individual's ability to function has even been compared to that of major chronic medical conditions and long-term illnesses including arthritis, diabetes, lung- and digestive tract problems/illnesses, and neurodegenerative disorders (Miyoshi, 2001; Wells, Stewart, Hays, Burnam, Rogers, Daniels, Berry, Greenfield & Ware, 1989). The interaction between depression and physical health has also been suggested by research. Mental health issues, of which depression primarily, are more common for individuals experiencing physical conditions compared to individuals who are physically healthy with research studies reporting a prevalence ranging between 15% and 61% (Steptoe, 2006). Depression on its turn has been shown to have an adverse impact on long-term illnesses, which is observed in conditions such as breast cancer, malignant melanoma and cardiovascular disease (Lépine et al. 1997).

### 1.2 Depression: burden and costs

It is acknowledged that up to one third to half of individuals with either mild or severe depression do not receive treatment for their condition. Another difficulty in practice, is that individuals who do present in primary care for treatment may not necessarily receive evidence based treatment (van Straten, Seekles, van 't Veer-Tazelaar, N. J., Beekman & Cuijpers, 2010).

Costs burden at an individual level may be evident with restriction of interest/pleasure due to pain, lack of energy, and motivation (Klerman & Weissman, 1992). This impacts on the individual's personal interests, social activities, family and friends, and also work, causing a cost burden on society as it creates a need of financial support (Clark, 2011). On a secondary level, mental health potentially leads to a cost burden on society as in the long term the consequences may spiral into a loss of employment potentially leading to bills and housing issues (Klerman & Weissman, 1992). An interesting argument offered by economists and clinical researchers is that evidence-based psychological treatment would pay entirely for itself. This is reasoned as the ability to provide support would reduce burden of costs on society on medical needs and benefits, and increase revenues by return to work through taxes and work productivity (Clark, Layard, Smithies, Richards, Suckling, & Wright, 2009; Clark, 2011; Layard, Clark, Knapp & Mayraz, 2007).



### 1.3 Psychological Therapy treatment

#### 1.3.1 Cognitive Behavioural Therapy: an umbrella term

Psychotherapy, especially Cognitive Behavioural Therapy (CBT), behavioural activation, and problem solving are now well established in terms of efficacy in the treatment of MDD (Cuijpers, van Straten, Smit, Andersson, 2008a; Cuijpers et al. 2013). In a recent integrative meta-analysis, CBT was found to be an efficacious treatment for MDD, however there was no compelling evidence for differential treatment outcome by type of psychotherapy (Cuijpers, Weitz, Cristea, & Twisk, 2017). As such, individual evidence-based psychological therapies do not record significant differences in treatment outcome, but do report beneficial effects in reducing negative affect. CBT is an umbrella term used to describe a class of structured symptom focused therapies, including cognitive-behaviour therapy, cognitive therapy, behaviour therapy and Problem-Solving Therapy. Depending on the definition used, so-called third-wave therapies may be classed as CBT treatments. Within CBT, response prevention and behavioural activation find their roots in Behavioural Therapy. Notably, CBT is often used to directly refer to as Cognitive Therapy, or CT for short (Bartosh, 2018).

#### 1.3.2 Cognitive Behavioural therapy in practice

Dissimilar from approaches such as psychoanalytic therapy, CBT implements a self-help and problem-oriented approach to symptom alleviation that adopts a specific treatment structure. This method targets the disorder's specific consequences with interventions for common mental health difficulties including depression and low mood. CBT encompasses a model called the cognitive model (see figure 1.1), of thoughts, feelings and behaviour and illustrates the interaction between these elements of an individual's wellbeing (Beck, J.S. 2011; Chand & Grossberg, 2013).

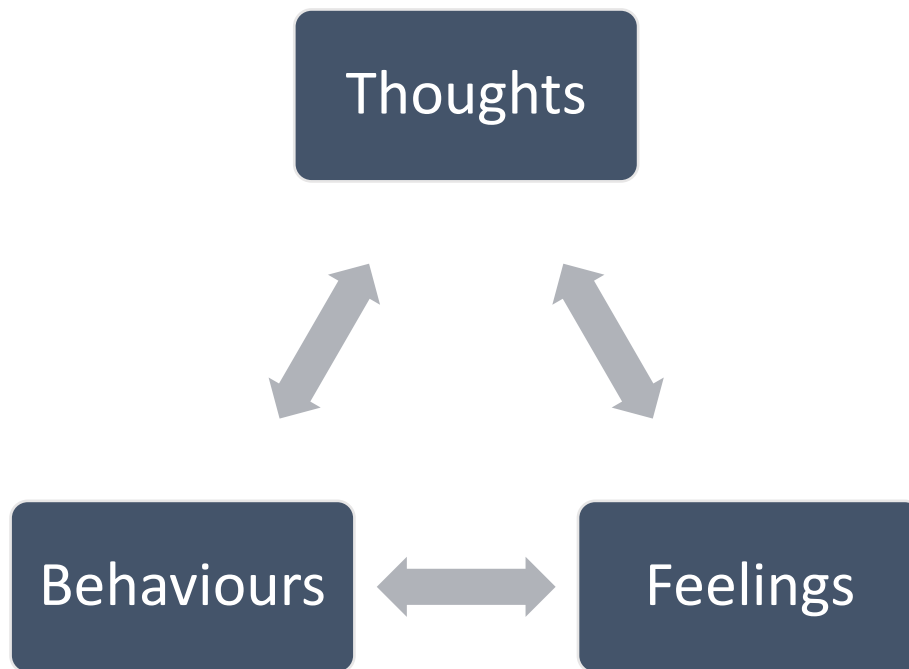


Figure 1.1: the CBT model of the vicious cycle between thoughts, feelings and behaviour

The Beck model of CBT for depression supports the connection between distorted thoughts and dysfunctional behaviours, based on the finding that the root of this disorder is negative cognitive content and distorted information processing (Hollon, 2010). The CBT model supports the notion that symptoms, and disorders, can be relieved by addressing these disorder specific changes in behaviour and thoughts. For example, when something goes wrong for an individual with low mood or depression they might experience an automatic thought such as “everything always goes wrong for me” or “I can’t do anything right”. Negative cognitions interact with the individual’s mood and emotions, such as making them feel sad and hopeless. As such, the individual is likely to make changes in their behaviour including withdrawing themselves from these situations. However, if the individual investigated the validity of their thought they might have concluded this was a situation specific thought, which they had overgeneralised, and they do lots of things well too (Beck, J.S. 2011).

In the United Kingdom (UK), CBT is provided to support individuals struggling with mood through the NHS as part of the Improving Access to Psychological Therapy (IAPT) program (Clark, 2011).

Treatment is offered by Psychological Wellbeing Practitioners (PWPs) and by high intensity CBT therapists (HIT) in a stepped care model of treatment intervention. The IAPT initiative was announced in 2007 by the UK government with the aim of increasing support for depression and the anxiety disorders. The IAPT program offers evidence-based treatment based on guidelines from NICE (National Institute for Clinical Excellence), as part of an evidence-based approach to treatment advocated by the department of health in the UK. These guidelines were reviewed between 2004 and 2007 prior to, and in preparation of, the IAPT initiative. Reviewing the stepped care model treatment guidelines was of great importance to support the recommended treatment pathways and the use of particular treatments for disorders with evidence. As a result, a stepped care model was created suggesting that particular types of treatments at different levels in clinical service based on the type of disorder and severity (Richards, Bower, Pagel, Weaver, Utey, Cape, Pilling, Lovell, Gilbody, Leibowitz, Owens, Paxton, Hennesey, Simpson, Gallivan, Thompson & Vasilakis, 2012). For example, NICE guidelines (Clark, 2011) for mild to moderate depression advice low intensity CBT treatment (including behavioural activation and/or problem solving techniques). This involves providing self-help bibliography, or six to eight treatment sessions (including follow up) with a Psychological Wellbeing Practitioner (either over the telephone or face-to-face) over a nine to 12 week period (Clark, 2011).

#### 1.4 A cohort of older people for psychological therapy

People are now living longer than previous generations, and with a rise in older adults of 47% in 2014 older adults accounted for 18% of the population (Rodda, Walker & Carter, 2011). This along with the statistics previously mentioned on the prevalence of MDD in the 60 to 64 and 65 to 69 year olds age groups calls for the need to provide support in these age groups specifically. Support for older adults (generally defined aged 65 and above, Chapman & Perry, 2008; Rodda, Walker & Carter, 2011) is essential due to depression being reported to be the most common mental health problem in older adults (Blazer, 2003; Laidlaw, Davidson, Toner, Jackson, Clark, Law, Howley, Bowie, Connery & Cross, 2008).

Amongst community-based older people, prevalence and incidence seems to be relatively low (Blazer, 2010; Fiske, Wetherell & Gatz, 2009), and lower than most people would expect (Laidlaw et al., 2008). Rates of depression appear to reach a peak mid-life and decline subsequently (Laidlaw, 2008, in press). Despite this, depression has significant impact on both family and society levels, and on an individual level. Those who report to experience low mood tend to be those frequently making use of the healthcare system. Similarly, rates of MDD have been found to be higher in those living in healthcare facilities (Laidlaw, 2008 in press; Thakar & Blazer, 2008) and when experiencing long-term conditions (Laidlaw, 2008; Seitz, Purandare & Conn, 2010). Additionally, for older adults it is estimated that less individuals receive support compared to working age adults, with 85% of older adults with depression not receiving psychological support (Knight, Kaskie, Shurgot & Dave, 2006). This may be due to older people mistakenly ascribing their depressive symptoms to aging, which is known as the understandability phenomena, and are assuming it to be normal and unavoidable (Laidlaw & Kishita 2015). Research investigating this phenomenon has interestingly found evidence of older adults expressing a lower prevalence for depression compared to working age adults. In addition, older people reported an increased sense of wellbeing and emotional stability (Carstensen, Turan, Scheibe, Ram, Erser-Hershfeld, Samanez-Larkin, Brooks & Nesselroade, 2011).

Symptoms of depression in older adults may be more difficult to identify since they could be misinterpreted as cognitive impairment, or as a neuroendocrine- or chronic disorder. Depression, on its turn, also complicates the treatment and outcome of other illnesses and diseases (Alexopolous, 2005; Chapman & Perry, 2008; Pinguart, Duberstein & Lyness, 2007; Rodda, Walker & Carter, 2011; Titov, Dear, Ali, Zou, Lorian, Johnston, Terides, Kayrouz, Klein, Gandy & Fogliati, 2015). Mental health problems in older people are reported to be the most frequent cause of emotional suffering. It is important to note that older people may also face a decreasing amount of social support in their surroundings due to the passing of family and friends (Blazer, 2005; Moss, Scogin, Di Napoli & Presnell, 2011). Depression affects an older person's social life, health and financial situation similar to that of a working age adult. Though on the contrary to working age adults, in older adults it imposes an increased the risk on an individual's

quality of life, risk of (co)morbidity and mortality (Alexopolous, 2005; Blazer, 2003; Lynch, Morse, Mendelson & Robin, 2003). Most importantly, depression is a strong predictor for suicide amongst older adults, with suicide rates being higher in this age group than any other age group (Alexopolous, 2005; Chapman & Perry, 2008; Rodda, Walker & Carter, 2011; Titov, Dear, Ali, Zou, Lorian, Johnston, Terides, Kayrouz, Klein, Gandy & Fogliati, 2015). Attending to the needs of support in older adults in an appropriate time and manner may lead to enhanced quality of life, ability for individuals to function and retain independence, reduce mortality, (co)morbidity and medical illnesses, and reduced cost burden (Avasthi & Grover, 2018).

#### 1.4.1 Cognitive Behavioural Therapy for older people

CBT with older people is a mainstream treatment option for common mental health problems such as depression and the anxiety disorders. CBT is particularly applicable with older people as it is problem-focused, skill enhancing, individually empowering, present-oriented and straightforward to use (Laidlaw & Wilkinson, 2018, in press). A number of different sources of evidence testify to the efficacy of CBT for late life depression (Cuijpers, van Straten, Smit & Andersson, 2009; Gould, Coulson & Howard, 2012; Karlin, Trockel, Brown, Gordienko, Yesavage, Taylor, 2015; Laidlaw, 2015). However, whether CBT efficacy for depression is equivalent between older people and working age adults remains under-examined (Chaplin, Farquharson, Clapp & Crawford, 2015; Cuijpers, Karyotaki, Weitz, Andersson, Hollon & van Straten, 2014). Given the demographic transition affecting all societies across the globe means that more older people are seeking psychological treatment and, as such, the question of treatment equivalence across the lifespan is becoming increasingly important.

Current treatment for older people experiencing depression is often provided in primary care by general practitioners, and this is usually achieved through pharmacological support (Laidlaw et al. 2008). Research available at this time still provides insufficient information comparing CBT with pharmacological interventions (Bennett-Levy, Farrand, Christensen & Griffiths, 2010; Laidlaw et al. 2008). There is a correspondingly but mistaken assumption that older people are unlikely to benefit from receiving CBT (Laidlaw, Cassidy-Eagle, Bilbrey, Thompson, & Gallagher-Thompson,

2018). However, treatment of depression in older people through CBT is shown by research to be equally effective compared to CBT treatment outcomes in working age adults (Pinquart & Sorensen, 2001; Alexopolous, 2005; Scogin et al. 2005; Frazer, Christensen & Griffiths, 2005; Cuijpers, van Straten & Smit, 2006; Pinquart, Duberstein & Lyness, 2008; Laidlaw et al. 2008). In fact, clinical evidence from statistics of the IAPT services in 2014-2015 have shown greater recovery rates for individuals in the older people group compared to those of working age adults. (Chaplin, Farquharson, Clapp & Crawford, 2015). Given that older adults have reported to seek psychological treatment for the same reasons as working age adults, such as relationship difficulties or transitions of life phases, this should not come as a surprise (Knight, 2004; Laidlaw et al. 2018).

The stereotypical belief that older people are more reluctant to access psychological treatment compared to working age adults is shown by research to be unfounded. In fact, older adults are reported to endorse more positive attitudes towards accessing psychological treatment compared to working age adults (Knight et al. 2006; Quinn, Laidlaw & Murray, 2009). Despite this, there are currently still lower numbers of older people seeking CBT as treatment for depression, which may largely be due to the stigma associated with seeking or receiving psychological support for this age group (Laidlaw, Thompson & Gallagher-Thompson, 2004; Titov et al. 2015). Other factors potentially influencing older people's involvement with CBT are decreased mobility affecting the ability to attend face-to-face therapy and a shortage of trained therapists (Laidlaw, Thompson & Gallagher-Thompson, 2004; Titov et al. 2015). Nevertheless, with the increasingly aging population, a new cohort of older people will be requesting psychological support. This new cohort of older people are likely to be different at least in terms of chronological age, as therapists are increasingly likely to come in contact with people in their eighties and nineties. Consequently, this age group is likely to present with comorbidity and in some cases chronicity. Additionally there may be differences in cohort values and beliefs between therapists and client born up to 70 years apart complicating treatment. As such we have no evidence for how well CBT functions with the oldest-old (Laidlaw, 2018).

Given the potential for increased complexity, comorbidity, and different value systems when applying CBT with older people it is unsurprising that therapists untrained in geriatrics and gerontology may be less confident in working with this age group. A lack of experience in applying treatments, such as CBT, with older adults may create uncertainty regarding the suitability of therapy models for this age group. Therapist's beliefs also extend to the uncertainty as to whether older people will benefit from psychological therapy (Knight, 2004; Laidlaw, Thompson & Gallagher-Thompson, 2004; Laidlaw & McAlpine, 2008). An interesting discussion arises from the evaluation of potential adaptations for therapy implementation with older people. Whilst there may be greater variability in life experience and difficulties may be complex, adaptations or modifications are said to not necessarily be required. As it is reported that older people seek support for similar reasons as working age adults, the intervention focus can overall remain the same. Older people may, however, in some cases benefit from a shift in focus of the therapist towards the older people's perspective on the aging process in addition to the primary aim of reducing individual centered (and not age centered) symptoms (Laidlaw et al. 2003; Laidlaw & McAlpine, 2008; Laidlaw, 2015).

As CBT is increasingly applied with clients in their 8th and 9th decades, therapists would be well advised to apprehend and appreciate that a major difference in working with older people is that clients have lived longer than therapists (Laidlaw, Kishita & Chellingsworth, 2016). This simple observation reminds therapists that if clients have lived longer than they have, clients may have confronted major life events and other challenges they have not (Laidlaw & Kishita, 2015). Life experiences may confer some 'life skills' that therapists may wish to explore for their utility in promoting change and enhancing psychological wellbeing in the here and now (Laidlaw, 2015). "Life skills therefore acknowledge that clients have emotional and psychological resources that may be used to good advantage in CBT. Recognising and respecting the client as someone who has strong life skills helps to promote a strong therapeutic alliance." (Laidlaw et al. 2018, in press). Life skills is a positive and valuing term to acknowledge that older people may have been 'tested' by life and may have faced and overcome adversity that the therapist may reflect upon and wonder how they would cope in similar circumstances. As a simple example take the very common case

of older clients who may be widows or widowers and have lost partners after more than 40 or even 50 years and yet they carry on and survive (Laidlaw, 2015).

Reviewing the research, it illustrates why CBT for depression in older adults is suggested to be the most researched (psychological) therapy, and research is greatly supporting its implementation as an effective treatment for depression in older adults (Landreville, Landry, Baillargeon, Guerette & Matteau, 2001; Laidlaw et al. 2008; Wilson, Mottram & Vassilas, 2008; Rodda, Walker & Carter, 2011; Cuijpers, Karyotaki, Weitz, Andersson, Hollon & van Straten, 2014).

#### 1.4.3 CBT efficacy for older people

Meta-analyses investigating CBT efficacy has been investigating the older people age group, with research trials being carried out since the late 1970s and early 1980s (Cuijpers, van Straten & Smit, 2006). Initial studies by Dolores Gallagher and Larry Thompson, and research from Joanne Steuer with colleagues included small sample sizes but showed significant improvement in mood (Gallagher and Thompson, 1982; Steuer, Mintz, Hammen, Hill, Jarvik, McCarley, Motioke & Rosen, 1984). Research that followed these initial findings confirmed the beneficial outcomes and provided more reliable findings due to their increased sample sizes. Similarly, the methodological quality of subsequent studies carried out was improved by means of randomised controlled trials. Examining the effects of CBT compared to pharmacological treatment may have been one of the most important investigations for this therapy. This focus of research on CBT in the older population is relevant due to the common misbelief that older people don't respond to, or are not open to receiving, psychological support (Steuer et al. 1984; Thompson & Gallagher, 1984). However, it is argued that older people have decreased tolerance to medication, experience difficulties with side effects, and pharmacotherapy medicine may interact with other medication for any long-term conditions (Steuer et al. 1984; Thompson & Gallagher, 1984; Thompson, Gallagher & Breckenridge, 1987). As a result, this often leaves older people with sub-therapeutic doses of medication (Laidlaw et al. 2008). Findings thus have great implications for alternative



therapy to pharmacotherapy and treatment guidelines for depression in older people (Steuer et al. 1984).

One benefit of CBT compared to pharmacotherapy is availability of group therapy, as this is both cost effective and addresses loneliness associated with depression (Steuer et al. 1984). Overall, meta-analyses and research studies support the consensus that CBT is an effective treatment for depression in older adults compared to pharmacotherapy (Thompson & Gallagher, 1984; Steuer et al. 1984; Thompson, Gallagher & Breckenridge, 1987; Landreville et al. 2001; Laidlaw, Thompson, Gallagher-Thompson & Dick-Siskin, 2003; Cuijpers et al. 2006; Dimijian, Hollon, Dobson, Schmaling, Kohlenberg, Addis, Gallop, McGlinchey, Markley, Gollan, Atkins, Dunner & Jacobson, 2006; Piquart, Duberstein & Lynes, 2006; Dobson, Hollon, Dimidjian, Schmaling, Kohlenberg, Gallop, Rizvi, Gollan, Dunner & Jacobson, 2008; Laidlaw et al. 2008; Serfaty, Haworth, Blanchard, Buszewicz, Murad & King, 2009).

After the initial research studies showed beneficial outcomes of CBT in the older people population compared to pharmacotherapy, focus shifted towards effectiveness of CBT compared with other psychological therapies. Benefits of assessing psychotherapy as treatment for depression in this population may be found in simultaneously supporting age related challenges faced in late life accompanied by, or overlapping with, the depression (Arean, Perri, Nezu, Schein, Christopher & Joseph, 1993).

Meta-analyses on CBT with wait list or delayed treatment comparisons show significant beneficial outcomes for CBT compared to non-active control groups (Scogin, Jamison & Gochneaur, 1989; Churchill, Hunot, Corney, Knapp, McGuire, Tylee & Wessely, 2001; Moss, Scogin, Di Napoli & Presnell, 2012). One meta-analysis specifically focusing on randomised control trial studies likewise found an efficacious result for CBT treatment of depression in older people. With an effect size of 0.72, benefits in this meta-analysis are comparable to those of working age adults (Cuijpers et al. 2006). Overall, research supports the effectiveness of CBT for the treatment of depression in the older population (Cuijpers, van Straten, van Oppen, & Andersson, 2008c).

### 1.5 CBT efficacy for working age adults

Research investigating the efficacy of CBT have evaluated treatment outcomes for depression and compared this to different psychological therapies, pharmacological treatments, and/or control groups (e.g. treatment as usual, placebo or wait list). These comparisons have been made in both older people and working age adult groups.

For working age adults, comparisons between CBT efficacy and other psychological therapies have repeatedly shown the benefits of this treatment. Research investigating CBT efficacy with other psychological therapies may involve comparisons with, for example, Dynamic Psychotherapy, Interpersonal Therapy, Metacognitive therapy, Narrative Therapy, psycho-educational prevention programs, Positive Psychology Interventions, Psychodynamic supportive (psycho)therapy, Rational Emotive Behaviour Therapy, and/or Relaxation Therapy, Schema Therapy. An overview of the outcomes for these types of studies can be obtained through meta-analyses and systematic reviews. These overviews are important in research as they quantify treatment efficacy, and analyse in what population or under what condition beneficial or less beneficial outcomes are particularly found (Cuijpers et al. 2008c).

Early research quickly established CBT as having an increased benefit over receiving no treatment (Dobson, 1989; Gloaguen, Cottraux, Cucherat, & Blackburn, 1998; Cuijpers et al. 2013a). Since this early research, several studies have repeated the finding of a favourable outcome for CBT treatment over the control conditions treatment as usual, wait list and no treatment (Hofmann et al. 2012; Cuijpers et al. 2013a; Cuijpers, Berking, Andersson, Quigley, Kleiboer & Dobson, 2013b).

Comparison research was also conducted between CBT and pharmacological treatment in the 1970s, showing favourable benefits for CBT over medication (Rush, Beck, Kovacs & Hollon, 1977). Since this research, numerous studies have investigated the performance of pharmacotherapy with CBT. Overall, this research has been shown that CBT can match, and in cases outperform, the benefits of pharmacological treatments. This outperformance seems to be particularly focussed on protection against relapsing, preventing return of symptoms following the end of treatment (Hollon, Shelton & Loosen, 1991; Driessen & Hollon, 2010). However, these

early studies faced some criticism, since most of the research did not include specific control groups, such as placebos (Hollon, Shelton & Loosen, 1991). Still, research continued comparing these two treatments against each other and included placebo comparison. Further research has shown an average recovery of 50-60% for individuals with depression through CBT, compared to a 40% recovery rate for individuals on medication (De Maat, Dekker, Schoevers & De Jonghe, 2006; Cuijpers et al. 2008b; Cuijpers et al. 2013a; Cuijpers, Karyotaki, Weitz, Andersson, Hollon & van Straten, 2014; Vittengl, Jarrett, Weitz, Hollon, Twisk, Cristea, David, DeRubeis, Dimijian, Dunlop, Faramarzi, Hegerl, Kennedy, Kheirkhan, Mergl, Miranda, Mohr, Rush, Segal, Siddique, Simmons & Cuijpers, 2016). With a vast amount of research now published it is generally accepted that CBT is equally efficacious in depression treatment compared to pharmacological treatment (DeRubeis, Hollon, Amsterdam, Shelton, Young & Salomon, 2005; Butler, Scogin, Kirkish, Schretlen, Corbishley, Hamblin, Meredith, Potter, Bamford & Levenson, 2006; De Maat et al. 2006; Dimijian et al. 2006; Cuijpers et al. 2008c; Cuijpers et al. 2013b; Farabaugh, Fisher, Nyer, Holt, Cohen, Baer, Shapero, Huz, Cardoos, Fava & Alpert, 2015).

More interestingly perhaps is the comparison of CBT efficacy with other psychological treatments. Several meta-analyses support the notion that CBT has an increased benefit as treatment for depression over other psychological therapies (Miller & Berman, 1983; Gloaguen, Cottraux, Cucherat, & Blackburn, 1998; Churchill et al. 2001; Pinquart, Duberstein & Lyness, 2007; Cuijpers, Van Straten, Warmerdam & Smits, 2008d). It is argued, however, that benefits may be overestimated and despite CBT being a beneficial treatment, other treatments may approach similar outcomes (Wampold, Minami, Baskin & Tierney, 2002; Cuijpers, 2013b). Potential explanation for this finding of overestimated benefits may be publication bias and poor quality studies (Cuijpers et al. 2013a).

### 1.6 Research importance, implications and hypotheses

In research literature, evidence is widely available for CBT efficacy in working age adults and older people (Laidlaw et al. 2008; Cuijpers et al. 2013). With research investigations ongoing since the 1970's and 1980s, support is grounded for the efficacy of CBT as a treatment for

depression in both age groups individually (Cuijpers, 2006). Just one comparative meta-analysis, looking at efficacy differences between the two age groups, has been completed, which investigated the differences of psychotherapy efficacy between working age adults and older people (Cuijpers et al. 2009). Yet, current research is lacking in the examination between working age adult and older people for the efficacy of CBT treatment specifically. Another relevant, and recently published, meta-analysis did investigate the efficacy of CBT between working age adults and older people, however the focus for this research was Generalised Anxiety Disorder (Kishita & Laidlaw, 2017). Thus, this still leaves a gap between research available in CBT treatment outcomes for depression between working age adults and older people, and the need for information in providing support for the aging population in clinical practice.

Therefore, in the current study, the aim is conducting a meta-analysis with a focus on exploring CBT treatment efficacy for depression solely, and comparing outcomes for working age adults and older people to close the gap in research. The importance of this research emanates from the high prevalence of depression, the consequences of depression on individuals and society, and the increasing demand on IAPT services to provide support. Moreover, reviewing the outcome of CBT efficacy between working age adults and older people has particular implications for clinical settings due to the relative aging of the population, and the emergence of this new cohort of older people requiring psychotherapy support. In addition, therapists may still be reluctant to work with older adults due to stigma, or uncertainty of life experiences and life events associated with late life depression influencing on treatment (Knight, 2004; Laidlaw & McAlpine, 2008). Thus, despite the proven benefits of CBT in the two age groups, the question of possible differential efficacy between working age adults and older people is still outstanding (Cuijpers et al. 2009). Findings of this research may have great implications for (age specific) treatment protocols and guidelines, therapist's approaches and beliefs in providing treatment, treatment outcomes, the individual's wellbeing, social (and economic) burden, and reducing stigma and misassumptions which currently may be causing less older people accessing IAPT services for support.

This meta-analysis, therefore, aims to investigate and compare outcomes of CBT for depression between working age adults with older people as definite as can be achieved at this stage. The current meta-analysis hypothesises there will be a statistically significant difference between pre-post treatment effect size of CBT treatment for depression favouring post treatment scores, but with no statistically significant difference when comparing working age adult and older people. Secondly, this meta-analysis hypothesises a statistically significant difference in effect size for depression treatment comparing CBT to psychological treatments and control groups (either active or non-active treatment) in favour of CBT, but no statistically significant difference when comparing the outcomes between the working age adults and older people groups.

## **2.0 Methods**

### **2.1 Literature search and data sources**

Research articles were searched for with publication between 1977 to 2018, and identified through searches in the databases PubMed, Medline, Web of Science, Cochrane, PsychInfo, PsychArticles, Scopus and Embase. In addition, reference lists of identified articles, meta-analyses and systematic reviews were scanned to identify any papers potentially missed through the main searches. Furthermore, Prospero and Ethos (e-theses online library by the British Library) were searched for to identify any unpublished applicable research. No relevant ongoing, unpublished, or thesis research was identified through these means.

The literature searches were completed with the use of Medical Subject Headings (in short called MeSH terms). MeSH terms are used to provide uniformity and consistency in literature searches by indexing and categorising literature.

### **2.2 Inclusion and exclusion criteria**

Several inclusion and exclusion criteria were set for research articles to meet in order to ensure a valid, reliable and meaningful meta-analysis.

#### **2.2.1 Inclusion criteria**

Studies were eligible if they included information about participants' age so that they could be classified as having recruited participants from either a working age adults group (18-65 year olds) or an older people (60 years or over) age group. Literature reviews were carried out for both the working age adults and older people age groups to facilitate between age group comparisons of treatment outcomes. The literature search in the working age adults encompassed research on 18 to 65 year olds. The older adults' literature search allowed studies for adults 60 years and over. These age group definitions needed to partially overlap as due to demographic changes people are living longer and otherwise relevant older adult studies could be erroneously excluded, should criteria focus on 65 years and over for the older people age group. For the working age adults, literature searched contained MeSH terms ["young adult" OR adult OR "middle aged"]. Literature

searches for older people contained the MeSH term [aged]. Apart from these different terms defining the age groups, the same search terms were used in the working age adult and older people age groups for the remaining search criteria to ensure homogeneous comparisons of outcomes.

Research studies were included in the meta-analysis if they involved a randomised controlled trial. This would be evident from random allocation procedures of participants into a treatment group, either the CBT treatment group or the comparison group. CBT treatments included in the meta-analysis involved CBT protocols, CBT related and CBT derived therapies. This includes CBT, Cognitive Therapy, and Behavioural Therapy (including Behavioural Activation). Treatments could be carried out in an individual-, online-, or group setting. Support had to include a trained therapist who provided the treatment in accordance with evidence-based guidelines. For CBT as the main intervention, search terms for CBT, CBT related and CBT derived therapies were included in the literature searched to identify relevant articles. This involved search terms ["CBT" OR "low intensity CBT" OR "Cognitive Behaviour\* Therap\*" OR "cognitive therap\*" OR "Behavioural activation"].

Participants were required to meet diagnostic criteria of clinical depression as measured with the use of a reliable and valid diagnostic instrument (for example, the Diagnostic and Statistical Manual of Mental Disorders). Treatment for MDD had to be the primary aim of the research study. The appropriate clinical population was sought for through search terms [depression OR "low mood"].

Intention to treat as a study design for research was another criterion. This as, due to the criterion of randomised controlled trials, complications may be experienced with non-compliance and dropouts, resulting in missing outcome data (Gupta, 2011). This is an important criterion as not including intention to treat as a criterion may result in including studies with skewed outcomes on data analysis of pre-post treatment comparisons. However, exceptions had to be made for the older people studies (e.g. including papers without an intention to treat study design) due the timeframe during which the research was conducted in order to prevent unnecessarily excluding relevant and valid research articles.

A criterion included in the search was for scientific articles to consist of research carried out in Western society countries. The main reason for this criterion is maintaining homogeneity, as different sociocultural factors may influence on treatments and outcomes, and potentially result in unequal comparisons. Additionally, all research articles had to be available in the English language.

Lastly, published articles has to meet the criterion of completed research with outcome measures. This ensured the criterion of ability to obtain pre-post treatment data (or where applicable odd ratio's or effect sizes applicable) for use in data analysis. Where articles involved reviews or publications of ongoing research, studies were excluded from the meta-analysis.

### 2.2.2 Exclusion criteria

Research studies were excluded where treatments did not incorporate CBT, CBT related- or CBT derived therapies. This includes, for example, when treatment groups involved mindfulness or mindfulness- based CBT, yoga, Mindfulness-Based Stress Reduction, Acceptance and Commitment Therapy, Mindfulness Based Relapse Prevention, counselling psychology, or psychotherapy.

Comparison groups in this meta-analysis had to involve either an active treatment (alternative psychotherapy), non-active treatment (wait list, usual care or delayed treatment), or pharmacotherapy (including placebo). Where research did not involve a randomised controlled trial (e.g. involved open trials or single case studies), studies were excluded from the meta-analysis.

Research studies reporting outcome for comorbid physical illness with depression, which primarily focused on other mental health disorders, or where depression was not the primary focus of treatment were excluded from analyses. Where studies reported physical comorbidities, such as chronic or long-term conditions, research studies were included as long as the main aim was reduction of MDD. Studies with degenerative disease comorbid with depression (e.g. depression in dementia) were excluded from this meta-analysis, as there is no accepted treatment protocol for the use of CBT in these conditions.



### 2.3 Measures

The meta-analysis involves studies with pre-post treatment data, which is obtained through use of valid and reliable psychometrics. It is essential that studies used a standardised psychometric as it has been shown that self-administered questionnaires may skew results. For example, prevalence of depression was found to be higher in studies where self-administered psychometric measures were used, compared to studies implementing a standardised measure (Stephoe, 2006). Two types of psychometric tools are self-report measures and peer-report measures.

In self-report measures, the individual completes the psychometric measure themselves without input from a researcher or therapist. A benefit of a self-report measure is the opportunity for the participant to disclose how they feel. However, a difficulty which may be experienced with this method is participants exacerbating the severity of their symptoms, or underreporting the frequency of symptoms. There is simply no way to conclusively assess the validity of report.

Peer-report measures are used for therapists, family or another person, to respond on behalf of the participant to rate, for example, frequency and severity of symptoms. A benefit of this method is an external perspective of the situation by a professional trained in assessment may be less prone to specific types of biased reporting from the person experiencing symptoms. One disadvantage with peer-report measures is the subjective nature of the answers provided by the person completing the measures and the opportunity for a biased observation on the part of the reviewer. As such no approach is free from disadvantage, hence the use of both data in this meta-analysis. A main emphasis will be placed upon self-report measures where possible. Both measures can be used to obtain an effect size to compare outcomes and treatment efficacy, which is the main aim of this meta-analysis. A subanalysis will be completed to account for any potential sensitivity differences.

### 2.4 Studies included

The initial literature searches resulted in overall 13,569 studies meeting search criteria for the working age adult group, and 5,937 studies meeting search term criteria for the older people

age group. Duplicates were removed and study title and abstracts were screened for further eligibility investigations. After the eligibility screening process was completed, 22 studies met inclusion criteria in the working age adults age group. However, for three of these articles (namely DeRubeis et al. 2005, McLean & Hakstian, 1979, and Gilbody et al. 2015) insufficient data was available required for meta-analysis purposes and therefore had to be excluded despite meeting inclusion criteria. This resulted in 19 studies being included in the meta-analysis for working age adults. The older adult age group incorporated 12 studies in the meta-analysis.

The studies identified and included in the meta-analysis were checked by Professor Ken Laidlaw (a recognised international expert in CBT) for appropriateness, relevance and quality of the research. Any queries or issues were discussed, and the studies selected in the screening process were approved for inclusion. An overview of the research article selection process, and exclusion numbers, can be found in the flow charts, figure 2.1 and figure 2.2, below (Moher et al. 2009).



## PRISMA 2009 Flow Diagram Working age adults

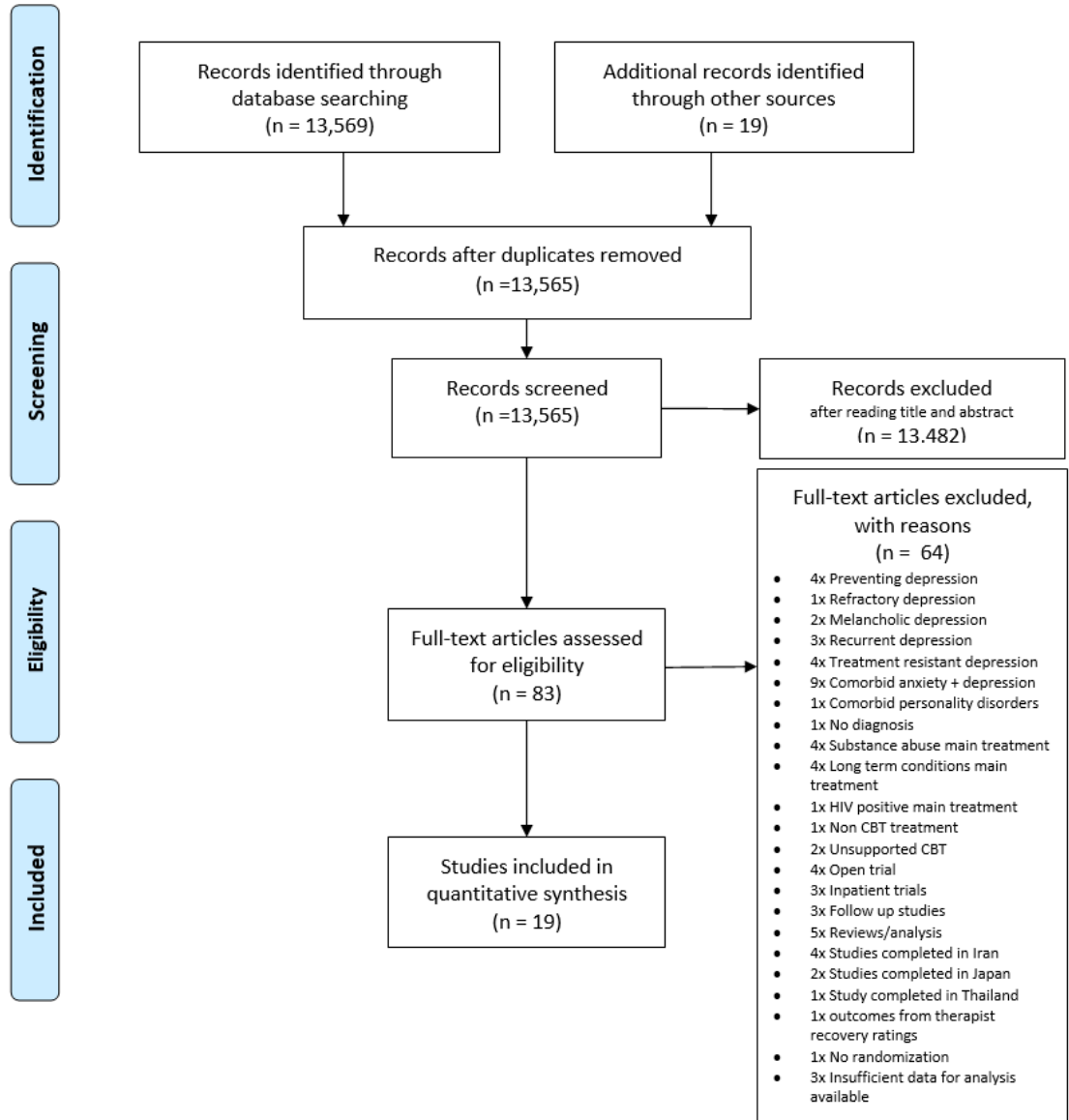


Figure 2.1: screening process at each stage for working age adults



## PRISMA 2009 Flow Diagram Older people

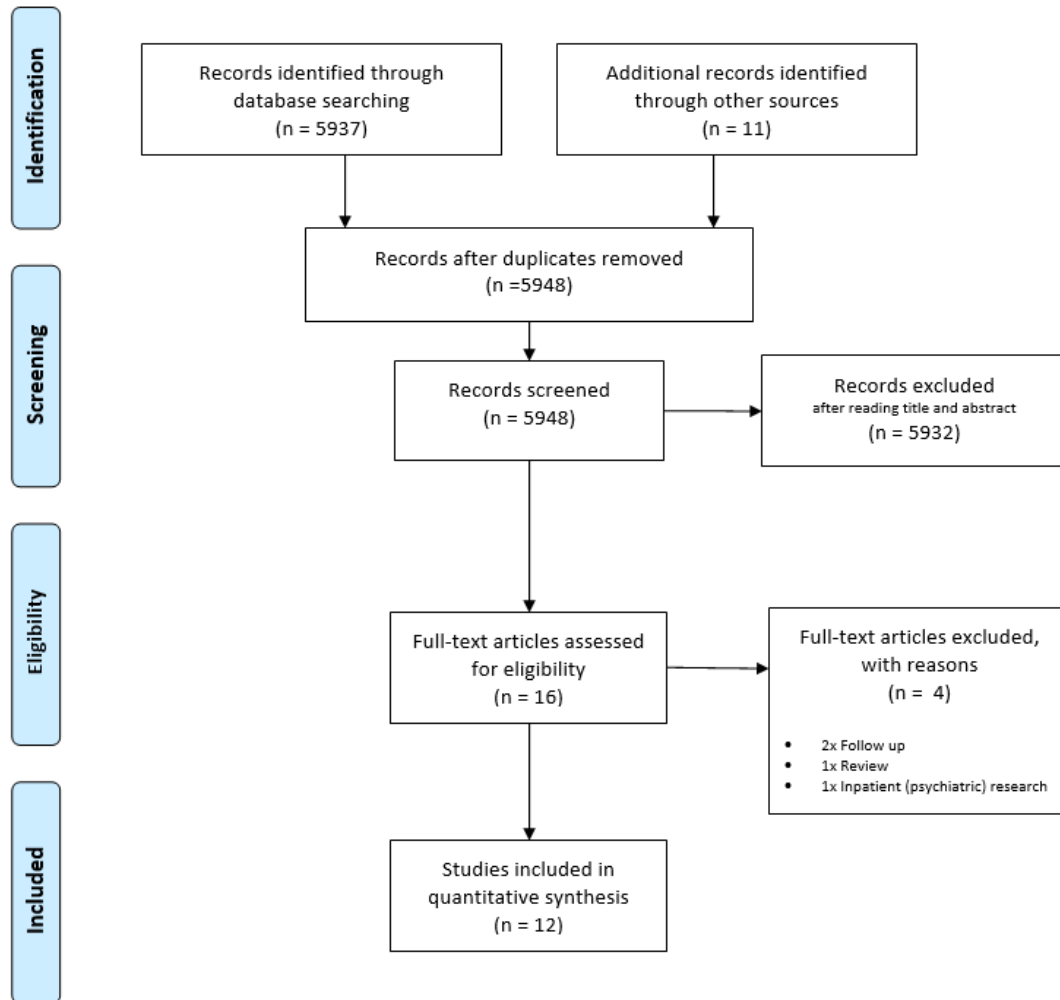


Figure 2.2: screening process at each stage for older people

#### 2.4.1 Characteristics of included studies

Data was obtained from the articles and transferred to a data extraction sheet. Collecting data for both the working age adults and older adult groups separately, the data extraction sheet includes data on sample size, number of individuals of each gender, the participant's mean age and standard deviation, diagnostic criteria and means of diagnosis, primary outcome measure, comorbidity, pre-post outcome data (mean and standard deviations), length of intervention, method of intervention (individual, group or online), and type of psychometric. Research articles included in the meta-analysis were allocated for data analysis to either the active treatment group (psychological therapies or pharmacological treatment) or non-active group (e.g. wait list or delayed treatment), based on their comparison condition. A summarised characteristics table on articles included in this meta-analysis with their for the working age adults can be found in table 2.1. For the older people papers, a list of papers with summarised characteristics can be viewed in table 2.2.

The research articles show an age range from 22.4 to 51.65 year old for working age adults, and between 66.8 to 77.5 year old for older people. The average ages for the two groups were 37.99 and 63.96 years old respectively.

##### 2.4.1.1 Characteristics of working age adult studies

The 19 research articles for the working age adults group showed the following characteristics for age, sample size, gender, psychometric instrument treatment approach, and intervention method.

Carlbring et al. (2013) included 80 participants, of which 14 were male and 66 female. The average age of the participants was 44.4 years, with a standard deviation of 13.5 years. Depression levels were measured using the BDI. Treatment intervention for the research study involved allocation to either Behavioural Activation, Acceptance and Commitment Therapy, or wait list control. Active treatment was offered in an online format.

Carter et al. (2013) recruited 100 participants. This total comprised of 31 males and 69 females, with an average age of 38.38 years and a standard deviation of 11.7 years. Participants

were screened using the BDI and allocated to either CBT or Schema Therapy, which was provided through individual treatment.

Chaves et al. (2017) conducted research with 96 participants, all of which female. Age distribution showed an average of 51.65 with a standard deviation of 10.36. Depression was assessed using the BDI. Treatment involved CBT or Positive Psychology Intervention in a group setting.

Connolly et al. (2016) recruited 237 participants. Amongst the participants were 59 males and 178 females, aging an average of 36.2 years of age with a standard deviation of 12.1 years. Depression level measurement involved the use of the HAM-D, and treatment provided involved Dynamic Psychotherapy or Cognitive Therapy in an individual setting.

Conradi et al. (2007) involved 265 participants, 93 male and 172 female, with an average age of 42.8 (standard deviation 11.3). The psychometric instrument used to measure depression was the BDI and treatment involved treatment as usual, psycho-educational prevention program, psychiatrist enhanced psycho-educational prevention program, or CBT enhanced psycho-educational prevention program.

David et al. (2008) included a total of 170 participants, of which 57 male and 113 female. The average age of the participants was 37 years and the standard deviation of age 8.33 years. Depression was measured with the use of the BDI. Treatment involved allocation to either Rational-Emotive Behaviour Therapy, Cognitive Therapy or the medication group. Therapies were provided in an individual setting.

The research completed by Dimijian et al. (2006) involved 241 participants. This included 82 males and 159 females, aging on average 39.9 years of age with a standard deviation of 10.97 years. The psychometric instrument used to measure depression involved the BDI. Treatment involved Behavioural Activation, Cognitive Therapy, medication or a placebo. Therapies were completed with individual sessions.

A total of 341 participants, 102 males and 239 females, were recruited in the study by Driessen et al. (2014). The participants averaged on age at 38.91 years with a standard deviation

of 10.30. Participants' depression levels were measured through use of the HAM-D, and treatment involved either CBT or psychodynamic supportive therapy in individual settings.

Farabaugh et al. (2015) recruited 26 participants, 13 male and 13 female. The average age of the participants was 47.19 and the standard deviation 13.68 years. Depression was measured with the HAM-D and BDI. Treatment was offered in individual setting following allocation to CBT group, or involved medication.

Hallgren et al (2016) involved 945 participants in their study, 190 males and 689 females. Participants averaged at 43 years of age, which distributed with a standard deviation of 12 years. The MADRS was used to assess depression levels. Treatment allocation was made to a physical exercise group, internet based CBT group or to treatment as usual.

Hollon et al. (1992) completed research with 107 participants. The 32 males and 75 females shared an average age of 32.6 and a standard deviation on age of 10.8 years. Depression was measured using the BDI, and treatment involved Cognitive Therapy, medication, or Cognitive Therapy with medication. Therapy was provided with individual sessions.

Jordan et al. (2014) recruited 48 participants, 25 male and 23 female. The average age of the participants was 36.1 with a standard deviation of 12.85. The psychometric instrument used to measure depression levels involved the MARDS. Treatment was provided with Metacognitive therapy or CBT in individual settings.

Lemmens et al. comprised 182 participants in their research in 2015. The participants averaged on age at 41.2 (standard deviation 12.1 years). The BDI was used to measure depression. Treatment involved CBT, Interpersonal Therapy or the wait list control group. Therapies were provided in individual settings.

Lopez et al. (2014) allocated 63 participants (12 males, 51 females, age averaging at 35.3 years with a standard deviation of 11.22 years) to either Narrative Therapy or CBT. Depression was measured with the BDI and treatment sessions were completed in individual settings.

Power and Freeman's research (2012) was completed with 157 participants, 60 males and 97 females. The average age of the participants was 36.1, and a standard deviation of 11.3 years was found amongst participants' age. The BDI was used to measure depression. Treatment

involved CBT, Interpersonal Therapy, both completed in individual sessions, or treatment as usual.

Rush, Beck, Kovacs & Hollon (1977) recruited 41 participants, 15 males and 26 females. The participants' average age was 35.7 (no standard deviation was reported). Depression levels were measured using the BDI and treatment involved CBT (individual sessions) or medication.

Taylor and Marshall's research (1977) was completed with 28 participants, 8 males and 20 females. The average age of the participants was 22.4 years, with a standard deviation of 2.6 years. Depression was measured with the BDI. Treatment was provided through either CBT, Behavioural Therapy, Cognitive Therapy, or, alternatively, participants were allocated to a wait list control group. Therapy sessions were completed in individual settings.

Wagner, Horn & Maercker (2014) included 62 participants. The 22 males and 40 females shared an average age of 37.99 years, and differed in age with a standard deviation of 11.41 years. The psychometric measure used in the study was the BDI. Treatment involved CBT, either in an individual setting or online.

Wilson, Goldin, & Charbonneau-Powis (1983) completed research with 25 participants, 5 males and 20 females. The average age of the participants was 39.5 years (no standard deviation was reported). The BDI was used to measure depression. Treatment was provided through Behavioural Therapy or Cognitive Therapy (receiving individual sessions), or participants were allocated to a wait list control group.

#### 2.4.1.2 Characteristics of older people studies

Characteristics for the older adult research articles on age, sample size, gender, psychometric instrument treatment approach, and intervention method involve the following.

Arean et al. (1993) completed their study with 75 participants, 19 males and 56 females. They averaged on age at 66.4 years with a standard deviation of 7.43 years. Depression levels were measured with the BDI. Treatment involved allocation to Problem Solving Therapy, or reminiscence therapy, which were offered in group settings, or to a wait list control group.



Beutler et al. (1987) included 56 participants in their research, of which 25 males and 31 females. The participants' average age was 70.7 years, with a standard deviation of 4.02 years. The psychometric instrument used to measure depression involved the BDI. Treatment involved either medication, placebo, Cognitive therapy with medication or Cognitive Therapy with placebo. Cognitive Therapy was provided in a group setting.

Floyd et al. completed research in 2004 with 46 participants. The 11 males and 35 females had an average age of 68 years (no standard deviation was reported). The HAM-D & GDS were used to assess depression levels of participants. Allocation for treatment was made to Cognitive Psychotherapy, bibliography or the wait list control group. Therapies were completed in an individual setting.

Gallagher & Thompson (1982) recruited 30 participants, 7 males and 23 females, in their research. The participants' average age was 67.77 years with a standard deviation of 6.07 years. Depression was measured with the BDI. Treatment was provided in the form of Behavioural Therapy, Cognitive Therapy or Brief relational/insight psychotherapy, in individual settings.

A total of 40 participants were recruited by Laidlaw et al. (2008), comprising 11 males and 29 females. The average age of the participants was 74.03, and the standard deviation of age 8 years. For depression levels, the BDI & GDS were used to measure severity. Treatment involved CBT alone (psychological therapy allocation where participants are not receiving medication concurrently), or participants were allocated to continued treatment as usual. CBT was provided in individual settings.

In 2012, Moss et al. completed research with 26 participants, consisting of 6 males and 20 females. The participants' average age was 77.5 years, with a standard deviation of 6.72 years. The HAM-D & GDS were used to measure depression, and allocation to treatment involved Behavioural Activation Bibliography or the Delayed Treatment Control Group. Treatment was provided through supported self-help.

Scogin, Jamison & Gochneaur (1989) involved 67 participants in their research. The 10 males and 57 females averaged on age at 68.3 (no standard deviation was provided). Scoring depression was done using the HAM-D & GDS. Treatment allocation involved the treatment

groups for Cognitive Therapy (bibliography) or Behavioural Therapy (bibliography), which was completed through self-help, or to the Delayed Treatment Control Group.

The 204 participants of Serfaty, Haworth & Buszewicz (2009) were formed by 42 males and 162 females. The average age for these participants was 74.1 years, with a standard deviation of 7 years. Depression was measured using the BDI. Treatment involved Treatment as Usual, Treatment as Usual with Talking control or Treatment as Usual with CBT. Therapy sessions were provided in individual settings.

Steuer et al (1984) recruited 33 participants, including 8 males and 25 females in the research. The age average and standard deviation were not specified. The BDI & HAM-D were used to measure depression levels. In group settings, treatment provided involved CBT or Psychodynamic group psychotherapy.

Thompson & Gallagher (1984) recruited 61 participants of which 20 were male and 41 female. Their average age was 67, but the standard deviation was not provided. Depression measures were obtained using the HAM-D & BDI. Allocation was done to treatment groups, being either Behavioural Therapy, Cognitive Therapy, Psychodynamic Therapy or the Waitlist Control Group. Therapies were completed in group settings.

For Thompson, Gallagher & Breckenridge (1987) research was completed with 95 participants, of which 31 male and 64 female. The participants' average age was 66.88 years with a standard deviation of 6.17 years. Both the HAM-D & BDI were used to measure depression levels. Treatment allocation was done to Behavioural Therapy, Cognitive Therapy or Psychodynamic Psychotherapy, all provided in individual sessions, or to the Delayed Treatment Control Group.

Thompson et al. (2001) included 100 participants in their research, of which 33 male and 67 female. The average age of the participants was 66.8, with a 5.9 year standard deviation. Depression levels were measured with the HAM-D & BDI. The treatment groups were Medication, CBT or Medication with CBT. Therapies were completed in an individual setting.

Table 2.1: Characteristics table for working age adults

Author (date)	Sample size (N) + gender distribution	Age (mean (st.dev.))	Comparison conditions *	Diagnosis of depression	Psychometric instrument **	Measurements	Session length	Follow up time	Intervention method (format)
Carlbring et al. (2013)	80  14 males,  66 Females	44.4 (13.5)	BA+ACT & control (wait list)	Major Depressive Disorder on DSM-IV	BDI	Pre and post treatment, and at follow up	8 weeks	3 months post treatment	Online
Carter et al. (2013)	100  31 Males,  69 Females	38.38 (11.7)	CBT & ST	Major Depressive Disorder (DSM-IV)	BDI	Measurement taken at weekly and monthly sessions	Weekly sessions for 6 months followed by monthly sessions for 6 months	Not specified	Individual
Chaves et al. (2017)	96  96 Females	51.65 (10.36)	CBT & PPI	DSM-IV diagnosis of major depression or dysthymia	BDI	Pre and post treatment	10 weekly sessions of 2hours	6 months and 24 month follow up reported in separate research	Group

Table 2.1: Characteristics table for working age adults (continued)

Connolly et al. (2016)	237  59 Males, 178 Females	36.2  (12.1)	DT & CT	Major Depressive Disorder on DSM-IV	HAM-D	Pre and post treatment	16 sessions over a 5 month period	Not specified	Individual
Conradi et al. (2007)	265  93 Male, 172 Female	42.8  (11.3)	TAU, PEP, psychiatrist enhanced  PEP & CBT-enhanced  PEP	Major depression on Composite International Diagnostic Interview (CIDI) & Major Depressive Episode on DSM-IV	BDI	Pre and post treatment	PEP: 3x90min sessions + tailored treatment plan  Psychiatrist enhanced PEP: 1x60min session followed by PEP program  CBT: 10-12 sessions	Quarterly assessments until 3 year follow-up	Individual
David et al. (2008)	170  57 Male, 113 Female	37  (8.33)	REBT, CT & Med	Major Depressive Disorder according to DSM-IV	BDI	Pre-treatment, 7 weeks in treatment and post treatment	Active treatment: 20 sessions  Pharmacotherapy: weekly sessions, 1x50 minutes, subsequently 30 minutes	6 months	Individual

Table 2.1: Characteristics table for working age adults (continued)

Dimidjian et al. (2006)	241  82 Male,  159 Female	39.90  (10.97)	BA, CT, Med,  PLA	Major Depressive Disorder according to DSM-IV	BDI	Pre-treatment, at 8 weeks and post treatment	BA/CT: max 24 sessions of 50 minutes over 16 weeks.  Med: weekly sessions for first 4 weeks followed by biweekly sessions through to week 16	Not specified	Individual
Driessen et al. (2014)	341  102 Male,  239 Female	38.91  (10.30)	CBT & PST	Major Depressive Disorder according to DSM-IV	HAM-D	Pre and post treatment	16 sessions	1 year	Individual
Farabaugh et al. (2015)	26  13 Male,  13 Female	47.19  (13.68)	CBT & Med	DSM-IV criteria for major depressive disorder (MDD)	HAM-D & BDI	Pre-treatment, at 4 weeks, 8 weeks and post treatment	CBT: 12 weekly 50 minute sessions over 4 months  Med: fortnightly appointments with physician	Not specified	Individual

Table 2.1: Characteristics table for working age adults (continued)

Hallgren et al. (2016)	945  190 Male, 689 Female	43 (12)	PE, ICBT & TAU	Score of 9 or above on PHQ-9	MADRS	Pre and post treatment	Online self-help manual with initial assessment by therapist	12 months	Online
Hollon et al. (1992)	107  32 Male, 75 Female	32.6 (10.8)	CT, Med & combined CT+Med	Major Depressive Disorder as defined by the Research Diagnostic Criteria	BDI	Pre, mid (6 weeks) and post treatment	Maximum of 20 sessions of 50 minutes over 12 weeks	Not specified	Individual
Jordan et al. (2014)	48  25 Male, 23 Female	36.1 (12.85)	MCT & CBT	DSM-IV diagnosis of major depressive disorder, bipolar II, or bipolar not-otherwise-specified depressed	MADRS	Pre-treatment, 4 weeks and post treatment	12 weeks of CBT or MCT	6month and 24 month	Individual

Table 2.1: Characteristics table for working age adults (continued)

Lemmens et al. (2015)	182  66 Male,  116  Female	41.2  (12.1)	CBT,  IPT &  WCG	Primary diagnosis of Major Depressive Disorder confirmed by structural clinical interview for DSM-IV Axis-I Disorders.	BDI	Pre-treatment, at 2 & 3 months and post treatment	16-24 sessions of 45 minutes, with option of sessions less than weekly depending on progress of individual	Monthly up to 5m post treatment	Individual
Lopes et al. (2014)	63  12 Male,  51  Female	35.3  (11.22)	NT &  CBT	Diagnosis of Major Depressive Disorder according to DSM-IV	BDI	Pre and post treatment	20 sessions of 1 hour, weekly for 16 weeks and fortnightly for 2 months	Not specified	Individual
Power & Freeman (2012)	157  60 Male,  97  Female	36.1  (11.3)	TAU,  CBT &  IPT	SCID diagnosis of depression	BDI	Pre and post treatment	IPT: 16 sessions  CBT: 12-16 sessions	5 months	Individual

Table 2.1: Characteristics table for working age adults (continued)

Rush, Beck, Kovacs & Hollon (1977)	41 15 Male, 26 Female	35.70	CT & Med	A "definite" depressive syndrome diagnosis according to the criteria of Feighner, Robins, Guze, Woodruff, Winokur, and Munoz (1972)	BDI	Pre-treatment and weekly including end of treatment	CBT: 20 sessions over 12 weeks Med: 1 weekly 20 minute session over 12 weeks	3 months and 6 months	Individual
Taylor & Marshall (1977)	28 8 Male, 20 Female	22.4 (2.6)	CT, BT, CBT & WCG	Beck Depression Inventory (BDI) scores of not less than 13.	BDI	Pre and post treatment	6 sessions of 40 minutes	5 weeks	Individual
Wagner, Horn & Maercker (2014)	62 22 Male, 40 Female	37.99 (11.41)	CBT (individual) & CBT (online)	Score of at least 12 on the Beck Depression Inventory (BDI-II)	BDI	Pre and post treatment	CBT individual: Weekly 1 hour sessions	3 months	Individual and online



Table 2.1: Characteristics table for working age adults (continued)

Wilson, Goldin, & Charbonneau-Powis (1983)	25  5 Male, 20 Female	39.5	BT, CT & WCG	Score of at least 17 on the Beck Depression Inventory	BDI	Pre, mid and post treatment	8 sessions of 1 hour	5 months	Individual
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\***ACT** = Acceptance and Commitment Therapy; **BA** = Behavioural Activation; **BT** = Behavioural Therapy; **CBT** = Cognitive Behavioural Therapy; **CT** = Cognitive Therapy; **DT** = Dynamic Psychotherapy; **IPT** = Interpersonal Therapy; **MCT** = Metacognitive therapy; **NT**= Narrative Therapy; **PE** = Physical exercise; **PEP** = psycho-educational prevention program; **PI** = psychodynamic-interpersonal psychotherapy; **PLA** = Placebo Control Group; **PPI** = Positive Psychology Intervention; **PSPS**= Psychodynamic supportive psychotherapy; **PST** = psychodynamic supportive therapy; **Med** = pharmacotherapy; **REBT** = rational-emotive behaviour therapy; **RFCBT** = rumination-focused cognitive behavioural therapy; **RxT** = Relaxation Therapy; **ST** = Schema Therapy; **TAU** = Treatment As Usual; **WCG** = Waitlist Control Group.

\*\***BDI** = Beck Depression Inventory; **HAM-D** = Hamilton Rating Scale for Depression; **PHQ-9** = Patient Health Questionnaire-9; **MADRS** = Montgomery-Åsberg Depression Rating Scale

Table 2.2: Characteristics table for older people

Author (date)	Sample size (N)	Age (mean (st.dev))	Comparison conditions*	Diagnosis of depression	Psychometric instrument **	Measurements	Session length	Follow up time	Intervention Method (format)
Arean et al. (1993)	75  19 Male, 56 Female	PST: 67.0 (7.5); RT: 66.7 (8.5); WCG 65.5 (6.3)	PST, RT & WCG	Meeting the RDC requirements for a diagnosis of unipolar, major depressive disorder	BDI	Pre and post treatment	12 weekly sessions of 1½ hours	3 months	Group
Beutler et al. (1987)	56  25 Male, 31 Female	Male 70.24 (3.40), female 71.16 (4.63)	Med, PLA; CT+PLA & CT+Med	Diagnosis of major, unipolar depression on DSM-III	BDI	Pre-treatment, at every session and post treatment	19 weekly sessions of 90 minutes	3 months	Group
Floyd et al. (2004)	46  11 Male, 35 Female	68	CPT, Bib & WCG	DSM-IV diagnosis of Major Depressive Disorder or Dysthymia and a score of 10 or higher on the Hamilton Rating Scale for Depression	HAM-D & GDS	Pre, mid, and post treatment	12 to 20 sessions	3 months	Individual

Table 2.2: Characteristics table for older people (continued)

Gallagher & Thompson (1982)	30  7 Male, 23 Female	BT: 66.0 (5.7); CT: 68.3 (7.7); BR: 69.0 (4.8)	BT, CT & BR	RDC diagnosis of current definite episode of non-psychotic major depressive disorder	BDI	Pre and post treatment	16 sessions in 12 weeks, 2x weekly for 4 weeks followed by weekly for 8 weeks	6 months and 12 months	Individual
Laidlaw et al. (2008)	40  11 Male, 29 Female	CBT: 74 (8.39); TAU: 74.05 (7.62)	CBT alone+ & TAU	Diagnosis of moderate major Depressive Episode using SCID DSM-IV diagnostic criteria	BDI & GDS	Pre and post treatment	2-17 sessions, average was 8 sessions (SD 4.7).	3 months and 6 months	Individual
Moss et al. (2012)	26  6 Male, 20 Female	77.5 (6.72)	BA (Bib) & DTCG	Score of 33 or greater on the modified Telephone Interview for Cognitive Status-Modified (TICS-M; Welsh, Breitner, & Magruder-Habib, 1993)	HAM-D & GDS	Pre and post treatment	4 weekly telephone check-ins of 10-15 minutes	1 month	Supported self-help

Table 2.2: Characteristics table for older people (continued)

Scogin, Jamison & Gochneaur (1989)	67 10 Male, 57 Female	68.3	CT (BiB), BT (BiB) & DTCG	Scoring of 10 or higher on the Hamilton Rating Scale for Depression	HAM-D & GDS	Pre and post treatment	4 weekly telephone check-ins of 5 minutes	6 months	Self-help
Serfaty, Haworth & Buszewicz (2009)	204 42 Male, 162 Female	74.1 (7.0)	TAU, TAU+TC & TAU+CBT.	Primary diagnosis of depressive disorder on Geriatric Mental State and History and Etiology Schedule and a score of 14 or higher on the BDI-II	BDI	Pre and post treatment	12 sessions maximum	4 months and 10 months	Individual
Steuer et al. (1984)	33 8 Male, 25 Female	Not specified.	CBT & PDT (group)	Diagnosis of major depressive disorder according to the criteria of the DSM-III	BDI & HAM-D	Pre-treatment, at 4, 8, 12 and 26 weeks, and post treatment	46 sessions of 1½ hours over 9 months, 2x week for 10 weeks followed by 1x week for 26 weeks	N/A	Group

Table 2.2: Characteristics table for older people (continued)

Thompson & Gallagher (1984)	61  20 Male, 41 Female	67	BT, CT, PT & WCG	Current episode of MDD/score above 14 on the HRSD and above 16 on the BDI;	HAM-D & BDI	Pre-treatment, at 6 weeks, and post treatment	10 sessions	6 weeks, and 3, 6, 12, 18, and 24 months	Group
Thompson, Gallagher & Breckenridge (1987)	95  31 Male, 64 Female	66.88 (6.17)	BT, CT, PDPT & DTCG	Diagnosed as having MDD using the Research Diagnostic Criteria (RDC)	HAM-D & BDI	Pre-treatment, at 6 weeks, and post treatment	16-20 sessions, 2x weekly for 4 weeks followed by 1x week afterwards	N/A	Individual
Thompson et al. (2001)	100  33 Male, 67 Female	66.8 (5.9)	Med, CBT & Med+CBT	Current diagnosis of major depressive disorder (MDD) as determined by the Research Diagnostic Criteria (RDC)	HAM-D & BDI	Pre and post treatment	16-20 sessions of 50-60 minutes over 3-4 months, 2x weekly for 4 weeks followed by weekly afterwards	N/A	Individual

\* **BA** = Behavioural Activation; **Bib** = bibliography; **BR** = Brief relational/insight psychotherapy; **BT** = Behavioural Therapy; **CPT** = Cognitive Psychotherapy; **CT** = Cognitive Therapy; **DTCG** = Delayed Treatment Control Group; **Med** = pharmacotherapy; **PLA** = Placebo Control Group; **PDPT** = Psychodynamic Psychotherapy; **PDT** = Psychodynamic group psychotherapy; **PT** = Psychodynamic Therapy; **PST** = Problem-Solving Therapy; **RT** = reminiscence therapy; **TAU** = Treatment As Usual; **TC** = Talking Control; **WCG** = Waitlist Control Group.

+ = CBT alone is psychological therapy allocation where participants are not receiving medication concurrently.

\*\***BDI** = Beck Depression Inventory; **HAM-D** = Hamilton Rating Scale for Depression; **GDS** = Geriatric Depression Scale.

## 2.5 Study quality

The quality of studies included in this meta-analysis was rated using the RCT of Psychotherapy Quality Rating Scale (RCT-PQRS: Gerber et al. 2011), a 25 item scale designed to assess the quality of psychotherapy RCTs. The scale uses items in six categories: 1) description of subjects, 2) definition and delivery of treatment, 3) outcome measures, 4) data analysis, 5) treatment assignment, and 6) overall quality of study (Kocsis et al. 2010). Due to the focus of this meta-analysis being on comparing pre and post data, one item from the scale (item 14) was excluded as this item assesses long-term post treatment outcomes.

First, a random selection of four papers was made to independently rate the methodological quality of the studies. This facilitated an understanding on the use of the RCT-PQRS. In addition, an inter-rater reliability score was established between AW and KL (study supervisor) at  $.94667 \approx 95\%$ .

With this inter-rater reliability score signifying a strong understanding of the RCT-PQRS, the next step involved rating all studies on methodological quality. An overview of the ratings can be viewed in Table 2.3 and table 2.4. A complete overview of scores for each research paper per item on the RCT-PQRS can be viewed in appendix one. In this appendix, two separate tables provide an overview of quality separately for the working age adult and older adult age groups.

Quality ratings for the articles were plotted using Microsoft Excel. The overall quality ratings varied amongst research articles from 28 to 49, with an average of 40.93 and a standard deviation of 5.03. The 95% confidence interval showed a lower limit of 39.13 and an upper limit of 42.73. An overview of the rankings for the study quality can be viewed in figure 2.3.

Table 2.3: RCT-PQRS scores for working age adults articles

Author (date)	RCT of Psychotherapy Quality Rating Scale (RCT-PQRS) score						
	Exceptionally poor	Very poor	Moderately poor	Average	Moderately good	Very good	Exceptionally good
Carlbring et al. (2013)					●		
Carter et al. (2013)						●	
Chaves et al. (2017)						●	
Connolly et al. (2016)					●		
Conradi et al. (2007)					●		
David et al. (2008)						●	
Dimidjian et al. (2006)						●	
Driessen et al. (2013)					●		
Farabaugh et al. (2015)					●		
Hallgren et al. (2016)					●		
Hollon et al. (1992)							●
Jordan et al. (2014)							●
Lemmens et al. (2015)						●	
Lopes et al. (2014)						●	
Power & Freeman (2012)				●			
Rush et al. (1977)						●	
Taylor & Marshall (1977)					●		
Wagner et al. (2014)					●		
Wilson et al. (1983)				●			



Table 2.4: RCT-PQRS scores for older people articles

Author (date)	RCT of Psychotherapy Quality Rating Scale (RCT-PQRS) score						
	Exceptionally poor	Very poor	Moderately poor	Average	Moderately good	Very good	Exceptionally good
Arean et al. (1993)					●		
Beutler et al. (1987)						●	
Floyd et al. (2004)						●	
Gallagher & Thompson (1982)						●	
Laidlaw et al. (2008)						●	
Moss et al. (2012)					●		
Scogin et al. (1989)				●			
Serfaty et al. (2009)							●
Steuer et al. (1984)						●	
Thompson & Gallagher (1984)					●		
Thompson Gallagher & Breckenridge (1987)						●	
Thompson et al. (2001)						●	

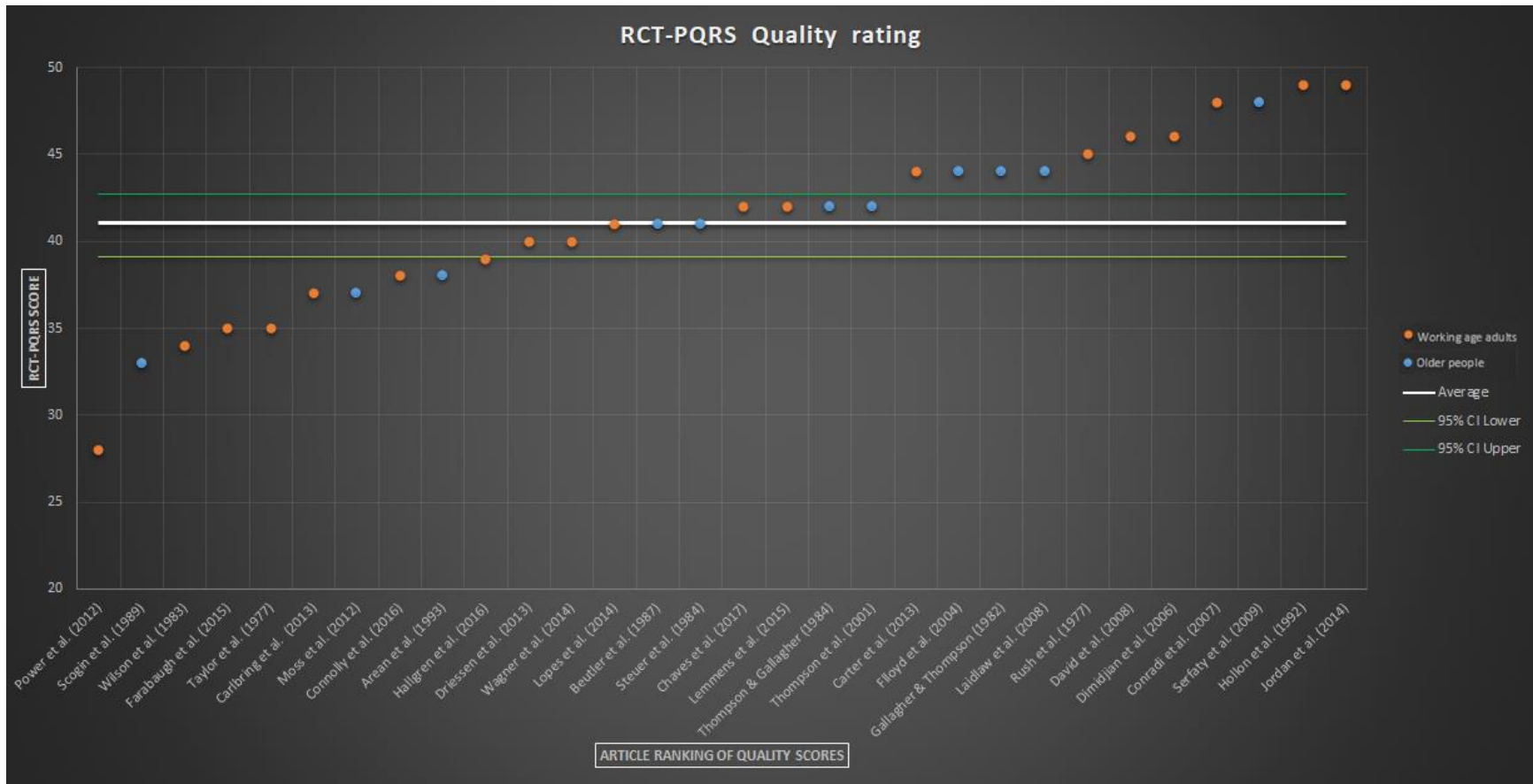


Figure 2.3: RCT-PQRS quality score ratings for articles

## 2.6 Data analysis

Data from CBT treatment and control treatment groups obtained from the articles were analysed using Comprehensive Meta-analysis Software and MAVIS: Meta-Analysis via Shiny (Borenstein et al. 2011). The effect size metric used in calculations was Hedges'  $g$ , rather than Cohen's  $d$ , to adjust for an overestimation in effect size with the smaller number of studies included in this meta-analysis. Data was analysed in accordance with the research question and evaluated via the following approaches.

### 2.6.1 Research Questions and approach to analysis

- 1) Post treatment effect size using data from CBT groups compared to alternative treatment groups were analysed to provide a controlled CBT efficacy comparison. Following the main calculation, a subgroup analysis investigated differences between age groups.
- 2) A subgroup calculation on post treatment data from CBT and alternative treatment was completed. This calculation investigates outcomes between CBT and active (psychological or pharmacological) treatments solely. Main analysis also followed with a subgroup analysis to compare results between age groups.
- 3) Another subgroup analysis compared post treatment data from CBT with non-active treatment (treatment as usual, wait list and delayed treatment). Here too, a between groups calculation of the two age groups through subgroup analysis was completed.
- 4) A second methodological approach applied a pre-post effect size calculation in both the working age adults and older people group using only CBT treatment was carried out. This provides an uncontrolled comparison with the effect size focussing on CBT treatment efficacy. Following this calculation, a subgroup analysis was carried out to compare effect size outcomes between working age adults and older people.
- 5) Main calculations were followed by a moderator analysis investigating the influence of CBT treatment format (individual, group or online) on effect size findings in pre-post treatment effect.
- 6) A final moderator analysis reviewed the influence of treatment duration (in months) on CBT treatment outcomes in CBT pre-post treatment effect.

Analysis included publication bias testing regression for funnel plot asymmetry using the weighted regression with multiplicative dispersion model. Open circles in funnel plots (where applicable) show missing null studies estimated through use of Duval and Tweedie's trim-and-fill method (Duval & Tweedie, 2000) and are added in the funnel plots. The Fail-safe N was calculated using both Rosenthal's and Orwin's approach to identify the robustness on both the statistical significance as well as substantive significance (Borenstein et al, 2011).

## **3.0 Results**

### **3.1 Analysis methodology**

Calculations comparing treatment outcomes of CBT for depression between working age adults and older people were completed through use of two methodologically different statistical analyses.

The first methodological approach involved a between groups comparison. For this analysis, the post treatment data of CBT treatment is compared to post treatment data of control groups providing a randomised controlled indication of CBT efficacy. Control groups were either active treatment (e.g. a form of psychological therapy) or non-active treatment (e.g. treatment as usual). Further, to compare treatment outcomes between the two age groups, a moderator analysis follows this analysis separating the two age groups allowing the investigation of scores for each age group individually. Subsequently, sensitivity analyses were carried out in separating different control groups. The control groups were separated into either being active treatment (including medication) or non-active treatment (treatment as usual, wait list control or delayed treatment).

A second methodology to data analysis focussed on calculating pre-post outcome of CBT treatment. Obtaining an overall effect for CBT solely through this analysis, the calculation provides an indication of treatment efficacy for CBT as a psychological treatment. Adding a moderator analysis to compare outcomes of the working age adults and older people age groups with each other, further allows the evaluation of efficacy in CBT treatment.

Calculations for sensitivity analyses were completed through use of meta-regression and investigated the prediction of factors towards the effect sizes of research articles within the selection of articles.

### **3.2. Data analysis**

#### **3.2.1 CBT efficacy compared to other treatments**

The first methodological approach focussed on a between group comparison. All but one articles were included in this analysis (based on criteria) as all research included in the meta-analysis involved a CBT treatment group and a type of comparison group. However, Driessen et al (2013) had to be excluded in analysis as insufficient data was available from the paper required for completing this methodological

approach. The analysis included 30 papers, with a combined total of  $n = 3707$  participants of which  $n = 2874$  for working age adults and  $n = 833$  for older adults. Analysing the between group comparison, a random effects model was used to calculate post treatment data from the CBT treatment group compared to post treatment data for control conditions. Effect sizes ranged from  $-2.57$  to  $0.25$ . For an overview of the effect size distribution, see the forest plot (see figure 3.1). From the forest plot it is visible three articles are outliers, namely Taylor et al (1977), Wilson et al (1983) and Flloyd et al (2004). As with the pre-post effect methodological analysis, these outliers were not excluded as they met inclusion criteria for the meta-analysis though it is evident the outcomes of these studies influence overall outcome.

The overall effect size for CBT treatment outcome compared to other treatments showed a statistically significant effect  $g = -.36$  (95% CI =  $-0.49$  to  $-0.22$ ) in favour of CBT treatment ( $Z = -5.22$ ,  $p < .0005$ ). Study heterogeneity amongst the included studies was  $I^2 = 47\%$ , supporting a statistically quite different finding in treatment effect amongst studies included in the analysis. The distribution can be observed in the funnel plot (see figure 3.2). Publication bias calculations showed a statistically significant result  $t = -2.06$ ,  $df = 28$ ,  $p = .049$ . Using the Duval and Treedie trim-and-fill method to calculate the result with missing null studies included ( $k = 30$ ) showed an overall effect size of  $g = -.35$  (95% CI =  $-0.5$  to  $-0.21$ ). This indicates a statistically significant effect in favour of CBT treatment.

Analysis of the Rosenthal's Fail-safe showed an observed significance level of  $< .0005$  (target significance level  $0.05$ ), with a suggested 622 failed trials necessary to succeed the two-tailed  $p$ -value. Orwin's fail-safe with  $1.0$  as the mean risk ratio and criterion for a 'trivial' Hedge's  $g$  at  $-0.2$  for a small effect showed  $n = 77$  studies showing a quite robust effect.

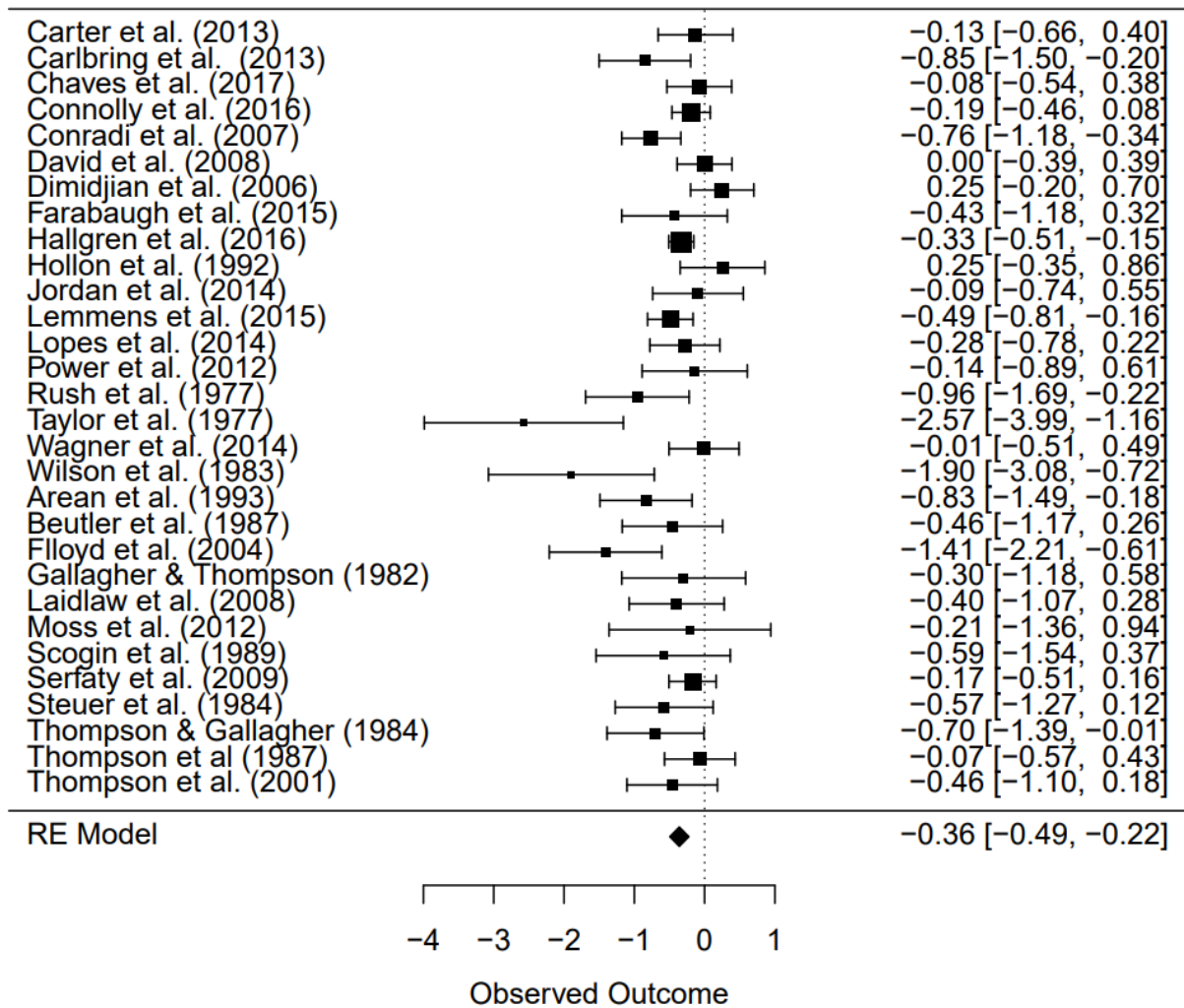


Figure 3.1: Forest plot for effect size post treatment CBT versus control conditions

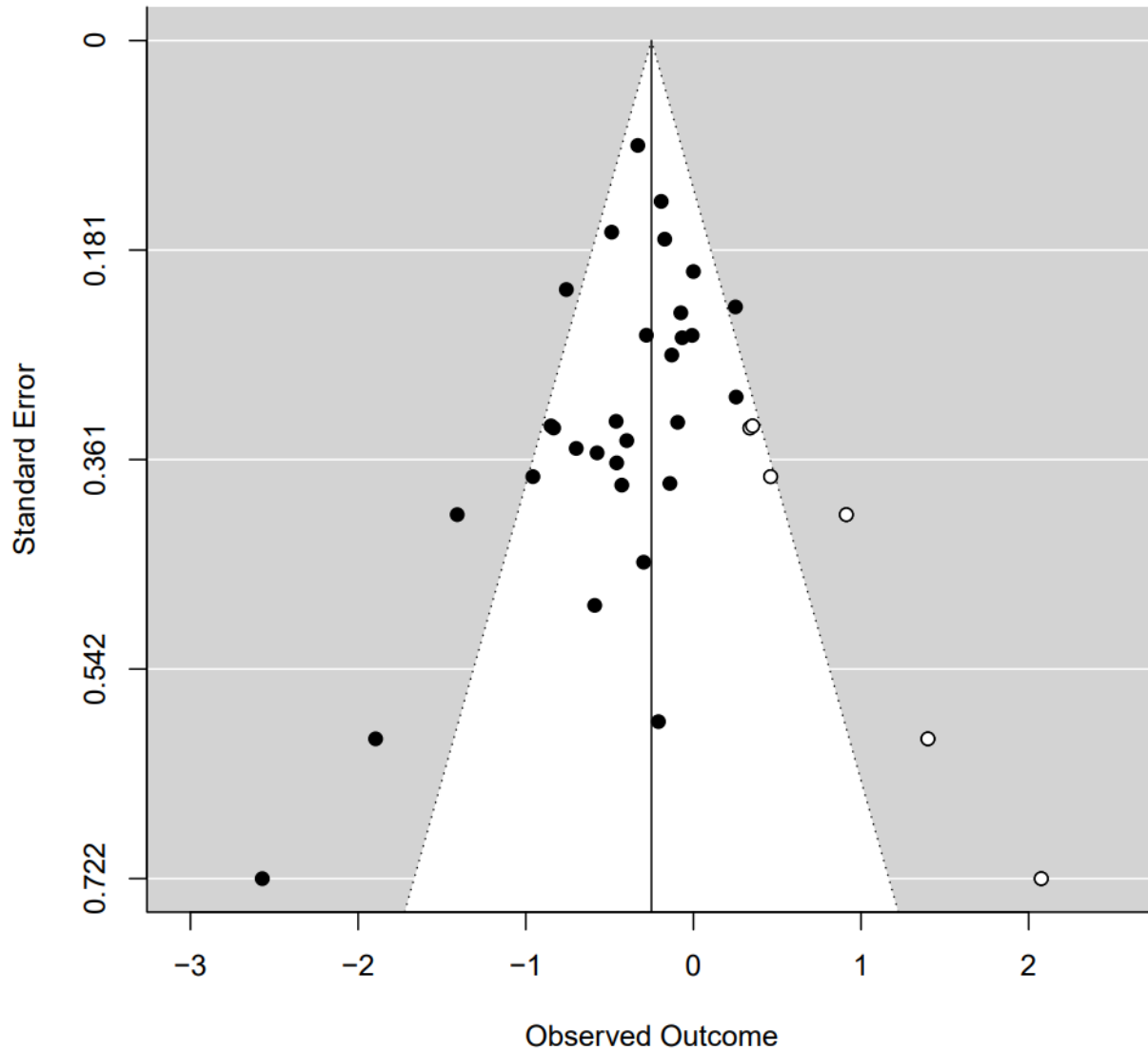


Figure 3.2: Funnel plot for distribution of post treatment CBT versus control conditions

The moderator analysis in this CBT compared to other treatment analysis included a random effects comparison calculation (see table 3.1). To establish whether there is a statistical difference between working age adults and older people, heterogeneity (Q) was reviewed for the effect sizes of the two age groups. The random effect model test for heterogeneity showed  $Q_{\text{between}}(df = 28) = 1.37$ , with  $p = .24$ . Due to the non-significant finding, this calculation suggests there are no statistically significant differences in terms of effect sizes between working age adults and older people in the CBT versus control conditions comparison.



Table 3.1: Moderator analysis for post treatment CBT versus control conditions

Moderator*	N	Estimate (G)	Variance	SE	CI low	CI high	Z	p	Q	Df	P.h.	I <sup>2</sup>
<b>WAA</b>	18	-0.290	0.003	0.050	-0.39	-0.19	-5.76	<.001	43.85	17	0.000	61%
<b>OP</b>	12	-0.413	0.009	0.092	-0.59	-0.23	-4.48	<.001	12.57	11	0.322	12%
<b>Overall</b>	30	-0.319	0.002	0.044	-0.41	-0.23	-7.21	<.001	57.78	29	0.0012	50%

\* **WAA** = Working Age Adults; **OP** = Older People

### 3.2.1.1 Sensitivity analysis of post treatment CBT and active control

Subsequently to the overall statistical analysis, sensitivity calculations were carried out. In this methodological approach, two types of sensitivity calculations were completed involving comparison between CBT treatment outcomes and control group outcomes.

The first control group comparison was made between CBT treatment and active treatment groups. This includes post treatment data in the working age adults and older people age groups comparing CBT to active treatment including a psychological treatment (e.g. Interpersonal Therapy, Metacognitive therapy, or Narrative Therapy) or medication. Calculations in the working age adult group included the following papers which encompassed CBT and an active treatment as comparison condition (n = 10): Carter et al (2013), Chaves et al (2017), Connolley et al (2016), David et al (2008), Dimijian et al (2006), Farabaugh et al (2015), Hollon et al (1992), Jordan et al (2014), Lopez et al (2014), and Rush et al (1977). Articles comparing CBT with an active treatment in the older adult group are (n = 6): Gallagher & Thompson (1982), Moss et al (2012), Scogin, Jamison & Gochneaur (1989) and Steuer et al (1984), Thompson, Gallagher & Breckenridge (1987), and Thompson et al (2001). All papers combined included a total of n = 1480 participants, consisting of n = 1129 participants from working age adult papers and n = 351 for older adult papers.

Using a random effect model showed a statistical overall effect size of  $g = -.16$  (95% CI = -0.29 to -0.03). Comparing CBT to other active treatments indicated a statistically significant effect for CBT with  $Z = -2.35$  and  $p < .02$ . Heterogeneity amongst articles in this calculation scored  $I^2 = 0\%$ , a percentage reflecting statistically no difference between findings in the study outcomes. The Duval and Treedie trim-and-fill

method calculation did not produce a result. Failing to include additional missing null studies indicates the calculation could not usefully improve on the overall effect.

Further investigating the significant overall effect, a moderator analysis was completed comparing the outcomes between the two age groups (see table 3.3). Analysis showed no statistically significant effects between CBT and active treatment for working age adults ( $g = -.12$ , 95% CI = -0.26 to 0.03,  $Z = -1.55$ ,  $p = .12$ ). However, a statistically significant difference was found for the older people age group favouring CBT over alternative active treatments with  $g = -.44$  (95% CI = -0.62 to -0.03,  $Z = -2.16$ ,  $p = .03$ ). Investigating the statistical difference between the two age groups (heterogeneity), effect sizes of the two age groups were compared. Heterogeneity showed  $Q_{\text{between}}(df = 15) = 1.53$ , with  $p = .22$ . With a non-significant outcome, findings indicate there is no statistically significant difference between effect sizes of working age adults and older people when considering CBT treatment compared to active treatment.

Table 3.3: Moderator analysis for post treatment CBT with active treatment comparison

Moderator*	N	Estimate (G)	Variance	SE	CI low	CI high	Z	p	Q	Df	P.h.	I <sup>2</sup>
<b>WAA</b>	10	-.116	0.006	0.075	-0.26	0.03	-1.55	.122	10.773	9	0.068	16%
<b>OP</b>	6	-.324	0.023	0.15	-0.62	-0.03	-2.16	.030	2.015	5	0.847	0%
<b>Overall</b>	16	-.158	0.005	0.067	-0.29	-0.03	-2.35	.019	14.322	15	0.501	0%

\* **WAA** = Working Age Adults; **OP** = Older People

### 3.2.1.2 Sensitivity analysis post treatment CBT and non-active control

Following the comparison between CBT and active treatment control conditions, a second sensitivity analysis in this methodology involved a comparison calculation between CBT and non-active treatments. For this calculation, articles were included with CBT and a control comparison group (treatment as usual, wait list and delayed treatment) or a placebo condition. Articles included in this meta-analysis and meeting the criteria for this calculation in the working age adult group are ( $n = 8$ ): Carlbring et al (2013), Conradi et al (2007), Hallgren et al (2016), Lemmens et al (2015), Power et al (2012), Taylor et al (1977), Wagner et al (2014), and Wilson et al (1983). Comparing a CBT treatment group with a control comparison group in the older adult group are the following articles ( $n = 6$ ): Areal et al (1993), Beutler et al (1987), Filloyd et al (2004), Laidlaw et al (2008), Serfaty et al (2009), and Thompson & Gallagher (1984). These articles

included all together a sum of  $n = 2568$  participants, of which  $n = 1745$  for the working age adults and  $n = 482$  for older people.

The random effect model showed a medium effect size with  $g = -0.59$  (95% CI = -0.82 to -0.36), significantly favouring CBT treatment over control conditions ( $Z = -5.02, p < .001$ ). Analysis of heterogeneity amongst articles resulted in  $I^2 = 63\%$ , indicating quite different findings between articles. A moderator analysis showed the outcomes in this analysis for the two age groups individually indicating statistically significant results in both age groups (see table 3.4). Completing a heterogeneity analysis between the two age groups showed a non-significant difference ( $Q_{\text{between}} = 0.07, p_{\text{(two-tailed)}} = .8$ ). This non-significant finding supports the favourable effect of CBT compared to control treatments for both working age adults and older people.

Table 3.4: Moderator analysis for post treatment CBT with control treatment comparison

Moderator*	N	Estimate (G)	Variance	SE	CI low	CI high	Z	p	Q	Df	P.h.	I <sup>2</sup>
<b>WAA</b>	8	-.594	0.025	0.159	-0.906	-0.283	-3.742	<.0005	23.293	7	0.004	70%
<b>OP</b>	6	-.595	0.036	0.19	-0.967	-0.224	-3.141	.002	9.981	5	0.076	50%
<b>Overall</b>	14	-.595	0.015	0.122	-0.833	-0.356	-4.886	<.001	33.340	13	0.002	61%

\* **WAA** = Working Age Adults; **OP** = Older People

### 3.2.2 CBT treatment efficacy CBT pre-post effect sizes

The second statistical analysis focussed on the comparison of treatment efficacy for CBT with all active treatments between the working age adults and older people. This comparison provides an overall treatment efficacy for CBT. All articles were included as all research involved a CBT treatment group. The combined articles provided a total of  $n = 4048$  participants, with  $n = 3215$  for working age adults and  $n = 833$  for older adults.

The random effects analysis model calculation of pre-post data of CBT treatment on both age groups showed ranging effect sizes (Hedge's  $g$ ) from .02 to 3.13, with an overall effect size  $g = 1.43$  (95% CI = 1.19 to 1.66). An overview of the effect sizes per study can be observed in a forest plot (see figure 3.3 below). From the forest plot it can be observed that there were a few outliers, namely Dimidjian et al (2006), Rush et al (1977), Taylor et al (1977), Wilson et al (1983), and Flloyd et al (2004). Outliers were not excluded

from the analysis as they met inclusion criteria for this meta-analysis, however it should be noted that their outcomes influence the overall finding. This effect size supports a large effect for CBT treatment in both the working age adult and older people age groups ( $Z = 11.67, p < .0005$ ). Analysis of heterogeneity resulted in  $I^2 = 85\%$ , showing a statistically different treatment effect between the studies. The distributions for effect can be viewed in the funnel plot (see figure 3.4). Investigations in publication bias found a significant result ( $t = 2.63, df = 29, p = .01$ ), indicating evidence of bias. Calculating the result with missing null studies estimated through use of Duval and Treedie's trim-and-fill method ( $k = 31$ ) resulted in an overall effect size of  $g = 1.19$  (95% CI = 0.74 to 1.64). Thus, a large effect for CBT treatment remains ( $Z = 5.19, p < .002$ ).

The fail-safe calculation using the Rosenthal approach found an observed significance level of  $p = <.0005$  (target significance level: 0.05). With the fail-safe suggesting 8190 failed trials are required to exceed the two-tailed  $p$ -value, the effect size found in this calculation appears to be robust. Calculation of Orwin's fail-safe N is 41 with 1.0 as the mean risk ratio in missing studies, and the criterion for a 'trivial' Hedge's  $g$  set at 0.5 for a medium effect. Adjusting the 'trivial' effect to 0.2 (small effect) resulted in Orwin's fail-safe N at 149 studies.

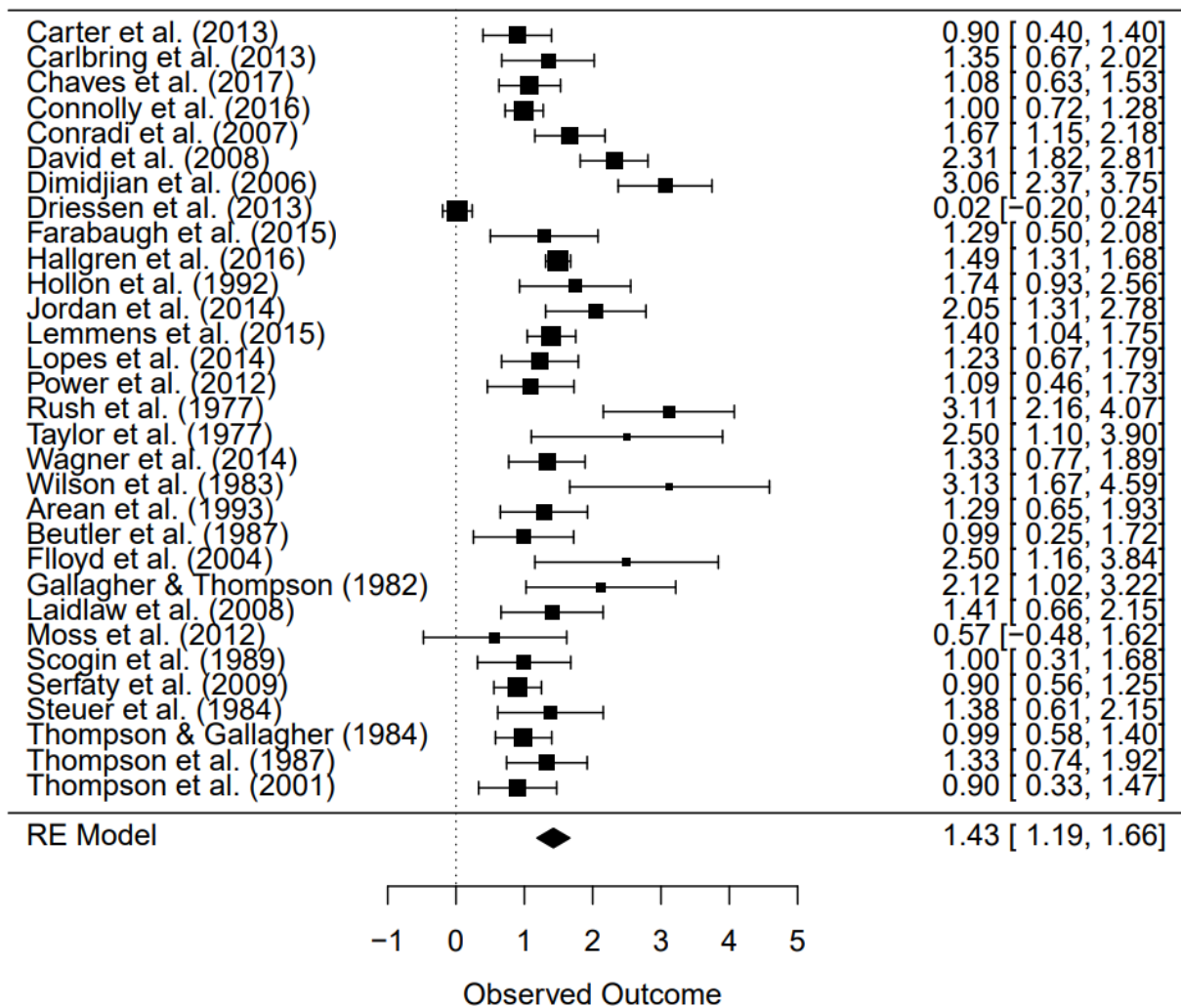


Figure 3.3: Forest plot random effect model pre-post CBT treatment

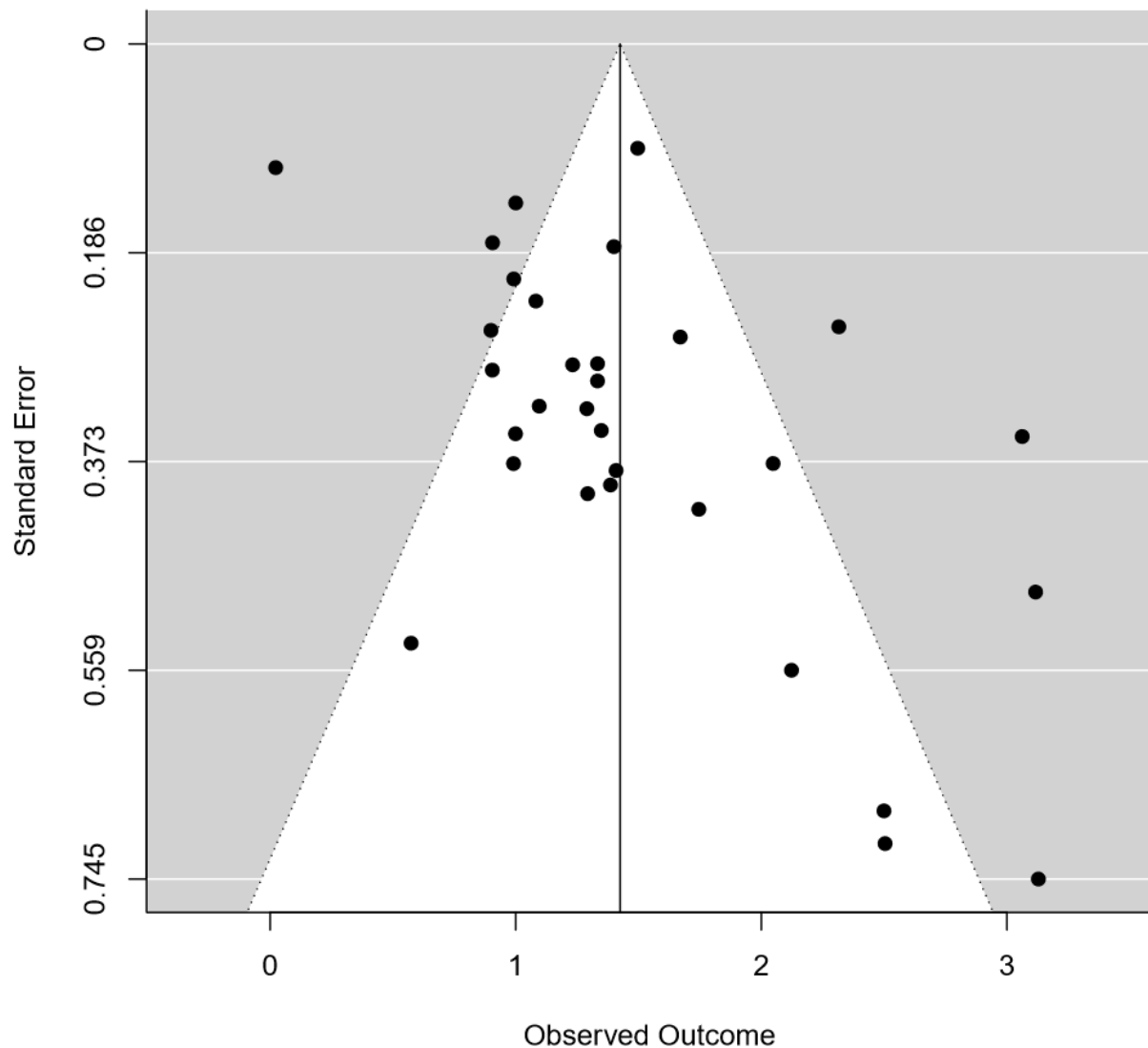


Figure 3.4: Funnel plot distribution of articles for pre-post CBT treatment

Results of the moderator analysis for the pre post treatment effect of CBT including both age groups is showed in table 3.2. Then, a comparison calculation was reviewed for the pre-post effect size difference between the working age adult and older people groups. This calculation allows to establish whether there is a statistical difference, or heterogeneity (Q), between the effect sizes of the two age groups. The random effect model test for heterogeneity showed  $Q_{\text{between}}(df = 29) = 0.62$ , with  $p = .43$ . This non-significant  $p$ -value indicates there is no statistically significant difference recorded for CBT treatment (based on pre-post

treatment effect) in comparison to age group (e.g. working age adults versus older people for CBT treatment outcome).

Table 3.2: Moderator analysis for CBT pre-post treatment effect

Moderator*	N	Estimate (G)	Variance	SE	CI low	CI high	Z	p	Q	Df	P.h.	I <sup>2</sup>
<b>WAA</b>	19	1.180	0.002	0.049	1.08	1.28	24.17	<.001	212.37	18	0.000	92%
<b>OP</b>	12	1.099	0.008	0.09	0.92	1.28	12.26	<.001	12.71	11	0.313	13%
<b>Overall</b>	31	1.161	0.002	0.043	1.08	1.25	27.09	<.001	225.70	31	0.000	87%

\* **WAA** = Working Age Adults; **OP** = Older People

### 3.2.3 Moderator analyses

Following calculations to determine the overall efficacy of CBT treatment and comparing the age groups, two subgroup analyses were completed. These subgroup analyses aimed to further investigate influences on statistical outcomes through differences in research from the articles included. The subgroup analyses focused on post CBT treatment and alternative treatment outcome data. Through this, an increased understanding of the validity of statistical findings can be provided.

#### 3.2.3.1 Moderator analysis CBT treatment format

Firstly, a moderator meta-regression analysis was completed looking at impact of intervention format on treatment outcomes. Intervention formats were provided in either individual, group or online settings. In this analysis, all articles (n = 31) were included encompassing 4048 participants in the calculations, with n = 3215 for working age adults and n = 833 for older adults.

The ANOVA resulted in a non-significant meta-regression model with  $F_{(3,27)} = 0.22$ ,  $p > .05$  (see table 3.5). Results for meta-regression investigating the treatment formats indicated non-significant statistical difference in effect size between for each type of intervention method (see table 3.6).

Table 3.5: ANOVA calculation for intervention format sensitivity analysis

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	0,253	0.084	0.215	0.889
Residual	27	10,598	0.393		
Total	30	10.851			

Table 3.6: regression statistics for intervention format sensitivity analysis

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-1,069	0,778	-1,374	0,181	-2,666	0,528
Individual	0,589	0,767	0,768	0,449	-0,985	2,163
Group	0,566	0,827	0,684	0,500	-1,132	2,263
Online	0,472	0,640	0,738	0,467	-0,841	1,786

### 3.2.5.2 Moderator analysis CBT treatment duration

A second moderator meta-regression investigated whether duration of treatment influenced treatment outcomes. This analysis incorporated the variable of treatment length (in months). Analysis was completed including all articles ( $n = 31$ ) resulting in a total of 4048 participants,  $n = 3215$  for working age adults and  $n = 833$  for older adults.

The ANOVA showed a non-significant meta-regression model,  $F_{(1,27)} = 2.75$ ,  $p > .05$  (see table 3.7). Treatment duration (length in amount of months) as a predictor for treatment effect size resulted in a non-significant contribution with its coefficient at 0.075,  $t = 1.658$ ,  $p = 0.12$ .

Table 3.7: ANOVA calculation for intervention length sensitivity analysis

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0,984	0,984	2,749	0,109
Residual	27	9,668	0,358		
Total	28	10,652			

Table 3.8: regression statistics for intervention length sensitivity analysis

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-0,799	0,214	-3,729	0,001	-1,239	-0,360
Duration	0,075	0,045	1,658	0,108	-0,018	0,168



## **4.0 Discussion**

### **4.1 Aims and findings**

The aim of this meta-analysis was to examine the efficacy of CBT treatment and investigate treatment outcomes between working age adults and older people.

Analysis investigating CBT treatment outcomes with alternative treatment (either active or non-active) showed a statistically significant benefit in favour of CBT. These findings support existing literature in the established effectiveness of CBT as a psychotherapy for depression (Cuijpers et al. 2008a; Cuijpers et al. 2013), and the lack of evidence for differential outcomes between CBT and alternative treatments (Cuijpers et al. 2017). Results were further examined in a subgroup analysis to compare outcomes for working age adults with older adults. When reviewing the age subgroup analysis, indicating no statistical difference in CBT efficacy between working age adults and older people, results in this meta-analysis are found to be supportive of those in existing literature. Existing literature has found that CBT is as efficacious in older people as working age adults (Cuijpers et al. 2009; Gould, Coulson & Howard, 2012; Karlin et al. 2015; Laidlaw, 2015). With the meta-analysis results concurring the effectiveness for CBT in older people compared to working age adults for CBT, this psychotherapy appears to, indeed, be an efficacious treatment for the older people age group as previously argued (Laidlaw & Wilkinson, 2018, in press). These results provide essential support to the under researched topic on efficacy of CBT between working age adults and older people (Chaplin et al. 2015; Cuijpers et al. 2014).

Comparing CBT with other active (psychological) treatments solely showed a small favourable outcome for CBT compared to other active treatments. A subgroup analysis on this outcome between the two age groups revealed a significant effect in treatment outcomes for the older people group, but a non-significant result was found for working age adults. However, the subgroup analysis showed no statistically different result in CBT treatment efficacy between the two age groups. This result supports CBT efficacy in comparison with other active treatments in both age groups. Findings of the significant effect in older adults are supportive of IAPT data, where greater recovery rates were found in the treatment of older people with depression through CBT compared to working age adults (Cuijpers et al. 2009; Gould, Coulson & Howard, 2012; Karlin et al. 2015; Laidlaw, 2015; Chaplin et al. 2015). However, there is particular importance in the

statistically significant finding for the older adults. Due to the aging population, offering a new cohort of older people seeking psychological treatment, the implications of this result are in favour of providing CBT to older adults as results support the previously offered notion that older people are likely to benefit from CBT (Pinquart & Sorensen, 2001; Alexopolous, 2005; Scogin et al. 2005; Frazer et al. 2005; Cuijpers et al. 2006; Pinquart, Duberstein & Lyness, 2008; Laidlaw et al. 2008; Laidlaw et al. 2018). The particular implication for this finding lies with current treatment for depression in older people is often provided by general practitioners by means of pharmacological support (Laidlaw et al. 2008). This whilst findings in this meta-analysis support existing literature in the benefit of CBT treatment over other psychotherapeutic or pharmacological treatment.

In the investigation of CBT efficacy compared to alternative treatments, a subgroup analysis found a significant effect in comparing CBT with non-active treatment control groups. The result in this analysis is consistent with existing literature, as research studies investigating CBT efficacy with wait list or delayed treatment control groups found the same outcome (Scogin, Jamison & Gochneaur, 1989; Churchill et al. 2001; Cuijpers et al. 2006; Moss et al. 2012). Reviewing non-active treatment outcomes for working age adults with older people in a subgroup analysis showed significant benefits for CBT in both age groups with no statistical difference in efficacy. This finding is in line with existing literature showing effectiveness of depression treatment in older people through CBT over non-active treatment (Cuijpers et al. 2008c).

Analysis on pre-post treatment data showed CBT is a significant efficacious treatment for depression. Consistent with research literature, the finding agrees with the statement of CBT being established as a beneficial treatment over receiving no treatment (Dobsen, 1989; Gloaguen et al. 1998; Cuijpers et al. 2013). With no statistical difference in efficacy found between working age adults and older people in a subgroup analysis, CBT was shown to be equally beneficial in both age groups. In this subgroup analysis it should be noted that heterogeneity showed 85% amongst the studies included, which suggests high variability in this finding. The subgroup analysis showed a relative low heterogeneity for older people ( $I^2=13\%$ ), compared to a high heterogeneity ( $I^2=92\%$ ) in working age adults suggesting the overall heterogeneity is largely influenced by working age adult studies. Therefore, the outcome of this analysis comparing pre-post treatment data for CBT treatment provides a more robust outcome for older people. These findings are consistent with results in existing literature on equal benefits from CBT treatment for working age adults

and older people (Pinquart & Sorensen, 2001; Alexopolous, 2005; Scogin et al. 2005; Frazer et al. 2005; Cuijpers et al. 2006; Pinquart, Duberstein & Lyness, 2008; Laidlaw et al. 2008). The greater consistency (heterogeneity) in the results for older adults in this meta-analysis may be ascribed to older people reporting to have more positive attitudes towards psychological therapies compared to working age adults (Knight et al. 2006; Quinn, Laidlaw & Murray, 2009). Importance for the implication of this finding lies with the stigma attached to older people being reluctant to seek psychological therapy, or therapists' beliefs of older people not benefitting from psychological therapies (Knight, 2004; Laidlaw, Thompson & Gallagher-Thompson, 2004; Laidlaw & McAlpine, 2008).

Moderator analyses revealed that neither intervention format or intervention duration influenced effect sizes in CBT pre-post treatment data analysis. These results were consistent in both age groups. Potential confounders for this result may be, for example, it being easier to get access psychological services for the working age group. The older people age group may have difficulties accessing psychological services due to the common misbelief that older people don't respond to, or are not open to receiving, psychological support (Steuer et al. 1984; Thompson & Gallagher, 1984). Additionally, there may be an influence from therapists' beliefs, or uncertainty, to treat older people as they might be (perceived to be) more difficult to treat as a result of (physical) comorbidities or the reason for onset of depression (different stage in life) (Knight, 2004; Laidlaw, Thompson & Gallagher-Thompson, 2004; Laidlaw & McAlpine, 2008). Similarly, older people may have difficulties with accessing online treatment formats due to a lack of access to a computer/internet. Working age adults are faced with the difficulty of finding time for appointments, as they are likely to be working and would need to make time for the appointments should these be completed in an individual or group setting. Working age adults may find it more appealing though to attend individual sessions compared to group sessions, as group sessions are run at fixed times. A treatment benefit for older adults in group intervention format may be due to the social aspect, which may relief some of the loneliness experienced by older adults (Steuer et al. 1984). These factors may influence recruitment and drop outs in research studies included in this meta-analysis. However, it may be argued that as both age groups may have faced challenges, potentially providing confounding variables, these confounding variables could be equalled out between them.

In addition, differences may be observed in heterogeneity between the working age adults and older people age groups. Throughout data analysis, a noteworthy lower heterogeneity can be observed in the older people age group compared to the working age adults. The low, and occasionally non-existing, heterogeneity provides a strong foundation for the statistical findings and offers evidence that research articles included in this meta-analysis for the older people age group measure the same effect and are comparable amongst each other. Therefore, analyses outcomes in this meta-analysis support the notion that CBT is an efficacious, problem-focussed, skill enhancing, and present-orientated treatment for older people as much as it is for working age adults. Reviewing the existing literature this is not an unexpected overall finding (Cuijpers et al. 2009; Gould, Coulson & Howard, 2012; Karlin et al. 2015; Laidlaw, 2015; Laidlaw & Wilkinson, 2018, in press).

#### 4.2 Limitations and strengths

Previously to completing the screening process caution was taken as inclusion and exclusion criteria were defined in line with the research question. These criteria were set for both the working age adults and older people age groups, in order to maintain homogeneity between articles included in analysis. Despite the natural differences between studies, this measure allowed for a fair comparison between outcomes and reduced the criticism meta-analyses often face of comparing apples with oranges (Borenstein et al. 2011). Relative success from implementing this measure can be observed from the low to medium heterogeneity in the working age adult articles and very low to non-existing heterogeneity amongst older people articles.

During the screening process, relevant and irrelevant articles were separated. Relevant articles were included in the meta-analysis and data was extracted. Unfortunately, some articles reported pre-treatment data but no post-treatment data. In a few cases, outcome data was calculated with provided outcome data, though this was not possible for all papers. Therefore, three articles who did meet inclusion criteria had to be excluded due to lack of data required for analysis.

One particularly important criteria included in this meta-analysis is articles needed to implement an intention to treat analysis. By applying an intention to treat analysis a real life comparison can be made, as not all patients will always complete an entire course of treatment. Thus, bias of outcomes in favour of a particular treatment is reduced when, for example, patients drop out when they do not perceive any benefits.

Additionally, by applying an intention to treat criteria it reduces the risk of selection bias within the meta-analysis (Kishita & Laidlaw, 2017). It should be noted that this criteria had to be adapted for the older people research articles due to the timeframe the research was conducted in, taking into account standards of research at the time the research was completed. As standards have evolved with time and quality has improved this reflects in improved study design (e.g. implementing an intent to treat design). The adaptation to include studies without an intent to treat design was necessary to prevent unnecessarily excluding relevant and valid papers into the meta-analysis.

The sample size in this meta-analysis consisted of 19 studies for working age adults and 12 studies for older people, including a total of 4048 participants with 3215 being working age adults and 833 older people. Meta-analysis research currently available in literature on CBT efficacy for older adults has included small sample sizes and found significant benefits for CBT in working age adults and older people (Gallagher and Thompson, 1982; Steuer et al. 1984; Cuijpers et al. 2006). Whilst subsequent research confirmed these initial beneficial findings with increasing sample sizes, this successive research did not focus on CBT solely (and included a variety of different psychotherapies), limiting the potential to interpret benefits for CBT as a psychotherapy. Moreover, research focussed on either working age adults or older adults, missing on the opportunity to sample the full range of ages on people accessing psychotherapy services. This meta-analysis aimed to provide a full sample of ages by including working age adults and older people, and set criteria to include studies in the analysis which allowed to provide meaningful outcomes. Reviewing the analyses of this meta-analysis, outcomes consistently show statistically significant benefits for CBT in working age adults and older people. This provides power to accept the alternative hypothesis (there being a difference, or in this case, a benefit in favour of CBT treatment), and to reject the null hypothesis. The power to reject the null hypothesis would be indicative of an ample sample size. As more research is carried out on CBT efficacy in older adults, subsequent meta-analyses may include a larger sample sizes. This follows the pattern of previous research where sample sizes were increased, however could now focus on CBT solely.

The population sample in this meta-analysis ranged in age from 22.4 to 51.65 years old for working age adults, and 66.8 to 77.5 years old for older people. The two age groups averaged on 37.99 and 63.96

years old respectively. As working age adults were identified in the age criterion as being between 18 and 65 years old (average being 41.5) and the age criterion for older adults was 60+, this sample appears, on face value, to appropriately represent the population. Nevertheless, the increasingly aging population provides a new cohort of older people who are likely to be different at least in terms of chronological age. This is of importance as therapists are increasingly likely to come in contact with octogenarian (80+ year olds) and nonagenarian (90+ year olds). Age distribution of the population sample in this meta-analysis does not attend to these ages, and research evidence on CBT benefits are currently under researched. Future research would benefit from exploring CBT efficacy in people in their eighties and nineties as we have no evidence for how well CBT functions with the oldest-old (Laidlaw, 2018).

#### 4.3 Methodology: reviewing the bias potential

This meta-analysis applied two methodological approaches in answering the research question to investigate treatment outcomes for depression between working age adults and older people. First, the investigation started with a comparison analysis of pre-post data solely on the CBT treatment data for both age groups. Completing this calculation allows to investigate the research question in investigating treatment differences in efficacy. It is argued, however, that pre-post treatment effect is not a reliable comparison due to a lack of control conditions (Cuijpers, et al 2017). A pre-post treatment analysis approach does, indeed, ignore control conditions by not including a controlled comparison group. However, by including this approach it also excluded the variety and differences between the control formats creating a homogeneous calculation of CBT efficacy. Another argument against the pre-post treatment data analysis methodology is the lack of consideration for natural recovery. Regardless of any measures taken to enhance quality within this meta-analysis, no measure in a pre-post outcome data can counteract this effect. Therefore, this meta-analysis reviewed the research question in a second methodological approach and included a statistical comparison of CBT treatment outcome data with control conditions. The comparison of CBT with control conditions provides a treatment effect of CBT in comparison with other treatments. This analysis was then reviewed for each age group individually through a moderator analysis to answer the research question. In order to ensure the outcomes of these two methodological calculations were meaningful and carried out appropriately to the research question, subgroup analyses were completed for

CBT individually with active treatment and non-active treatment control groups in addition. There is support for this methodological approach in data analysis as it takes into account the natural recovery which occurs during treatment. In addition, the subgroup analyses added to this methodology-reduced variability amongst differences in type of treatment control group for the comparison. However, treatment bias may also accompany these methodological analyses due to natural variability between and within the control groups of different research articles. Reviewing the two methodological approaches, it is evident that both are at risk of including some form of bias.

Another type of bias meta-analyses are prone to is the file drawer problem as studies with significant effects are more likely to be published than studies, which did not find an effect. In spite of this, it must be stated that this bias is a problem for all literature searches, including searching for articles, reviews and meta-analyses (Borenstein et al. 2011). Evidence of the file drawer problem can be seen in a meta-analysis through a publication bias, which tests this bias in a sample of relevant studies. In this meta-analysis both methodological approaches on the publication bias found a significant effect for Rosenthal's fail-safe N. Reviewing this approach through Orwin's fail-safe N showed a robust finding for the pre-post data effect size. Orwin's fail-safe N also indicated a quite robust finding for the CBT compared to alternative treatment effect.

The inclusion and exclusion criteria set for research articles was kept as similarly as possible for both age groups to aid valid comparisons. An exception had to be made for the age specifications defining both age groups, as working age adults were classed 18-65 years old older people 60 years and over. This creates a slight overlap due to the complication in reality, namely the contemporary aging population. This overlap represents a flaw in research evidence due to the aging population and the time span during which the research in this meta-analysis was conducted in. However, the overlap in age criteria was necessary to secure the inclusion of relevant and valid research articles.

Whilst search criteria allowed the age groups to overlap in age range for the literature searches, the ages in the population sample for the two age groups in this meta-analysis do not overlap. Therefore, the population provides a distinct separation of the two groups, not negatively affecting the ability to answer the research question or interpretation of the results.

In terms of the garbage in, garbage out bias, this meta-analysis focussed on including studies of substantial quality. One method of securing quality was setting inclusion and exclusion criteria. Articles included in the selection process were subsequently rated on the RCT-PQRS, which showed an average and above average quality for all studies included. This consideration of criteria and quality may yield the bias of ignoring important studies. However, as can be seen from the inclusion and exclusion criteria (set prior to literature searches), articles were selected on relevance towards answering the research question. Articles excluded from analysis (which did meet inclusion criteria) were only excluded due to a lack of data required for analysis.

With the aim of maintaining quality for this meta-analyses, and prevent unnecessarily excluding relevant research, outliers in data analyses were not excluded from the analysis as they met initially defined inclusion criteria for this meta-analysis. However, it should be noted that their outcomes influence the overall findings in the analyses.



## **5.0 Conclusion**

This meta-analysis reviewed literature on CBT efficacy for working age adults and older people to compare treatment outcomes. Data analysis comparing the CBT pre-post treatment effect showed a large statistically significant effect in favour of CBT treatment in both working age adults and older people. No statistically significant difference was found comparing treatment effects between the two age groups. Evaluation of CBT treatment outcomes in comparison with other psychological treatments showed a small, but statistically significant effect in favour of CBT. Analysis showed no statistically significant difference between the two age groups within this result. The first subgroup analysis, investigating CBT compared with active psychological treatments, showed a very small statistically significant effect favourable for CBT. The second subgroup analysis, comparing CBT with non-active treatments, showed a statistically significant medium effect in favour of CBT. Analyses comparing outcomes between the two age groups in both these subgroup analyses showed no statistically significant differences. Two moderator analyses into intervention format and intervention length were completed showing neither influenced the treatment effects found for in the analyses.

With the methodology approach implemented in this meta-analysis, results suggest to be relatively robust and meaningful in answering the research question. Thus, this meta-analysis accepts the hypothesis that CBT is an efficacious treatment for older people as much as it is for working age adults. This finding halts relevant implications for clinical settings when older people access these services, and the misconception that older people do not benefit from CBT may be rejected. The importance of these findings lie with the continuously aging population and a new cohort of individuals who will be demanding psychological therapies.

This meta-analysis was performed to further investigate the misconception that older people may not benefit from CBT, and to raise the importance of attending to older people who access this type of support as well as receive appropriate treatment. There is a large importance of findings from this meta-analysis due to the aging population and a new cohort of people seeking psychological support. Therefore, it is essential to adjust beliefs and approaches in treatment, for type of treatment offered as well as making reasonable adjustments during treatment where needed. Adjustment of treatment includes, for example,

using wisdom enhanced CBT to support and increase the number of older people accessing psychological services, increase treatment engagement and enhance treatment outcomes.

The recommendation for future research is to perform subsequent research into CBT efficacy in the older people age group continuing the investigations of treatment efficacy in this age group. More research may be conducted in the over 65 year olds, as research currently available is not performed with more modern methodologies (impacting on standards of research at the time the research was completed). If more research was available for the 65 year olds, additional meta-analyses could be conducted to further the comparison of treatment outcomes, thus treatment efficacy, with working age adults, and this could comprise larger sample sizes.

Another particular group of interest for future research are octogenarians (80+ year olds) and nonagenarians (90+ year olds). The necessity for attention to oldest-old age groups are due to the aging population which will start to offer increasing numbers of cases in clinical practice. In addition, clinical therapists may be advised to enhance implementation of CBT treatment with older people and enhance treatment with age appropriate support to optimise experience, reduce drop out and increase outcome benefits. Further investigation into support and resources on how to apply and adapt CBT with older people will aid the implementation of CBT with the older people age group.

Following this meta-analysis, clinical implications of the findings could be explored. This may involve bridging the gap between current clinical practices in providing treatment for depression in older people, which would, at present, in particular involve reviewing the benefit of offering CBT treatment over pharmacotherapy. In addition, a focus could be put on shifting therapists' perspective of CBT treatment for depression in older people. More specifically, the perspective of therapists on the older people's aging process, and shifting primary treatment aims to individual centred (and not age centred) symptoms.

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Table 7.2 RCT-PQRS score per item for older adults research articles

Author (year)	RCT-PQRS item																									Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
Arean et al. (1993)	2	2	1	1	2	2	1	1	0	2	2	2	0		1	2	2	1	1	2	2	1	1	2	5	38
Beutler et al. (1987)	2	2	0	1	2	2	2	2	0	2	2	1	1		1	2	1	1	0	2	2	2	2	2	5	41
Floyd et al. (2004)	2	2	0	2	2	2	1	2	1	2	2	1	2		0	2	2	2	2	2	2	2	2	2	5	44
Gallagher & Thompson (1982)	2	2	0	0	2	2	2	2	2	2	2	0	2		0	2	2	2	1	2	2	2	2	2	7	44
Laidlaw et al. (2008)	2	2	1	2	2	2	2	1	1	2	2	2	2		2	1	2	1	1	2	2	2	1	1	6	44
Moss et al. (2012)	2	2	0	2	2	2	0	0	0	2	2	0	0		2	2	2	2	0	2	2	2	2	2	5	37
Scogin et al. (1989)	2	2	1	1	2	2	0	0	0	2	2	0	1		0	1	2	2	0	2	2	2	2	1	4	33
Serfaty et al. (2009)	2	2	1	2	2	2	2	2	2	2	2	2	0		2	1	1	2	2	2	2	2	2	2	7	48
Steuer et al. (1984)	2	2	1	1	2	2	2	2	0	2	2	0	1		2	1	2	1	2	2	2	1	2	2	5	41
Thompson & Gallagher (1984)	2	2	2	2	2	2	0	0	2	2	2	0	1		0	1	2	1	2	2	1	2	1	2	5	38
Thompson et al. (1987)	2	2	1	0	2	2	2	2	1	2	2	0	1		0	2	2	2	1	2	2	2	2	2	6	42
Thompson et al. (2001)	2	2	2	2	2	2	2	0	2	2	2	0	0		2	0	2	2	0	2	2	2	2	2	6	42