

**Cognitive and Interpersonal Predictors and Moderators of Treatment  
Outcomes in Psychological Therapy for Depression**

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## **Part I. Executive Summary**

### **1. Overview**

The overarching aim of the thesis was to contribute to the growing field of personalised medicine for depression, which aims to optimise an individual's response to treatment on the basis of their unique characteristics and underlying mechanisms. Factors that predict response to therapy, particularly theorised processes, are crucial to the development, refinement and improvement of current psychotherapies. This thesis explored the role of cognitive and interpersonal factors and their relationship with treatment outcomes during psychological treatment for depression, with a specific focus on Cognitive Behaviour Therapy (CBT). Part II is a Systematic Review, which aimed to synthesise the existing literature on change in interpersonal functioning during CBT for depression, and its association with treatment outcomes. Part III is an Empirical Study, which explored the utility of measures of dysfunctional attitudes and interpersonal problems, as pre-treatment predictors or moderators of treatment outcomes in individuals receiving CBT or Interpersonal Therapy (IPT) for depression. Part IV integrates the findings from Parts II and III, provides reflections on the process and discusses the impact of the study and plans for dissemination.

### **2. Systematic Review**

Interpersonal difficulties are important in the cause and maintenance of depression. Despite the fact that CBT constitutes one of the most widely researched interventions for the treatment of depression, there is little consensus regarding the role of interpersonal functioning during therapy. The systematic review aimed to synthesise the existing research on change in interpersonal functioning during CBT, and its association with depression outcomes. To achieve these aims there were three review questions (RQs).



For individuals receiving CBT for depression:

RQ1. Does interpersonal functioning change between pre-treatment, post-treatment and follow-up, and does CBT differ from other psychological therapies with regard to this effect?

RQ2. Does pre-treatment interpersonal functioning predict or moderate depression outcomes?

RQ3. Is change in interpersonal functioning associated with depression outcomes?

Three databases (PsychINFO, PubMed and Web of Science) were systematically searched to identify potentially relevant studies. Search terms were determined using four concepts: depression; CBT; interpersonal functioning; and relationship.

The inclusion criteria were:

Participants: (a) adults; (b) with a diagnosis of depression; (c) receiving an acute-phase cognitive behavioural intervention in which depression was the primary focus of treatment

Studies: (d) use of at least one quantitative self-report measure of interpersonal functioning at baseline and/or post-treatment or follow-up; (e) relevant quantitative data provided on interpersonal functioning; (f) depression included as a primary outcome, measured using a validated self-report scale or diagnostic interview.

Following database screening, 18 studies across 21 articles were included in the review.

‘Interpersonal functioning’ was measured across three different self-report instruments: The Inventory of Interpersonal Problems; The Social Adjustment Scale; and The Outcome Questionnaire – Interpersonal Relations subscale. For each study, key information was extracted, including the main findings of relevance to each review question. Methodological quality was assessed using two different appraisal methods adapted for the review. The most common problems in terms of quality were treatment adherence and use of medication.

Data synthesis was organised according to each review question. Findings from included studies were synthesised and summarised narratively, supplemented by a meta-analysis for pre- to post-treatment change in interpersonal functioning.

RQ1. Fourteen studies were included in a meta-analysis of pre- to post-treatment change in interpersonal functioning. Overall, interpersonal functioning improved with a medium-to-large effect size following CBT for depression, however substantial heterogeneity was observed. Subgroup analyses for: type of instrument; CBT format; study quality; and length of treatment, did not substantially reduce heterogeneity. Seven studies included another psychological comparator group, however there was little evidence for a differential treatment effect; only two studies found a statistical difference in effect size, which favoured the comparator group.

RQ2. Nine studies reported on pre-treatment interpersonal functioning as a predictor or moderator of depression outcomes in CBT for depression. There was some evidence that higher levels of pre-treatment interpersonal distress predicted worse depression outcomes, however the findings were inconclusive. Some studies also suggested that specific interpersonal problems were predictors of outcomes. Four studies examined whether interpersonal functioning moderated outcomes in CBT compared to another psychological intervention; the findings were mixed - two studies found no differential treatment effect and two studies found significant interactions.

RQ3. Only four studies reported on the association between change in interpersonal functioning and change in depression over the course of CBT; all provided evidence that change in interpersonal functioning was associated with change in depression symptoms.

There were many limitations to the review. Evidence on the predictive utility of interpersonal functioning was limited by inconsistent reporting in the literature, which made it difficult to make comparisons and draw meaningful conclusions. At the review level, there may have been limits to number of studies identified, specific scales were not included as search terms, and the review only included self-report measures. There was also no second reviewer available at the data extraction and quality appraisal stage.

Overall, the evidence suggests that despite not being the explicit target of therapy, interpersonal functioning improves following CBT for depression. Further research is needed to understand the predictive and moderating role of interpersonal functioning on depression outcomes.

### **3. Empirical Study**

Psychological therapies for depression are effective, however individuals vary substantially in treatment response. CBT and IPT are both recommended by the National Institute for Clinical Excellence as effective treatments for depression, however treatment assignment decisions, particularly those made within primary care, are often not made in ways that draws on the evidence base concerning predictors of outcome. With this in mind, the empirical study aimed to explore the utility of two therapy modality-specific measures (that is, measures specifically constructed to tap into theoretically relevant constructs) as potential predictors or moderators of treatment outcome in CBT and IPT for depression.

There were two main hypotheses:

1. Greater pre-treatment dysfunctional attitudes would predict poorer post-treatment outcomes in individuals receiving CBT and IPT for depression. Dysfunctional attitudes would differentially predict treatment outcomes according to therapy type.

2. Greater pre-treatment interpersonal problems would predict poorer post-treatment outcomes in individuals receiving CBT and IPT treatment for depression. Interpersonal problems would differentially predict treatment outcomes according to therapy type.

The study used a prospective cohort design; 86 clients receiving high intensity CBT ( $n = 76$ ) or IPT ( $n = 10$ ) for depression were recruited from two Improving Access to Psychological Therapies services (IAPT). Participants completed two predictor measures at their first assessment appointment, and outcome measures were taken from their last treatment session.

Predictor measures:

- Dysfunctional Attitude Scale – Short Form (DAS-SF): a 9-item self-report questionnaire used to measure maladaptive beliefs associated with depression
- The Inventory of Interpersonal Problems – Circumplex – Item Response Theory (IIP-C-IRT): a 32-item self-report questionnaire used to measure interpersonal problems

Outcome measures:

*Primary outcomes*

- The Patient Health Questionnaire-9 (PHQ-9): A 9-item self-report measure used to assess symptoms of depression
- Work and Social Adjustment Scale: A self-report measure of functioning across five domains, operationalised as a measure of social functioning for the purpose of the study

*Secondary outcomes*

- Caseness: A score of  $\geq 10$  on the PHQ-9
- Clinically significant improvement: Pre-treatment scores in caseness and post-treatment scores no longer meet the criteria for caseness
- Reliable improvement: Changes in score of  $\geq 6$  on the PHQ-9

- Reliable and clinically significant improvement: Meeting criteria for both clinically significant improvement and reliable improvement
- Dropout: Not completing scheduled treatment

Hierarchical regression analyses were carried out to examine the predictive role of pre-treatment dysfunctional attitudes and interpersonal problems on treatment outcomes, over and above pre-treatment symptom levels. Further regression analyses were carried out to examine whether dysfunctional attitudes or interpersonal problems differentially predicted treatment outcomes in CBT compared to IPT.

It was found that the main study hypotheses were not supported. Pre-treatment dysfunctional attitudes and interpersonal problems did not significantly predict any of the treatment outcomes. There were no statistically significant interactions between therapy type and predictor variables in predicting post-treatment outcomes. However, there was a trend towards the interaction between dysfunctional attitudes and therapy type predicting post-treatment depression symptom severity, whereby higher levels of pre-treatment dysfunctional attitudes were associated with lower depression symptom severity in IPT, but not in CBT. However, the findings should be interpreted with extreme caution as the sample size in the IPT group was extremely small.

Post-hoc exploratory analyses were conducted to determine the extent to which different subscales on the DAS-SF and IIP-C-IRT predicted and/or moderated treatment outcomes. The two DAS-SF subscales did not significantly predict or moderate treatment outcomes. For the IIP-C-IRT, higher scores on dominance dimension and the domineering/controlling subscale predicted better post-treatment depression outcomes.

The results suggest that overall, dysfunctional attitudes and interpersonal problems were unrelated to treatment outcomes. The findings that dysfunctional attitudes and interpersonal problems did not differentially predict outcomes in CBT and IPT could imply that the mechanisms of action are similar, despite differences in the content of the intervention. However, it is possible that differential effects were present but not detectable due to the insufficient statistical power. There was tentative evidence that specific interpersonal styles related to dominance and control, rather than overall levels of interpersonal problems, may have prognostic value, however these were exploratory analyses and thus at risk of Type I error.

There were substantial limitations to the study, most importantly the number of clients receiving IPT was extremely small and the power to detect moderator effects was significantly lacking. The findings will therefore need to be replicated in a larger sample. There is an ongoing need to develop an understanding of factors that contribute to differential treatment responses and future studies should continue to examine the predictive role of theorised processes.

#### **4. Integration, Impact and Dissemination**

There was a moderate degree of integration between the systematic review and empirical study; both are situated within the field of personalising psychological treatment for depression and had a broad aim of understanding how an individual's unique characteristics might influence treatment outcomes. There were many challenges and dilemmas encountered during the project. Recruitment was the most significant challenge to the empirical study; under-recruitment to the IPT arm of the study resulted in a large discrepancy between CBT and IPT numbers. The impact of this was that the analyses were underpowered to detect moderation

effects, and the study was limited in its ability to compare treatment types. The empirical study had additionally aimed to track a subset of individuals over the course of therapy using a single-case experimental design. However, it was not possible to include this in the empirical write-up because not all clients had completed therapy. The empirical study should therefore be viewed as part of a longer-term strategy and it is planned that myself and future trainees will continue to expand this research.

The primary impact of this project at the service level has been the implementation of research into clinical practice and supporting ongoing research within the two IAPT services. The process of carrying out the research has helped me reflect on the importance of developing collaborative partnerships between clinical services and research institutions. It is planned that this research will be disseminated through the publication of the systematic review, and pending further data, the empirical article.

## Part II.

### Change in interpersonal functioning and its association with depression outcomes during cognitive behaviour therapy for depression: A systematic review

#### Abstract

**Introduction:** Interpersonal difficulties are important in the cause and maintenance of depression. Cognitive behaviour therapies (CBT) constitute one of the most widely researched interventions for the treatment of depression, however there is little consensus regarding the role of interpersonal functioning during therapy. This review aimed to synthesise the empirical evidence on change in interpersonal functioning following CBT and its relationship to depression outcomes.

**Methods:** A systematic search was conducted in PubMed, PsychINFO and Web of Science. The review included studies which used a validated self-report measure of interpersonal functioning during CBT for adult depression. Findings were synthesised narratively and supplemented by a meta-analysis where possible. Methodological quality was assessed using quality checklists adapted for this review.

**Results:** 18 studies met the pre-specified inclusion criteria, 14 of which were included in a meta-analysis investigating change in interpersonal functioning from pre- to post-treatment following CBT for depression. The most widely used instrument was the Inventory of Interpersonal Problems (IIP). The meta-analysis found that interpersonal functioning improved with a medium-to-large effect size following CBT. There was little evidence for a differential treatment effect. Evidence was inconclusive regarding whether pre-treatment interpersonal functioning predicted or moderated depression outcomes. Evidence from four studies suggested that change in interpersonal functioning was associated with depression outcomes.



**Limitations:** There was substantial heterogeneity in population, methodology and study design, and evidence for the predictive utility of interpersonal functioning was limited by the small number of studies and inconsistent reporting in the literature.

**Discussion:** Despite not being the explicit target of therapy, interpersonal functioning was found to improve following CBT for depression. Future research is needed to understand the predictive role of interpersonal functioning on outcomes, particularly studies comparing different therapeutic modalities which could help inform who might benefit most from treatment.

## 1. Introduction

Major Depressive Disorder (MDD) is a highly prevalent and recurrent condition (Ferrari et al., 2013), which seriously impairs people's work, relationships and leisure (Kessler, 2012). According to the World Health Organisation (WHO), depression is one of the leading causes of disability worldwide and a major contributor to the overall global burden of disease (WHO, 2017). MDD consists of a variety of somatic, cognitive, affective, and behavioural symptoms that impact not only the way an individual feels and thinks about themselves, but also the way in which they interact with the people in their environment (Grosse Holtforth et al., 2014; Hames, Hagan, & Joiner, 2013).

There are many efficacious treatments for acute depression (Hollon & Ponniah, 2010), however recovery and remission typically occur in only 40-60% of treated patients (DeRubeis et al., 2005; Hollon, Thase, & Markowitz, 2002), and approximately 50% of individuals experience a recurrence (Eaton et al., 2008). Cognitive behavioural therapies (CBT) constitute one of the most widely-used (Beck & Dozois, 2011; Cuijpers, Cristea, Karyotaki, Reijnders, & Huibers, 2016) and best-researched outpatient psychotherapies for acute depression (Cuijpers et al., 2013; Zhang, Zhang, Zhang, Jin, & Zheng, 2018). However, despite its demonstrated efficacy (Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012), less is understood about the mechanisms that predict or underlie therapeutic change (McMain, Newman, Segal, & DeRubeis, 2015), including the extent to which psychological processes influence or predict symptom change (Lorenzo-Luaces, German, & DeRubeis, 2015).

This has led to a recent interest in the identification of patient characteristics associated with treatment outcomes that have the potential to highlight additional avenues for intervention, thereby increasing treatment effectiveness and reducing vulnerability to relapse. In a recent

review of the literature, Delgado, Huey, Bennett, and McMillan (2017) proposed that several prognostic factors have been identified in previous studies, which are generally clustered around four domains: clinical, demographic, characterological, and dispositional. The authors highlight that the first two domains have the most evidence, however characterological and dispositional features are less well understood. Further research is therefore needed to explore the relative contribution of these domains to outcome domains, and the mechanisms through which they may complicate or undermine treatment (Delgado et al., 2017).

Within the characterological domain, interpersonal functioning represents an important area of interest, which arguably warrants further exploration. Interpersonal difficulties are associated with the development and maintenance of depression (Dobson, Quigley, & Dozois, 2014; Lewinsohn, Rohde, Seeley, Klein, & Gotlib, 2003) and are common among individuals with depression (Barrett & Barber, 2007; Bjerke, Hansen, Solbakken, & Monsen, 2011; McEvoy, Burgess, & Nathan, 2013). Interpersonal problems can be defined as unremitting difficulties experienced by individuals in their social relationships (Horowitz, Rosenberg, Baer, Ureno, & Villasenor, 1988; Horowitz, Rosenberg, & Bartholomew, 1993), and are considered both a cause and a consequence of depression, whereby interpersonal risk factors predispose an individual to develop depression and an individual suffering from depression affects others accordingly (Hames et al., 2013). Chronic interpersonal stress has been identified as a unique predictor of risk of a major depressive episode (Sato & McCann, 2007; Vrshek-Schallhorn et al., 2015). Additionally, interpersonal domains of distress have been found to predict recurrence of depression over and above well-recognised depression risk factors such as dysfunctional cognitions and personality disorder symptoms (Sheets & Craighead, 2014).

Despite the recognised relationship between interpersonal processes and depression, interpersonal functioning is rarely assessed in clinical practice (McFarquhar, Luyten, & Fonagy, 2018). Furthermore, most research to date has focused on psychodynamic psychotherapies such as Emotion-Focused Therapies or Interpersonal Therapy (IPT), in which interpersonal difficulties are typically the target of psychotherapy. However, the role of interpersonal functioning has received particularly little attention within the literature on CBT for depression, likely due to the fact that interpersonal problems are not the explicit target of CBT.

Furthermore, there has been an ongoing criticism in the literature that CBT tends to overlook the importance of clients' interpersonal functioning as an area for possible intervention (Coyne & Gotlib, 1983; Goldfried & Castonguay, 1993; McEvoy, Burgess, & Nathan, 2013; Robins & Hayes, 1993). Dobson et al. (2014) suggest that although cognitive and behavioural approaches to depression tend to emphasise intra-individual factors, some CBT therapists may incorporate interpersonal risk factors into their case conceptualisations and treatment formulations, thus CBT is likely to address some of the interpersonal processes involved in depression, either directly or indirectly (Vittengl, Clark, & Jarrett, 2003). However, it is currently unclear to what extent interpersonal functioning changes over the course of CBT for depression and whether interpersonal functioning is associated with depression outcomes.

Previous systematic reviews have been conducted on the effect of psychotherapy for depression on interpersonal or social functioning more generally (e.g. Renner, Cuijpers, & Huibers, 2014). A meta-analysis of Short-Term Psychodynamic Psychotherapy found a large effect for improvement in interpersonal functioning across a number of different measures, including the Inventory of Interpersonal Problems (IIP), the Outcome Questionnaire (interpersonal relations

subscale) and the Social Adjustment Scale (Driessen et al., 2015). A more recent systematic review also found a large effect of brief psychological therapies on reducing interpersonal problems, however this review was limited to the IIP as a measure of interpersonal problems and only included individual therapies (McFarquhar et al., 2018). Until now, no systematic reviews have been conducted to examine the magnitude of effects *specific* to CBT for depression across different measures of interpersonal functioning and including all formats. The latter point is particularly relevant to CBT as it is often delivered in group formats (Thimm & Antonsen, 2014), and the magnitude of effect may differ according to mode of delivery.

In addition to the uncertainty surrounding the degree to which interpersonal functioning changes following CBT for depression, there also remains little consensus about the relationship between interpersonal functioning and depression outcomes. Better understanding this relationship could yield important information about who might respond best, and how to work with interpersonal difficulties within CBT. When referring to predictors of treatment outcomes, an important distinction is made between prognostic factors (predictors), variables which predict response irrespective of treatment type (Kraemer, Wilson, Fairburn, & Agras, 2002), and prescriptive factors (moderators), variables which identify who is more likely to benefit from a particular treatment (Kazdin, 2007). As discussed above, the ability to predict treatment outcomes from pre-treatment interpersonal domains could have considerable clinical utility in terms of case formulation, management, and prognosis (McEvoy et al., 2013). An enhanced understanding of interpersonal moderators (i.e. interpersonal domains that have differential treatment effects in CBT compared to other psychological therapies) has the potential to provide valuable information to help inform treatment selection and client allocation (Altenstein-Yamanaka, Zimmermann, Krieger, Dorig, & Grosse Holtforth, 2017).

In their systematic review, McFarquhar et al. (2018) explored the association between scores on the IIP and therapeutic outcome, and concluded that this relationship is still elusive. However, the authors did not make a clear distinction between studies looking at pre-treatment scores and studies exploring change in scores on the IIP as predictors of outcome. Arguably, these two types of relationships have different implications in terms of clinical utility. It is currently unknown whether change in interpersonal functioning during CBT for depression has more influence on predicting outcomes than pre-treatment levels.

Understanding the relationship between change in interpersonal functioning and depression symptoms can provide information about the potential role of interpersonal functioning as a mechanism driving symptom change, which may have clinical utility in understanding the importance of modifying interpersonal functioning within therapy. The current consensus regarding cognitive behavioural interventions is that modifying dysfunctional thinking patterns that perpetuate depressive symptoms is the main vehicle by which CBT produces symptom change (Beck & Dozois, 2011). However, recent research has questioned this so-called ‘cognitive specificity’ and suggested that change in theorised processes may not be modality specific (Bernecker, Constantino, Pazzaglia, Ravitz, & McBride, 2014; Quilty, Mainland, McBride, & Bagby, 2013). Indeed, there is ongoing debate in the literature with Kazdin (2007) stating, “perhaps we can state more confidently now than before that whatever may be the basis of changes with cognitive therapy, it does not seem to be the cognitions as originally proposed” (p. 8). However, others argue that even when so-called ‘non-cognitive’ procedures lead to symptom change, the mechanism of that change may nonetheless be cognitive (Hofmann, 2008; Longmore & Worrell, 2007).

The literature regarding cognitive change is thus unclear (Cristea et al., 2015) and an exploration of alternative, non-cognitive, psychological variables that explain change in treatment is warranted (Lemmens et al., 2017). Given its importance in theories of depression, interpersonal functioning could arguably represent such an alternative variable. To date, no systematic reviews exist which have explored the relationship between pre-treatment interpersonal functioning or change in interpersonal functioning, and depression outcomes within CBT for depression.

### **Aims of the current review**

Taken together, the literature on if, and how, interpersonal functioning is related to treatment outcomes and processes in CBT, is both complicated and unclear. To help understand the relationship better, this review sought to evaluate the current state of evidence regarding what is known about the different ways that interpersonal functioning and CBT for depression are related. Firstly, it aimed to determine the magnitude of effect to which interpersonal functioning changes during CBT depression and whether this effect differs to other psychological therapies. Secondly, it aimed to determine whether pre-treatment interpersonal functioning is a predictor or moderator of depression outcomes, and finally, whether change in interpersonal functioning is related to depression outcomes.

To achieve these aims, the review sought to summarise and synthesise findings from studies that reported quantitative data on interpersonal functioning over the course of CBT for depression. The review included studies which reported pre-post treatment data on interpersonal functioning and/or pre-treatment interpersonal functioning as predictor or moderator of depression outcomes, and/or the association between change in interpersonal functioning and depression outcomes. The review was restricted to validated self-report

instruments, in order that comparisons could be made across the measures. Where there was sufficient data, a meta-analysis was planned; meta-analyses can help with the problem of statistical power and help provide clearer answers where individual studies are inconsistent (Haidich, 2010).

### **Overarching review question (RQ)**

What is the relationship between interpersonal functioning and CBT for depression?

### ***Specific review questions***

For individuals receiving CBT for depression:

RQ1. Does interpersonal functioning change between pre-treatment, post-treatment and follow-up, and does CBT differ from other psychological therapies with regard to this effect?

RQ2. Does pre-treatment interpersonal functioning predict or moderate post-treatment depression outcomes?

RQ3. Is change in interpersonal functioning associated with depression outcomes?



## **2. Method**

Where appropriate, the systematic review was designed and conducted with reference to the ‘Preferred Reporting Items for Systematic Reviews and Meta-Analyses’ (PRISMA) guidelines (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009).

### **2.1 Eligibility criteria**

The review sought to identify studies that reported quantitative data on interpersonal functioning during the course of CBT for depression. The literature search included all published articles up to December 2018. The search was limited to studies available in English and reported in peer-reviewed journals. The review included Randomised Controlled Trials (RCTs), uncontrolled (open) treatment trials, and observational studies that used a pre-post study design in which participants were undergoing CBT for depression. All settings and locations were included.

The inclusion criteria were: (a) adult participants aged 18 or over; (b) depression diagnosed by DSM or ICD or through a cut-off on a self-report scale; (c) any acute-phase cognitive behavioural intervention in which depression was the primary focus of treatment; (d) use of at least one quantitative, psychometrically validated self-report measure of interpersonal functioning at baseline and/or post-treatment or follow-up; (e) relevant quantitative data provided on interpersonal functioning; (f) depression included as a primary outcome, measured using a validated self-report scale or diagnostic interview.

The exclusion criteria were: (a) sample comprising older adults only (over 60 years); (b) less than 70% of the sample diagnosed with depression; (c) continuation, maintenance or relapse

prevention interventions; (d) behavioural activation studies (e) case studies/series, dissertation abstracts, unpublished theses, book chapters/reviews.

In studies where participants had mixed diagnoses, a cut-off was set at 70% of the sample having a diagnosis of depression for inclusion in the review. This was to keep the sample as homogenous as possible. Studies that included other mental health diagnoses were included if depression was part of a specific subgroup and the study reported data separately for the depression subgroup.

CBT was defined as any therapy in which the therapist focused on the impact that a client's present dysfunctional thoughts have on current behaviour and functioning through the use of cognitive restructuring and/or exposure<sup>1</sup> (Cuijpers et al., 2013; Jacobson et al., 1996). CBT interventions were included regardless of the format (group or individual), number, duration, and frequency of sessions. Where possible, an exploration of these differences was planned.

In order to synthesise and make comparisons between the most commonly used measures of interpersonal functioning, the review was restricted to quantitative and psychometrically validated self-report instruments. Observer-reported or observer-rated instruments were excluded, as they do not easily converge (Leising, Krause, Köhler, Hinsen, & Clifton, 2011). In order to focus on 'interpersonal functioning' as a distinct construct, instruments were excluded if the primary focus of the measure was on: working alliance; dyads or marital relationships; attachment; relationship satisfaction; and availability of, or satisfaction with,

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<sup>1</sup> Breathing retraining or relaxation therapy in the absence of cognitive restructuring and/or exposure were excluded. Behavioural activation studies were also excluded as they were considered to be a distinct intervention. Cognitive Behavioural Analysis of Psychotherapy (CBASP) interventions were excluded because they are considered conceptually different to CBT interventions

social support. Measures looking at personality disorders were also excluded and considered outside the scope of this review<sup>2</sup>.

In addition to the inclusion criteria listed above, studies were required to report quantitative data on at least one of the following:

- (a) change in interpersonal functioning from pre-treatment to post-treatment and follow-up; where means and standard deviations were reported, a meta-analysis was planned.
- (b) interpersonal functioning as a pre-treatment predictor of depression outcomes or symptom change, using (bivariate or multivariate) statistical models with interpersonal functioning as predictor variables and depression symptoms as outcome variables.
- (c) interpersonal functioning as a moderator of depression outcomes, defined as studies which reported on interpersonal functioning as a differential predictor of depression outcomes in CBT versus a non-CBT psychological intervention.
- (d) the association between change in interpersonal functioning and depression outcomes.

Studies were excluded if they did not meet the inclusion criteria and/or failed to report data for at least one of the methods described above.

## **2.2 Search strategy**

Studies were identified by searching electronic databases, manual reviews of reference lists of articles, and through consultation with an expert in the field (JaD). Three databases (PsychINFO, PubMed and Web of Science) were systematically searched to identify potentially relevant studies. Search terms were determined using four concepts: depression;

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<sup>2</sup> Notably, the Standardized Assessment of Personality – Abbreviated Scale (SAPAS) was excluded as this was developed to screen for the likely presence of a personality disorder (Moran et al., 2003) and therefore considered beyond the remit of the current review.

cognitive behavioural therapies; interpersonal functioning; and relationship. Within each concept, the Boolean operator ‘OR’ was used and the Boolean operator ‘AND’ was used to combine concepts. Search terms were defined in consultation with an information scientist from Royal Holloway, University of London, and were then reviewed by an expert in the research field (JaD), who deemed them to be comprehensive. The search terms are outlined in Table 1. The last search was run on December 2018.

Table 1

*Search terms used to identify articles*

Concept	Search terms
Depression	? major depressive disorder* OR depression OR affective disorder* OR mood disorder*
Cognitive Behavioural Therapies	Cognitive behavio*ral therapy OR CBT OR cognitive therap* OR CT OR cognitive psychotherap* OR behaviour* therapy OR behavior* therapy OR metacognitive therap*
Interpersonal functioning	Interpersonal function* OR interpersonal problem* OR interpersonal difficult* OR social function* OR social relationship*
Relationship	Predict* OR moderat* OR mediat* OR mechanism* OR associat* OR change OR effect

### ***Study selection***

Citations from each database search were exported into EndNote and duplicates between databases were removed. After this, titles and abstracts were screened for eligibility by the first reviewer (IS), using the pre-specified inclusion criteria. 10% of titles and abstracts of identified studies were independently screened for inclusion by a second reviewer (JD), until a good inter-rater reliability had been observed (Kappa statistics,  $k > .60$ ). Once inter-rater agreement was good, the remaining references were then screened by the first reviewer (IS).

Following this screen, articles considered relevant were retrieved in full text and re-evaluated for eligibility. When screening full texts, exclusions were reported with reasons given. Reference lists of selected articles were subsequently hand-searched to identify any other relevant studies, following which the abstracts and then full texts were screened for eligibility.

During the initial selection phase, all studies which used a self-report instrument broadly focused on ‘interpersonal functioning’ were included. Following this, a list of potentially relevant instruments was compiled, and decisions made about their inclusion or exclusion based on the pre-specified criteria in consultation with a second reviewer (GB) and an expert in the research field (JaD). Hand searching for studies including these eligible scales was also conducted in order to identify further articles.

### **2.3 Data extraction**

A data extraction sheet was developed, based on the Cochrane Consumers and Communication Review Group’s data extraction template.

One reviewer (IS) conducted independent data extraction and quality assessment. Any difficulties with coding were planned to be resolved through the opinion of a second reviewer

(GB). Authors of the included studies were contacted via email to obtain supplementary study information that either was not reported or needed clarification, and to locate any studies in press or in preparation. Authors of eight studies were contacted and two replied with necessary information that was included in the current review (Huber, Zimmermann, Henrich, & Klug, 2012; Višlā, Constantino, Newkirk, Ogrodniczuk, & Söchting, 2018). In the case of two studies (Quilty et al., 2013; Renner et al., 2012), relevant data was obtained from an existing systematic review (McFarquhar et al., 2018).

For each study, information was extracted with regard to (a) setting and country; (b) study design; (c) sample size; (d) characteristics of population (including mean age, % female, ethnicity, marital status); (e) type of intervention (including format, duration, and comparison interventions, where applicable); (f) measure used to diagnose depression; (g) instrument used to measure interpersonal functioning; (h) outcome timepoint (including time of follow-up); (i) measure of depression outcomes; (j) main findings of relevance to the review questions.

## **2.4 Study quality assessment**

To ascertain the validity of eligible studies, a quality assessment tool was adapted for specific use in this review, building on the relevant criteria from the Cochrane Collaboration (Higgins and Green, 2011). The characteristics for the assessment tool were similar to those used in the systematic review by McFarquhar et al. (2018). A six-point quality scoring system was adopted, and studies were rated according to whether they met the criteria (see Table 2). Studies were awarded 1 point if they met criteria for each item and were coded as 0 if they did not meet criteria, or it was unclear. Articles with total scores of 0–2 were considered low quality, 3–4 considered medium quality and 5–6 considered high quality. Any difficulties with coding were resolved via discussion with a second reviewer (GB).

Table 2

*Study quality scoring system*

Number	Criterion
1	If more than one treatment arm, participant randomisation (single-arm studies awarded 1 point)
2	100% of the sample had a diagnosis of major depressive disorder
3	Use of a CBT treatment manual
4	Use of fully qualified therapists only
5	No concurrent psychotropic medication
6	A treatment adherence check was reported

For RQ2, studies were assessed according to the presence or absence of further quality indicators based in part on Steketee and Chambless (1992) methodological requirements of prediction research. Items chosen were those most relevant to this review:

1. The study controlled for baseline symptom severity or employed residual gain scores, rather than employing raw gain scores as a measure of symptom change during treatment.
2. Type I error was controlled if many (20 or more) prediction or moderation analyses were conducted.
3. Study provided a theoretical or empirical rationale for interpersonal predictor or moderator variables examined.
4. The study had sufficient power, defined as 80% power to detect a medium effect in a linear regression with no other predictors (studies with a sample size of less than 55 were considered underpowered)<sup>3</sup>.

<sup>3</sup> This sample size was used in previous systematic reviews looking at predictors and moderators in CBT (Porter & Chambless, 2015)

## 2.5 Planned method of analysis

Data synthesis was organised according to each review question. For RQ1, a meta-analysis was planned, providing that the primary studies had available data to enable this (details below). For RQs 2 & 3, findings from included studies were synthesised and summarised narratively due to wide variation in the study design and analyses.

### *Meta-analysis*

To conduct a meta-analysis for change in interpersonal functioning during CBT for depression, a minimum of six studies was required<sup>4</sup> and the original papers had to report pre- and post-treatment means and standard deviations, or these were obtained by author correspondence. This was in order to calculate effect sizes (ESs). Ideally, a between-group meta-analysis was planned, however it was anticipated that there may not be a sufficient number of RCTs reporting sufficient data, in which case it was planned to conduct a pre-post meta-analysis for CBT interventions only.

The method of outcome analysis reported in the primary paper was used, however where both completer and intention-to-treat (ITT) data was reported, ITT data was prioritised as this arguably gives a more conservative estimate (Gupta, 2011). If more than one measure of interpersonal functioning was used, the mean of the ESs were calculated, so that each comparison yielded only one ES (using methods described in Borenstein, Hedges, Higgins, & Rothstein, 2009).

The overall mean ESs were calculated, weighted by the sample size of the individual studies. ESs were converted into Hedges' *g*, which is a measure of standardised mean differences

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<sup>4</sup> This was based on the number of studies required in similar meta-analyses (e.g. McFarquhar et al., 2018)



preferred to Cohen's *d* for small sample sizes (Borenstein, et al., 2009). The standardized mean difference (*g*) transforms all ESs into a common metric, thus enabling the inclusion of different outcome measures in the same synthesis. Review Manager (RevMan 5.3) was used to calculate the pooled mean ESs using a random-effects model which assumes heterogeneity of the included studies (Borenstein et al., 2009). Heterogeneity in treatment effects was anticipated because of between study variations. The random-effects model allows for both the random error within studies and the real variations of ESs from one study to the next to be accounted for, which results in a more conservative estimate, with broader 95% confidence intervals. The *I*<sup>2</sup> statistic was used to indicate the degree of heterogeneity in percentages, whereby a value of 0% indicates no observed heterogeneity, and larger values show increasing heterogeneity, with 25% indicating low, 50% indicating moderate, and 75% indicating high heterogeneity (Higgins, Thompson, Deeks, & Altman, 2003).

To explore possible sources of heterogeneity, subgroup analyses were planned for: (i) instrument used to measure interpersonal functioning; (ii) CBT format; (ii) study quality; (iv) length of treatment. Subgroup analyses were conducted by pooling studies within subgroups using a random effects model.

### 3. Results

#### 3.1 Study selection

Database searching identified 8,556 studies. One additional article was identified through other sources. Removal of duplicates left a total of 6,517 unique articles. During screening by title and abstracts, 6,393 studies were deemed not to meet inclusion criteria and were excluded from the review. Inter-rater reliability for 10% of articles double screened for eligibility based on title and abstract assessed using Cohen's Kappa ( $k = .79$ ) indicated a substantial level of agreement (McHugh, 2012). The full texts of 124 articles were then assessed for eligibility and reference lists screened to check for any other relevant articles, which yielded one new article. Following full text review, a total of 18 studies across 21 articles were included in the systematic review (three studies were reported across more than one article). 14 studies (across 16 articles) met the inclusion criteria for a meta-analysis of change in interpersonal functioning following CBT. Figure 1 presents a flowchart describing the inclusion process.

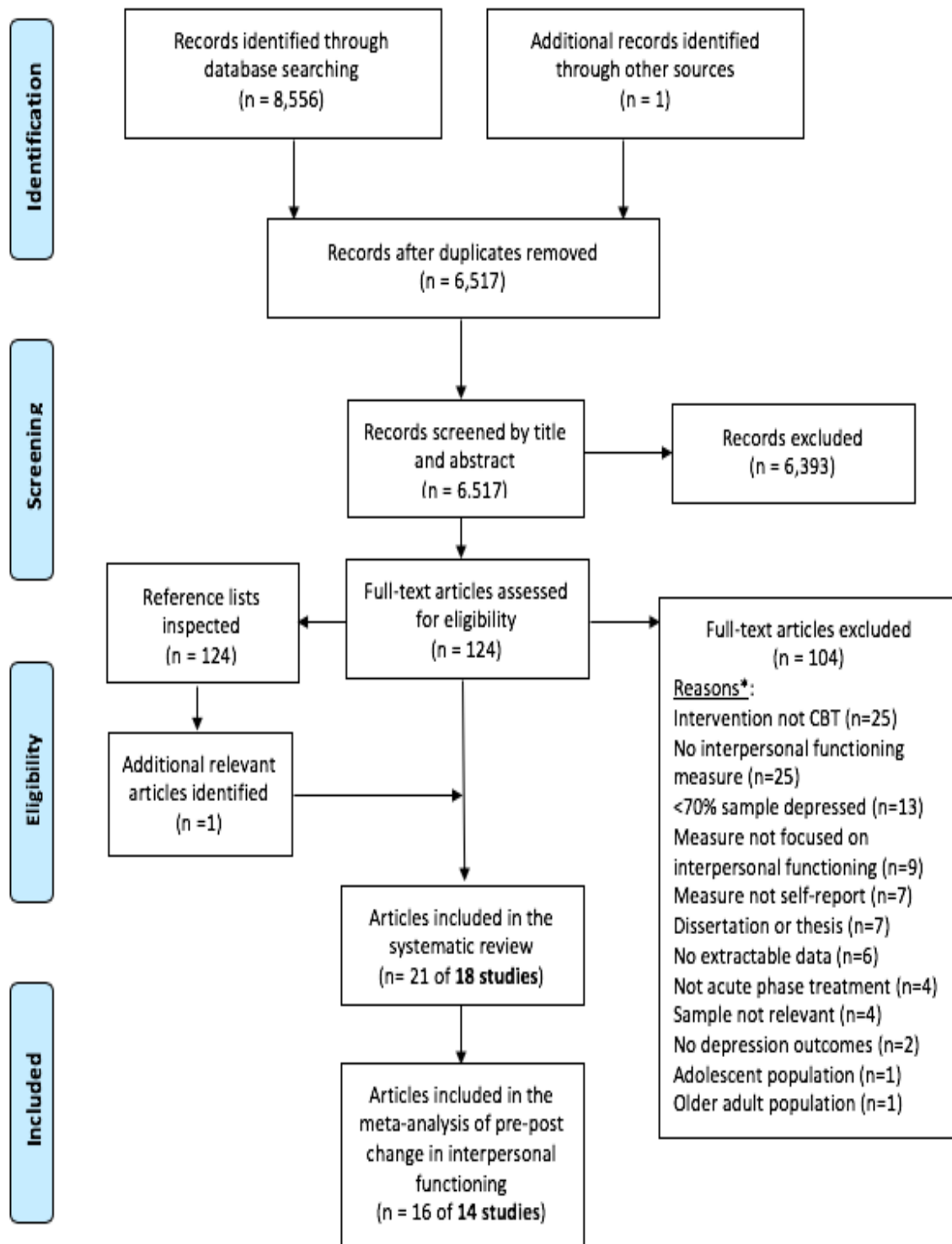


Figure 1. PRISMA flow diagram outlining the study selection process

Note. \* = if a study met more than one exclusion criteria, it is only counted under the first criteria met

### 3.2 Summary of study characteristics

18 studies across 21 articles were identified for inclusion in the review: Altenstein-Yamanaka et al. (2017); Carter et al. (2011); Carter et al. (2018); Driessen et al. (2017); Gelhart and King (2001); Howard, Turner, Olkin, and Mohr (2006); Huber et al. (2012); Huibers et al. (2015) and Lemmens et al. (2017); Lopes, Goncalves, Fassnacht, Machado, and Sousa (2014); McEvoy, Burgess, and Nathan (2013); McEvoy, Burgess, and Nathan (2014); Quilty et al. (2013); Renner et al. (2012) and Dunn et al. (2012); Strand, Hagen, Hjemdal, Kennair, and Solem (2018); Višlā et al. (2018); Vittengl et al. (2003) and Vittengl, Clark, and Jarrett (2004); Ward et al. (2000); and Watson, Gordon, Stermac, Kalogerakos, and Steckley (2003). Table 3 provides an overview of the study characteristics and main findings of these studies. Where multiple publications for the same study existed or reported a subsample of the same study, the sample size of the article with the largest sample is reported.

All studies were published between 2000 and 2018 and all were carried out in Western countries; seven took place in Europe, four in the US, three in Canada, two in Australia and two in New Zealand. Eleven studies were RCTs and seven were prospective cohort studies (with or without a comparator group). All studies took place in outpatient clinics, with the exception of one study which was conducted in primary care (Ward et al., 2000). Sample sizes ranged from 19 to 523 (mean  $n = 157$ ). The average age ranged from 33.0 to 47.8 years and the proportion of female participants from 55.2 to 84.2%, however two studies did not report this data. In the nine studies that reported ethnicity, the sample was predominantly White/Caucasian (proportions ranging from 77 to 100%). Nine studies reported relationship status, with the percentage of participants married/co-habiting ranging from 23.7 to 68.4%.

In all studies, psychotic or bipolar affective disorder were excluded. Four studies included samples with comorbidities other than anxiety disorders. One study recruited a sample with a relapsing form of multiple sclerosis (Howard et al., 2006), however as depression was the primary focus of the intervention, it met inclusion for the review. In two studies, a proportion of the sample had a comorbid diagnosis of a personality disorder (Huber et al., 2012 and Watson et al., 2003, 34% and 51%, respectively). In one study, 21% of the sample had drug/alcohol abuse (Gelhart & King, 2001).

In 14 of the 18 studies a diagnostic interview was used to establish the presence of a depressive disorder, while the remaining four studies used a cut-off on a self-report scale to establish the presence of depression. Three studies recruited participants with recurrent major depressive disorder (Carter et al., 2018; Renner et al., 2012; Vittengl et al., 2003) and two studies included dysthymia as well as major depressive disorder (Gelhart & King, 2001; McEvoy et al., 2013). Two studies recruited a sample with ‘emotional disorders’, however over 70% had either MDD or dysthymia, therefore they met criteria for inclusion in the review (McEvoy et al., 2013; McEvoy et al., 2014).

A total of 19 CBT interventions were examined (one study included both individual and group CBT, McEvoy et al., 2014). The majority of interventions were individual CBT or CT ( $n = 15$ ), three were group-CBT, and one individual meta-cognitive therapy. For the purpose of this review these interventions are referred to under the broad umbrella of ‘CBT’. In nine studies, CBT was compared to another psychological therapy: interpersonal therapy ( $n = 3$ ); psychodynamic/ psychoanalytic therapy ( $n = 2$ ); non-directive counselling ( $n = 1$ ); schema therapy ( $n = 1$ ); narrative therapy ( $n = 1$ ); process–experiential therapy ( $n = 1$ ). In 17 of the 18 studies, treatment lasted from 6 to 26 weeks (mean = 15.89,  $SD = 5.54$ ) and the mean number

of sessions delivered across CBT interventions was 16.28 ( $SD = 4.95$ ). In one study, the treatment was of longer-term duration, with an average of 45 sessions over 26 months (Huber et al., 2012).

Three different self-report measures of interpersonal functioning (and their variants) were included in the review: The Inventory of Interpersonal Problems (IIP) (Alden, Wiggins, & Pincus, 1990; Horowitz et al., 1988), The Social Adjustment Scale - Self Report version (SAS-SR) (Weissman & Bothwell, 1976; Weissman, Prusoff, Thompson, Harding, & Myers, 1978) and modified version (Cooper, Osborn, Gath, & Feggetter, 1982); and The Outcome Questionnaires- 45.2 Interpersonal Relations subscale (OQ-45.2 IR) (Umphress, Lambert, Smart, Barlow, & Clouse, 1997). 12 studies used a variation of the IIP including the IIP-32 ( $n = 4$ ); IIP-64 ( $n = 3$ ); IIP-127 ( $n = 4$ ) and IIP-28 ( $n = 1$ ). Six studies used the SAS; three the SAS-SR and three the SAS-modified. Two studies used the OQ-45.2 IR.

Table 3

*Characteristics of studies included in the systematic review*

Author, date, country	Study Design	Study N, participants Age: mean (SD); % female; Relationship status; Ethnicity; Comorbidities	Setting	Definition of depression (% sample with depression)	CBT Intervention & Comparator	Treatment duration/ follow up	Interpersonal measure & Depression outcome measure	Main Findings
Altenstein-Yamanaka et al., 2017 Germany	RCT <sup>a</sup>	144 Age: 40.7 (11.4); 56.3% female; 38.9% married/ relationship 100% Caucasian	OP	MDD (100%); BDI-II $\geq$ 14	Individual CBT or EBCT-R	22 sessions over 26 weeks  Post-treatment; 3 & 12-month follow-up (BDI-II only)	IIP-32  BDI-II IDS	1. Change in interpersonal functioning over therapy (RQ1) 2. Relationship with depression outcomes (RQ2&3)  1. IIP Distress significantly decreased over therapy $p < .001$ 2. Pre-post change in IIP Distress was significantly associated with pre-post change in the BDI-II and IDS, but not IIP Agency and Communion.
Carter et al., 2011 New Zealand	RCT	177 Age: 45.2 (10.3); 72% female	OP	MDD (100%)	Individual CBT (N=86)  IPT (N=91)	16 weekly sessions  Post-treatment	SAS-modified  MADRS	2. The SAS-interpersonal relations was not a significant general or differential predictor of poor response to treatment.
Carter et al., 2018 New Zealand	RCT	100 Age: 38.4 (11.3); 69% female; 44% married	OP	MDD chronic and/or recurrent depression (100%)	Individual CBT (N=50)  ST (N=50)	Weekly sessions over 6 months  Post-treatment	SAS-modified  MADRS	2. Pre-treatment social functioning factors did not independently predict treatment outcomes. There was a significant interpersonal functioning-by-treatment type interaction ( $p = .02$ ).
Driessen et al., 2017 Netherlands	RCT	341 Age: 38.9 (10.3); 70.1% female; 23.7% married; 55% 'North West European'	OP	MDD (100%); HAM-D $\geq$ 14	Individual CBT (N=164) <sup>g</sup>  Time 1 assessment N = 106	16 sessions over 22 weeks  Post-treatment; 12-month follow-up	OQ-45.2-IR  HAM-D	1. Percentage of clients showing clinically meaningful change on OQ-IR was 44.9% for CBT and 48.0% for SPSP. No statistically significant differences between CBT and SPSP.

					SPSP (N=177)				
Gelhart and King 2001	Cohort	92	OP	MDD or dysthymia or BDI $\geq$ 10 (100%)	Group multicomponent CBT	12 x 2 hr sessions over 8 weeks.	SAS-SR	1.Social adjustment increased following the intervention and was maintained at 24-month follow-up.	
USA		21% sample had drug/alcohol abuse				Post-treatment; 24-month follow-up	BDI; CES-D		
Howard et al., 2006	Cohort	19	OP	BDI $\geq$ 16 (100%)	Individual CBT	16 weekly sessions	IIP-64	2.The IIP-C significantly predicted week 16 BDI.	
USA		Age: 46.05 (11.74); 84.2% female; 68.4% married; 89.5% white; 100% relapsing form of MS				Post treatment	BDI-21		
Huber et al., 2012	Cohort (non-R)	100 (IIT sample)	OP	MDD episode or recurrent depression; BDI $\geq$ 16 (100%)	Individual CBT (N=34)	CBT: average 45 sessions over 26 months.	IIP-64	1.CBT was moderately effective in alleviating interpersonal problems at 3-year follow-up. In comparison with PAT and PDT, CBT was significantly inferior at reducing interpersonal problems due to small within-group effect sizes.	
Germany		Age: 33.0; 71% female; 34% comorbid PD			PAT (N=35)	Post-treatment 36-month follow-up	BDI		
Hubers et al., 2015 and Lemmens et al., 2017 <sup>b</sup>	RCT	151	OP	MDD (100%)	Individual CT (N=76)	12-20 sessions	IIP-64	1.Interpersonal problems decreased over therapy for both CT and IPT. CT showed a larger change in the second half of treatment whereas IPT showed a larger decrease in the first half of treatment (Lemmens et al., 2017).	
Netherlands		Age: 41.2 (12.1); 66.2% female; 43% had a partner			IPT (N=75)	Post-treatment	BDI-II	2.Interpersonal self-sacrificing subscale of the IIP (but no other subscales) had a differential treatment response; higher scores predicted a better response to CT than IPT (Huibers et al., 2015). Within CT there were concurrent relationships between changes in interpersonal functioning and depression severity;	
		Huibers et al., (2015) sample = 134							



								change on the BDI-II was mediated by concurrent change on the IIP in early and late phases of treatment, however there was no evidence for temporal mediation (Lemmens et al., 2017).
Lopes et al., 2014 Portugal	Cohort (non-R)	63 Age: 35.44 (11.51); 81% female	OP	MDD (100%)	Individual CBT (N=29) NT (N=34)	20 sessions Post-treatment; 21-month follow-up	OQ-45.2 IR BDI-II	1. The pre-to post-treatment OQ-45.2 IR effect size was significant. There were no significant differences for treatment group regarding time to improvement. A small proportion of patients had recovered from interpersonal problems at post-treatment and maintained recovery at the 21-month follow-up.
McEvoy et al., 2013 Australia	Cohort	144 (112 completers) Age: 38.56 (13.69); 68.1% female; 41% married/cohabiting; 71.5% Australian	OP	MDD (88.2%) or dysthymia (11.8%).	Group CBT	10 x 2 hr weekly sessions Post-treatment	IIP-32 BDI-II	1. CBGT was associated with significant and moderate (ITT) to large (completer) reductions in interpersonal problems. Change in interpersonal problems was found not to be a consequence of a change in mood state or negative thinking.  2. Greater pre-treatment interpersonal problems predicted higher post-treatment depression symptoms after controlling for pre-treatment symptoms, negative cognitions, demographics, and comorbidity. 'Difficulty being assertive' and a 'tendency to subjugate one's needs' were associated with higher post-treatment depression symptoms. Changes in IPs did not predict post-treatment depression symptoms when controlling for changes in negative cognitions, pre-treatment symptoms, demographics, and comorbidity.

McEvoy et al., 2014 <sup>c</sup>	Cohort (non-R)	199 (131 completers)	OP	MDD or dysthymia (70.5%) <sup>d</sup>	Individual CBT (N=84)	Group CBT= 10 x 2 hr weekly sessions	IIP-32 BDI-II	1.IIP total scores reduced significantly pre- to posttreatment in both groups.  2.After controlling for pre-treatment BDI-II, the total effect of IIP-32 on post-treatment BDI-II was not significant. For those receiving individual treatment the pattern of findings was the same. For those receiving group treatment, the total effect of IIP- 32 on post-treatment BDI- II was significant; higher pre-treatment IIP-32 scores were associated with higher post- treatment BDI-II scores.
Australia		Age: I-CBT 35.4 (12.6) G-CBT 38.6 (12.4); 70% female; 37% married/co-habiting			Group CBT (N=115)	Individual CBT= Mean 11.1 session  Post-treatment		
Quilty et al., 2013	RCT	125	OP	MDD (100%)	Individual CBT (N=63)	16-20 sessions	IIP-32	1.IIP global sum scores (distress) reduced significantly from pre-treatment to post-treatment. There were no differences between therapy type.
Canada		Age: 18-60 65.6% female;			IPT (N=62)	Post-treatment	BDI-II, HAMD	2.Higher pre-treatment dominance and amplitude were associated with decreased change in depression over the course of treatment. IIP distress was indirectly associated with poor treatment outcomes (through its negative association with informant reported agency). Results were consistent across therapy type.
Renner et al., 2012 and Dunn et al., 2012	RCT (acute phase of multi-phase trial)	523 <sup>e</sup> Age: 42.4 (SD=12.1); 67.5% female; 32.5% married; 80.9% white	OP	Recurrent MDD (100%); HAM-D-17>14	Individual CT	16–20 sessions over 12-14 weeks.  Post-treatment	IIP-127 SAS-SR (Dunn 2012) HRSD-17	1.IIP mean total scores and SAS-SR significantly reduced from pre-treatment to post-treatment.  2. Higher pre-treatment interpersonal distress scores significantly predicted higher mean symptom scores over the course of treatment. Higher pre-treatment dominance predicted
USA								

								lower symptom scores in the middle of treatment and slightly lower symptom scores at the end.
Strand et al., 2018	RCT	39	OP	MDD (100%)	Individual MCT (N=20)	10 sessions	IIP-64	1.MCT showed large reductions in interpersonal problems. All of the subscales on the IIP showed significant reductions. Patients on the waitlist did not show significant change in interpersonal problems post-waitlist. At 6-month follow-up, responders had significantly lower scores on the majority of IIP subscales. Overall $d = 1.36$ .
Norway		Age: 33.7 (10.4); 59% female; 51.3% married/ cohabiting; 84.6% Norwegian			Waitlist control (N=19)	Post-treatment; 6-month follow-up	BDI-II	
								2. Level of interpersonal problems was not related to poorer treatment response. Correlations inspected the association between pre-treatment IIP scores and BDI at post-treatment and follow-up. None of the correlations reached significance.
Višlá et al., 2018	Cohort	91 (N=89 completed baseline IIP)	OP	MDD (100%)	Group CBT	10 x 2 hr weekly sessions	IIP-28	1.The mean baseline total score on the IIP-28 reduced at post-treatment.
Canada		Age: 47.82 (10.58); 73% female; 77% white				Post-treatment	BDI-21	
Vittengl et al., 2003 and Vittengl et al., 2004	RCT (acute phase CT) ^^^	155 Age: 41.3 (SD=11.0); 74.2% female; 87.1% white	OP	Recurrent MDD (100%); HRSD $\geq 16$	Individual CT	20 sessions - 2 x weekly for first 8 weeks, 1 x weekly for last 4 weeks	IIP-127 SAS-SR	1. IIP and SAS-SR scores significantly reduced pre-treatment to post-acute phase treatment, $p < 0.0001$ . Social-interpersonal functioning improvement was maintained in responders over 24 months.
USA		Vittengl (2003) subsample				Post-treatment	BDI-II HDRS Vittengl et al., 2004 = composite of	
								2.The SAS-SR and IIP were equally predictive of late depression severity. Change in depressive symptoms was

		completing IIP= 118					BDI, HRSD, IDS	correlated moderately highly with change in social-interpersonal functioning, but there was no significant change in social-interpersonal functioning independent of change in depressive symptoms.
Ward et al., 2000	RCT <sup>f</sup>	260	Primary care	Depression diagnosis or depressive symptoms (>70%)  BDI ≥14	Individual CBT (N=134)  Non-directive counselling (N=126)	6-12 weekly sessions  Post-treatment; 12-month follow-up	SAS-modified  BDI	1. At 12 months, patients in the CBT groups made greater gains on the SAS than those receiving non-directive counselling. However, the differences in scores were small and occurred against a background of improving social adjustment in both groups.
Watson et al., 2003	RCT	101 (66 completers)	OP	MDD (100%)	Individual CBT (completer =29)  PET (completer=36)	16 weekly sessions  Post-treatment	IIP-127  BDI-21	1. IP total mean scores for completers reduced pre-treatment to post-treatment in the CBT group. There was a significant Group x Time interaction: PET clients improved more than CBT clients on interpersonal problems.
Canada		Age: 41.52 (SD10.82); 67% female; 91% European 51% diagnosed with personality disorders.						

*Note:* Articles reporting data from the same or overlapping study are grouped together in the same row of the table and all papers containing relevant data that were included in the review are listed

<sup>a</sup> The original RCT is reported in Grosse Holtforth et al., 2017. No differences were found between CBT and EBCT-R, so the results in Altenstein-Yamanaka et al., (2017) reported for the two interventions combined

<sup>b</sup> Participant information taken from Lemmens et al. (2015)

<sup>c</sup> It was unclear if McEvoy et al., 2014 used the same sample for the GCBT. The paper implies that the samples are independent, so for the purpose of the review they have been treated as so. The authors were contacted to clarify; response still pending

<sup>d</sup> Overall, 70.5% had depression, therefore the study met the inclusion criteria, however proportions in the two groups were unequal (Individual CBT: 54% depression, Group CBT: 80% depression,  $p < .001$ ). The individual CBT data was not included in the meta-analysis as it did not meet criteria.

<sup>e</sup> Data from an ongoing, two-site clinical trial comparing acute-phase CT responders randomized to continuation-phase CT, fluoxetine or pill placebo (Jarrett & Thase, 2010). Relevant data is taken from the acute phase of this trial Jarrett & Thase (2010)

<sup>e</sup> Sample taken from Jarrett 2001 trial

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<sup>f</sup> Prospective, controlled trial with both randomised and patient preference allocation arms. Data taken from total numbers of participating patients randomised to the two psychological therapies (table 3 in paper)

<sup>g</sup> Completed assessment pre-treatment: 106; post-treatment: 56

*Abbreviations:* BDI= Beck Depression Inventory; CBT= Cognitive behavioral therapy; CES-D = Center for Epidemiological Studies-Depression; CT = Cognitive therapy; EBCT= Exposure based cognitive therapy; HAM-D/HRSD = Hamilton Rating Scale for depression; IDS = Inventory of Depressive Symptomatology; IIP = Inventory of Interpersonal Problems; IPT = Interpersonal therapy; ITT = Intention to treat; MCT = Metacognitive therapy; MDD= Major Depressive Disorder; non-R= non-randomised; NT = Narrative therapy; OP= outpatient; OQ 45.2-IR = Outcome Questionnaire 45.2- Interpersonal Relations Subscale; MADRS: Montgomery Asberg Depression Rating Scale; PAT = psychoanalytic therapy; PDT = psychodynamic therapy; PET= process– experiential therapy; PD= Personality Disorder; RCT= Randomised controlled trial; SAS-modified = Social Adjustment Scale – modified; SAS-SR = Social Adjustment Scale – Self Report; ST = Schema Therapy; SPSP = short-term psychodynamic supportive psychotherapy

### 3.3 Quality appraisal

Overall, half the studies were rated high quality, six were rated medium quality and three rated low quality. Quality scores for the studies included in the review ranged from 1 to the maximum score of 6, with a mean score of 4.2 (SD = 1.7). The most common problems in terms of quality were treatment adherence and use of medication (Table 4).

Table 4

*Number of studies meeting criteria for quality indicators*

Quality Indicator	<i>N</i> (%)
Randomised or single arm studies	15 (83.3)
100% MDD diagnosis	15 (83.3)
Manualised treatment	15 (83.3)
Qualified therapists	13 (72.2)
No concurrent medication	10 (55.6)
Treatment adherence check reported	10 (55.6)

Table 5 presents the full quality checklist for all studies included in the review. In the nine studies that included a psychological comparator group, three were non-randomised (Huber et al., 2012; Lopes et al., 2014; McEvoy et al., 2014), which introduces risk of selection bias and was important to consider when evaluating differential treatment effects. In 15 studies, 100% of the sample had an MDD diagnosis, however in three studies MDD was not diagnosed for the full sample (McEvoy et al., 2013; McEvoy et al., 2014; Ward et al., 2000). In 15 of the 18 studies, a CBT treatment manual was used, however three studies did not report adopting a specific CBT treatment manual (Howard et al., 2006; Huber et al., 2012; McEvoy et al., 2014), which increases the influence of therapeutic variations on treatment outcome. In 13 studies,

fully qualified therapists delivered the therapy, however in three studies not all therapists were qualified (Gelhart and King, 2001; McEvoy et al., 2013; McEvoy et al., 2014), and in two studies it was unclear (Howard et al., 2006; Lemmens et al., 2017). Only 10 studies excluded those with concurrent psychotropic medication, with eight studies allowing or not reporting on the use of antidepressants. Eight studies did not report a treatment adherence check, which could introduce bias as CBT may not have been adequately implemented according to its treatment manual.

Table 6 presents a quality appraisal summary for studies reporting on prediction and moderation. These indicators are discussed and considered when interpreting the findings for RQ2.

Table 5

*Quality appraisal for all studies included in the review: An overall score of 0–2 was considered low quality, 3–4 medium quality and 5–6 high quality*

Study ID (First author and date)	1. Randomisation	2. Diagnosis	3. Manualised	4. Qualified therapists	5. No medication	6. Treatment adherence	Total Number of Criteria Met	Global Quality rating (ascending order)
Carter 2011	+	+	+	+	+	+	6	High
Carter 2018	+	+	+	+	+	+	6	High
Driessen 2017	+	+	+	+	+	+	6	High
Renner 2012	+	+	+	+	+	+	6	High
Vittengl 2003	+	+	+	+	+	+	6	High
Watson 2003	+	+	+	+	+	+	6	High
Lemmens 2017	+	+	+	?	+	+	5	High
Quilty 2013	+	+	+	+	+	?	5	High
Strand 2018	+	+	+	+	-	+	5	High
Altenstein- Yamanaka 2017	+	+	+	+	-	-	4	Medium
Huber 2012	-	+	-	+	+	+	4	Medium
Lopes 2014	-	+	+	+	-	+	4	Medium
Víslá 2018	+	+	+	+	?	-	4	Medium
Ward 2000	+	-	+	+	+	-	4	Medium
Gelhart 2001	+	+	+	-	-	-	3	Medium



Study ID (First author and date)	1. Randomisation	2. Diagnosis	3. Manualised	4. Qualified therapists	5. No medication	6. Treatment adherence	Total Number of Criteria Met	Global Quality rating (ascending order)
Howard 2006	+	+	-	?	?	-	2	Low
McEvoy 2013	+	-	+	-	-	-	2	Low
McEvoy 2014	-	-	-/+*	-	-	?	1	Low

*Note:* + = met criteria; - = did not meet criteria; ? = unclear. '+' were coded as a score of 1 and -/? were coded as a score of 0; \* = yes for group CBT, no for individual CBT

Table 6

*Quality appraisal for studies reporting on prediction or moderation (RQ2)*

Study ID (First author and date)	Controlled for baseline symptom severity	Theoretical or empirical rationale	Type I error was controlled	Sufficient power
Carter 2011	+	-	-	+
Carter 2018	+	-	-	+
McEvoy 2013	+	+	+	+
McEvoy 2014	+	+	+	+
Howard 2006	+	+	+	-
Huijbers 2015	+	-	-	+
Quilty 2013	+	+	+	+
Renner 2012	+	+	+	+
Strand 2018	-	+	+	-

*Note:* + = met criteria; - = did not meet criteria

### **3.4 Data synthesis**

Key findings from individual studies are summarised in Table 3. To aid comparability of the results across studies and methodology, the data synthesis is organised into three main sections according to the methodology and review question they address: RQ1 change in interpersonal functioning following CBT for depression; RQ2 pre-treatment interpersonal functioning as a predictor or moderator of post-treatment depression outcomes; RQ3 association between change in interpersonal functioning and depression outcomes.

For RQ1, a meta-analysis of pre-post change in interpersonal functioning following CBT for depression was conducted. It was not possible to conduct a between-group meta-analysis due to insufficient studies including a control or comparator group. It was therefore only possible to conduct a pre-post treatment meta-analysis for CBT interventions only, which included both RCTs and non-controlled cohort studies.

For RQ 2 and 3, the findings are synthesised narratively, due to heterogeneity in the methodology and data reported.

**RQ1. Does interpersonal functioning change between pre-treatment, post-treatment and follow-up, and does CBT differ from other psychological therapies with regard to this effect?**

*Change in interpersonal functioning pre- to post-treatment*

Fourteen studies<sup>5</sup> reported means and standard for measures of interpersonal functioning at pre- and post-treatment following CBT for depression (see Appendix A for a summary). In all studies, there were improvements in interpersonal functioning. The quality of studies varied from low to high and the average number of sessions was 12.1. Ten studies used a version of the IIP, four studies used a version of the SAS and two studies used the OQ-45.2 IR. Two studies reported data for both the IIP and SAS-SR (Vittengl et al., 2003/Vittengl et al., 2004 and Renner et al., 2012/Dunn et al., 2012); here the mean scores were combined for the meta-analysis, however both instruments were included in sub-group analyses conducted to examine differences between instruments.

*Meta-analysis*

In total, 14 studies ( $n = 1658$ ) were included in a meta-analysis of pre- to post-treatment ESs for change in interpersonal functioning following CBT. The meta-analysis yielded a medium-to-large effect (overall ES  $g = .69$ , 95% CI = .47-.90). However, substantial statistical heterogeneity was observed,  $\tau^2 = .14$ ,  $X^2 = 95.34$ ,  $df = 13$  ( $p < .00001$ );  $I^2 = 86\%$  (Figure 2). ESs attached to pre- to post-treatment improvement ranged from .25 to 1.27.

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<sup>5</sup> One study was not included in the meta-analysis, as the length of treatment was over 12-months (Huber et al., 2012), therefore it was not considered suitable to pool in the meta-analysis

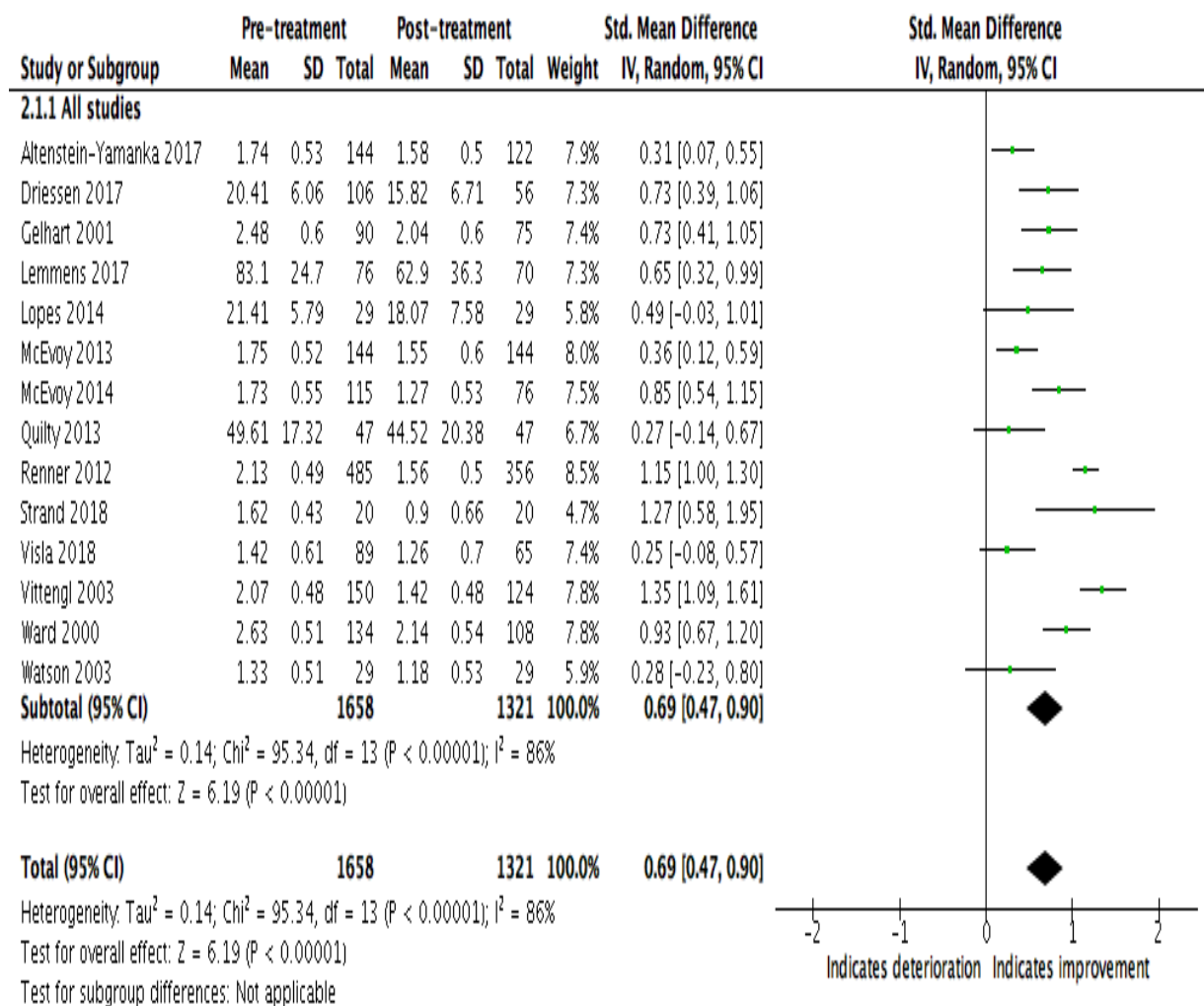


Figure 2. Forest plot of effect sizes for change in pre-treatment to post-treatment interpersonal functioning

### Subgroup analyses

To explore possible sources of heterogeneity, subgroup analyses were performed (Table 7). Restricting the analyses to IIP only ( $n = 10$ ) yielded a slightly reduced overall ES ( $g = .62$ , 95% CI = .39-.85); however, heterogeneity remained high ( $I^2 = 84\%$ ). The pooled ES for the SAS only ( $n = 4$ ) was higher ( $g = 1.20$ , 95% CI = .82-1.58, see Figure 3 for forest plot), but again with very high heterogeneity ( $I^2 = 90\%$ ). For individual CBT interventions only ( $n = 10$ ), the pooled ES remained large ( $g = .73$ , 95% CI = .47-.99) and heterogeneity high ( $I^2 = 87\%$ ), whereas the ES for group-CBT only ( $n = 4$ ) was lower ( $g = .54$ , 95% CI = .26-.82) and

heterogeneity moderately high ( $I^2 = 72\%$ ). Including only those studies rated ‘high’ quality ( $n = 7$ ) resulted in a larger pooled ES ( $g = .81$ , 95% CI .48-1.13), again with considerable heterogeneity ( $I^2 = 85\%$ ). There was no difference in ES according to length of treatment (< 12 sessions versus > 12 sessions). In summary, there was no indication that heterogeneity was significantly reduced according to these subgroups of studies.

Table 7

*Results of subgroup analyses*

Subgroup	<i>n</i>	<i>g</i>	95% CI	$I^2$
<i>Specific measures</i>				
IIP	10	0.62	0.39, 0.85	84%
SAS	4	1.20	0.82, 1.58	90%
OQ-45.2 IR	2	0.66	0.38, 0.94	0%
<i>Format</i>				
Individual	10	0.73	0.47, 0.99	87%
Group	4	0.54	0.26, 0.82	72%
<i>Quality</i>				
High	7	0.81	0.48, 1.13	85%
Medium	5	0.55	0.31, 0.78	75%
Low	2	0.59	0.11, 1.07	84%
<i>Length of treatment</i>				
>12 sessions	9	0.68	0.39, 0.96	88%
<12 sessions	5	0.68	0.35, 1.00	81%

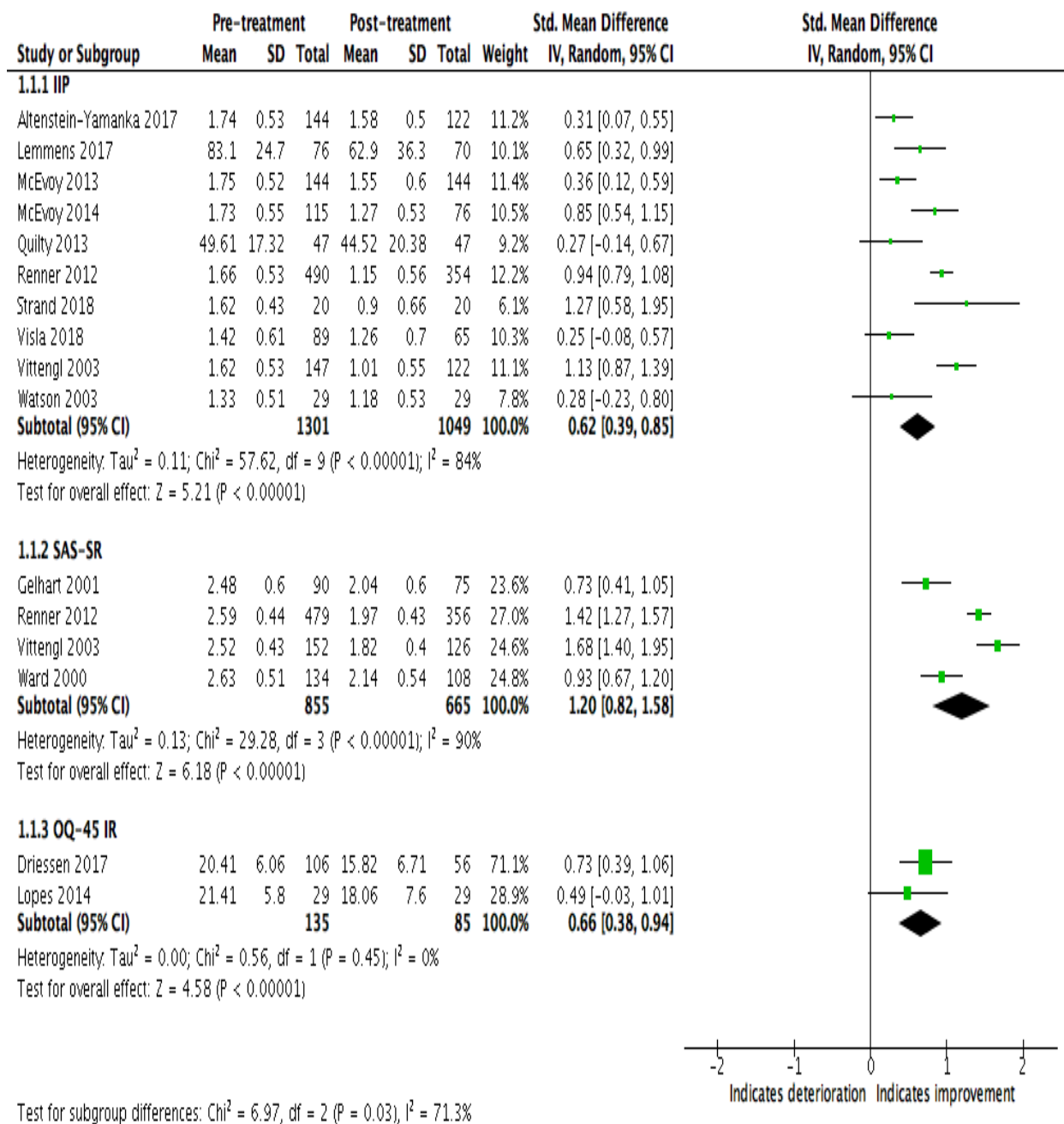


Figure 3. Forest plot of effect sizes sub-grouped by measure of interpersonal functioning

### *Change in interpersonal functioning at follow-up*

Seven studies reported follow-up data, but due to variations in follow-up period (6 to 36 months), it was not considered suitable to conduct a meta-analysis. ESs were either not reported or could not be calculated in the majority of studies. Overall, studies suggest these effects were sustained at follow-up, with improvements in interpersonal functioning maintained at 6-month

(Strand et al., 2018), 12-month (Driessen et. al., 2017; Ward et al., 2000), 21-month (Lopes et al., 2014), 24-month (Gelhart & King, 2001; Vittengl et al., 2004) and 36-month (Huber et al., 2012) follow-up.

***Is there a differential effect between CBT versus other psychological interventions?***

Seven studies ranging from medium to high quality reported pre- and post-treatment data on interpersonal functioning in CBT compared with another psychological intervention (5 RCTs and 2 non-randomised studies). Table 8 summarises the difference in ES between treatments. In five studies there was no statistically significant difference between the therapy types. Two studies reported a statistically significant difference in ES between treatments; in both studies CBT was inferior to the comparator group. One high quality study found that Process Experiential Therapy had a significantly greater decrease in interpersonal problems on the IIP than CBT (Watson et al., 2003) and one medium quality study found that CBT was significantly inferior to Psychoanalytic Therapy and Psychodynamic Therapy at reducing interpersonal problems on the IIP at post-treatment and 3-year follow-up (Huber et al., 2012). However, the results of Huber et al. (2012) should be treated with caution as treatment assignment was not randomised, treatment manuals were not used, and the number of sessions differed between treatments.

Table 8

*Differences in effect sizes for pre-post treatment interpersonal functioning in CBT compared to other psychological interventions*

Study ID	Intervention & comparator	Interpersonal Measure	Difference in ES	Direction of effect
<i>RCTs</i>				
Driessen 2017	CBT vs SPSP	OQ-45.2 IR	$d = .12, p = ns$	
Lemmens 2017	CT vs IPT	IIP	$d = .30, p = ns$	
Quilty 2013	CBT vs IPT	IIP	$p = ns$	
Ward 2000	CBT vs Counselling	SAS	$p = ns$	
Watson 2003	CBT vs PET	IIP	$d = .44, p < .05^*$	Favours PET
<i>Non-RCTs</i>				
Huber 2012	CBT vs PDT	IIP	$d = .58, p < .01^*$	Favours PDT
	CBT vs PAT	IIP	$d = .65, p < .01^*$	Favours PAT
Lopes 2014	CBT vs NT	OQ-45.2 IR	$p = .52, ns$	

*Note.* \* = statistically significant difference; ns = non-significant; IPT = Interpersonal therapy; NT = Narrative Therapy; PAT = psychoanalytic therapy; PDT = psychodynamic therapy; PET = process-experiential therapy.

## **RQ2. Does pre-treatment interpersonal functioning predict or moderate post-treatment depression outcomes in CBT?**

Nine studies of variable quality reported data on interpersonal functioning as a pre-treatment predictor or moderator of depression outcomes in CBT (see Appendix B for summary of statistical analyses and Table 6 for summary of quality appraisal). All studies either controlled for pre-treatment depression symptoms or employed residual gain scores, with the exception of one (Strand et al., 2018). Two studies conducted multiple prediction analyses without controlling for Type I error and did not provide a rationale for including interpersonal functioning as a predictor (Carter et al., 2011; Carter et al., 2018), and two studies were found to have insufficient power (Howard et al., 2006; Strand et al., 2018). Overall, the findings were



mixed regarding whether pre-treatment interpersonal functioning predicted or moderated depression outcomes.

### ***Interpersonal functioning as a predictor of depression outcomes in CBT***

#### *General interpersonal distress*

Six studies examined pre-treatment interpersonal distress measured on a version of IIP as a predictor of depression outcome. Renner et al. (2012) found that individuals with higher pre-treatment interpersonal distress scores had significantly higher mean depression symptom scores over the course of cognitive therapy. Howard et al. (2006) also found higher IIP distress scores significantly predicted higher post-treatment depression scores, despite the study being underpowered. Quilty et al. (2013) found that overall distress on the IIP did not significantly predict depression outcomes directly, however IIP distress was indirectly associated with treatment response later in treatment, through its association with agentic style. McEvoy et al. (2014) found that more severe pre-treatment IIP total scores were associated with increased post-treatment depression scores for group-CBT, but not individual CBT. However, the quality of this study was rated low, in part because allocation was not random, treatment adherence was not reported, and only 54% of the sample who received individual CBT had depression. One study found that pre-treatment IIP distress was not associated with post-treatment depression following MCT (Strand et al., 2018), however this study was underpowered, so it is possible an effect was missed. Two studies found that the interpersonal relations as measured on the SAS did not independently predict post-treatment depression outcomes in individual CBT (Carter et al., 2011; Carter et al., 2018); in both these studies many prediction analyses were conducted without controlling for Type I error and there was no rationale provided for including interpersonal relations as a predictor.

### *Specific interpersonal difficulties*

Three studies reported data on subscales of the IIP (representing specific interpersonal problems) as pre-treatment predictors of depression outcomes. McEvoy et al. (2013) found two out of eight interpersonal problems measured on the IIP-32 - 'difficulty being assertive' and 'tendency to subjugate one's needs' - predicted higher post-treatment depression symptoms during group-CBT, after controlling for pre-treatment symptoms, negative cognitions, demographics, and comorbidity. In another study, higher pre-treatment IIP scores on agency (representing dominance) and amplitude (representing rigidity) were associated with decreased change in depression over the course of treatment (Quilty et al., 2013), whereas communion was not. However, Renner et al. (2012) found that higher pre-treatment dominance scores predicted lower depression symptoms in the middle and slightly lower symptom scores at the end of treatment.

### ***Interpersonal functioning as a moderator of depression outcomes (in CBT versus a non-CBT psychological interventions)***

Four studies examined interpersonal functioning as a moderator of depression outcomes (Appendix B). Two studies found that pre-treatment interpersonal functioning did not differentially predict treatment outcomes in CBT compared with IPT. Quilty et al. (2013) used multigroup path analysis to test whether the associations between pre-treatment interpersonal problems and depression outcomes differed between IPT and CBT and found no appreciable differences, whilst Carter et al. (2011) found no moderating effects of social-interpersonal functioning between CBT and IPT with respect to interpersonal relations, friction with others, and inner feelings and satisfaction.

Two studies found a differential treatment response for specific interpersonal problems. Huibers et al. (2015) found that higher scores on the interpersonal ‘self-sacrificing’ subscale of the IIP-64 (caring for others, even when it requires sacrificing one’s own needs) predicted a better response to CT than IPT. However, none of the other seven subscales had a differential treatment effect and many analyses were conducted without controlling for Type I error, therefore it is possible this is a spurious finding. Carter et al. (2018) reported a significant interpersonal functioning x treatment type interaction for CBT versus narrative therapy in predicting depression outcomes on the MADRS, however the direction of effect was unclear. This study also conducted many analyses without controlling for Type I error.

### **RQ3. Is change in interpersonal functioning associated with depression outcomes?**

Four studies reported on the association between change in interpersonal functioning and change in depression over the course of CBT (see Appendix C for summary of analyses). One study found that pre– post-treatment change in IIP distress was significantly associated with pre– post-treatment change on the BDI-II and IDS-C (Altenstein-Yamanaka, et al., 2017), however changes in agency/dominance and communion/affiliation were not associated with depression symptom change. Vittengl et al. (2004) found that change on both the IIP and SAS were significantly associated with change in depression symptoms. In a study of group-CBT, McEvoy et al. (2013) found that change in interpersonal problems was significantly associated with change in depression symptoms and explained unique variance when controlling for pre-treatment symptoms, negative cognitions, demographics, and comorbidity. However, when changes in negative cognitions were entered into the model, interpersonal problems did not significantly add unique explanatory power.

Finally, Lemmens et al. (2017) examined the relationship between change in interpersonal problems on the IIP and subsequent change in depression symptoms. The authors found significant concurrent relations between change in depression severity and change in the IIP at 0-3 months and 3-7 months, indicating that change in interpersonal functioning was associated with change in depression symptoms, however there was no evidence of temporal mediation.

## 4. Discussion

The aim of this review was to synthesise the empirical literature on what is known about the degree to which interpersonal functioning changes during CBT for depression, whether interpersonal functioning predicts depression outcomes, and whether there is an association between change in interpersonal functioning and depression symptoms. The review included self-report measures of interpersonal functioning; the most commonly used measure within studies was the IIP, which has a specific focus on interpersonal problems. In total, 18 studies across 21 articles met inclusion criteria for the review.

### 4.1 Interpretation of findings

*Does interpersonal functioning change between pre-treatment, post-treatment and follow-up, and does CBT differ from other psychological therapies with regard to this effect?*

In a meta-analysis of 14 studies, interpersonal functioning was found to improve from pre- to post-treatment with a medium-large ES ( $g = .69$ , 95% CI = .47-.90). The pooled ES found in this review was slightly lower than found in McFarquhar et al.'s (2018) meta-analysis of the effect of individual psychotherapy on change on the IIP ( $g = .74$ ). However, McFarquhar et al. (2018) observed a slight imbalance in ESs for therapeutic approaches, with studies with smaller ESs leaning more towards therapies with a goal focus, such as CBT, which is consistent with the finding from the present meta-analysis.

Nevertheless, the results of the meta-analysis should be interpreted with caution, as substantial heterogeneity was observed, suggesting that ESs differed from study to study. Subgroup analyses did not substantially reduce heterogeneity, however did reveal some differences in the magnitude of effects. A subgroup analysis for different instruments found a larger ES for the SAS ( $g = 1.20$ ), compared to the IIP ( $g = .62$ ). One way of interpreting this could be that these

instruments measure different constructs within the ‘interpersonal domain’. For example, the SAS may measure functional difficulties that change more easily with therapy, whereas the IIP could measure distress related to more ‘trait’-like problems, which are less amenable to change. Only two studies used the OQ.45-IR, so it is difficult to draw any conclusions regarding this scale.

A subgroup analysis also found that studies rated high quality yielded a larger ES. This suggests the importance of study quality on changes in scores of interpersonal functioning from pre- to post-therapy. This observation was also found in both McFarquhar et al. (2018) and Driessen et al. (2015)’s meta-analyses and suggests that studies that adopt the particular quality indicators used in this review (related to the quality of the therapy delivered) yield higher ESs. It was also notable that the weighting of ESs was slightly lower for group compared to individual CBT, suggesting that individual interventions could be more effective at improving interpersonal functioning than group therapies. Surprisingly, there was no indication that ESs differed according to length of treatment. This contrasts with previous research, that suggests that the number of sessions is related to improvement in interpersonal problems (Barkham, Rees, Stiles, Hardy, & Shapiro, 2002; Renner et al., 2012), and theories that conceptualise interpersonal change as second-order change (Watzlawick, Weakland, & Fisch, 1974). However, it could be that treatment length did not vary enough to observe any noticeable differences. Another interpretation is that longer treatment duration could reflect a level of “complexity”, whereby clients are less liable to change.

Nevertheless, all abovementioned observations must be interpreted with caution as the subgroup analyses contained *very* few studies, which renders comparisons difficult. It is also acknowledged that there are criticisms in carrying out meta-analyses with pre-post effect sizes

as opposed to between group effect sizes (Cujipers, Weitz, Cristae & Twisk, 2017) and for pooling heterogenous groups of studies. However, this method of meta-analysis has been undertaken by both McFarquhar et al. (2018) and Driessen et al. (2015) to explore change in interpersonal functioning, and thus can be seen to represent a viable approach to synthesising the data, which allows comparisons to be made with these other meta-analyses.

However, an important limitation in pre-post effect sizes is that the scores on the outcome measures at pre-treatment and post-treatment are not independent of each other. Ideally, the correlation between the two scores should be accounted for in the calculation of the pre-post ESs. However, it was not possible to calculate the value of the correlation within the statistical programme used, and therefore the impact of the correlation between pre- and post-treatment is unknown. The results of this meta-analysis should therefore be interpreted within the context of this limitation.

Notwithstanding these limitations, the consistent finding that interpersonal functioning improves during CBT broadly supports the idea that individuals can change on interpersonal indices even in cognitively oriented treatments (Constantino et al., 2016). This is consistent with the notion that although cognitive and behavioural approaches emphasise intra-individual factors, CBT does address interpersonal processes involved in depression (Vittengl et al., 2003). This fits with Lemmens et al.'s (2017) suggestion that CBT might lead to changes in interpersonal functioning, both through direct and indirect pathways. For example, cognitive interventions and behavioural experiments in CBT might have a specific focus on interpersonal situations, thereby directly facilitating change in interpersonal functioning. Indirectly, a decrease in dysfunctional attitudes in cognitive therapy might lead to a change in beliefs related to interpersonal relationships, making individuals more likely to also improve their

interpersonal functioning (Lemmens et al., 2017). However, it could also be argued that change in interpersonal functioning is simply a consequence of improvement in depression symptoms, rather than a domain that is directly addressable within therapy.

There was little consistent evidence for a differential treatment effect in the seven studies that compared CBT to another psychological therapy. Two studies found that a reduction in interpersonal problems was significantly lower in CBT compared to process experiential therapy and psychodynamic therapy, however the quality of the latter study was low. Five studies found no significant differences between therapy types. One way of interpreting this is that change in interpersonal functioning is likely to occur regardless of the therapy in which it is delivered. Interestingly, no significant differences were found in the two studies comparing CBT to IPT, suggesting that therapies which directly employ strategies to target interpersonal functioning are no more efficient at changing it than CBT. However, again, the very small number of studies limits the ability to draw any meaningful conclusions.

*Does pre-treatment interpersonal functioning predict or moderate depression outcomes?*

The findings were inconclusive regarding whether levels of pre-treatment interpersonal functioning predicted depression outcomes. Heterogeneity in the type of interpersonal predictor reported made it difficult to make comparisons and draw meaningful conclusions. Two studies of individual CBT found that higher pre-treatment interpersonal distress scores on the IIP predicted less improvement in depression symptoms at post-treatment. This could tentatively be taken to suggest that identifying those with more severe interpersonal distress may help identify those at risk of less symptom change. Interpersonal problems could interfere with adequate engagement with therapy, for example, by undermining expectancy or



therapeutic alliance, which are well-established predictors of treatment outcomes (Constantino, Arnkoff, Glass, Ametrano, & Smith, 2011).

However, one study did not find an effect of interpersonal distress predicting outcomes in individual CBT, whereas for group-CBT, more severe pre-treatment interpersonal problems predicted less symptom change (McEvoy et al., 2014). The quality of this study was rated low, as notably not all of the sample receiving individual CBT were diagnosed with depression, and treatment assignment was not randomised. Nevertheless, the authors propose that interpersonal problems may have differential effects on outcomes depending on CBT treatment modality and suggest that individuals with more interpersonal problems may require more intensive individual therapy to enable therapists to formulate idiosyncratic obstacles to persevering with treatment and optimising outcomes. This could potentially be seen to converge with the observation from the meta-analysis that the ES for change in interpersonal functioning was smaller in studies of group compared to individual CBT. However, this study in isolation is not enough to draw any meaningful conclusions from.

Three studies reported data on specific interpersonal problems measured on the IIP as pre-treatment predictors of depression outcomes. One study found that higher scores on ‘dominance’ and ‘rigidity’ dimensions predicted worse depression outcomes, whilst another study found scores on ‘dominance’ or ‘communion’ dimensions were not related to depression outcomes. There was also evidence from one study that more interpersonal problems on the IIP related to ‘hard to be assertive’ and ‘too caring’ predicted worse treatment outcomes in group CBT. Taken together, the evidence is inconclusive regarding whether specific interpersonal difficulties predict treatment outcomes. Future studies, particularly those using

the IIP, would benefit from more consistent reporting regarding whether specific interpersonal dimensions and styles are predictors of depression outcomes.

Only four studies reported on interpersonal functioning as a differential predictor of treatment outcomes in CBT compared to non-CBT interventions, and there was little evidence of a moderation effect. The two studies that did find an interaction with treatment type included measures of interpersonal functioning in large multivariate analyses, therefore there was risk of Type I error and one study did not report the direction of effect. Future research is needed to help elucidate the moderating role of specific interpersonal domains by exploring interactions with treatment type in adequately powered studies. This information could have important implications for improving treatment assignment.

*Is change in interpersonal functioning associated with depression outcomes?*

Four studies of variable quality all found significant associations between change in interpersonal functioning and change in depression symptoms over the course of CBT for depression. This supports the idea of concurrent change, however is inconclusive with respect to causality. It has been suggested that interpersonal change could be an epiphenomenon of symptom change (e.g. people might become more assertive as a result of feeling less depressed) and there is an argument that overall IIP distress is not genuinely interpersonal but shares about half of its variance with general distress (e.g. Thomas et al., 2011). One study did include repeated assessments of interpersonal functioning and depression symptoms over the course of therapy, which gives an indication of the temporal relationship (Lemmens et al., 2017). The authors found that change in depression symptoms was associated with concurrent change on the IIP, however there was no evidence of temporal mediation. It remains unclear whether change in interpersonal functioning is the cause or consequence of depression improvement during CBT; further studies are needed to examine the pattern of covariation over time in both

interpersonal difficulties and depression symptoms (using methods suggested by Kazdin, 2007).

## **4.2 Limitations**

There were a number of limitations in this systematic review, both at the study level and at the review level. Firstly, there was wide heterogeneity in study designs, measurement of interpersonal functioning, and the type of analyses used, which made drawing comparisons difficult. Additionally, the sample sizes of many of the studies were small and of variable quality. Notably, nearly half of the studies did not use a treatment adherence check, which is important as CBT may not have been adequately implemented in the sense of mobilising mechanisms, or is not distinct enough to other treatments. It is therefore possible that cognitive procedures were not correctly implemented, or there may have been spill-over effects whereby strategies from other therapeutic modalities may have been present. However, a previous meta-analysis found a non-significant association between therapist adherence and symptom change (Webb, Derubeis, & Barber, 2010), which makes it unlikely that therapist adherence would have significantly affected the findings.

All studies were carried out in the Western world, which is largely reflective of efficacy studies of psychological interventions. It is therefore possible that differences in findings related to the role of interpersonal functioning could be found if studies were carried out in different settings. The majority of studies were carried out in the context of outpatient clinics, where suicidal intent, substance use, bipolar disorder or psychotic disorder were set as exclusion criteria. Although these are standard exclusion criteria for research trials, this may not reflect the reality of everyday clinical practice, potentially limiting the generalisability of these findings for routine practice.

Limitations were also present at the review level. Caveats to the meta-analysis have already been described above. Additionally, although the search strategy tried to be comprehensive, there may have been limits to the number of studies identified, as not all variants of ‘CBTs’ or measures of interpersonal functioning were included as specific search terms. More focused additional searches could have been run to include the specific names of eligible scales in order to identify further studies. Furthermore, the review was also restricted to journal articles reporting their results in English, which may have resulted in relevant data not being included. Not searching unpublished grey literature also increases the chance of publication bias. However, attempts were made to minimise the risk of missing studies by conducting manual searches of reference lists and contacting authors for data not reported in the published articles.

Another limitation was that the assessment of study quality was conducted using scoring methods developed specifically for this review, which makes comparison to other studies and systematic reviews difficult. This decision was taken as the other available tools failed to capture the key quality indicators relevant for this review. However, it must be acknowledged that certain quality indicators were not included in the review. In particular, one limitation was that blinding of outcome assessors was not part of the quality criteria checklist – it is recognised that the use of independent outcome assessors can reduce risk of bias in outcomes; future reviews would therefore benefit from a more comprehensive quality checklist that includes blinding of assessors. A strength of the review was the inclusion of a second reviewer to assess eligibility of studies by title and abstract, however a second reviewer was not available at the data extraction and quality appraisal stage, which increased the risk of bias in critical appraisal process.

A further limitation inherent in the literature synthesised was that the review only included psychometrically validated self-report measures of interpersonal functioning, and as such was limited to just three different scales and their variants. Exclusion of other scales due to a focus on other domains had the benefit of attempting to make interpersonal functioning a distinct construct, however at the cost of excluding other potentially important information on the broader social-interpersonal realm (e.g. availability of social support, attachment, dyadic adjustment and personality dimensions). Inclusion of these measures may have added further heterogeneity to the present review; however, this could be the focus of future reviews, particularly with regard to their predictive utility.

It is also important to note that self-report measures of interpersonal functioning may be susceptible to mood congruent effects and reporter bias, and may leave relevant behavioural variance untapped (Leising et al., 2011). It has been found that self-reported interpersonal problems do not necessarily converge with observer-rated interpersonal problems (Leising, Rehbein, & Sporberg, 2007). Future reviews could also include informant ratings of interpersonal functioning (e.g. impact messages), in addition to observational coding schemes such as The Structural Analysis of Social Behaviour Coding Scheme (Benjamin, 1996), or the Quantitative Assessment of Interpersonal Themes (Crits-Christoph, Demorest, Muenz, & Baranackie, 1994), which assess interpersonal patterns from treatment narratives, in order to give a more comprehensive picture of the role of interpersonal functioning in CBT.

### **4.3 Recommendations for future research**

A number of recommendations for extending the research in this area have been described above. Despite the fact that CBT is one of the most widely researched psychological treatments for depression (Cuijpers, Cristea, et al., 2016), interpersonal functioning is infrequently

reported in treatment studies, either as an outcome, or more rarely, as a predictor or moderator of depression outcomes. Further research on the role of interpersonal functioning in CBT for depression is therefore necessary. In particular, the field needs more high-quality studies which are sufficiently powered to explore whether pre-treatment interpersonal functioning predicts treatment outcomes.

There is a lack of clarity in the literature regarding the concept of ‘interpersonal functioning’, which is arguably not a monolithic construct (McEvoy et al., 2013). As such, specific areas of interpersonal functioning may be more or less amenable to change over the course of therapy, and it might be that specific, rather than overall levels of measures are more predictive of treatment outcome. This information may have more clinical utility in personalising treatment. This is particularly relevant to the IIP, where specific interpersonal problems may differentially predict outcomes. However, it is important to note that there are many different versions of the IIP, and although they have some common items, differences in scoring approaches make comparisons between studies using different IIP derivatives difficult (McEvoy, Burgess, Page, Nathan, & Fursland, 2013). Future studies would benefit from consistent use and reporting of a common measure of interpersonal functioning. Heterogeneity in measures may contribute to the diversity in conclusions drawn about the role of interpersonal functioning, and research on the validity of measures of interpersonal functioning is therefore needed. As mentioned above, future research using multimodal approaches, such as collateral reports or behavioural observations, could make valuable contributions to understanding the role of interpersonal functioning in CBT for depression.

Future studies and reviews would also benefit from exploring whether other processes or mechanisms might reflect a possible means by which interpersonal problems have their

observed effects on outcome in CBT. Some studies have explored whether social-interpersonal problems may affect treatment outcomes through a relationship mediated by therapeutic alliance (e.g. Renner et al., 2012 and Howard et al., 2006). Indeed, the IIP general distress factor has been associated with poor working alliance (Constantino & Smith-Hansen, 2008), and it has been suggested that clients who presented with interpersonal distress and rigidity (particularly hostility and submissiveness), experience greater difficulty forging an alliance with their therapists (Constantino & Smith-Hansen, 2008).

Furthermore, recent advances in the field suggest that multiple patient characteristics may have a cumulative effect on treatment outcomes and there is likely to be a complex relationship between predictor variables. This has led to an increased interest in ‘precision medicine’, which attempts to combine this information into a statistical approach (e.g. Delgadillo et al., 2017; Driessen & Hollon, 2010). Future research could consider interpersonal functioning as a (putative) predictor to combine in these models, rather than considered in isolation. Analyses that combine variables arguably map more closely to intuitive clinical decision making.

Finally, the lack of studies reporting on the role of interpersonal functioning in CBT may reflect a widespread problem in the literature, whereby measures of cognitive variables dominate, whilst interpersonal variables are lacking (with the opposite problem true of IPT, e.g. Bernecker et al., 2014). Recent research suggests that change in theorised processes may not be modality specific (Quilty, McBride, & Bagby, 2008; Warmerdam, van Straten, Jongasma, Twisk, & Cuijpers, 2010) and future studies should therefore continue to test theories of change. As suggested by Lemmens et al. (2017), studies should include theory-specific factors as well as factors that are not directly consistent with theory, such as interpersonal functioning in CBT for depression. Data structures allowing fine-grained time-lagged analyses (e.g.

interpersonal functioning and depressive symptoms assessed at every session) are recommended for testing potential causal relations among these constructs (Vittengl et al., 2003).

#### **4.4 Clinical and practice implications**

The findings from this systematic review have implications for the treatment of individuals with depression within CBT and provide some evidence for integrating an interpersonal perspective into CBT approaches (Follette & Greenberg, 2006). For example, it may be important to assess clients' pre-therapy interpersonal attitudes to give an indication of its influence on therapeutic process and outcome. Identifying clients with more severe interpersonal problems (such as the distress measure on the IIP) may help identify those at risk of poorer outcomes or less symptom change, and offer clinical utility in terms of case formulation, management, treatment-matching, and prognosis. The development of specific procedures to address clients' interpersonal difficulties within CBT could be effective, as well as a focus on clients' perceived problems in the therapeutic relationship. For example, Watson and Greenberg (2000) suggest that it may be helpful to be more explicit about treatment rationale with clients for whom interpersonal problems are central. Tentative evidence from the current review suggests that change in interpersonal functioning may be more important in predicting treatment outcome than pre-treatment levels, thus interpersonal processes may be importance to consider and modify within therapy. However, further research is needed to explore whether improvement in interpersonal functioning is a mere by-product of therapy, or whether it should be explicitly targeted as a mechanism of change, with the potential to enhance therapeutic success (Altenstein-Yamanaka et al., 2017).



## **4.5 Conclusions**

In conclusion, this systematic review and meta-analysis revealed that, despite not being the explicit target of therapy, interpersonal functioning improves following CBT for depression. Although there were few consistent findings regarding the predictive utility of pre-treatment interpersonal functioning, there was some preliminary but inconclusive evidence that pre-treatment interpersonal distress (measured on the IIP) predicted poorer depression outcomes. However, the predictive and moderating role of pre-treatment interpersonal variables remains an open question for future studies to explore. Evidence from a very small number of studies suggests that change in interpersonal functioning is associated with change in depression symptoms, however further research is needed to address whether changes in interpersonal functioning drive changes in depression symptoms, or vice versa.

### **Part III.**

#### **Empirical Study: Cognitive and interpersonal predictors and moderators of treatment outcomes during psychological therapy for depression**

##### **Abstract**

**Background:** Psychological therapy for depression is effective, however individuals vary substantially in treatment response. Treatment decisions within services do not often draw on the evidence base concerning predictors of outcome, and research to date has largely focused on demographic and clinical factors, rather than factors related to theory and process. This study aimed to explore the utility of two therapy modality-specific factors, dysfunctional attitudes and interpersonal problems, as pre-treatment predictors or moderators of treatment outcomes in individuals receiving Cognitive Behaviour Therapy (CBT) or Interpersonal Therapy (IPT) for depression.

**Design:** Prospective cohort study

**Method:** Eighty-six clients receiving high intensity CBT or IPT for depression were recruited from two Improving Access to Psychological Therapies services. Clients completed the Dysfunctional Attitude Scale and The Inventory of Interpersonal Problems at their first assessment appointment. Depression and social functioning outcomes were collected post-treatment.

**Results:** Regression analyses found that pre-treatment dysfunctional attitudes and interpersonal problems did not significantly predict or moderate treatment outcomes. Post-hoc exploratory analyses found that for The Inventory of Interpersonal Problems, the dominance dimension and the domineering/controlling subscale significantly predicted post-treatment outcomes, whereby higher levels of pre-treatment dominance and control were associated with better depression outcomes.

**Discussion:** The main study hypotheses were not supported. There was tentative evidence that specific interpersonal styles related to dominance and control, rather than overall levels of interpersonal problems, may have prognostic value, however these were exploratory analyses and thus at risk of Type I error.

**Conclusion:** There were substantial limitations to this study, most importantly the number of clients receiving IPT was *extremely* small and the power to detect moderator effects was significantly lacking. There is an ongoing need to develop an understanding of factors that contribute to differential treatment responses, and future studies should continue to examine the predictive role of theorised processes.

## 1. Introduction

Major Depressive Disorder (MDD) is one of the most prevalent mental illnesses (de Graaf, ten Have, van Gool, & van Dorsselaer, 2012; Kessler et al., 2003) and has the highest disease burden worldwide in terms of life-years lost to disability (Prince et al., 2007). The efficacy of psychological treatment for depression has long been established, however response varies widely among individuals (Delgadillo, Moreea, & Lutz, 2016; Simon & Perlis, 2010) and approximately 50% of people do not recover (NHS Digital, 2018).

Psychological treatments for depression embrace a variety of interventions (Cuijpers et al., 2014), however studies comparing the effectiveness of different treatments yield comparable results (Cuijpers, Andersson, Donker, & van Straten, 2011), and there is little evidence that, on average, one treatment is more effective than another. Cognitive Behaviour Therapy (CBT) and Interpersonal Psychotherapy (IPT) represent two of the most commonly-practiced, well-studied and empirically-validated psychological interventions for depression (Cuijpers, Andersson, et al., 2011; Cuijpers, van Straten, Andersson, & van Oppen, 2008; Hollon, Thase, & Markowitz, 2002), which are found to produce equivalent outcomes (Jakobsen, Hansen, Simonsen, Simonsen, & Gluud, 2012; Luty et al., 2007; Power & Freeman, 2012; Zhou, Hou, Liu, & Zhang, 2017).

Cognitive behaviour therapies refers to a range of different interventions pioneered by Beck (1964), with the core idea that depression results from maladaptive processing strategies and is maintained by dysfunctional behavioural responses. CBT is currently considered the ‘gold-standard’ of the psychotherapy field (David, Cristea, & Hofmann, 2018). In contrast, IPT, initially developed by Klerman and Weissman for the treatment of depression, focuses on current relationships and interpersonal processes (Klerman, Weissman, Rounsaville &

Chevron, 1984), rather than intra-psyche ones, such as core beliefs within CBT. Despite both CBT (Driessen & Hollon, 2010; Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012; Santoft et al., 2019) and IPT (Cuijpers, Geraedts, et al., 2011; Markowitz & Weissman, 2012), being among the most empirically-supported treatments for depression, there is considerable variation in patient response, with significant proportions of individuals responding either not at all or only partially.

The National Institute for Health and Care Excellence (NICE) recommend both CBT and IPT as high-intensity treatments for depression (NICE, 2009), however there are currently no tools to aid treatment assignment decisions, which are largely based on a trial and error approach (Kessler et al., 2017). Furthermore, clinicians' prognostic assessment of clients can be inaccurate (Ægisdóttir et al., 2006; Grove & Meehl, 1996) and may fail to identify cases at risk of poor treatment outcomes (Hannan et al., 2005). Using this trial and error approach therefore has implications for high rates of treatment drop-out and potentially delays recovery for those patients who persist with treatment until their optimal modality is found (Cuijpers & Christensen, 2017). It is, thus, clinically important to identify which clients will respond best to which treatments.

### **Personalised medicine**

It is now recognised that different people respond differently to different psychological therapies based on their individual characteristics (Delgadillo et al., 2016; Hansen, Lambert, & Forman, 2002; Huibers et al., 2015). This has stimulated an interest in so-called personalised or precision medicine, which aims to use this information to answer the question "what works best for whom?" (Hamburg & Collins, 2010). This is relevant when several alternative treatments are available and the differences in their effectiveness are, on average, small, as is

the case with psychological treatments for depression. Research into personalised treatment and factors that predict outcomes has received increased attention over recent years and has been identified as a priority for advancing psychological treatment research in a recent commission by The Lancet Psychiatry (Holmes et al., 2018). As such, personalised treatment for depression can be viewed as one of the most important challenges for mental health researchers (Cuijpers, Ebert, Acarturk, Andersson, & Cristea, 2016), and has the potential to enhance treatment decisions, improve outcomes and increase the cost-effectiveness and efficiency of mental health treatment systems (Cuijpers, Ebert, et al., 2016; Delgadillo et al., 2016).

### **Predictors and moderators**

Understanding predictors and moderators of treatment outcome is a basis for personalising treatment. When referring to variables that predict outcomes, an important distinction should be made between prognostic factors (predictors), variables which predict response irrespective of treatment type (Kraemer, Wilson, Fairburn, & Agras, 2002), and prescriptive factors (moderators), variables associated with a differential response to treatments, which can help identify individuals most likely to benefit from a particular therapy type (Kazdin, 2007; Kraemer et al., 2002).

A body of research has identified various predictors of therapeutic outcomes in depression, largely focused on common or general factors such as demographic or symptom-specific variables (Cuijpers et al., 2008; Fournier et al., 2010; Huibers et al., 2015). In CBT, predictors of poor response include high initial depression severity, chronic depression, younger age of depression onset, increased number of depressed episodes, comorbid axis 1 disorders, and marital status (Jarrett, Eaves, Grannemann, & Rush, 1991; Neimeyer & Weiss, 1990; Thase,

Simons, Cahalane, McGeary, & Harden, 1991). Studies have also identified moderators of treatment response, for example, Luty et al. (2007) found that severely depressed patients responded better to CBT than to IPT, and Barber and Muenz (1996) found that married patients did better in CBT than in IPT, whereas unmarried patients showed the opposite pattern.

However, to date, research on predictors and moderators of therapeutic outcomes has largely centred on demographic and clinical factors, with relatively less attention paid to factors related to theorised processes or potential mechanisms through which interventions work (Holmes et al., 2018). Using theory to identify and evaluate potential moderators and predictors of therapeutic outcome has been emphasised as an important requirement in this field of research (Kraemer et al., 2002). In CBT, the central assumption is that changes in (negative) thinking, cognition or dysfunctional beliefs is the main mechanism that leads to symptomatic relief (Crits-Christoph, Johnson, Connolly Gibbons, & Mukherjee; Llewelyn, Macdonald, & Aafjes-Van Doorn, 2016). IPT is still in an incipient phase in terms of understanding theory and mechanisms of change (Lipsitz & Markowitz, 2013), however the central idea is that depression typically occurs in an interpersonal context due to interpersonal loss or dispute (Weissman, Markowitz & Klerman., 2000); the focus of therapy is therefore to define and resolve these interpersonal problems. With this in mind, the current study aimed to explore the role of two modality-specific factors, dysfunctional attitudes and interpersonal problems, related respectively to the therapy types CBT and IPT, as potential predictors or moderators of treatment outcomes.

### **Dysfunctional Attitudes**

The cognitive model of depression proposes that dysfunctional attitudes, beliefs and information-processing strategies have a causal role in the aetiology and maintenance of

depression (Beck, 1964; Clark & Beck, 2010; Driessen & Hollon, 2010), with negative thinking found to prospectively predict the onset, relapse, and recurrence of depression symptoms (Mathews & MacLeod, 2005; Wenze, Gunthert, & Forand, 2010). Addressing the assumptions underlying dysfunctional attitudes (Beck, 1964), and the transformation of dysfunctional cognitions into more adaptive ones, is at the core of CBT (Clark & Beck, 2010). In support of this theory, a recent meta-analysis found that CBT reduced levels of negative thinking with a moderate effect (Cristea et al., 2015) and another systematic review concluded that dysfunctional attitudes are associated with symptom change in the majority of studies (Lemmens, Müller, Arntz, & Huibers, 2016).

A number of studies have also explored the prognostic role of pre-treatment levels of dysfunctional attitudes on treatment outcome. Whilst some studies have found that higher levels of dysfunctional attitudes predict poorer response to CBT for depression (Jacobs et al., 2009; Jarrett et al., 1991; Keller, 1983; Sotsky et al., 1991; Thase et al., 1991), believed to be due to greater levels of bias in information-uptake processes, other studies have not replicated this association (e.g. Fournier et al., 2009; Spangler, Simons, Monroe, & Thase, 1997). It has also been suggested that specific attitudes or beliefs (rather than overall levels) might predict treatment outcomes. For example, Blatt, Quinlan, Pilkonis, and Shea (1995) found that higher levels of beliefs related to ‘perfectionism’, but not ‘need for approval’, predicted greater depression symptom severity. There is greater uncertainty in the literature regarding whether levels of dysfunctional attitudes differentially predict (or moderate) outcomes in CBT, relative to other psychological therapies. In relation to IPT, some studies have reported a differential treatment effect, for example, Sotsky et al. (1991) found that low cognitive dysfunction predicted superior treatment response to CBT but not to IPT. However other studies have failed to find this effect (e.g. Carter et al., 2011; Donker et al., 2013).



## **Interpersonal problems**

Interpersonal problems are central to theories of depression, however they are infrequently included in outcome studies (McFarquhar, Luyten, & Fonagy, 2018) and there is little evidence as to the role they play in predicting treatment outcomes. The systematic review (Part II) found inconsistent evidence that pre-treatment interpersonal functioning predicts depression outcomes in CBT for depression; whilst some studies suggest that greater interpersonal problems predict poorer depression outcomes (e.g. Quilty, Mainland, McBride, & Bagby, 2013; Renner et al., 2012), others have not replicated this finding (e.g. Carter et al., 2011). There is little evidence that interpersonal problems differentially predict depression outcomes in CBT compared to IPT (Quilty et al., 2013; Carter et al., 2011), however some studies have found that specific interpersonal problems might interact with therapy type to predict outcomes (e.g. Huibers et al., 2015). The systematic review (Part II) suggests that future studies are needed to explore the predictive and moderating effect of interpersonal problems on treatment outcomes.

## **The present study**

Drawing all these strands of research together, there is clearly a need to enhance depression treatment selection through the identification of prognostic and prescriptive variables. Most patients with depression are seen in primary care, and decisions about patient pathways through services do not often draw on the evidence base concerning mechanisms of therapeutic change (Cohen & DeRubeis, 2018). This study therefore aimed to make use of modality-specific measures (that is, measures specifically constructed to tap into theoretically relevant constructs) as potential predictors or moderators of treatment outcomes in CBT and IPT for depression. In order to increase clinical relevance, the study was conducted within Improving Access to Psychological Therapies (IAPT) services. When considering outcomes, there has

been a growing shift towards looking at functional outcomes as well as reducing symptomology (Powers, de Kleine, & Smits, 2017). Indeed, in a recent meta-analysis comparing the efficacy of CBT and IPT, Zhou et al. (2017) highlighted a need for assessing more clinically-relevant functional outcomes, especially reflecting social function. The current study therefore included social functioning as an additional outcome.

The study firstly aimed to identify whether pre-treatment measures of dysfunctional attitudes and interpersonal problems were prognostic predictors of treatment outcomes (i.e. predicted outcomes regardless of therapy type), and secondly whether they were moderators of treatment response (i.e. differentially predicted treatment outcomes in CBT compared to IPT). Studies in which pre-treatment variables are found to predict treatment response can provide clues about treatment mechanisms and thus can help distinguish between compensation and capitalisation models of the effects of psychotherapies (Cohen & DeRubeis, 2018). The compensation model suggests that individuals with deficits in areas targeted by a therapy will benefit the most from it (Cohen & DeRubeis, 2018); on this basis, it would be expected that for individuals high on dysfunctional attitudes, treatment outcomes would be greater for CBT compared to IPT, whereas for individuals with more interpersonal problems, IPT would be preferred. This contrasts with the capitalisation model, which proposes that therapies work best when they build on clients' strengths (Barber & Muenz, 1996; Cheavens, Strunk, Lazarus, & Goldstein, 2012).

As discussed above, the evidence base for cognitive and interpersonal predictors and moderators of outcomes in psychological treatment for depression is mixed. Findings have been more consistent with regards to prediction, whereas the evidence for moderation could be argued in contradictory ways. Taking this into account, the study had two main hypotheses:

1. Greater pre-treatment dysfunctional attitudes would predict poorer post-treatment outcomes in individuals receiving CBT and IPT for depression. Dysfunctional attitudes would differentially predict treatment outcomes according to therapy type.
2. Greater pre-treatment interpersonal problems would predict poorer post-treatment outcomes in individuals receiving CBT and IPT treatment for depression. Interpersonal problems would differentially predict treatment outcomes according to therapy type.

## 2. Method

### 2.1 Design and setting

This was a prospective cohort study of clients receiving high intensity psychological treatment for depression across two IAPT services. IAPT services offer evidence-based psychological therapies at two levels of intensity following NICE clinical guidelines (Clark, 2018). The ‘high intensity’ pathway is for people with moderate to severe depression and/or anxiety. Whilst formal diagnoses are not necessarily made in IAPT services, clinicians identify a ‘presenting problem’, which is used to select an appropriate treatment protocol, recommended by NICE (Clark, 2018). For depression, a number of treatment options are available (NICE, 2009), however this study only included those receiving high intensity CBT or IPT.

### 2.2 Participants

Participants were recruited from two London IAPT services between October 2018 and April 2019.

*Inclusion criteria:* adults aged 18 years or older; with a primary presenting problem of ‘depressive episode’ or ‘recurrent depressive episode’; a score of 10 or more on the Patient Health Questionnaire-9 (PHQ-9) at screening (service cut-off for depression caseness); allocated to the CBT or IPT high intensity pathway; with a sufficient command of English to comprehend instructions and questionnaires without the use of an interpreter; and attended at least two high intensity treatment sessions.

*Exclusion criteria:* a score below 10 on the PHQ-9 at screening; not able to give consent for the study; not able to read and write in English; depression was not the primary focus of the intervention. Exclusion criteria for accepting referrals to IAPT services are if the primary presenting problem is bipolar affective disorder, psychotic symptoms or a risk of psychotic

relapse, deliberate self-harm or suicidal behaviour that is frequent and/or life threatening, dependence on substances, a personality disorder, complex post-traumatic stress disorder, significant learning difficulties, an eating disorder, psychosexual problems not related to anxiety or depression, anger that is unrelated to a common mental health problem or a significant forensic history.

### **2.3 Interventions**

High intensity CBT and IPT were delivered in one-to-one 50–60-minute-long sessions. Treatment protocols form part of the national curriculum for IAPT training courses, meaning all clients with particular conditions should be receiving the same NICE recommended interventions across services (Clark, 2018). All therapists were trainee or qualified high intensity CBT therapists, IPT therapists, Clinical Psychologists or Counselling Psychologists. A total of 34 therapists participated in the study. Information on treatment protocol adherence is not routinely collected by IAPT services and therefore not available for the current study, however services are expected to operate their own means of checking adherence through practice and supervision.

### **2.4 Power analysis**

A power analysis was carried out using G\*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) for a linear regression analysis ( $R^2$  increase). A power calculation based on an effect size of .110, alpha = .05 and power = .80 and two predictors indicated that 73 participants would be required. It was anticipated that it would be unlikely to detect a large effect size (.35; Cohen, 1992), given that the predictive effects of the two predictor variables were being estimated beyond pre-treatment symptoms levels. The anticipated effect size was therefore estimated to be between small (.02; Cohen, 1992) and medium (.15; Cohen, 1992) and set at .11. This effect

size was also based on existing literature which estimates the correlation between dysfunctional attitudes and depression symptoms to be around .35, equivalent to an  $R^2$  increase of .11. Interaction effects tend to be less powerful than linear effects (Brookes et al., 2004; Perugini, Gallucci, & Constantini, 2010); therefore it was anticipated that the effect size to detect moderator effects based on an interaction between the predictor variable and therapy type would be smaller.

## **2.5 Measures**

### ***Predictor variables***

*Dysfunctional Attitudes Scale – Short Form (DAS-SF; Beevers, Strong, Meyer, Pilkonis, & Miller, 2007)*

The DAS-SF is a self-report questionnaire designed to measure stable and enduring maladaptive beliefs associated with depression, in accordance with cognitive theory (Appendix D). Individuals are asked to rate on a 4-point Likert scale from 1 (totally disagree) to 4 (totally agree) how well each statement describes their attitude. The DAS-SF is a nine-item version. Scores range from 9-36 with higher scores indicating more maladaptive beliefs. The DAS-SF has been found to have good internal consistency ( $\alpha = .84$ ) and is sensitive to change over therapy (Beevers et al., 2007). It is also reported to have good concurrent, convergent and predictive validity and provide a valid and accurate assessment of dysfunctional attitudes in people with depression (Beevers et al., 2007). The DAS-SF has two subscales; perfectionism and need for approval.

*Inventory of Interpersonal Problems – Circumplex – Item Response Theory (IIP-C-IRT; Sodano & Tracey, 2011)*

The IIP is a self-report questionnaire that measures the most common interpersonal problems through a ‘circumplex model’ (Alden, Wiggins, & Pincus, 1990). The IIP-C-IRT (Sodano & Tracey, 2011) is a 32-item version developed from the original 64-item version and consists of 18 items which address behaviours that are hard to do and 14 items which address behaviours that occur too often (Appendix E). Respondents rate the level of difficulty for each interpersonal problem using a 5-point Likert scale from 0 (not at all) to 4 (extremely). Higher scores indicate more interpersonal problems and the total score represents an overall level of distress. The IIP-C-IRT is also designed to yield interpersonal circumplex octant scores on the dimension of love/affiliation (cold-distant vs self-sacrificing) and dominance/agency (non-assertive vs controlling), as well as the total distress score. Adequate internal reliability has been demonstrated for the dominance ( $\alpha = .85$ ) and affiliation ( $\alpha = .86$ ) scale items (Krieg & Tracey, 2016). The IIP-C-IRT has eight subscales: domineering/controlling; vindictive/self-centred; cold/distant; socially inhibited; non-assertive; overly accommodating; self-sacrificing; and intrusive-needy. The internal consistency estimates for IIP-C-IRT subscales range from  $\alpha = .63$  to  $.81$  and test-retest correlations across 2 weeks range from  $r = .64$  to  $.76$ . The IIP-C has been shown to have structural consistency across samples and good convergent validity with other interpersonal circumplex measures (Alden et al., 1990).

### ***Outcome measures***

#### *Primary outcomes*

*Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001)*

The PHQ-9 is a nine-item self-report questionnaire used to measure symptoms of depression (Appendix F). Individuals are asked to rate on a 5-point Likert scale from 0 (not at all) to 3

(nearly every day) how often they experience particular symptoms. Scores range from 0-27 with higher scores indicating increased severity of depression symptoms. The PHQ-9 has been validated in primary care populations (Kroenke, Spitzer, Williams, & Lowe, 2010) and is routinely used in IAPT services across England. It is reported to be a valid measure of depression severity and has adequate sensitivity (88%) and specificity (88%) for the detection of major depressive disorder using a cut-off score of  $\geq 10$  (Kroenke et al., 2001). The PHQ-9 is reported to have good internal consistency ( $\alpha = .89$ ) and test-retest reliability ( $r = .84$ ; Kroenke et al., 2001) and is sensitive to change over treatment (Cameron, Reid, & Lawton, 2010).

*Work and Social Adjustment Scale (WSAS; Mundt, Marks, Shear, & Greist, 2002).*

The WSAS is a simple, reliable and valid measure of functioning across five domains: work, home management, social leisure activities, private leisure activities, family and close relationships (Appendix G). Each item is rated on a scale of 0 (no impairment) to 8 (very severe impairment), rendering a total functional impairment score between 0 and 40. Scores above 20 suggests moderately severe or worse psychopathology, scores between 10 and 20 are associated with significant functional impairment but less severe clinical symptomatology, and scores below 10 are associated with subclinical populations (Mundt et al., 2002). The WSAS is reported to have good internal consistency ( $\alpha = .70$  to  $.94$ ) test-retest reliability ( $r = .73$ ) and scores are sensitive to patient differences in disorder severity and treatment-related change (Mundt et al., 2002). The WSAS has been found to measure a distinct social functioning component (Zahra et al., 2014), and therefore is operationalised as a measure of ‘social functioning’ for the purpose of this study.



## *Secondary outcomes*

### *Binary indicators of reliable and clinically significant improvement and drop-out*

Measures of caseness, clinically significant improvement, reliable improvement and dropout (see definitions below) were included as outcome measures in addition to symptom scores to provide additional ways of operationalising change and treatment outcomes. These measures are routinely used as outcomes in IAPT services, therefore enhancing the applicability of this research to routine clinical practice. Using clinically significant change as an outcome variable is suggested to lead to more consistent findings (Kyrios, Hordern, & Fassnacht, 2015).

### *Definitions*

- *Caseness*. A score of  $\geq 10$  on the PHQ-9 (NHS Digital, 2016).
- *Clinically significant improvement (CSI)*. Pre-treatment scores are in caseness and post-treatment scores no longer meet the criteria for caseness (NHS England, 2017).
- *Reliable improvement (RI)*. The amount of change an individual should show on a psychometric outcome measure between two time points for a change to be deemed reliable and beyond that which could be due to measurement error (Jacobson & Truax, 1991). If an individual's score changes by  $\geq 6$  on the PHQ-9, this can be deemed to be a statistically reliable improvement (Richards & Borglin, 2011; NHS England, 2017);
- *Reliable and clinically significant improvement (RCSI)*. Meeting criteria for both clinically significant improvement and reliable improvement (Delgadillo et al., 2014; NHS Digital, 2016).
- *Dropout*. Not completing scheduled treatment.

## **2.6 Procedures**

Eligible clients meeting the study criteria and who had not opted to dissent from research (see 2.7 ethical approval) were identified from the high intensity CBT and IPT waiting lists. When clients were booked in for their first assessment appointment, their assigned therapist was contacted and asked to provide the client with an information sheet about the study (Appendix H) and obtain verbal consent to participate in the study and share data for research purposes. Following consent, clients completed both the DAS-SF and IIP-C-IRT questionnaires. Clients completed the PHQ-9 and WSAS as part of routine clinical practice before every session either by using a secure online portal or by completing them on a pen-and-paper version and handing the completed questionnaires to their clinicians who then entered the scores directly into the electronic patient record system.

Treatment and demographic information including age, gender, ethnicity, marital status, type of therapy, whether the client was stepped up from low-intensity therapy, number of therapy sessions and sessional data from the PHQ-9 and WSAS were extracted from the electronic patient record system. The last observed measures were used to assess final treatment outcomes. The data was held anonymous at all times to ensure data protection.

## **2.7 Ethical approval**

NHS ethical approval was previously granted for this research by the South Central – Berkshire B Research Ethics Committee (Appendix I). An amendment was made and approved by Health Research Authority NHS to extend the research (Appendix J) and Research and Development approval was granted for the study sites (Appendix K). Ethical approval was granted by Royal Holloway University of London through the self-certification process. In addition, ethical approval was granted by the HRA Confidential Advisory Group which allowed the principal

investigators to access specified confidential patient information (patient name, therapist name and date of appointment) without consent, in order to allow invitation to participate to be provided (Appendix L). Prior to starting recruitment, both IAPT services implemented a system whereby clients were given the opportunity to dissent from research. Information from clients who had opted to dissent was not accessed.

## **2.8 Data analytic strategy**

The main study hypotheses were tested using hierarchical multiple regression analyses. The predictor variables were treated as continuous variables to maintain power. Pearson's correlations were used to explore data prior to regression analyses. Differences in baseline characteristics between the two therapy types was assessed using Independent T-tests for continuous variables and Chi-square tests for categorical variables. The internal consistency of the DAS-SF, IIP-C-IRT and WSAS were also examined.

Hierarchical linear regression analyses were firstly carried out to evaluate the extent to which pre-treatment dysfunctional attitudes or interpersonal problems predicted post-treatment symptom severity. Hierarchical logistic regressions were used to evaluate whether variables predicted caseness, clinically significant improvement, reliable improvement, reliable and clinically significant improvement or dropout. Based on consistent findings that higher initial symptom severity predicts poorer post-treatment outcomes (Carter et al., 2018; Fournier et al., 2010; Vittengl, Jarrett, et al., 2016), pre-treatment symptom scores were entered at step 1 and predictor variables were entered at step 2. This allowed for an examination of the predictive role of dysfunctional attitudes or interpersonal problems on post-treatment symptoms, over and above pre-treatment symptom levels.

Further hierarchical linear regression analyses were carried out to examine whether dysfunctional attitudes or interpersonal problems differentially predicted treatment outcomes in CBT compared to IPT<sup>6</sup>. In these models, pre-treatment symptom scores were entered at step 1, the predictor variable and therapy type were entered at step 2, and the interaction between therapy type and predictor variable (representing a moderator effect) at step 3 (as described in Aguinis, 2004). The net incremental  $R^2$  was used to examine whether the interaction term represented unique variance after accounting for all other variables in the final model. Following the recommendations of Kraemer and Blasey (2004), scores on the predictor variables were mean-centred prior to creating interaction terms, which is generally considered best practice (Disatnik & Sivan, 2016). However although mean-centering scores is thought to help with interpretation, it may not reduce some of the collinearity problems that arise when product terms are used as predictors (Echambadi & Hess, 2007).

Due to the unequal size of the therapy groups, and very small numbers in the IPT group (discussed below), a general approach was taken to analyse the data using a bootstrap resampling technique (Efron, 1979). Bootstrapping is a method for deriving robust estimates of standard errors and confidence intervals for estimates in which random samples are drawn from the full sample with replacement. Bootstrapping is recommended as an alternative to parametric estimates when the assumptions of those methods are in doubt, and can provide more accurate inferences when the sample size is small (Davison & Hinkley, 1997) and improve estimates when heteroscedasticity is present (Davison, Hinkley, & Young, 2003). Bootstrapping was applied to all tests to improve the robustness of the sample distribution. The

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<sup>6</sup> Separate regression analyses were conducted because the main effects of predictor variables are different in a main effect only model versus a model including an interaction.

method used to estimate confidence intervals was based on 1000 bootstrap samples (IBM bootstrapping SPSS 21).

## **2.9 Data screening approach**

Prior to statistical analyses, data were examined for input errors, missing values, normality, and violations of assumptions of regression analyses. Little's Missing Completely at Random (MCAR) test (Little, 1988) was used to identify whether data were MCAR. Normality and variability of the data distributions were checked by skewness and kurtosis statistics, histograms and scatter-plots. Data were considered to be normally distributed if z-scores for skewness and kurtosis were less than 2.58 ( $p > .01$ ). Pearson's correlations between predictor variables were used to assess multicollinearity alongside variance inflation factor (VIF) statistics (Garson, 2012) using the guidelines that correlations among predictor variables should be less than .90 (Tabachnick & Fidell, 2007), the VIF less than 10, and tolerance greater than 0.1 (Myers, 1990). Homoscedascity was assessed by visual inspection of the studentized residuals plotted against the dependent variables. Unless otherwise stated, it should be assumed that these and other main assumptions of regression analysis were not violated.

All data were analysed using IBM Statistical Package for Social Sciences (SPSS) version 21.

### 3. Results

#### 3.1 Demographic information and descriptive statistics

Across the two services, a total of 86 clients participated in the study; 76 received CBT and 10 received IPT. Data were included from all clients who had at least two timepoints for outcome data. Four clients were defined as early completers (received fewer than five sessions because they were no longer experiencing symptoms) and 18 clients dropped out of treatment or were referred to other services. Due to timing restrictions in the completion of the study, 39% of participants had not completed therapy (i.e. ended a course of CBT or IPT) when results were analysed, however over 93% of clients had completed more than five sessions. For clients who had not completed therapy, PHQ-9 and WSAS data were taken from their most recent session for the Time 2 (post-treatment) assessment.

Demographic information is presented in Table 1. The majority of participants were female (56.98%) and White British (50%). Participants were aged between 19 and 74 years and the mean age was 37.70 years (standard deviation (SD) = 13.23). The means and standard deviations for the predictor and outcomes variables are presented in Table 2. There was a trend towards individuals receiving CBT scoring higher on both the DAS-SF ( $p = .063$ ) and IIP-C-IRT ( $p = .074$ ) at baseline. There were no statistically significant differences in baseline PHQ-9 or WSAS scores. Statistically more individuals made a reliable and clinically significant improvement in the IPT group than the CBT group ( $p = .010$ ).

Table 1

*Demographic data for the study sample*

Variable	CBT <i>n</i> = 76	IPT <i>n</i> = 10	Total Sample <i>n</i> = 86
Age at referral (mean years, SD)	37.39 (13.33)	40.10 (12.84)	37.70 (13.23)
Gender <i>n</i> (%)			
Female	41 (53.95)	8 (80.00)	49 (56.98)
Male	34 (44.74)	2 (20.00)	36 (41.86)
Transgender	1 (1.16)	0 (0.00)	1 (1.16)
Ethnicity <i>n</i> (%)			
White British	37 (48.68)	6 (60.00)	43 (50.00)
White (any other)	14 (18.42)	0 (0.00)	14 (16.28)
Mixed	8 (10.53)	3 (30.00)	11 (12.80)
Asian	5 (6.58)	1 (10.00)	6 (6.96)
Black Caribbean	4 (5.26)	0 (0.00)	4 (4.65)
Black African	4 (5.26)	0 (0.00)	4 (4.65)
Black (any other)	2 (2.63)	0 (0.00)	2 (2.33)
Turkish	1 (1.16)	0 (0.00)	1 (1.16)
Not stated	1 (1.16)	0 (0.00)	1 (1.16)
Primary diagnosis <i>n</i> (%)			
Depressive episode	50 (65.79)	6 (6.00)	56 (65.12)
Recurrent depression	21 (27.63)	4 (4.00)	25 (29.07)
Mixed depressive disorder	3 (3.95)	0 (0.00)	3 (3.49)
No problem descriptor	2 (2.63)	0 (0.00)	2 (2.33)
Marital status <i>n</i> (%)			
Single	36 (47.37)	2 (20.00)	38 (44.18)
Married/civil partnership	10 (13.16)	0 (0.00)	10 (13.16)
Divorced/separated	11 (14.47)	1 (10.00)	12 (13.95)
Not reported/unknown	19 (25.00)	7 (70.00)	26 (30.23)
Number of therapy sessions			
Mean (SD)	8.01 (3.29)	7.60 (3.44)	7.97 (3.29)
Stepped up from LI treatment	4 (5.26)	1 (10.00)	5 (5.81)

*Note.* SD = standard deviation; LI = Low Intensity; <sup>a</sup> = Fisher's exact test.

Table 2

*Means and standard deviations for predictor and outcome measures*

Outcome	CBT ( <i>n</i> = 76)		IPT ( <i>n</i> = 10)		Total sample ( <i>n</i> = 86)		Difference Between groups <sup>b</sup>
	Pre-treatment	Post-treatment	Pre-treatment	Post-treatment	Pre-treatment	Post-treatment	
DAS-SF Mean (SD)	23.37 (5.11)	-	20.07 (3.29)	-	23.02 (5.04)	-	<i>p</i> = .063
IIP-C-IRT Mean (SD)	51.93 (15.15)	-	42.80 (13.51)	-	50.87 (15.18)	-	<i>p</i> = .074
PHQ-9 Mean (SD)	15.84 (5.16)	10.76 (6.44)	15.40 (15.40)	6.90 (5.20)	15.79 (5.02)	10.31 (6.40)	<i>p</i> = .795, .072
WSAS Mean (SD)	20.92 (8.57)	15.40 (10.46)	16.70 (8.37)	12.40 (9.39)	20.42 (8.61)	15.05 (10.33)	<i>p</i> = .145, .389
PHQ-9 Caseness % (n) <sup>a</sup>	96.05 (73)	48.7 (27)	100 (10)	20 (20)	96.51 (86)	45.35 (39)	<i>p</i> = .087
PHQ-9 CSI % (n)	-	47.4 (36)	-	80 (8)	-	51.20 (44)	<i>p</i> = .052
PHQ-9 RI % (n)	-	40.79 (31)	-	70 (7)	-	44.19 (38)	<i>p</i> = .080
PHQ-9 RCSI % (n)	-	28.9 (22)	-	70 (7)	-	33.7 (29)	<i>p</i> = .010

*Note.* SD = Standard Deviation; CSI = Clinically Significant Improvement; RI = Reliable Improvement; RCSI = Reliable and Clinically Significant Improvement

<sup>a</sup> Although PHQ>9 was inclusion criteria for entry into the study, scores were taken from initial screening which determined eligibility to the study. It is noted three clients were not at caseness at their first assessment appointment (i.e. scored below 9 on the PHQ). However, all clients still received a high intensity treatment for depression and therefore were included in the study.

<sup>b</sup> T-Tests were carried out to test for differences in demographic and clinical variables, where continuous, and chi squared for categorical variables.



### **3.2 Data screening**

Five participants missed a small number of items, however there were no variables with 5% or more missing values, and it was established that data were MCAR (Little, 1988). Mean substitution was therefore used to impute missing values (Tabachnick & Fidel, 2007). Unless otherwise stated, all variables were found to be within normal limits for skewness and kurtosis.

### **3.3 Questionnaire reliability**

The DAS-SF, IIP-C-IRT and WSAS were shown to have good overall internal consistency ( $\alpha = .84, .83, .78$ , respectively). Cronbach's alpha for DAS-SF perfectionism subscale was  $\alpha = .79$  and need for approval subscale,  $\alpha = .72$ . Cronbach's alphas for the individual subscales for the IIP-C-IRT ranged from  $\alpha = .40$  to  $.85$ .

### **3.4 Correlations**

In order to explore initial relationships between the DAS-SF, IIP-C-IRT, PHQ-9, and WSAS data and to assess multicollinearity, Pearson's correlations were conducted between each of these variables (Table 3). To control for multiple testing and reduce the chance of a Type I error, a Bonferroni correction was applied and the criterion for significance was set at  $p = .003$ .

Table 3

*Correlation matrix showing Pearson's r for DAS-SF, IIP-C-IRT, PHQ-9, WSAS data.*

Variable	DAS-SF	IIP-C-IRT	T1 PHQ-9	T1 WSAS	T2 PHQ-9	T2 WSAS
DAS-SF	-					
IIP-C-IRT	.548**	-				
T1 PHQ-9	.165	.115	-			
T1 WSAS	.258*	.158	.458***	-		
T2 PHQ-9	.137	.094	.547**	.328**	-	
T2 WSAS	.186	.112	.541**	.513**	.800**	-

*Note.* \*\*\* $p < .001$ ; \*\* $p < .01$ ; \* $p < .05$ ; T1 = Time 1 (pre-treatment); T2 = Time 2 (post-treatment)

### 3.5 Demographic and clinical variables predicting depression symptoms

There were no significant differences in post-treatment depression symptoms according to gender ( $p = .50$ ), ethnicity ( $p = .39$ ), or problem descriptor ( $p = .95$ ), and there were no significant correlations between post-treatment depression symptoms and either age ( $p = .09$ ) or number of sessions ( $p = .28$ ). Consequently, these variables were considered not to add to the predictive power and therefore not included in the regression models.

### 3.6 Assumptions for regression analyses

For the hierarchical linear regressions, linearity was evaluated by visual inspection of scatter plots. There was no evidence of homoscedasticity as assessed by visual inspection of the residuals plotted against the predicted values. Errors were mostly normally distributed, yet in some cases they slightly deviated from a normal distribution. For linear regressions without the interaction term, there was no evidence of multicollinearity, as evidenced by no VIF values greater than 10 or tolerance levels less than 0.1. For logistic regressions, linearity of the continuous variables with respect to the logit of the dependent variable was assessed via the

Box-Tidwell (1962) procedure. The assumptions of collinearity and linearity of independent variables with log odds were tested and found to be met. All independent variables were found to be linearly related to the logit of the dependent variable ( $p > .05$ ). In the analyses which included the interaction term between predictor and therapy type, multicollinearity was present (however as discussed above, this was expected). Predictor variables were mean-centred which slightly lowered multicollinearity. Bootstrapping with 1000 samples were applied to all tests.

## Regression analyses

### 3.7 Pre-treatment dysfunctional attitudes predicting post-treatment outcomes

#### *Dysfunctional attitudes predicting post-treatment depression symptom severity*

Pre-treatment depression symptoms entered into the model at step 1 explained a significant amount of the variance in post-treatment depression symptom severity ( $F(1,84) = 35.83$ ,  $p < .001$ ,  $R^2 = .299$ , adjusted  $R^2 = .291$ ). When entered into the model at step 2, dysfunctional attitudes did not contribute to a significant increase in variance in post-treatment depression symptom severity ( $F(1,83) = .265$ ,  $p = .608$ , incremental  $R^2 = .002$ ), see Table 4.

Table 4

*Bootstrap beta values for hierarchical regression: DAS-SF predicting post-treatment PHQ-9*

Predictor	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment PHQ-9	.698	.116	.001**	.477	.930
Step 2					
Pre-treatment PHQ-9	.688	.115	.001**	.458	.912
DAS-SF	.610	.129	.624	-.177	.319

*Note.* \*\*  $p < .01$ ; BCa = bias-corrected and accelerated; CI = Confidence interval

*Dysfunctional attitudes moderating post-treatment depression symptom severity*

After controlling for pre-treatment depression symptoms, dysfunctional attitudes and therapy type entered together at step 2 did not contribute to a significant increase in variance in post-treatment depression symptom severity ( $F(2,82) = 1.98, p = .145$ , incremental  $R^2 = .032$ ). At step 3, the dysfunctional attitudes x therapy type interaction contributed to an increase in variance from 33% to 36% and showed a trend towards statistical significance, ( $F(1,81) = 3.79, p = .055$ , incremental  $R^2 = .030$ ), see Table 5. Regression lines plotted separately for CBT and IPT indicated that higher pre-treatment dysfunctional attitudes were associated with lower post-treatment depression symptom severity in IPT, but not in CBT (see Figure 1).

Table 5

*Bootstrap beta values for hierarchical regression: DAS-SF x therapy type interaction predicting post-treatment PHQ-9*

Predictor	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment PHQ-9	.698	.111	.001**	.473	.916
Step 2					
Pre-treatment PHQ-9	.688	.103	.001**	.483	.907
DAS-SF	.016	.126	.891	-.225	.266
Therapy type	3.508	1.977	.075	-.667	7.188
Step 3					
Pre-treatment PHQ-9	.692	.102	.001**	.497	.908
DAS-SF	-1.011	.690	.175	-2.935	.734
Therapy type	6.279	2.740	.014*	.208	10.961
DAS-SF x therapy type	1.075	.704	.061	-.709	2.076

*Note.* \*\* $p < .01$ ; \* $p < .05$ ; BCa = bias-corrected and accelerated; CI = Confidence interval; Therapy type was dummy coded as 1 = CBT, 0 = IPT

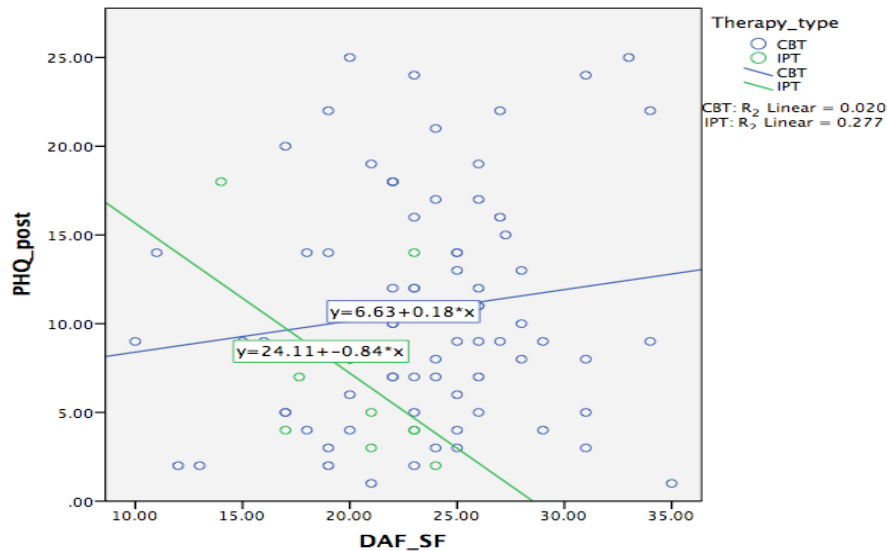


Figure 1. Regression lines for CBT and IPT with separate slope estimates.

*Dysfunctional attitudes predicting post-treatment social functioning*

At step 1, pre-treatment social functioning explained a significant amount of the variance in post-treatment social functioning ( $F(1,84) = 30.08, p < .001, R^2 = .264, \text{adjusted } R^2 = .255$ ), however at step 2, dysfunctional attitudes did not contribute to a significant increase in variance in post-treatment social functioning ( $F(1,83) = .334, p = .559, \text{incremental } R^2 = .003$ ), see Table 6.

Table 6

*Bootstrap beta values for hierarchical regression: DAS-SF predicting post-treatment WSAS*

Predictor	Beta	Standard Error Beta	p-value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment WSAS	.616	.117	.001**	.389	.846
Step 2					
Pre-treatment WSAS	.599	.125	.001**	.359	.832
DAF-SF	.116	.217	.570	-.291	.546

Note. \*\* $p < .01$ ; BCa = bias-corrected and accelerated; CI = Confidence interval

*Dysfunctional attitudes moderating post-treatment social functioning*

After controlling for pre-treatment social functioning, dysfunctional attitudes and therapy type entered into the regression model together at step 2 did not contribute to a significant increase in variance in post-treatment social functioning ( $F(2,82) = .171, p = .843$ , incremental  $R^2 = .003$ ). At step 3, the dysfunctional attitudes x therapy type interaction contributed to an increase in variance in post-treatment social functioning from 27% to 29%, however this was not statistically significant ( $F(1,81) = 2.43, p = .123$ , incremental  $R^2 = .021$ ), see Table 7.

Table 7

*Bootstrap beta values for hierarchical regression: DAS-SF x therapy type interaction predicting post-treatment WSAS*

Predictor	Beta	Standard Error Beta	p-value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment WSAS	.616	.119	.001**	.357	.828
Step 2					
Pre-treatment WSAS	.598	.128	.001**	.318	.817
DAS-SF	.115	.214	.577	-.362	.627
Therapy type	.124	.199	.951	-5.484	5.693
Step 3					
Pre-treatment WSAS	.578	.126	.001**	.307	.792
DAS-SF	-.544	.345	.249	-1.044	.230
Therapy type	3.965	2.657	.115	-1.196	9.333
DAS-SF x therapy type	1.467	.683	.101	-.074	2.581

*Note.* \*\* $p < .01$ ; BCa = bias-corrected and accelerated; CI = Confidence interval; Therapy type was dummy coded as 1 = CBT, 0 = IPT

### *Dysfunctional attitudes predicting caseness, CSI, RI, RCSI and dropout*

After controlling for pre-treatment depression symptoms, dysfunctional attitudes did not significantly predict caseness ( $p = .883$ ), clinically significant improvement ( $p = .787$ ), reliable improvement ( $p = .719$ ), reliable and clinically significant improvement ( $p = .584$ ), or dropout ( $p = .644$ ). Furthermore, the interaction between dysfunctional attitudes x therapy type did not contribute to an increase in variance in any of the outcomes (See appendix M for a summary of the logistic regression analyses).

### **Summary**

The first hypothesis was not supported; pre-treatment dysfunctional attitudes as measured on the DAS-SF did not significantly predict any of the post-treatment outcomes. The interaction between dysfunctional attitudes and therapy type did not contribute to a statistically significant increase in variance in any of the outcomes, however the dysfunctional attitudes x therapy type interaction showed a trend towards significance in explaining post-treatment depression symptoms and contributed to explaining an additional 3% of the total variance. Nevertheless, these findings should be interpreted with extreme caution as the analyses were *substantially* underpowered to detect moderation effects; they are reported here subject to eventual replication with a larger sample size.

### 3.8 Pre-treatment interpersonal problems predicting post-treatment outcomes

#### *Pre-treatment interpersonal problems predicting post-treatment depression symptoms*

At step 1, pre-treatment depression symptoms explained a significant amount of the variance in post-treatment depression symptom severity ( $F(1,84) = 35.86$   $p < .001$ ,  $R^2 = .30$ , adjusted  $R^2 = .29$ ). At step 2, interpersonal problems did not contribute to a significant increase in variance in post-treatment depression symptoms ( $F(1,83) = .116$ ,  $p = .735$ , incremental  $R^2 = .001$ ), see Table 8.

Table 8

#### *Bootstrap beta values for hierarchical regression: IIP-C-IRT predicting post-treatment PHQ-9*

Predictor	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (lower)	BCa 95% CI (upper)
Step 1					
Pre-treatment PHQ-9	.698	.114	.001**	.466	.916
Step 2					
Pre-treatment PHQ-9	.693	.114	.001**	.458	.913
IIP-C-IRT	.013	.039	.729	-.066	.091

*Note.* \*\*  $p < .01$ ; BCa = bias-corrected and accelerated; CI = Confidence interval

#### *Pre-treatment interpersonal problems moderating post-treatment depression symptoms*

After controlling for pre-treatment depression symptoms, therapy type and the interpersonal problems entered together as main effects at step 2 did not contribute to a significant increase in variance in post-treatment depression symptoms ( $F(2,82) = 1.969$ ,  $p = .146$ ,  $R^2 = .331$ , incremental  $R^2 = .032$ ). At step 3, the interpersonal problems x therapy type interaction did not contribute to a significant increase in variance in post-treatment depression symptoms, ( $F(1,81) = .226$ ,  $p = .636$ , incremental  $R^2 = .002$ ), see Table 9.



Table 9

*Bootstrap beta values for hierarchical regression: IIP-C-IRT x therapy type interaction predicting post-treatment PHQ-9*

Predictor	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (lower)	BCa 95% CI (upper)
Step 1					
Pre-treatment PHQ-9	.698	.114	.001**	.466	.916
Step 2					
Pre-treatment PHQ-9	.692	.108	.001**	.480	.903
IIP-C-IRT	-.001	.039	.962	-.078	.078
Therapy type	-3.57	2.13	.086	-7.51	.610
Step 3					
Pre-treatment PHQ-9	.696	.108	.001**	.485	.915
IIP-C-IRT	.004	.040	.918	-.074	.083
Therapy type	-.699	11.52	.902	-14.39	16.53
IIP-C-IRT x Therapy type	-.006	.227	.642	-.434	.273

*Note.* \*\* $p < .001$ ; \* $p < .05$ ; BCa = bias-corrected and accelerated; CI = Confidence interval; Therapy type was dummy coded as 1 = CBT, 0 = IPT

*Pre-treatment interpersonal problems predicting post-treatment social functioning*

At step 1, pre-treatment social functioning explained a significant amount of the variance in post-treatment social functioning  $F(1,84) = 30.08, p < .001$ , adjusted  $R^2 = .264$ . At Step 2, interpersonal problems did not contribute to a significant increase in variance in post-treatment depression symptoms ( $F(1,83) = .110, p = .741$ , incremental  $R^2 = .001$ ), see Table 10.

Table 10

*Bootstrap beta values for hierarchical regression: IIP-C-IRT predicting post-treatment WSAS*

Predictor	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (lower)	BCa 95% CI (upper)
Step 1					
Pre-treatment WSAS	.616	.118	.001**	.359	.830
Step 2					
Pre-treatment WSAS	.610	.116	.001**	.350	.826
IIP-C-IRT	.021	.067	.749	-.116	.154

*Note.* \*\* $p < .001$ ; BCa = bias-corrected and accelerated; CI = Confidence interval; Therapy type was dummy coded as 1 = CBT, 0 = IPT

*Pre-treatment interpersonal problems moderating post-treatment social functioning*

After controlling for pre-treatment social functioning, therapy type and the interpersonal problems entered at step 2 did not contribute to a significant increase in variance in post-treatment depression symptoms ( $F(2,82) = .057$   $p = .368$  .  $R^2 = .262$ , incremental  $R^2 = .001$ ). At step 3 the interaction between the interpersonal problems and therapy type did not contribute to a significant increase in variance in social functioning ( $F(1,81) = .082$   $p = .368$ , incremental  $R^2 = .007$ ), see Table 11.

Table 11

*Bootstrap beta values for hierarchical regression: IIP-C-IRT x therapy type interaction predicting post-treatment WSAS*

Predictor	Beta	Standard Error Beta	p-value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment WSAS	.616	.117	.001**	.370	.835
Step 2					
Pre-treatment WSAS	.609	.119	.001**	.367	.834
IIP-C-IRT	.202	.069	.768	-.119	.152
Therapy type	.244	2.511	.915	-4.979	4.961
Step 3					
Pre-treatment WSAS	.606	.119	.001**	.369	.826
IIP-C-IRT	-.171	.240	.360	-.596	.172
Therapy type	1.783	2.701	.414	-3.422	6.132
IIP-C-IRT x therapy type	.210	.250	.277	-.176	.673

*Note.* \*\* $p < .001$ ; BCa = bias-corrected and accelerated; CI = Confidence interval; Therapy type was dummy coded as 1 = CBT, 0 = IPT

#### *Pre-treatment interpersonal problems predicting caseness, CSI, RI, RCSI and dropout*

After controlling for pre-treatment depression symptoms, it was found that pre-treatment interpersonal problems did not significantly predict caseness ( $p = .541$ ), CSI ( $p = .344$ ), RI ( $p = .330$ ), RCSI ( $p = .721$ ) or dropout ( $p = .607$ ). Furthermore, the interaction between dysfunctional attitudes x therapy type did not contribute to a significant increase in variance in any of the outcomes (see Appendix N for a summary of the logistic regression analyses).

#### **Summary**

The second hypothesis was not supported. Pre-treatment interpersonal problems as measured by the total distress score on the IIP-C-IRT did not significantly predict any of the post-

treatment outcomes. Furthermore, interpersonal problems did not differentially predict (or moderate) any of the outcomes in CBT and IPT, as evidenced by no interpersonal problems x therapy type interactions contributing to a significant increase in variance in outcomes. However, again the analyses were substantially underpowered to detect moderation effects and thus should be treated as preliminary, subject to replication with a larger sample size.

### **3.9 Exploratory analyses: Predicting treatment outcomes from the DAS-SF and IIP-C-IRT subscales**

Previous studies suggest that specific dysfunctional attitudes (e.g. Blatt et al., 1995) and interpersonal problems (e.g. McEvoy et al., 2013) may have more predictive utility than overall levels. Post-hoc exploratory regression analyses were therefore conducted to explore whether specific dysfunctional attitudes or interpersonal problems, as measured by the DAS-SF subscales and IIP-C-IRT dimensions and subscales, predicted or differentially predicted (moderated) treatment outcomes. Again, pre-treatment symptom scores were entered at step 1 and subscale data were entered at step 2. Pearson's correlations between subscales and outcome variables were examined prior to carrying out regression analyses. Due to the exploratory nature of these analyses, controls for multiple testing were not implemented to minimise the risk of Type II error.

#### ***Dysfunctional attitudes subscales***

There was a significant positive correlation between pre-treatment WSAS and the DAS-SF need for approval subscale, however there were no significant correlations between the DAS-SF subscales and post-treatment outcomes (see Table 12).

Table 12

*Correlations between DAS-SF subscales and outcome variables*

Subscale	Pre-treatment		Post-treatment	
	PHQ9	WSAS	PHQ9	WSAS
Perfectionism	.122	.199	.133	.188
Need for approval	.182	.276*	.110	.140

*Note.* \* $p < .05$

Hierarchical regression analyses found that neither the ‘perfectionism’ or ‘the need for approval’ subscales significantly predicted any of the post-treatment outcomes, after controlling for pre-treatment symptom severity. Furthermore, the addition of the subscale x therapy type interaction did not significantly contribute to explaining a significant amount of variance.

***Interpersonal problems: dimensions and subscales***

There was a significant negative correlation between the dominance dimension of the IIP-C-IRT and post-treatment PHQ-9 scores ( $r(86) = -.27, p = .013$ ). There were also significant negative correlations between scores on the domineering/controlling subscale of the IIP-C-IRT and both post-treatment PHQ-9 ( $r(86) = -.24, p = .025$ ), and WSAS ( $r(86) = -.23, p = .039$ ) scores. None of the other subscales or dimensions were significantly correlated with post-treatment outcomes ( $p > .05$ ), see Table 13.

Table 13

*Correlations between IIP-C-IRT dimensions and subscales and outcome variables*

	Pre-treatment		Post-treatment	
	PHQ9	WSAS	PHQ9	WSAS
<i>IIP-C-IRT Dimensions</i>				
Dominance/agency	-.075	-.115	-.266*	-.209
Affiliation/Love	-.096	.139	-.181	.028
<i>IIP-C-IRT Octant Scales</i>				
Domineering/controlling	-.021	-.066	-.242*	-.225*
Vindictive/self-centred	.058	-.069	-.081	-.045
Cold/distant	-.011	.040	.044	.056
Social inhibited	.076	.142	.160	.183
Non-assertive	.019	.127	.168	.103
Overly accommodating	.171	.181	.150	.119
Self-sacrificing	.206	.166	.172	.213
Intrusive-needy	-.021	.077	-.127	-.058

Note. \* $p < .05$

Hierarchical regression analyses were carried out to examine the extent to which subscales of the IIP-C-IRT predicted post-treatment outcomes after controlling for pre-treatment symptom severity. It was found that the ‘dominance’ dimension and ‘domineering/controlling’ subscale significantly predicted post-treatment depression symptom severity (details below). None of the other subscales or the ‘affiliation’ dimension significantly predicted or moderated treatment outcomes.

## ***Dominance dimension***

### *Predicting post-treatment depression symptoms*

After controlling for pre-treatment depression symptoms, dominance scores contributed to a significant increase in variance explained from 30% to 35%, incremental  $R^2 = .051$ , a change that was statistically significant ( $F(1,83) = 6.52, p = .012$ ). In the final model, dominance scores made significant unique contribution to explaining post-treatment depression symptoms ( $\beta = -.595, SE = .194, p = .005, 95\% CI = -.990 \text{ to } -.205$ ), whereby higher dominance scores predicted lower post-treatment depression symptom severity (Appendix O, Table 1). The dominance x therapy type interaction did not contribute to a significant increase in variance in post-treatment depression symptoms ( $p = .245$ ).

### *Predicting or moderating post-treatment depression symptoms and social functioning*

After controlling for pre-treatment symptoms, neither the dominance ( $F(1,83) = 1.989, p = .162, R^2 = .281, \text{ incremental } R^2 = .016$ ) or the dominance x therapy type interaction ( $F(1,81) = 1.544, p = .219, \text{ incremental } R^2 = .013$ ) contributed to a significant increase in variance in post-treatment social functioning.

### *Dominance predicting caseness, CSI, RI, RCSI and dropout*

After controlling for pre-treatment symptoms, dominance scores did not independently predict caseness ( $p = .108$ ), CSI ( $p = .203$ ), RCSI ( $p = .161$ ) or dropout ( $p = .190$ ). However, dominance scores did show significant predictive status with regard to reliable improvement ( $\beta = -.224, SE = .099, p = .024$ ). A model based on both pre-treatment symptoms and dominance was significantly accurate in predicting reliable change ( $X^2(2) = 8.60, p = .014$ ), where higher levels of dominance meant individuals were more likely to make a reliable improvement (see Appendix O, Table 2).

### ***Domineering/controlling subscale***

#### *Predicting post-treatment depression symptoms and social functioning*

After controlling for pre-treatment symptoms, the domineering/controlling subscale significantly predicted both post-treatment depression symptoms ( $F(1,83) = 6.83, p = .011$ , incremental  $R^2 = .053$ ) and post-treatment social functioning ( $F(1,83) = 4.32, p = .041$ , incremental  $R^2 = .036$ ) (Appendix O, Table 3 and 4). The domineering x therapy type interaction did not contribute to a significant increase in variance in either post-treatment depression symptoms ( $p = .154$ ) or social functioning ( $p = .198$ )

#### *Domineering/controlling subscale predicting caseness, CSI, RI, RCSI and dropout*

After controlling for pre-treatment symptoms, the domineering/controlling subscale did not contribute to a significant increase in variance caseness ( $p = .090$ ), CSI ( $p = .058$ ), RI ( $p = .069$ ), RCSI ( $p = .158$ ) or dropout ( $p = .134$ ).

### **Summary**

The two DAS-SF subscales did not significantly predict or moderate treatment outcomes. For the IIP-C-IRT, the dominance dimension significantly predicted post-treatment depression symptom severity and reliable improvement, whereby higher levels of dominance predicted lower post-treatment depression symptoms and increased likelihood of reliable improvement. Dominance scores did not moderate outcomes according to therapy type. One subscale from the IIP-C-IRT significantly predicted post-treatment outcomes; higher scores on the ‘domineering/controlling’ subscale significantly predicted lower depression symptoms and better social functioning post-treatment. Dominance and domineering/controlling scores did not moderate outcomes according to therapy type. However, these were post-hoc analyses and Type I error was not controlled for.



## 4. Discussion

### 4.1 Summary of main findings

This study aimed to explore the utility of two modality-specific measures, dysfunctional attitudes and interpersonal problems, as potential predictors or moderators of treatment outcomes in individuals receiving CBT or IPT for depression. Unlike many previous studies, this study focused on clients within routine psychological therapy, rather than those seen in specialist settings, and included social functioning as an outcome in addition to depression symptom severity. In line with previous literature, higher pre-treatment symptom severity significantly predicted poorer post-treatment outcomes (e.g. Carter et al., 2018; Vittengl et al., 2016), therefore the analyses explored the predictive utility of these variables over and above initial symptom severity.

The first hypothesis, that higher levels of dysfunctional attitudes would predict poorer treatment outcomes was not supported; pre-treatment dysfunctional attitudes did not predict post-treatment depression symptoms, social functioning, caseness, clinically significant improvement, reliable improvement or drop-out. This is contrary to previous studies that have found that lower baseline dysfunctional attitudes are associated with better depression outcomes (e.g. Jarrett et al., 1991; Sotsky et al., 1999; Donker et al., 2013), however consistent with Fournier et al. (2009) who did not find this effect.

It was also hypothesised that dysfunctional attitudes would moderate (or differentially predict) outcomes in CBT compared to IPT. This hypothesis was not supported in as far as the interaction between therapy type and dysfunctional attitudes was not statistically significant for any of the outcomes. However, the interaction did show a trend towards predicting post-treatment depression symptom severity, whereby higher levels of pre-treatment dysfunctional

attitudes were associated with lower depression post-treatment symptom severity in IPT but not in CBT. This finding is in contrast to the compensation model, which suggests that individuals with deficits in areas targeted by a therapy will benefit the most from it (Cohen & DeRubeis, 2018). An alternative explanation for current findings could be that higher levels of dysfunctional attitudes represent an indirect marker of “complexity” (Delgado, Huey, Bennett, & McMillan, 2017) that may be better addressed by IPT rather than a CBT reasoning-based approach. However, it would be imprudent to give too much weight to these speculations given that the analyses were substantially underpowered to detect moderation effects and based on a trend finding. This will need to be replicated with a larger sample.

The second hypothesis was also not supported; pre-treatment interpersonal problems did not predict post-treatment depression symptom severity, social functioning, caseness, clinically significant improvement, reliable improvement or drop-out. This is in contrast to previous studies that found that higher levels of interpersonal distress on the IIP predict worse outcomes in CBT for depression (Howard et al., 2006; Renner et al., 2012), although other studies have not found this effect (McEvoy, Burgess, & Nathan, 2014). There were also no significant interactions between interpersonal problems and therapy type in predicting any of the treatment outcomes, which is consistent with previous studies that failed to find a differential treatment effect between CBT and IPT (e.g. Quilty et al., 2013; Carter et al., 2011). Taken together, these findings suggest that interpersonal problems (as measured by overall distress levels on the IIP) did not have prognostic or prescriptive predictive value in determining treatment outcomes. However, again, it must be acknowledged that the analyses, particularly the moderation analyses, did not meet the number required for sufficient statistical power, therefore it is possible that an effect was missed.

The results suggest that overall, dysfunctional attitudes and interpersonal problems were unrelated to treatment outcomes. The findings that dysfunctional attitudes and interpersonal problems did not differentially predict outcomes in CBT and IPT could imply that the mechanisms of action are similar, despite differences in the content of the intervention. However, it is also possible that differential effects were present but not detectable due to the insufficient statistical power. It was noteworthy that scores on the DAS-SF and the IIP-C-IRT were significantly positively correlated at baseline, which fits with the idea that individuals' cognitive and interpersonal styles are likely to mutually reinforce and sustain each other (Whisman & Friedman, 1998) and could be interpreted as representing a level of "complexity". Delgadillo et al. (2017) suggest that complex cases are characterised by the presence of multiple domains that have a cumulative effect on treatment outcomes. There is now a growing interest in combining several variables into multivariable prediction models in order to generate individualised predictions that can ascertain which of two or more available treatments may be more advantageous to an individual (DeRubeis et al., 2014; Huibers et al., 2015). Future studies could explore whether adding pre-treatment DAS and IIP scores to the existing predictive models built on IAPT populations (Delgadillo et al., 2017; Saunders, Cape, Fearon, & Pilling, 2016) could improve their predictive utility.

The main study hypotheses and primary analyses were conducted for overall levels of dysfunctional attitudes and interpersonal problems (as measured on the DAS-SF and IIP-C-IRT). However, some literature suggests that specific, rather than overall levels of both dysfunctional attitudes (Blatt et al., 1995) and interpersonal problems (e.g. McEvoy et al., 2013), might be more predictive of treatment outcomes. Post-hoc exploratory analyses were therefore conducted to determine the extent to which different subscales predicted and/or moderated treatment outcomes.

For the DAS-SF, it was found that neither the ‘perfectionism’ or the ‘need for approval’ subscales predicted or moderated treatment outcomes. This contrasts with Blatt et al. (1995), who found that perfectionism, but not need for approval, predicted therapeutic outcomes. This finding was perhaps surprising, given that the majority of the sample (86.8%) were receiving CBT, where dysfunctional attitudes were the focus of their therapy.

For the IIP-C-IRT, it was found that the ‘dominance-submission’ dimension significantly predicted (but did not moderate) post-treatment depression symptom severity, whereby higher dominance levels were associated with lower post-treatment symptom severity. This finding is consistent with Renner et al. (2012), who found higher pre-treatment dominance predicted lower symptom scores during cognitive therapy, however contrasts with Quilty et al. (2013), who reported higher pre-treatment dominance scores were associated with poorer outcomes in both CBT and IPT. Although it might be expected that those with lower dominance scores may be less likely to engage in power struggles and more willing to engage in a productive working relationship (Beretta et al., 2005), the positive effect of a higher score on the dominance-submission dimension in this study might be explained by the specific distribution of dominance-submissiveness in the sample. Those describing themselves as mostly submissive might have a lack of assertiveness, which hindered them from benefitting from treatment; this interpretation has been suggested in a previous study (Dinger, Strack, Leichsenring, and Henning, 2007) and fits with the idea that depression is related to subordination and submissiveness (Johnson, Leedom, & Muhtadie, 2012). However, if this was the case, one might also expect a predictive effect for the non-assertive subscale, which was not found in the current study. Additionally, dominance scores did not reach statistical significance for predicting any of the other outcomes (apart from reliable improvement), suggesting this finding is not robust. These speculations will therefore need to be replicated in future studies.

It was also found that higher scores on the ‘domineering/controlling’ subscale predicted both lower post-treatment depression symptom severity and better social functioning, however did not reach significance for predicting any of the other outcomes or interact with therapy type to differentially predict outcomes. An indicative item on this subscale is “it is hard for me to understand another person’s point of view”. These findings could be interpreted in the same way as the ‘dominance’ dimension, which is calculated using the scores from the ‘domineering/controlling’ subscale. However, it must be noted that none of the other seven subscales significantly predicted or moderated outcomes, and the exploratory analyses were carried out without controlling for Type I errors. As there was no previous precedent for either the ‘dominance’ dimension or the ‘domineering/controlling’ subscale being a predictor or moderator of outcomes, the results should be treated with caution because it is possible that the findings were artefact of multiple testing. Further studies are required to assess whether these findings are robust and to test specific hypotheses related to these subscales (Newman, Jacobson, Erickson, & Fisher, 2017). Nevertheless, these findings could be broadly taken to suggest that the individual subscales representing more trait-like interpersonal styles may have more predictive power than overall level of interpersonal distress in predicting treatment outcomes.

## **4.2 Limitations**

There were numerous limitations to this study, most importantly the small sample size. Ideally the number of participants in the IPT group would have been similar to the number in the CBT group, so that it would have been possible to detect a small to medium effect within each group. However, data were only available from 10 people receiving IPT. The study was therefore substantially underpowered to detect moderation effects, which increased the probability of

making a Type II error (Aguinis, Beaty, Boik, & Pierce, 2005). In regression analyses, there are problems making variance inferences for very small sample sizes which can often be unrepresentative of the underlying population, thus any methodology will struggle to accurately characterise the population (Bell, Morgan, Kromrey, & Ferron, 2010). Bootstrapping was used to help improve the robustness of estimates, however it is acknowledged that there is still a potential for unreliability in bootstrapping methods when sample sizes are less than 20 (Chernick & LaBudde, 2010), leading to a high degree of uncertainty about the reliability of the estimates when testing interactions.

Another important limitation was that questionnaires were not given to everyone eligible to participate, therefore the sample may represent only a small number of the population treated for depression in the service over the study period, thus limiting the generalisability of results. Furthermore, due to the recruitment time-scale, not all participants had completed therapy, therefore outcome data were collected from clients' latest, rather than final, therapy session. It is possible this led to a bias in results; participants may have shown a greater improvement in outcomes had they completed therapy. Additionally, follow-up data was not available; some studies have found that post-treatment residual dysfunctional attitudes may serve as indicators of risk of relapse or long-term outcomes, rather than predicting short-term post-treatment outcomes (Thase et al., 1992). It could also be that differences in symptom change trajectories may contain valuable prognostic information (Vittengl, Clark, Thase, & Jarrett, 2016) which was not addressed in this study.

An additional limitation was the use of self-report instruments which may be susceptible to mood congruent effects or reporter bias (Leising, Krause, Köhler, Hinsén, & Clifton, 2011). For example, individuals scoring high on perfectionism may have used high standards in

judging their interpersonal behaviours, resulting in over-reporting of interpersonal problems. Additionally, the collection of outcome data was not blinded as independent assessors were not available. It is therefore possible that therapists delivering the intervention may have influenced the outcome assessment, thereby introducing bias to the outcomes.

Furthermore, the use of the PHQ-9 as an outcome measure for depression may not capture the specific symptoms an individual presented with, and therefore fail to represent the processes or outcomes that changed during therapy. One possible explanation for contradictory findings in the literature could be that different studies have used different instruments to measure depression. There has also been a recent suggestion that the combined use of the PHQ-9 and more open questioning may better capture the relevance of symptoms to the individual's experience and influences treatment decisions (Robinson et al., 2017). This could be explored in future studies.

Furthermore, data on problem descriptor was based on clinicians' judgement of the primary presenting problem, rather than formalised diagnostic interview. Medication status was also not controlled for, and it was not possible to assess variability in clinical outcomes that may be attributable to therapist differences, estimated to be around 5-10% (Baldwin, Wampold, & Imel, 2007). Finally, there was no treatment adherence check, therefore CBT and IPT may not have been adequately implemented in the sense of mobilising mechanisms, or were not distinct enough to each other, meaning moderation is unlikely to be detected.

#### **4.3 Directions for future research**

In the present study, questionnaires were only administered at assessment, therefore it was not possible to examine changes in dysfunctional attitudes and interpersonal functioning over the

course of therapy. However, research indicates that cognitive change over therapy contributes to symptom change (Crista et al., 2015; Lorenzo-Luaces, German, & DeRubeis, 2015), and the systematic review (Part II) found evidence that change in interpersonal functioning was associated with change in depression symptoms, rather than pre-treatment levels within CBT for depression. Future research would benefit from investigating change in dysfunctional attitudes and interpersonal problems over the course of treatment and the relationship this has to treatment outcomes. This has the potential to enhance clinical utility in terms of understanding the relative importance of modifying dysfunctional attitudes and interpersonal problems during therapy.

It is likely that convincing evidence of moderators will require larger studies with confirmatory findings and perhaps the use of individual patient data meta-analyses (Luedtke, Sadikova, & Kessler, 2019). Furthermore, treatment comparisons within, rather than between, individuals could improve power and inspire more individualised treatment recommendations (Lakey & Ondersma, 2008; Simon & Perlis, 2010) without relying on the assumption that associations between variables are the same across individuals (Beltz, Wright, Sprague, & Molenaar, 2016; McDonald et al., 2017; Molenaar, 2004). Better understanding sources of variability and qualitative individual differences (Smith & Little, 2018) may facilitate treatment selection (Kessler et al., 2017) and add another crucial perspective to advancing precision medicine. Future research could use methods that capture finer grained information about specific individual-level changes in dysfunctional attitudes and interpersonal problems over the course of therapy, which may provide complementary information to larger-scale studies.

Future research could also take a qualitative focus to examine which factors participants understand to be most important in predicting therapeutic outcomes. Processes occurring



during treatment, for example the nature of the therapeutic relationship (Falkenstrom, Ekeblad, & Holmqvist, 2016), may better explain treatment outcomes than pre-treatment variables. Finally, further studies could manipulate individual treatment ingredients to help illuminate which elements of a treatment are responsible for moderating effects, thereby enabling more granular tailoring of interventions.

#### **4.4 Conclusions**

This study examined the role of dysfunctional attitudes and interpersonal problems as pre-treatment predictors or moderators of treatment outcomes of CBT and IPT for depression in the pragmatic context of IAPT services. As expected, initial symptom severity significantly predicted treatment outcomes. However, contrary to the study hypotheses, overall levels of dysfunctional attitudes and interpersonal problems were not significant predictors or moderators of post-treatment outcomes. Post-hoc analyses revealed that whilst specific dysfunctional attitudes did not predict outcomes, higher levels on the dominance dimension and domineering/controlling subscale of the IIP-C-IRT predicted better treatment outcomes, which may warrant further investigation. However, there were substantial limitations to the study, namely the lack of power. These findings will therefore need to be replicated in a larger sample. Research on predictors and moderators is a complex area and outcomes are likely to depend on a combination of different factors. The results of this study will hopefully encourage further research on theory-driven predictors and moderators of treatment outcomes which could further help to illuminate these difficult and complicated issues.

## **Part IV. Integration, Impact & Dissemination**

The following section is a critical appraisal and evaluation of the overall research process. It outlines the integration of the systematic review and empirical paper, challenges and dilemmas encountered, the impact of this research, and plans for dissemination.

### **1. Integration**

#### **Overview**

Mental health researchers and clinicians have long sought answers to the question “what works for whom?” (Cohen & DeRubeis, 2018). The overarching aim of this project was to contribute to this growing field of personalised medicine, which aims to optimise an individual’s response to treatment on the basis of their unique characteristics and underlying mechanisms. The project took a specific focus on the role of interpersonal and cognitive factors as predictors of treatment outcomes during psychological treatment for depression. The systematic review synthesised evidence on interpersonal functioning in Cognitive Behaviour Therapy (CBT) for depression, whilst the empirical study looked at the predictive role of dysfunctional attitudes and interpersonal problems in CBT with Interpersonal therapy (IPT) as a comparator therapy.

#### **Broader context for the research**

The increasing attention given to personalised medicine and factors that predict treatment response provided an initial backdrop to developing this research project. A recent commission by the Lancet Psychiatry made ten recommendations for priorities in advancing psychological treatment research, of which understanding how existing treatments work (who should be treated for what and with what) and personalised treatment approaches formed two of the recommendations. This commission also highlighted that factors that predict response to therapy, particularly theorised processes, are crucial to the development, refinement and

improvement of current psychotherapies. (Holmes et al., 2018). In addition, the mental health research charity ‘MQ’ has highlighted understanding predictors of treatment outcome, personalised medicine and how psychological treatments work as research priorities (MQ, 2018). The Wellcome Trust has also identified improving treatment for depression as a priority area for research stating, “in an era of personalised medicine, this failure to understand some of the underlying mechanisms means mental health is falling behind other fields” (Wellcome, 2019).

A second impetus for the project is the anticipation of the updated National Institute of Clinical Excellence (NICE) guidelines on depression. NICE currently recommend a range of psychological treatments of depression including both CBT and IPT, which are found to be equivalently effective. However, treatment assignment decisions, particularly those made within primary care, are often not made in ways that draws on the evidence base concerning predictors of outcome. The empirical study aimed to address this gap in the literature, by examining the role of therapy modality specific measures (specifically constructed to tap into theoretically relevant constructs) as potential predictors or moderators of treatment outcomes.

### **Extent of synergy achieved**

Overall, it was felt that there was a moderate degree of integration between the systematic review and empirical study. As outlined above, they are both situated within the field of personalising psychological treatment for depression, with the broad aim of understanding how an individual’s unique characteristics might influence treatment outcomes, based on the idea that individuals respond differentially to different treatments, and that these differences can be studied and characterised (Cohen & DeRubeis, 2018).

One obvious area of integration is the focus on interpersonal difficulties in CBT in both the systematic review and empirical study. One of the recommendations from the systematic review was a need for future research to explore the role of interpersonal difficulties as predictors of treatment outcomes, in particular studies comparing CBT with different therapeutic modalities. This partly provided a rationale for the empirical study, which aimed to address this gap in the literature by exploring the predictive utility of interpersonal problems on treatment outcomes, and whether there was a differential effect in CBT compared to IPT. However, whilst the systematic review had a narrower focus on interpersonal functioning, the empirical study examined the role of both interpersonal problems and dysfunctional attitudes on treatment outcomes.

Another area of overlap is that although the systematic review aimed to include a variety of different measures of ‘interpersonal functioning’, the Inventory of Interpersonal Problems (IIP) emerged from the literature as being the most widely used instrument. This linked with the empirical study, where the IIP had already been selected as the scale used to measure the interpersonal difficulties. Additionally, whilst reviewing the papers for the systematic review, it was noted that many of the studies which included the IIP reported on different subscales as predictors of treatment outcomes, rather than the overall scores. Although the main study hypothesis in the empirical study was focused on overall levels of interpersonal problems, findings from the studies in the systematic review provided a rationale for conducting exploratory analyses to look at the predictive utility of subscales of the IIP. These analyses revealed that two of the IIP subscales/dimensions were significant predictors of depression symptom severity, which could then be interpreted within the context of papers identified from the systematic review. However, it was important to hold in mind that these were post-hoc analyses, and there was therefore a risk of veering away from the main study hypotheses.

Nevertheless, findings from both the systematic review and empirical study could be taken together to suggest that specific interpersonal problems, as represented by subscales on the IIP, might have more predictive power than overall levels, and thus more clinical utility in terms of personalising treatment.

In conducting the systematic review and empirical study, important distinctions were made between predictors, moderators and correlates of outcomes (Kazdin, 2007; Kraemer, Wilson, Fairburn, & Agras, 2002). The systematic review and empirical study both aimed to address whether variables were pre-treatment predictors or moderators of depression treatment outcomes. However, the systematic review had a wider remit and also considered change in variables over therapy as well as concurrent change (with depression symptoms), which taps more into mechanisms of change. As discussed in the systematic review, it is important to make these distinctions, because they have different implications in terms of clinical utility. Whilst carrying out the systematic review, a framework was developed to help conceptualise this distinction (Table 1). The empirical study was only able to address pre-treatment variables as predictors (and to a limited extent, moderators), however in the discussion it was acknowledged that *change* in these variables may have more influence on treatment outcomes than pre-treatment symptom levels, and thus may have clinical utility in understanding the importance of modifying these factors during therapy.

Table 1

*Framework demonstrating the methodological integration between systematic review and empirical study*

Definition	Clinical Utility	Systematic review	Empirical Study
Change in variables from pre-post treatment	Inclusion of variables as outcomes	✓	
Predictors		✓	✓
Pre-treatment prognostic predictors	Prognosis, formulation, case management	✓	✓
Pre-treatment prescriptive predictors (moderators)	Treatment assignment decisions, client allocation		
Concurrent change (with depression symptoms)	Points to mechanisms of change. Highlights the importance of modifying variables during therapy	✓	

## **Challenges and dilemmas during the project**

### ***Systematic review***

An initial challenge in designing the systematic review was the wealth of existing research within the field of CBT for depression. Trying to find a unique gap in the literature, relating to the empirical project, was therefore difficult. When broadly reviewing the literature, it was found that whilst extensive research existed on the relationship between dysfunctional attitudes and CBT for depression (e.g. Cristae et al., 2015; Lorenzo-Luaces, German, & DeRubeis, 2015), less attention had been paid to the role of interpersonal functioning. In consultation with an expert in the field, it was agreed that interpersonal functioning in CBT was an under-

researched area, and therefore deemed to be a suitable topic, with the added benefit of linking well with the empirical study.

When constructing the search strategy and search terms, the number of records identified was large. Limiting the review to one specific measure of interpersonal functioning reduced the number of hits, however it was decided that it would be useful to capture the range of different instruments in order to explore differences between them. Consultation with an expert in the field regarding which instruments to include helped narrow down the definition and define appropriate inclusion/exclusion criteria, such as limiting the review to validated self-report measures.

Another challenge in carrying out the systematic review was the number of different angles from which to address the role of interpersonal functioning in CBT for depression. The framework outlined in Table 1 was adopted to help clarify the literature, and this formed the basis of organising the review. Although a more focused review question may have been more manageable given the limited time and resources, addressing these different questions allowed me to get to grips with the literature on predictors, moderators, and mechanisms of treatment outcomes and helped prepare me for the empirical study, particularly when it came to analysing and interpreting the results.

An additional dilemma in the systematic review centred around how best to synthesise the literature. For the question of change in interpersonal functioning from pre- to post-treatment, it was decided that a meta-analysis would be the best way to summarise the data, in line with other existing systematic reviews (e.g. McFarquhar, Luyten, & Fonagy, 2018). Although an argument could be made that it is inappropriate to pool the data due to heterogeneity

(Gurevitch, Koricheva, Nakagawa, & Stewart, 2018), on balance, it was decided to run the meta-analysis and conduct subgroup analyses to investigate potential sources of heterogeneity, as advised by an expert in the field. It is also acknowledged that there are difficulties ‘lumping’ diverse studies together (e.g. group and individual formats), however it was noted that this approach has been used in other existing systematic reviews (e.g. Driessen et al., 2015), and therefore considered one way of synthesising the data, which allowed for comparisons to be made with meta-analyses of non-CBT interventions.

### *Empirical study*

There were many barriers and difficulties encountered in carrying out the empirical study, however recruitment was undoubtedly the most significant challenge. Under-recruitment to the IPT branch of the study resulted in a large discrepancy between CBT and IPT numbers (76 versus 10). The impact of this was that the study was limited in its ability to compare treatment types, and the analyses were thus underpowered to detect moderation effects.

Prior to starting recruitment, it was identified that across the services, 2,789 people completed treatment over a 6-month period with approximately 1,122 receiving a problem descriptor of depression. It was therefore anticipated that the recruitment target would be achievable in the timeframe. Additionally, an application was made to the Confidentiality Advisory Group (CAG) in order to access minimal information prior to consent. This enabled me to identify eligible clients, keep track of appointment dates, contact therapists, and send questionnaires and reminders before appointments. This helped reduce the burden placed on therapists and administration staff, which was highlighted by a previous trainee as a barrier to recruitment in the service. During the study period, I spent at least one day a week in the services to conduct searches for eligible clients and meet with therapists to discuss the study.



However, during the initial stage of recruitment, it became apparent that there were difficulties recruiting to the IPT arm of the study, and that it was unlikely that the recruitment target was going to be reached within the time available. In an attempt to increase IPT resource from available therapists, meetings were set up with the IPT leads in the service to try to understand barriers to recruitment. During these discussions, it was understood that only a small number of clinicians were trained to deliver IPT, and those that did, also delivered CBT, putting limits on the number of clients on their caseloads. It was therefore clear that the number of IPT cases would not be reached from these services alone.

In response to this, an attempt was made to expand recruitment to other services. I attended an IPT network meeting with another trainee to present our research and encourage therapists to participate in the study. During the meeting, seven IPT therapists expressed an interest in the study, and were subsequently contacted, however sadly no responses were obtained. Discussion during the meeting highlighted that IPT therapists' workloads within IAPT are currently very high, and therefore we attributed the lack of response to limited time and resource to recruit to the study. In a further attempt to encourage participation in the research, an email was sent to all members of IPT Network UK to invite services across the country to take part in the study. Several therapists got in contact to express an interest, and one service has agreed to develop this research further. An amendment to the ethics application to extend the research to this study site has now been approved, however it was not processed in enough time to recruit for the current study. It is anticipated that involvement from other services will help extend the research.

A separate, but important limitation to the empirical study was that it additionally aimed to track a subset of individuals over the course of therapy using a single-case experimental design

(SCED). It was hoped that this would allow for a better understanding of intra-individual variation in interpersonal problems and dysfunctional attitudes during therapy and pattern of change over time. Although six participants have been recruited to this part of the study, due to the time constraints, it was not possible to include this in the empirical write-up because not all clients had completed therapy. Again, it is anticipated that data from these participants will be used to complement findings from this larger cohort study and help address the question of whether changes in dysfunctional attitudes and interpersonal problems precede, or follow, changes in depression symptoms (Lemmens et al., 2017; Lorenzo-Luaces et al., 2015). Developing a more in-depth understanding of particular individual patterns of change and how this contributes to treatment outcomes is in line with the development of more processed-based treatments which is likely to become increasingly important in personalised medicine (Hofmann & Hayes, 2018).

Taking all this into account, the empirical study should therefore be viewed as part of a longer-term strategy. Although the analyses were underpowered, they were conducted to see if any preliminary larger effects emerged. The study will need to be replicated with a larger sample size, and it is planned that future trainees will continue to expand this research. This is in line with the recommendation that new trainees build on previous trainee work, and academic staff build longitudinal data sets (Duke & Denicolo, 2017). With a larger sample, the project may be in a position to analyse data in a more definitive way than it can at present. Additionally, it is planned that myself or future trainees will follow-up on the data collected from the subset of individuals taking part in the SCED. It is hoped that this idiographic perspective may help complement findings from the present study.

### **Additional reflections**

Throughout this project, I have learnt a considerable amount about the application of research to clinical practice and have gained confidence in navigating processes in clinically applied research, such as NHS ethical applications.

Recruiting from a clinical population was challenging and something I didn't foresee was how much of the research process was outside of my control. The first stage of participant recruitment felt slow and frustrating at times, and there was often a feeling of uncertainty and uncontrollability surrounding data collection.

Recruitment was partly reliant on busy clinicians, and some therapists reported that the questionnaires were lengthy to complete in sessions, which was a barrier to giving them out. There have been criticisms in the literature regarding the multiple questionnaires completed within IAPT services (Binnie, 2015). I was also mindful that this was the first session that clinicians had with clients, and therefore completing questionnaires might have been seen as a barrier to engagement and rapport. This was something that resonated with me at the time, working in a busy service where any additional work was felt to impede on clinical time. During this process, it was also apparent that staff are under additional pressure due to increasingly high caseloads, which has been recognised in the literature (e.g. Steel, Macdonald, Schroder, & Mellor-Clark, 2015; Westwood, Morison, Allt, & Holmes, 2017).

To address some of these challenges, a reference group of therapists who had volunteered to participate in the research was set up in one of the IAPT services. Feedback was provided to these therapists regarding their client's specific pattern of dysfunctional attitudes and interpersonal problems (based on scores from the subscales of the measures) in the format of a

graph, with a written summary to explain the pattern of results. The aim was to increase the clinical utility of the questionnaires and help inform formulations. I also met with therapists to help interpret these graphs and consider how they might be used clinically. This made me aware of the need for making research relevant to everyday practice. It would be beneficial for future studies conducted in these services to consult with and involve therapist reference groups, as well as service users in the initial design of projects. In particular, there is a need for more user-led research (Ghisoni et al., 2017).

The process of carrying out the research has also led me to reflect on the importance of developing collaborative partnerships between clinical services and research institutions (Garland & Brookman-Frazee, 2015). In particular, it has highlighted the significance of research projects having team leaders and heads of service engaged within projects in order to make research studies more feasible, especially in the planning and development stages, which has been documented in the literature (Smith & Thew, 2017).

## **2. Impact**

### **Service level impact**

The primary impact at the service level has been the implementation of research into clinical practice and supporting ongoing research within the two IAPT services. Gaining approval from the CAG allowed me to identify eligible clients and contact therapists at the point at which they were due to see their client, thereby reducing the burden on clinicians to remember to give questionnaires. Feedback gained from therapists who participated in the study highlighted that they found this strategy useful – it is hoped that future research will benefit from adopting this method.

As mentioned above, in one of the services, a reference group of therapists was set up which encouraged involvement from therapists who had volunteered to be actively involved in research. It is planned that the results of this project will be fed back to the service and it is hoped that the impact of this will lead to further discussions about the service's research priorities. Building on this could allow for the professional development of therapists to support ongoing research within the service. Evidence suggests that clinical settings that foster research are associated with better client outcomes and it is recommended that clinicians design research projects on the basis of client needs, and/or those with a greater focus on service improvement (Smith & Thew, 2017).

As previously outlined, meeting with therapists to help interpret the results of the questionnaires meant that they had a direct impact on the day-to-day clinical practice of therapists within the service. One particular therapist fed back that they used information from the DAS-SF to help inform formulations for their clients.

## **Clinical impact**

Enhancing treatment assignment has the potential for wide reaching clinical impact. Therapists will need to select treatments for clients in everyday practice, therefore accurate selection of their optimal treatment could have substantial benefits for people living with depression, with treatment tailored to maximise the factors that contribute to better outcomes. However, this is clearly a vast and complicated field, and this project was only able to address one small area. Nevertheless, the empirical study was able to examine interpersonal and cognitive predictors of treatment outcomes within the pragmatic context of IAPT services. The results of the study did not reliably suggest that overall measures of dysfunctional attitudes or interpersonal problems should be added to models used to predict treatment outcomes over and above symptom severity in individuals receiving CBT or IPT for depression. However, it would be premature to draw conclusions that directly influence clinical practice. As mentioned above, this study should be viewed as part of a longer-term strategy, and the research provided a starting point for understanding the predictive roles of dysfunctional attitudes and interpersonal problems in treatment outcomes, and further research is needed to clarify their predictive utility. Indeed, replication and external validation are essential steps that should precede the implementation of any specific treatment selection model, as Cohen (2018) argues, the publication and discussion of candidate predictors are equally important, as they set the foundation for future efforts.

An unintended area for impact during this project was highlighting the lack of IPT resource within primary care. Despite IPT being one of the NICE recommended therapies for depression, it does not appear to be routinely offered within IAPT services; only one of the two IAPT services recruited from had practicing IPT therapists. Presenting the research at the IPT Network meeting had the impact of raising awareness of the difficulties in recruiting clients

receiving IPT. Reflecting on reasons why IPT might be under-resourced in primary care suggested that there is less opportunity and awareness of training opportunities. It is hoped that discussion of these issues will encourage future research, which in turn may help to raise the profile of IPT.

### **Personal impact**

On a personal level, the research has made me aware of the importance of understanding different factors which predict treatment outcomes, and the consideration of both modality-specific and non-modality specific processes. This has influenced my own practice; I have noticed myself making more ideographic formulations, which take into consideration a range of factors, including attitudes and interpersonal styles. The process of conducting the systematic review, particularly the critical appraisal, has made me more aware of the importance of evaluating the extent, nature and quality of evidence in studies. It also highlighted the difficulties in coming to a clear and consistent overall picture, and the way that research studies vary (Gough, Thomas, & Oliver, 2012).

Carrying out this project has also informed my understanding of the dual role of a clinical psychologist as both a clinician and researcher within the 'scientist-practitioner model' (Holtum & Goble, 2006; Stricker, 2002). It has also given me a greater understanding of how research capacity has the potential to enhance professional visibility and influence within the field, as well as improving clinical performance and health outcomes (Smith & Thew, 2017). This research has given me confidence and knowledge to understand and navigate the processes in clinically applied research, which has influenced me to consider research opportunities in my future career.

### 3. Dissemination

Dissemination of project findings can often be a somewhat neglected part of the research process (Cooper & Turpin, 2007). It is therefore planned that elements of the project will be submitted for publication. If accepted, this would increase the dissemination and possible impact of these findings. Potential journals for the systematic review are *Clinical Psychology Review* or *The Journal of Affective Disorders*. It is hoped that data from the subset of participants who took part in the single case design will be used to complement findings from the larger cohort study. Pending further data, a potential journal for the empirical article is *Behaviour Research and Therapy*. A potential journal for the findings related to interpersonal problems is the *Journal of Personality Assessment*. Results from the empirical study were presented at the Royal Holloway University of London research day and preliminary findings were presented at the IPT UK network meeting. I also plan to attend the IAPT services in which data was collected in order to feedback and present the results to the team. It is also planned that myself and the thesis supervisor will deliver a session in one of the IAPT services on working with interpersonal issues within a CBT framework.



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## Appendices- Appendix A

### *Characteristics of studies included in meta-analysis of pre- to post-treatment interpersonal functioning*

Study ID	CBT intervention	Interpersonal Measure	Scoring method	Pre-tx N	Pre-tx score	SD	Post-tx N	Post-tx score	SD	Pre-Post ES (g)	95% CI
Altenstein-Yamanaka 2017* <sup>a</sup>	Individual CBT/EBCT	IIP-32	Mean	144	1.74	0.53	122	1.58	0.50	0.33	.09-.58
Driessen 2017	Individual CBT	OQ-45.2 IR	Mean	106	20.41	6.06	56	15.82	6.71	0.73	.73–1.06
Gelhart 2001	Group CBT	SAS-SR	Mean	90	2.48	0.60	75	2.04	0.60	0.73	.39–1.06
Lemmens 2017	CT	IIP-64	Total mean	76	83.1	24.7	70	62.9	36.3	0.65	.32-.99
Lopes 2014	CBT	OQ-45.2 IR	Total mean	29	21.41	5.79	29	18.07	7.58	0.49	-0.03-.1.01
McEvoy 2013	Group CBT	IIP-32	Mean	144	1.75	0.52	144	1.55	0.60	0.36	.12-.59
McEvoy 2014	Group CBT	IIP-32	Mean	115	1.73	0.55	76	1.27	0.53	0.85	.54-1.15
Quilty 2013*	Individual CBT	IIP-32	Global sum	47	49.61	17.32	47	44.52	20.38	0.27	-.14-.67
Renner 2012*/Dunn 2012	Individual CT	IIP-127	Mean	490	1.66	0.53	354	1.15	0.56	0.94	.79-1.08
		SAS-SR	Mean	479	2.59	0.44	358	1.97	0.43	1.42	1.27-1.57
		Combined	Mean	485	2.13	0.49	356	1.56	0.50		
Strand 2018	MCT	IIP-C-64	Mean	20	1.62	0.43	20	0.90	0.66	1.27	.58-1.95
Víslá 2018 <sup>b</sup>	Group CBT	IIP-28	Mean	89	1.42	0.61	65	1.26	0.70	0.25	-.08-.57
Vittengl 2003/Vittengl 2004 <sup>c</sup>	Individual CBT	IIP-C-127	Mean	147	1.62	0.53	122	1.01	0.55	1.13	.87-1.39
		SAS-SR	Mean	152	2.52	0.43	126	1.82	0.40	1.68	1.40-1.95
		Composite mean	Mean	150	2.07	0.48	124	1.42	0.48	1.41	

Study ID	CBT intervention	Interpersonal Measure	Scoring method	Pre-tx N	Pre-tx score	SD	Post-tx N	Post-tx score	SD	Pre-Post ES (g)	95% CI
Ward 2000	CBT	SAS-modified	Mean	134	2.63	0.51	108	2.14	0.54	0.93	.67-1.20
Watson 2003	CBT	IIP-127	Mean	29	1.33	0.51	29 <sup>d</sup>	1.18	0.53	0.28	-.23-.80

*Note.* ES = effect size; Pre-tx = Pre-treatment; Post-tx = Post-treatment \*\* = means and sds obtained through contact with authors or taken from McFarquar's meta-analysis

<sup>a</sup>Altenstein-Yamanaka et al., (2017) report for both CBT and EBCT combined

<sup>b</sup>data taken for randomised pre-treatment scores in Vislä et al., 2018

<sup>c</sup>Data taken from Vittengl 2003

<sup>d</sup>Completer sample

## Appendix B

### *Summary of statistics for pre-treatment interpersonal functioning as a predictor or moderator of depression outcomes*

Study ID	Pre-treatment Interpersonal predictor/moderator	Depression outcome	Controlled for	Significant predictor (+= yes; - = no)	Statistics
Carter 2011	SAS-interpersonal tertiles*	MADRS % improvement	Baseline MADRS	-	ns
Carter 2018	SAS-interpersonal tertiles* SAS-Interpersonal x Treatment	MADRS % improvement	Baseline MADRS	- +	$R=.12, p= ns$ $R2=.14, p=.02$
Howard 2006	IIP distress	Post-tx BDI	Baseline BDI	+	$R2 = .261, p=.020$
McEvoy 2013	IIP- hard to be assertive IIP- too caring IIP- hard to be sociable IIP- too dependent IIP- other subscales	Post-tx BDI-II	Baseline BDI, negative cognitions, demographics, and comorbidity	+ + - - -	$B = 3.62, p<.05$ $B=3.16, p<.05$ $B= 0.04, ns$ $B= 0.25, ns$ $p=ns$
McEvoy 2014	IIP - distress Group CBT Individual CBT	Post-tx BDI-II	Baseline BDI	+ + -	$R= 0.29, p <.01$ $B=.23, p <.05$ $ns$
Huibers 2015	IIP Self-sacrificing x treatment IIP all other subscales x treatment	Post-tx BDI-II	Baseline BDI	+ -	$B=0.10, t=1.94, p=0.05$ $ns$
Quilty 2013~	IIP Agency/dominance IIP Amplitude/rigidity IIP Communion IIP distress	$\Delta$ HAMD/BDI-II		+ + - -	$p<.05$ $p<.05$ $ns$ $ns$
Renner 2012	IIP distress** Agency Communion	$\Delta$ HRSD		+ - -	$F=24.82 p<.01$ $F = 1.56, ns, p= .06$ $ns, p>.05$
Strand 2018	IIP-distress	Post-tx BDI		-	$R=0.02, ns$

*Note:* Abbreviations: ns= non-significant; Pre-tx= Pre-treatment; Post-tx = Post-treatment;  $\Delta$  = change in pre-post measurement; \*= continuous variables were converted into tertiles and treated as categorical variables; \*\* HRSD total scores were plotted over the course of cognitive therapy separately for low and high-distress groups  
~ did not report results separately for CBT and IPT results did not differ across treatment groups

## Appendix C

### *Summary of statistics for change in interpersonal functioning and depression symptoms*

Study ID	Interpersonal measure	Depression symptoms	Significant association (+= yes; - = no)	Statistics
Altenstein-Yamanaka 2017	Δ IIP distress	Δ BDI-II	+	$B = .195, p = .029$
	Δ IIP distress	Δ IDS-C	+	$B = .306, p = .001$
	Δ IIP communion	Δ BDI-II/IDS-C	-	<i>ns</i>
	Δ IIP agency	Δ BDI-II/IDS-C	-	<i>ns</i>
McEvoy 2013	Δ IIP	Δ BDI-II	+	$R = 0.50, p < .001$
	Δ IIP*	Post-tx BDI	+	$p < .05$
	Δ IIP**	Post-tx BDI	-	$p = .08$
Lemmens 2017 <sup>^</sup>	Δ IIP 0-3 months	Δ BDI-II 0-3 months	+	$B = 0.09 (0.04)$
	Δ IIP 3-7 months	Δ BDI-II 3-7 months	+	$B = 0.20 (0.03)$
	IIP 3 months	Δ BDI-II 3-7 months	-	$B = 0.02 (0.03)$
	Δ IIP 0-3 months	Δ BDI-II 3-7 months	-	$B = -0.02 (0.04)$
Vittengl 2003; 2004	Δ IIP	Δ Depression <sup>^^</sup>	+	$R = 0.57$
	Δ SAS-SR	Δ Depression	+	$R = 0.72$

*Note:* Abbreviations: Δ = change in pre-post measurement; Post-tx = Post-treatment;

\* pre-treatment depression symptoms, negative cognitions, demographics, and comorbidity

\*\*changes in negative cognitions were entered into the model

<sup>^</sup>= The interpretation for B is units of change in the outcome when the mediator changes with one unit. A positive relation indicates that more change in the mediator is associated with more change in outcome; a negative relationship means that more change in the mediator is associated with less change in outcome

<sup>^^</sup>= composite of BDI, HRSD, IDSC, IDSR

## Appendix D

### Dysfunctional Attitudes Scale – Short Form (DAS-SF1)

The sentences below describe people's attitudes. Circle the number which best describes how much each sentence describes your attitude. Your answer should describe the way you think most of the time.

**1 = Totally Disagree    2 = Disagree    3 = Agree    4 = Totally Agree**

1. If I don't set the highest standards for myself, I am likely to end up a second-rate person.

1                      2                                      3                                      4

2. My value as a person depends greatly on what others think of me.

1                      2                                      3                                      4

3. People will probably think less of me if I make a mistake.

1                      2                                      3                                      4

4. I am nothing if a person I love doesn't love me.

1                      2                                      3                                      4

5. If other people know what you are really like, they will think less of you.

1                      2                                      3                                      4

6. If I fail at my work, then I am a failure as a person.

1                      2                                      3                                      4

7. My happiness depends more on other people than it does me.

1                      2                                      3                                      4

8. I cannot be happy unless most people I know admire me.

1                      2                                      3                                      4

9. It is best to give up your own interests in order to please other people.

1                      2                                      3                                      4

*Note.* DAS-SF numbers were reversed in order that higher scores represented more maladaptive beliefs. This meant 1 = totally disagree, 2 = disagree, 3 = agree, 4 = totally agree.

## Appendix E

### Inventory of Interpersonal Functioning – Circumplex- Item Response Theory (IIP-C-IRT)

#### IIP-C-IRT

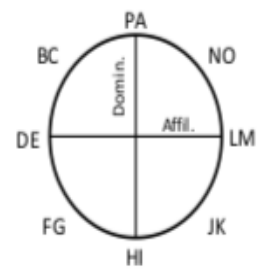
*Sodano & Tracey (2011) Journal of Personality Assessment.*

<b>Completion Instructions:</b> This is a list of problems that often come up when dealing with other people. Please read each problem in the list carefully and think about whether it has been a problem for you with <i>any</i> significant person in your life. Then <u>circle the answer that best describes how true each statement has been for you</u> . There are no “right” or “wrong” answers. Please describe yourself as honestly as possible, we will keep your responses confidential.						
		Not at all	A little bit	Moderately	Quite a bit	Extremely
1	It is hard for me to understand another person’s point of view.	0	1	2	3	4
2	It is hard for me to put somebody else’s needs before my own.	0	1	2	3	4
3	It is hard for me to feel close to other people.	0	1	2	3	4
4	It is hard for me to ask other people to get together socially with me.	0	1	2	3	4
5	It is hard for me to be assertive with another person.	0	1	2	3	4
6	I am too gullible.	0	1	2	3	4
7	I am overly generous to other people.	0	1	2	3	4
8	I open up to people too much.	0	1	2	3	4
9	I argue with other people too much.	0	1	2	3	4
10	It is hard for me to trust other people.	0	1	2	3	4
11	It is hard for me to give a gift to another person.	0	1	2	3	4
12	It is hard for me to join in on groups.	0	1	2	3	4
13	It is hard for me to be firm when I need to be.	0	1	2	3	4
14	It is hard for me to be assertive without worrying about hurting others’ feelings.	0	1	2	3	4
15	I trust other people too much.	0	1	2	3	4
16	I clown around too much.	0	1	2	3	4

**Completion Instructions:** This is a list of problems that often come up when dealing with other people. Please read each problem in the list carefully and think about whether it has been a problem for you with *any* significant person in your life. Then circle the answer that best describes how true each statement has been for you. There are no "right" or "wrong" answers. Please describe yourself as honestly as possible, we will keep your responses confidential.

		Not at all	A little bit	Moderately	Quite a bit	Extremely
17	I try to control other people too much.	0	1	2	3	4
18	I want to get revenge against people too much.	0	1	2	3	4
19	It is hard for me to show affection to people.	0	1	2	3	4
20	It is hard for me to socialize with other people.	0	1	2	3	4
21	It is hard for me to confront people with problems that come up.	0	1	2	3	4
22	It is hard for me to let other people know when I'm angry.	0	1	2	3	4
23	I try to please other people too much.	0	1	2	3	4
24	I want to be noticed too much.	0	1	2	3	4
25	I am too aggressive toward other people.	0	1	2	3	4
26	I am too suspicious of other people.	0	1	2	3	4
27	It is hard for me to experience a feeling of love for another person.	0	1	2	3	4
28	I am too afraid of other people.	0	1	2	3	4
29	It is hard for me to be aggressive toward someone when the situation calls for it.	0	1	2	3	4
30	I let other people take advantage of me too much.	0	1	2	3	4
31	I put other people's needs before my own too much.	0	1	2	3	4
32	It is hard for me to stay out of other people's business.	0	1	2	3	4

**Scoring Instructions:** The Inventory of Interpersonal Problems – Circumplex IRT has eight scales with four items per scale. These scales correspond to octants of the interpersonal circumplex: a circular model of interpersonal functioning formed by the intersection of the two primary dimensions in interpersonal theory (dominance and affiliation). By convention, these octants (and thus these scales) are referred to using two-letter codes that describe their position in the circle (e.g., PA, BC, DE).



To calculate an individual’s score on each scale, transfer his/her score on each item to the table below. It may be faster to transfer scores by table column rather than by table row. Add (or average) the four items contributing to each scale.

In clinical settings, a small number of missing scores may be handled by replacing them with the mean score on each item’s scale. However, scales with a larger number of missing scores should not be interpreted. In research settings, modern techniques for missing data analysis (e.g., multiple imputation or maximum likelihood) are recommended.

The relative standing of scores on each scale provides information about the individual’s interpersonal style, while the grand total (or average) across all scales provides information about his/her level of overall distress. These scores can be used to screen for distress/psychopathology, guide therapeutic intervention, and track response to treatment.

More sophisticated analyses are also available that leverage the circular relationship of the scales. For example, the Structural Summary Method (Zimmermann & Wright, 2017) can parsimoniously describe individuals and groups in terms of their dominance and affiliation. It may also be helpful to standardize scale scores using normative data.

More information about this version of the IIP-C-IRT (v1.0) can be found at: <http://jmgirard.com/iip-c-irt/>

Scale Label	Item	Score	Item	Score	Item	Score	Item	Score	Scale	Score
Domineering / Controlling	1		9		17		25		PA	
Vindictive / Self-Centered	2		10		18		26		BC	
Cold / Distant	3		11		19		27		DE	
Socially Inhibited	4		12		20		28		FG	
Nonassertive	5		13		21		29		HI	
Easily Exploited	6		14		22		30		JK	
Self-Sacrificing	7		15		23		31		LM	
Intrusive / Needy	8		16		24		32		NO	
									<b>Total</b>	

The dimensions of affiliation and dominance are calculated using equations which positively or negatively weight the octant scales and range from -9.8 to 9.8.



## Appendix F. Patient Health Questionnaire-9 (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems?	Not at all	Several Days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself in some way	0	1	2	3

**Total Score: 1-4 Minimal depression; 5-9 Mild depression; 10-14 Moderate depression; 15-19 Moderately severe depression; 20-27 Severe depression**

## Appendix G. Work and Social Adjustment Scale

### Work and Social Adjustment Scale

People's problems sometimes affect their ability to do certain day-to-day tasks. To rate your problems look at each section and choose a number for how much your problem impairs your ability to carry out the activity (choose a number from the scale below and then write the number in the box opposite).



<b>WORK</b> - if you are retired or choose not to have a job for reasons unrelated to your problem, please write N/A (not applicable)	↑
<b>HOME MANAGEMENT</b> - Cleaning, tidying, shopping, cooking, looking after home/children, paying bills etc.	↑
<b>SOCIAL LEISURE ACTIVITIES</b> - with other people, e.g. parties, pubs, outings, entertaining etc.	↑
<b>PRIVATE LEISURE ACTIVITIES</b> - Done alone e.g. reading, gardening, sewing, hobbies, walking etc	↑
<b>FAMILY AND RELATIONSHIPS</b> - Form and maintain close relationships with others, including the people that I live with.	↑

## **Appendix H - Participant information sheet**

### **Mechanisms of change in psychological therapy**

#### **Participant Information Sheet**

You are being asked to allow information from questionnaires you complete during therapy to be used in a research study. This study is being conducted as part of a Clinical Psychology Doctorate Thesis. This study is being run at both City and Hackney and Let's Talk Improving Access to Psychological Therapies (IAPT) services and Royal Holloway University of London.

#### **Why have I been invited to take part?**

You have been invited to take part as you have attended an assessment appointment or are receiving psychological therapy from either City and Hackney IAPT service or Let's Talk IAPT service.

It is known that psychological therapy helps to improve symptoms for a number of different mental health difficulties. However, we want to look in more detail at factors that might predict outcomes in psychological therapy.

#### **What will I have to do?**

During therapy, your therapist will ask you to complete some questionnaires. Everyone who has an assessment or receives treatment from an IAPT service is asked to complete questionnaires to help understand how they are feeling and to look at changes during therapy.

Information from your questionnaires will be anonymised and this information will then be used in the research study. Other anonymous information will also be used in the research such as the number of therapy sessions you attended and basic demographic information.

#### **Do I have to take part?**

No, it is completely up to you.

If you do decide to allow your information to be used in this research but later change your mind, you are free to withdraw your data from the research, without giving a reason.

Your decision will not affect the healthcare you receive in any way.

#### **Are there any benefits for me?**

There are unlikely to be any direct benefits to you from taking part in the study. You are currently receiving treatment from an NHS service, and there won't be any changes to the treatment you receive through taking part in this study. We hope that this study will help us to understand more about psychological therapy and how it works, and be of benefit in the future.

#### **Are there any risks for me?**

There are no risks involved in taking part in this study as we are using information collected as part of routine practice. If you feel uncomfortable or concerned about any of the questionnaires, your therapist will be able to talk about this with you and will only continue if you are happy to do so.

### **What will happen to my information?**

We will keep all information confidential and protect your privacy at all times. The data used for the research will be stored using a unique, anonymous 'participant number', so it will not include any personal identifying details. This information will be kept for 5 years following completion of the study, after which it will be destroyed. Two members of the research team, who works for the NHS, will have access to NHS records.

The results of the study will be written up as part of a doctoral thesis and may be published in an academic journal and may be presented at research conferences. There will be no way of identifying you from the information provided in this thesis or any publication.

### **Who has approved the study?**

All research in the NHS is reviewed by an independent group of people, called a Research Ethics Committee, which is there to protect your safety, wellbeing, rights and dignity. This project has been reviewed and was given a favourable review by the South Central – Berkshire B Research Ethics Committee on 24<sup>th</sup> April 2017.

### **What happens next?**

If you are willing for your data to be used for this research study, please let your therapist know.

### **Further information and contact details**

If you would like any further information, please contact Justine Kinney ([jkinney@nhs.net](mailto:jkinney@nhs.net)) or Iona Symington ([iona.symington@nhs.net](mailto:iona.symington@nhs.net)).

**Thank you for taking the time to read this information and for your interest in our research.**

## Appendix I. Ethical Approval from HRA NHS (original)



Health Research Authority

Dorothy King  
Trainee Clinical Psychologist  
Camden and Islington NHS Foundation Trust  
[Dorothy.King.2015@live.rhul.ac.uk](mailto:Dorothy.King.2015@live.rhul.ac.uk)

Email: [hra.approval@nhs.net](mailto:hra.approval@nhs.net)

08 May 2017

Dear Dorothy,

### Letter of HRA Approval

**Study title:** Predicting patterns of exacerbation and improvement in psychological therapies  
**IRAS project ID:** 225649  
**REC reference:** 17/SC/0204  
**Sponsor:** Royal Holloway University of London

I am pleased to confirm that **HRA Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications noted in this letter.

#### Participation of NHS Organisations in England

The sponsor should now provide a copy of this letter to all participating NHS organisations in England.

*Appendix B* provides important information for sponsors and participating NHS organisations in England for arranging and confirming capacity and capability. Please read *Appendix B* carefully, in particular the following sections:

- *Participating NHS organisations in England* – this clarifies the types of participating organisations in the study and whether or not all organisations will be undertaking the same activities
- *Confirmation of capacity and capability* - this confirms whether or not each type of participating NHS organisation in England is expected to give formal confirmation of capacity and capability. Where formal confirmation is not expected, the section also provides details on the time limit given to participating organisations to opt out of the study, or request additional time, before their participation is assumed.
- *Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria)* - this provides detail on the form of agreement to be used in the study to confirm capacity and capability, where applicable.

Further information on funding, HR processes, and compliance with HRA criteria and standards is also provided.

It is critical that you involve both the research management function (e.g. R&D office) supporting each organisation and the local research team (where there is one) in setting up your study. Contact details

and further information about working with the research management function for each organisation can be accessed from [www.hra.nhs.uk/hra-approval](http://www.hra.nhs.uk/hra-approval).

### Appendices

The HRA Approval letter contains the following appendices:

- A – List of documents reviewed during HRA assessment
- B – Summary of HRA assessment

### After HRA Approval

The document "*After Ethical Review – guidance for sponsors and investigators*", issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:

- Registration of research
- Notifying amendments
- Notifying the end of the study

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

In addition to the guidance in the above, please note the following:

- HRA Approval applies for the duration of your REC favourable opinion, unless otherwise notified in writing by the HRA.
- Substantial amendments should be submitted directly to the Research Ethics Committee, as detailed in the *After Ethical Review* document. Non-substantial amendments should be submitted for review by the HRA using the form provided on the [HRA website](http://www.hra.nhs.uk), and emailed to [hra.amendments@nhs.net](mailto:hra.amendments@nhs.net).
- The HRA will categorise amendments (substantial and non-substantial) and issue confirmation of continued HRA Approval. Further details can be found on the [HRA website](http://www.hra.nhs.uk).

### Scope

HRA Approval provides an approval for research involving patients or staff in NHS organisations in England.

If your study involves NHS organisations in other countries in the UK, please contact the relevant national coordinating functions for support and advice. Further information can be found at <http://www.hra.nhs.uk/resources/applying-for-reviews/nhs-hsc-rd-review/>.

If there are participating non-NHS organisations, local agreement should be obtained in accordance with the procedures of the local participating non-NHS organisation.

### User Feedback

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

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### HRA Training

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

Your IRAS project ID is 225649. Please quote this on all correspondence.

Yours sincerely

**Gemma Oakes**  
Assessor

Email: [hra.approval@nhs.net](mailto:hra.approval@nhs.net)

Copy to: *Annette Lock, Royal Holloway University of London [Sponsor Contact]*  
[annette.lock@rhul.ac.uk](mailto:annette.lock@rhul.ac.uk)



*Dr Gary Brown, royal Holloway University of London [Academic Supervisor]*  
[Gary.Brown@rhul.ac.uk](mailto:Gary.Brown@rhul.ac.uk)



## Appendix A - List of Documents

The final document set assessed and approved by HRA Approval is listed below.

<i>Document</i>	<i>Version</i>	<i>Date</i>
Contract/Study Agreement [Statement of Activities]	1	27 April 2017
Contract/Study Agreement [Schedule of Events]	1	27 April 2017
Evidence of Sponsor insurance or indemnity (non NHS Sponsors only) [Royal Holloway Indemnity Insurance]	1.1	01 August 2016
IRAS Application Form [IRAS_Form_05042017]		05 April 2017
IRAS Application Form XML file [IRAS_Form_05042017]		05 April 2017
IRAS Checklist XML [Checklist_08042017]		08 April 2017
Participant information sheet (PIS) [Participant Information Sheet (Clean Copy)]	2.1	27 April 2017
Participant information sheet (PIS) [Participant Information Sheet (Tracked Copy)]	2.1	27 April 2017
Referee's report or other scientific critique report [Critique of proposal (1)]		09 December 2016
Referee's report or other scientific critique report [Response to proposal critique (1)]		19 January 2017
Referee's report or other scientific critique report [Critique of proposal (2)]		30 January 2017
Referee's report or other scientific critique report [Response to proposal critique (2)]		23 February 2017
Research protocol or project proposal [Research Proposal]	1.1	24 February 2017
Summary CV for Chief Investigator (CI) [CI_CV_Dorothy King]	1.1	28 March 2017
Summary CV for supervisor (student research) [CV_Dr Gary Brown]	1.1	28 March 2017
Summary CV for supervisor (student research) [CV_Dr Jon Wheatley]	1.1	21 April 2016
Validated questionnaire [Ways of Responding Scale]		
Validated questionnaire [Work and Social Adjustment Scale (WSAS)]		
Validated questionnaire [The Anxiety Attitude and Belief Scale (AABS-2)]		
Validated questionnaire [Dysfunctional Attitudes Scale-Short Form (DAS-SF)]		
Validated questionnaire [Generalised Anxiety Disorder Scale-7 (GAD-7)]		
Validated questionnaire [Patient Health Questionnaire-9 (PHQ-9)]		



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## Appendix B - Summary of HRA Assessment

This appendix provides assurance to you, the sponsor and the NHS in England that the study, as reviewed for HRA Approval, is compliant with relevant standards. It also provides information and clarification, where appropriate, to participating NHS organisations in England to assist in assessing and arranging capacity and capability.

**For information on how the sponsor should be working with participating NHS organisations in England, please refer to the, *participating NHS organisations, capacity and capability and Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria) sections in this appendix.***

The following person is the sponsor contact for the purpose of addressing participating organisation questions relating to the study:

Name: Annette Lock

Tel: 01784 414 388

Email: [Annette.lock@rhul.ac.uk](mailto:Annette.lock@rhul.ac.uk)

### HRA assessment criteria

Section	HRA Assessment Criteria	Compliant with Standards	Comments
1.1	IRAS application completed correctly	Yes	No comments
2.1	Participant information/consent documents and consent process	Yes	No comments
3.1	Protocol assessment	Yes	No comments
4.1	Allocation of responsibilities and rights are agreed and documented	Yes	The sponsor has provided statement of activities and schedule of events. No other form of agreement is required, or will be used.
4.2	Insurance/indemnity arrangements assessed	Yes	Where applicable, independent contractors (e.g. General Practitioners) should ensure that the professional indemnity provided by their medical defence organisation covers the activities expected of them for this

IRAS project ID	225649
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Section	HRA Assessment Criteria	Compliant with Standards	Comments
			research study.
4.3	Financial arrangements assessed	Yes	The study is not externally funded.
5.1	Compliance with the Data Protection Act and data security issues assessed	Yes	The applicant has confirmed that data will be anonymised by herself prior to being provided to the research team.
5.2	CTIMPS – Arrangements for compliance with the Clinical Trials Regulations assessed	Not Applicable	No comments
5.3	Compliance with any applicable laws or regulations	Yes	No comments
6.1	NHS Research Ethics Committee favourable opinion received for applicable studies	Yes	Following REC review, submission of updated documentation was made to bring the study in line with HRA Standards, these changes were deemed as non-substantial and did not require review by the REC.
6.2	CTIMPS – Clinical Trials Authorisation (CTA) letter received	Not Applicable	No comments
6.3	Devices – MHRA notice of no objection received	Not Applicable	No comments
6.4	Other regulatory approvals and authorisations received	Not Applicable	No comments

### Participating NHS Organisations in England

<i>This provides detail on the types of participating NHS organisations in the study and a statement as to whether the activities at all organisations are the same or different.</i>
There is one site type participating in this study. All research activity is the same at all participating NHS sites as detailed in the study protocol.
The Chief Investigator or sponsor should share relevant study documents with participating NHS organisations in England in order to put arrangements in place to deliver the study. The documents should be sent to both the local study team, where applicable, and the office providing the research management function at the participating organisation. For NIHR CRN Portfolio studies, the Local

LCRN contact should also be copied into this correspondence. For further guidance on working with participating NHS organisations please see the HRA website.

If chief investigators, sponsors or principal investigators are asked to complete site level forms for participating NHS organisations in England which are not provided in IRAS or on the HRA website, the chief investigator, sponsor or principal investigator should notify the HRA immediately at [hra.approval@nhs.net](mailto:hra.approval@nhs.net). The HRA will work with these organisations to achieve a consistent approach to information provision.

### Confirmation of Capacity and Capability

*This describes whether formal confirmation of capacity and capability is expected from participating NHS organisations in England.*

Participating NHS organisations in England will be expected to formally confirm their capacity and capability to host this research.

- Following issue of this letter, participating NHS organisations in England may now confirm to the sponsor their capacity and capability to host this research, when ready to do so. How capacity and capability will be confirmed is detailed in the *Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria)* section of this appendix.
- The [Assessing, Arranging, and Confirming](#) document on the HRA website provides further information for the sponsor and NHS organisations on assessing, arranging and confirming capacity and capability.

### Principal Investigator Suitability

*This confirms whether the sponsor position on whether a PI, LC or neither should be in place is correct for each type of participating NHS organisation in England and the minimum expectations for education, training and experience that PIs should meet (where applicable).*

The sponsor has confirmed that a Local Principal Investigator would be required at each participating site and these have already been identified.

GCP training is not a generic training expectation, in line with the [HRA statement on training expectations](#).

### HR Good Practice Resource Pack Expectations

*This confirms the HR Good Practice Resource Pack expectations for the study and the pre-engagement checks that should and should not be undertaken*

If research staff working on the study do not have an appropriate contract with the research site then they will need a Letter of Access. Disclosure and Barring Service and Occupational Health checks will be needed where a Letter of Access is required.

## Appendix J

### Notice of Substantial Amendment- HRA approval

**From:** [hra.amendments@nhs.net](mailto:hra.amendments@nhs.net) [mailto:noreply@harp.org.uk]

**Sent:** 15 June 2018 18:05

**To:** [Dorothy.King.2015@live.rhul.ac.uk](mailto:Dorothy.King.2015@live.rhul.ac.uk); [Tona.Symington.2016@live.rhul.ac.uk](mailto:Tona.Symington.2016@live.rhul.ac.uk); [annette.lock@rhul.ac.uk](mailto:annette.lock@rhul.ac.uk)

**Cc:** VON SIERAKOWSKI, Susana (HOMERTON UNIVERSITY HOSPITAL NHS FOUNDATION TRUST); FAMUREWA, Olawale (HOMERTON UNIVERSITY HOSPITAL NHS FOUNDATION TRUST)

**Subject:** IRAS Project ID 225649. HRA Approval for the Amendment

#### Details of the amendment

Approval was sought for a number of changes to the study:

1. The timeframe for recruitment will be extended to May 2019.
2. Iona Symington and Justine Kinney will be added as chief investigators for this study and will take over from Dorothy King when she finishes her aspect of the study in April 2018. Iona and Justine are in contact and liaising with Dorothy to ensure there is a good transition for continuing the study.
3. The amended population will be participants who are assigned to receive individual therapy for depression, rather than all clients receiving treatment from IAPT services. Only clients with a problem descriptor of depression will be recruited.
4. In addition to CBT, the study will also include participants receiving Interpersonal Therapy (IPT), which are both NICE recommended treatments for depression.
5. The DAS-SF will continue to be administered, however the AAB-S will not be administered. Instead, the Inventory of Interpersonal Problems- short circumflex form (IIP-SC) will be administered.
6. Questionnaires will be administered at baseline only, rather than 4 time-points. This should reduce the burden on therapists and clients.

Dear Ms King,

<b>IRAS Project ID:</b>	225649
<b>Short Study Title:</b>	Mechanisms of change in psychological therapies
<b>Amendment No./Sponsor Ref:</b>	1.4
<b>Amendment Date:</b>	10 April 2018
<b>Amendment Type:</b>	Substantial Non-CTIMP

I am pleased to confirm **HRA and HCRW Approval** for the above referenced amendment.

You should implement this amendment at NHS organisations in England and Wales, in line with the conditions outlined in your categorisation email.

#### User Feedback

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

Please contact [[hra.amendments@nhs.net](mailto:hra.amendments@nhs.net)]/[hra.amendments@nhs.net](mailto:hra.amendments@nhs.net) for any queries relating to the assessment of this amendment.

Kind regards

**Alex Thorpe**

**Health Research Authority**

Ground Floor | Skipton House | 80 London Road | London | SE1 6LH

**E.** [hra.amendments@nhs.net](mailto:hra.amendments@nhs.net)

**W.** [www.hra.nhs.uk](http://www.hra.nhs.uk)

Sign up to receive our newsletter [HRA Latest](#).

## Appendix K – Research and Development Approval

### Site 1

**From:** [REDACTED] (NHS FOUNDATION TRUST)  
**Sent:** 28 June 2018 16:27  
**To:** [REDACTED] (NHS FOUNDATION TRUST)  
**Subject:** HRA amendment approval

Dear [REDACTED]

Please find following email correspondence with the HRA, The HRA approval for this study:

Name of Study: **Mechanisms of change in psychological therapies**  
**Amendment ref: 1.4 10<sup>th</sup> April 2018**  
**Type: Substantial amendment**

I can confirm these amendments do not affect the R&D approval of this study and I have therefore updated our database, please kindly update the Site File as well.

Please note it is the PI responsibility to ensure that local contact details and trust logo is added to any amended local documents such as patients Info sheet, consent form, patients diaries etc. before they are used at this trust.

Kind regards,

### Site 2

225649 - Amendment Approval [REDACTED]



[REDACTED] NHS FOUNDATION TRUST [REDACTED]

Reply all |

Wed 20/06/2018, 11:13

Kinney, Justine (2016); Symington, Iona (2016); +3 more

[REDACTED]  
Dear Justine and Iona,

<b>Study title:</b>	Mechanism of change in psychological therapies.
<b>R&amp;D /CSP number:</b>	<b>225649</b>
<b>REC number:</b>	17/SC/0204
<b>Date amendment submitted to REC</b>	10 April 2018

Following the review of the amendment for the above study by the **South Central - Berkshire B Research Ethics Committee**, **Barnet, Enfield and Haringey mental Health Trust** has decided that they can accommodate this amendment subject to any conditions set out in the REC letter of **01/06/18**.

The amendment may therefore be immediately implemented at this site.

Kind regards,

## Appendix L - Confidential Advisory Group Opinion (CAG): Approval confirmation



Health Research  
Authority

Skipton House  
80 London Road  
London  
SE1 6LH

Telephone: 020 7972 2557  
Email: [hra.cag@nhs.net](mailto:hra.cag@nhs.net)

18 September 2018

Ms Iona Symington  
Doctorate in Clinical Psychology, Department of Psychology  
Royal Holloway University of London  
Egham, Surrey  
TW20 0EX

Dear Ms Symington

Application title: Mechanisms of Change in Psychological Therapy  
CAG reference: 18/CAG/0014  
IRAS project ID: 225649  
REC reference: 17/SC/0204

### Updates from 28 August 2018 Letter

This letter is an updated version of the outcome sent on 28 August 2018. Changes made from the original letter are as follows:

- Confirmation that an additional site, Whittington Hospital NHS Trust, has provided evidence of satisfactory security assurance and is included within support.

Thank you for your research application, submitted for approval under Regulation 5 of the Health Service (Control of Patient Information) Regulations 2002 to process patient identifiable information without consent. Approved applications enable the data controller to provide specified information to the applicant for the purposes of the relevant activity, without being in breach of the common law duty of confidentiality, although other relevant legislative provisions will still be applicable.

The role of the Confidentiality Advisory Group (CAG) is to review applications submitted under these Regulations and to provide advice to the Health Research Authority on whether an application should be approved, and if so, any relevant conditions. This application was considered at the CAG meeting held on 08 February 2018; the response to the provisionally supported outcome was considered in correspondence.

### Health Research Authority decision

The Health Research Authority, having considered the advice from the Confidentiality Advisory Group as set out below, has determined the following:

1. The application is approved, subject to compliance with the standard and specific conditions of approval.

*Please note that the legal basis to allow access to the specified confidential patient information without consent is now in effect.*



This letter should be read in conjunction with the outcome letters dated 27 February 2018 and 28 August 2018.

## Context

### Purpose of Application

This application from Royal Holloway University of London sets out the purpose of medical research to examine the relationship between cognitive change and symptom change during psychological therapy for people with symptoms of depressive and anxiety disorders. It is expected that the study will find that a change in a client's attitudes and beliefs will be associated with symptom change during psychological therapy, and that changes in cognition will occur before changes in symptoms. Data will be collected from clients receiving individual psychological therapy in City & Hackney Improving Access to Psychological Therapies (IAPT) service and the 'Let's Talk' IAPT service, Barnet, Enfield and Haringey Mental Health NHS Trust and Whittington Hospital NHS Trust. Data from 200 participants will be required to examine the relationship between cognitive change and symptom change.

The project had originally been designed in such a manner that the IAPT therapists (direct care team) would identify potential participants; however, issues with recruitment were encountered which led to eligible patients not being invited to participate. The revised process proposes the main applicant review's patient medical records to identify potential participants and provide details to the team administrators, to enable participant information materials to be passed to the patients when they attend for their appointment or posted to them with their assessment letter.

A recommendation for class 1, 3 5 and 6 support was requested to cover activities as described in the application.

### Confidential Patient Information Requested

#### Cohort

- Male/Female patients over 18 years of age,
- Clients who are receiving individual psychological therapy from City and Hackney IAPT service and the 'Let's Talk' IAPT service, Barnet, Enfield and Haringey Mental Health NHS Trust and Whittington Hospital NHS Trust ,
- There will be 120 patients recruited to the study (33 have already been successfully recruited, 87 further participants are required). It is estimated that access to 380-400 patient records will be required in order to achieve this recruitment target.

The applicant will need access to the full patient record in order to determine which patients are eligible for inclusion in the study. The following data items are required for the purposes as set out below:

- Patient Name – to allow invitation to participate to be provided,
- Therapist's Name – to allow invitation to participate to be provided,
- Date of Appointment – to allow invitation to participate to be provided,
- Gender – analysis,
- Ethnicity – analysis.

### Confidentiality Advisory Group Advice

A Sub-Committee of the main CAG considered the written response to the request for further information detailed within the provisionally supported outcome in correspondence. This response was supported by an amendment request, which sought to change the main applicant (Chief Investigator) for the project – it was agreed that this amendment request would be considered together with the response to the provisionally supported outcome.

### Amendment Request

The amendment sought to change the main applicant detailed on the project. Ms Iona Symington would become named Chief Investigator on the proposal and would be supported by Ms Justine Kinney. Dr Dorothy King, previously named main applicant, had completed her aspect of the overarching research project and provided a letter confirming she was relinquishing her duties in relation to the proposed application.

The Sub-Committee considered the amendment to the application. It was acknowledged that the reviewing Research Ethics Committee had undertaken an assessment of the suitability of the proposed replacing Chief Investigator to take forward the proposal. Confirmation of the REC Favourable Opinion in relation to the change of Chief Investigator was confirmed on 01 June 2018.

The Sub-Committee agreed that consideration the proposed amendment alongside the written response to the provisionally supported outcome was the most appropriate handling route and was content to provide a recommendation of support to the amendment and change to main applicant.

The below response was provided by the newly appointed main applicant to the request for further information detailed in the provisionally supported outcome.

**1. Provide confirmation of which organisation is acting as controller for the project.**

It was confirmed that Royal Holloway, University of London was the controller for the application activity. The Doctoral Thesis associated with the application activity was taking place at this institution.

The Sub-Committee received the clarification and no further issues were raised in this area.

**2. Patient and Public Involvement and Engagement – further information is required in this area to address the following points:**

- a. Provide details around the service group attendance to discuss the revised recruitment strategy, including an overview of how many people attended,
- b. Provide details of the feedback provided by the attendees in relation to the proposed change to the project's recruitment strategy,
- c. If the responses given were negative, the CAG would take this into account when considering whether support should continue, or whether further actions are necessary.

It was explained that individuals associated with the proposal had attended three service user meetings at City and Hackney IAPT. Four service users attended the first meeting, with one service user being present at the following two attendances.

The general sense is that the service user feedback falls into two categories: (1) those who do not wish anyone but their therapist to have access to any identifying information and (2) those who accept limited use of identifying information insofar as it is necessary to facilitate data collection, once this has been explained.

Furthermore, in the final service user meeting, the relevance of GDPR regarding service-related research was discussed. The service user who attended explained that she did not see a problem with DClinPsych trainee staff having access to patient's name and problem descriptor in order to identify clients who may be interested in relevant research. It was explained that this is required due to clinician staff being very busy. It was also highlighted that this is all the data that the trainee staff would be able to access, and attendee agreed to this.

The Sub-Committee received the response and no further issues were raised in this area.

**3. Patient Notifications and Dissent – further information is required in this area to address the following points:**

- a. Provide a copy of the letter which will be included by the Trust in routine appointment letters to inform patients of potential access to medical records outside the direct care team to facilitate research activities for consideration,
- b. Confirm why it is not possible to check patient records for evidence of historic dissent.



It was explained that patient notification was not routinely provided within the participating sites at present. The applicant advised that they were working on the process of implementation of this procedure in co-ordination with the services involved. It was proposed that a slip of coloured paper within appointment letters which stated: "This service is actively involved in research to improve services provided. This can sometimes involve temporary and restricted access to personally identifying information. If you do not wish for your information to be accessed in this way, please tick this box and return this slip to the service". It was further explained that as historically the services involved with the proposal, did not have an established system to enable patient objections to be raised, this had not been previously recorded so there were no historic records to be checked.

The Sub-Committee received the response and agreed that the proposed system to enable patient dissenting was proportionate to the proposed activity and no further issues were raised in this area.

#### Confidentiality Advisory Group Advice conclusion

The CAG agreed that the minimum criteria under the Regulations appeared to have been met and therefore advised recommending support to the Health Research Authority, subject to compliance with the specific and standard conditions of support.

#### Specific Conditions of Support (Final)

1. Favourable opinion from a Research Ethics Committee (Confirmed – initial approval issued 20/04/2017, Change in Methodology 22/11/2017 and Change of Chief Investigator 01/06/2018).
2. Confirmation from the IGT Team at NHS Digital of suitable security arrangements via Information Governance Toolkit (IGT) submission. (Confirmed - Barnet, Enfield and Haringey Mental Health NHS Trust and Homerton University Hospital NHS Foundation Trust, V14.1, 2017/18 by email 16 August 2018. Additional Site: Whittington Hospital NHS Trust – confirmed by email on 13 September 2018).

As the above conditions have been met, this letter provides confirmation of final approval. I will arrange for the register of approved applications on the HRA website to be updated with this information.

#### Annual Review

Please note that your approval is subject to submission of an annual review report to show how you have met the conditions or report plans, and action towards meeting them. It is also your responsibility to submit this report on the anniversary of your final approval and to report any changes such as to the purpose or design of the proposed activity, or to security and confidentiality arrangements. An annual review should be provided no later than 28 August 2019 and preferably 4 weeks before this date.

#### Reviewed documents

The documents reviewed at the meeting were:

Document	Version	Date
CAG application from (signed/authorised) [CAG Form]		18 December 2017
Other [Employment Contract]		24 September 2015
Other [Letter of HRA Approval ]		08 May 2018
Other [CAGSF6-Amendment-request-Responses]		29 June 2018
Other [Letter from previous CI Dorothy King]		11 June 2018
Other [Re: Request for Caldicott Guardian Letter of Support-]		15 June 2018
Other [Responses to 18CAG0014 Provisionally Supported Outcome]		

## Re: Request for Caldicott Guardian Letter of Support- HRA CAG application

[REDACTED]  
Fri 15/06/2018 12:46

To: SYMINGTON, Iona (HOMERTON UNIVERSITY HOSPITAL NHS FOUNDATION TRUST) <iona.symington@nhs.net>;

Cc: [REDACTED]

Dear Iona

Thank you for asking me, as Caldicott Guardian for [REDACTED] for a letter of support for your project. Please accept this email as formal correspondence.

I note that the project already has NHS REC approval and HRA approval, including the amendments to change the investigators and expand the patient participants. I note that your request is to access patient data prior to formal consent, to identify appropriate patients that could then be approached and formally consented. I note that you are asking for permission to do this, to allow questionnaires and information sheets to be handed to the correct patients when they arrive at clinic, and that these questionnaires will be discussed with the patients by their therapist. This will give the patient an opportunity to verbally discuss the project with their therapist, who will then take informed consent.

I note that you and Justine Kinney are trainee psychologists and that you are both taking over this project as part of your doctoral research. I note this letter is to support your application to the Health Research Authority (HRA) Confidential Advisory Group (CAG) about this matter.

I am happy to support your application to access patient data prior to consent. I think it will allow the project to proceed with greater efficiency. It will remove the issue of patients who are not eligible being troubled with pointless paperwork. Also, as you and Justine Kinney are trainee clinical psychologists in the NHS and are employed by Camden and Islington NHS Foundation Trust, I think it is acceptable for you to access patient information, taking due consideration of NHS confidentiality policies and data protection regulations.

I hope this is what you require and please let me know if anything further is needed.

## Appendix M - Hierarchical Logistic Regression Analyses

### DAS-SF predicting post-treatment outcomes

*Bootstrap beta values for hierarchical logistic regression: DAS-SF predicting caseness*

Predictor	Beta	Standard Error Beta	p-value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment PHQ-9	-.287	.072	.001**	-.464	-.182
Step 2					
Pre-treatment PHQ-9	-.286	.077	.001**	-.469	-.178
DAS-SF	-.008	.057	.869	-.115	.096

*Note.* \*\* $p < .01$ ; BCa = bias-corrected and accelerated; CI = Confidence interval

*Bootstrap beta values for hierarchical logistic regression: DAS-SF predicting CSI*

Predictor	Beta	Standard Error Beta	p-value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment PHQ-9	.177	.67	.003**	.079	.345
Step 2					
Pre-treatment PHQ-9	.175	.068	.002**	.076	.346
DAS-SF	.013	.055	.789	-.089	.134

*Note.* \*\* $p < .01$ ; BCa = bias-corrected and accelerated; CI = Confidence interval

*Bootstrap beta values for hierarchical logistic regression: DAS-SF predicting RI*

Predictor	Beta	Standard Error Beta	p-value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment PHQ-9	-.078	.048	.069	-.181	.001
Step 2					
Pre-treatment PHQ-9	-.081	.049	.060	-.190	-.002
DAS-SF	.016	.051	.746	-.080	.125

*Note.* BCa = bias-corrected and accelerated; CI = Confidence interval

*Bootstrap beta values for hierarchical logistic regression: DAS-SF predicting RCSI*

Predictor	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment PHQ-9	.010	.046	.805	-.071	.108
Step 2					
Pre-treatment PHQ-9	.006	.047	.890	-.079	.107
DAS-SF	.025	.056	.607	-.075	.149

*Note.* BCa = bias-corrected and accelerated; CI = Confidence interval

*Bootstrap beta values for hierarchical logistic regression: DAS-SF predicting dropout*

Predictor	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment PHQ-9	.050	.055	.323	-.052	.155
Step 2					
Pre-treatment PHQ-9	.046	.059	.386	-.070	.156
DAS-SF	.025	.058	.616	-.084	.149

*Note.* BCa = bias-corrected and accelerated; CI = Confidence interval

## Appendix N -

### Hierarchical Logistic Regression Analyses - IIP-C-IRT predicting post-treatment outcomes

*Bootstrap beta values for hierarchical logistic regression: IIP-C-IRT predicting caseness*

Variable	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (lower)	BCa 95% CI (upper)
Step 1					
Pre-treatment PHQ-9	-.292	.067	.001**	-.421	-.219
Step 2					
Pre-treatment PHQ-9	-.292	-.020	.001**	-.427	-.217
IIP	.010	.018	.539	-.024	.049

*Note.* \*\**p* < .001; BCa = bias-corrected and accelerated; CI = Confidence interval

*Bootstrap beta values for hierarchical logistic regression: IIP-C-IRT predicting CSI*

Variable	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (lower)	BCa 95% CI (upper)
Step 1					
Pre-treatment PHQ-9	.177	.063	.004**	.065	.365
Step 2					
Pre-treatment PHQ-9	.184	.064	.002**	.068	.399
IIP	-.015	.016	.336	-.048	.014

*Note.* \*\**p* < .001; BCa = bias-corrected and accelerated; CI = Confidence interval

*Bootstrap beta values for hierarchical logistic regression: IIP-C-IRT predicting RI*

Variable	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (lower)	BCa 95% CI (upper)
Step 1					
Pre-treatment PHQ-9	-.078	.045	.072	-.166	.000
Step 2					
Pre-treatment PHQ-9	-.083	.048	.060	-.177	-.007
IIP	.015	.016	.325	-.016	.046

*Note.* BCa = bias-corrected and accelerated; CI = Confidence interval

*Bootstrap beta values for hierarchical logistic regression: IIP-C-IRT predicting RCSI*

Variable	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (lower)	BCa 95% CI (upper)
Step 1					
Pre-treatment PHQ-9	.010	.043	.815	-.075	.097
Step 2					
Pre-treatment PHQ-9	.012	.044	.761	-.076	.098
IIP	-.005	.016	.733	-.039	.025

*Note.* BCa = bias-corrected and accelerated; CI = Confidence interval

*Bootstrap beta values for hierarchical logistic regression: IIP-C-IRT predicting dropout*

Variable	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (lower)	BCa 95% CI (upper)
Step 1					
Pre-treatment PHQ-9	.050	.054	.293	-.062	.161
Step 2					
Pre-treatment PHQ-9	.052	.055	.278	-.059	.170
IIP	-.006	.017	.724	-.038	.030

*Note.* BCa = bias-corrected and accelerated; CI = Confidence interval

## Appendix O -

### Hierarchical regressions for the exploratory analyses - significant results

Table 1

*Bootstrap beta values for hierarchical regression: IIP-C-IRT dominance predicting post-treatment PHQ-9*

Predictor	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment PHQ-9	.698	.118	.001**	.458	.952
Step 2					
Pre-treatment PHQ-9	.676	.116	.001**	.440	.936
IIP dominance	-.595	.014	.003**	-1.037	-.128

*Note.* \*\**p* < .001; BCa = bias-corrected and accelerated; CI = Confidence interval

Table 2

*Bootstrap beta values for hierarchical regression: IIP-C-IRT dominance predicting RI*

Predictor	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment PHQ-9	-.078	.047	.080	-.177	.009
Step 2					
Pre-treatment PHQ-9	-.090	.052	.054	-.204	-.001
IIP dominance	-.224	.101	.014*	-.435	-.065

*Note.* \**p* < .05; BCa = bias-corrected and accelerated; CI = Confidence interval

Table 3

*Bootstrap beta values for hierarchical regression: IIP-C-IRT 'domineering/controlling' subscale predicting post-treatment depression symptoms*

Predictor	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment PHQ-9	.698	.119	.001**	.454	.958
Step 2					
Pre-treatment PHQ-9	.691	.118	.001**	.466	.941
IIP domineering	-2.351	.860	.012*	-4.013	-.436

*Note.* \*\* $p < .01$ ; \* $p < .05$ ; BCa = bias-corrected and accelerated; CI = Confidence interval

Table 4

*Bootstrap beta values for hierarchical regression: IIP-C-IRT 'domineering/controlling' subscale predicting social functioning*

Predictor	Beta	Standard Error Beta	<i>p</i> -value	BCa 95% CI (Lower)	BCa 95% CI (Upper)
Step 1					
Pre-treatment WSAS	.616	.118	.001**	.454	.958
Step 2					
Pre-treatment WSAS	.602	.116	.001**	.366	.813
IIP domineering	-3.125	1.627	.061	-6.537	.533

*Note.* \*\* $p < .01$ ; BCa = bias-corrected and accelerated; CI = Confidence interval