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The Efficacy of Randomised Controlled Trials of Cognitive Behaviour Therapy for
Perfectionism: A Systematic Review and Meta-Analysis

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Abstract

Perfectionism is a transdiagnostic process across anxiety, depression, and eating disorders. The aim of this systematic review was to examine the efficacy of self-help and face to face CBT for perfectionism in reducing perfectionism and anxiety, depression, and eating disorders. A total of 15 randomised controlled trials of CBT for perfectionism were identified ($N = 912$ participants; mean pooled age = 23 years) which met inclusion criteria. There were medium or large effect sizes found on perfectionism measures; personal standards ($g = 0.57$, 95% CI = 0.43-0.72), concern over mistakes ($g = 0.89$, 95% CI = 0.71-1.08) and clinical perfectionism ($g = 0.87$, 95% CI = 0.70-1.04). There were medium effects for symptoms of eating disorders ($g = 0.61$, 95% CI = 0.36-0.87) and depression ($g = 0.60$, 95% CI = 0.28-0.91), and a small-medium effect on anxiety ($g = 0.42$, 95% CI = 0.21-0.62). There was no publication bias found. Limitations included the small number of trials included and lack of active treatment comparisons. Results suggested that CBT for perfectionism is efficacious in reducing perfectionism and symptoms of depression, anxiety and eating disorders. Future research should examine comparisons of CBT for perfectionism with other psychological treatments.

Keywords: cognitive behaviour therapy; perfectionism; meta-analysis; systematic review; randomised controlled trials

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The Efficacy of Randomised Controlled Trials of Cognitive Behaviour Therapy for Perfectionism: A Systematic Review and Meta-Analysis

Perfectionism is a transdiagnostic process, associated with anxiety, depression and eating disorders (Limburg et al., 2017) and implicated as a risk and maintenance mechanism of various psychopathologies (Egan et al., 2011). Protocols for the treatment or prevention of specific psychological disorders address perfectionism, particularly Cognitive Behaviour Therapy (CBT) interventions (Egan et al., 2011). CBT interventions with a focus on perfectionism, rather than a specific psychological disorder, have been developed with the aim of reducing perfectionism, anxiety, depression, and eating disorder symptoms in a range of populations. These populations include transdiagnostic and single-diagnosis clinical samples and individuals who do not yet have psychological disorders but who may be at-risk of their onset. Systematic reviews on the effects of these interventions are required to understand the efficacy of CBT for perfectionism.

Clinical perfectionism refers to self-worth dependent on striving regardless of adverse consequences (Shafran et al., 2002). The majority of trials examining CBT for perfectionism have been based on the cognitive behavioural model of clinical perfectionism (Egan, van Noort et al., 2014; Handley et al., 2015; Lowndes et al., 2019; Riley et al., 2007; Rozental et al., 2017; Sadri et al., 2017; Shafran et al., 2017; Shu et al., 2019; Valentine et al., 2018; Wade et al., 2019), with a small number of trials not based on the model (e.g., Arpin-Cribbie et al., 2012; Radhu et al., 2012; Steele & Wade, 2008). CBT for perfectionism based on the model of clinical perfectionism (Shafran et al., 2002), involves targeting a range of cognitive and behavioural factors which maintain perfectionism, for example, repeated performance checking, cognitive biases, self-criticism, procrastination and avoidance. The treatment involves strategies such as surveys

and behavioural experiments, which are used extensively and are central to challenging beliefs which maintain perfectionism based on an individualised formulation (see Egan, Wade et al., 2014 for further details). CBT for perfectionism is a specific form of treatment which is designed to reduce perfectionism. It is distinct from trials of CBT that focus on primary anxiety or depressive symptoms and lead to changes in perfectionism indirectly (e.g., Ashbaugh et al., 2007).

CBT for perfectionism has demonstrated efficacy in numerous RCTs including face to face, internet and self-help (book) formats. Lloyd et al. (2015) conducted the first meta-analysis of CBT for perfectionism including eight studies (Arpin-Cribbie et al., 2012; Egan & Hine, 2008; Glover et al., 2007; Pleva & Wade, 2007; Radhu et al., 2012; Riley et al., 2007; Steele & Wade, 2008; Steele et al., 2013). This meta-analysis included open trials not only RCTs. Large within-group effect sizes were found for perfectionism (e.g., FMPS; concern over mistakes $g = 1.32$; personal standards $g = 0.79$), and medium effects for anxiety ($g = 0.52$) and depression ($g = 0.64$). This meta-analysis only included one study with eating disorders (Steele & Wade, 2008), and was therefore limited in conclusions regarding these symptoms. Additionally, between-group effect sizes for RCTs were not calculated, so the efficacy of CBT for perfectionism compared to control and non-specific artefacts (i.e., statistical regression to the mean, expectation effects) was not provided. Lastly, there were too few studies at the time to enable comparisons of effects by treatment delivery.

Suh et al. (2019) conducted a meta-analysis to evaluate the efficacy of 10 RCTs of psychological treatments for perfectionism, including CBT for perfectionism (Arpin-Cribbie et al., 2012; Egan et al., 2014; Goldstein et al., 2014; Handley et al., 2015; James & Rimes, 2018; Pleva & Wade, 2007; Radhu et al., 2012; Riley et al., 2007; Rozental et al., 2017; Sadri et al., 2017), and one trial of mindfulness (James & Rimes, 2018). They

reported moderate between-group differences compared to control in reducing perfectionistic strivings ($g = 0.48$) and perfectionistic concerns ($g = 0.55$). Moderate effect sizes were also found for depression ($g = 0.62$) and anxiety ($g = 0.49$). There was no difference in efficacy between face-to-face and internet-delivered treatment (Suh et al., 2019). Eating disorder symptoms were not included as an outcome. However, a recent meta-analysis by Robinson and Wade (2021) found large between and within-group effect sizes for eating disorder symptoms and perfectionism, and similar medium effect sizes for anxiety and depression, on a subset of open trials and RCTs of CBT for perfectionism where disordered eating was included an outcome measure (Robinson & Wade, 2021).

There were limitations of the meta-analysis of Suh et al. (2019), for example the study conducted by Rozental et al. (2017) was included, but they excluded the relevant study by Shafran et al. (2017). This is problematic as it was not clear why the Shafran et al. (2017) study was excluded, which was a concurrent trial with Rozental et al. (2017) and met the same criteria for inclusion. Further, the inclusion of one mindfulness study while the other 9 trials were of a specific form of CBT for perfectionism makes it difficult to determine the efficacy of CBT for perfectionism. Additionally, while Robinson and Wade's (2021) recent meta-analysis of 15 CBT for perfectionism studies examined anxiety and depression outcomes, studies were only selected that targeted disordered eating, therefore numerous relevant studies which have assessed the efficacy of CBT for perfectionism in anxiety and depression but not eating disorders were not included in their meta-analysis. Furthermore, designs besides the gold standard of RCTs were included (i.e., non-randomised, case series, and qualitative designs), and outcomes were not examined by treatment delivery format. To date, no meta-analysis has examined the efficacy of RCTs of CBT for perfectionism across anxiety, depression and eating disorders to examine the transdiagnostic impact of the treatment, which is important to build on

previous meta-analyses and given the argument that perfectionism is a transdiagnostic process (Egan et al., 2011). We will examine anxiety and depression as an outcome to be included in the current review, unlike Robinson and Wade (2021) where studies must have examined eating disorders as an outcome to be included. Finally, while Suh et al (2019) examined internet versus face-to-face delivery of the treatment, they did not examine the other self-help (book) trials of perfectionism and this would be helpful to understand the efficacy of this format.

The aim of this study is to perform a systematic review and meta-analysis of RCTs of CBT for perfectionism to quantify treatment effects on perfectionism and symptoms of anxiety, depression, and eating disorders. A secondary aim is to investigate the efficacy of face-to-face and self-help delivery. It is hypothesised that CBT for perfectionism, including both face-to-face and self-help delivered treatment, will result in significant decreases in perfectionism and symptoms of anxiety, depression and eating disorders. It is also hypothesised that face-to-face and self-help treatment (including guided and unguided) when examined independently will be efficacious in reducing perfectionism and symptoms of anxiety, depression and eating disorders.

Method

Inclusion and Exclusion Criteria

Inclusion criteria were: (a) in English, (b) a randomised controlled trial, (c) intervention was CBT for perfectionism, (d) included a measure of perfectionism, and/or any psychological symptoms including anxiety, depression, and eating disorders. Unpublished studies were also included by contacting key researchers in the area to see if there were any relevant trials in preparation that should be included. The exclusion criteria were (1) did

not include a control group (including waitlist/placebo/active comparison) (2) if a study of CBT for perfectionism only included a measure of eating disorder symptoms but not a measure of anxiety or depression. The rationale for this was due to our focus on examining CBT for perfectionism as a transdiagnostic process across disorders, not only eating disorders. Further, another recent meta-analysis has focused on eating disorders as the primary outcome in a meta-analysis of the efficacy of CBT for perfectionism (Robinson & Wade, 2021), therefore we aimed to reduce duplication between the systematic reviews.

Self-help interventions were differentiated from face-to-face interventions and could be unguided or guided in format. Self-help interventions were defined as an intervention which was not face to face therapy, including both internet interventions and self-help books. Self-help books were added to the original aim of the systematic review registered on PROSPERO which included only internet interventions, in order to be as inclusive as possible when assessing the efficacy of CBT for perfectionism given some studies examined self-help books in a traditional bibliotherapy format rather than via an internet intervention (e.g., Hoiles et al., 2021; Lowndes et al., 2019). See Table 1 for study characteristics.

[Insert Table 1 and 2 here]

Databases and Search Strategy

The research protocol was registered and approved on PROSPERO (approval number: CRD42020190709) on 6 June 2020. A literature search was conducted in October 2020 in electronic databases including the Cochrane Library, Medline (PubMed), PsycINFO, and the Web of Science. Search terms were: perfectionism, cognitive-behavioural therapy (CBT) (both American and British spelling), depression, anxiety, social anxiety, generalised anxiety, efficacy, eating disorder, anorexia nervosa, bulimia nervosa, symptom, intervention, face-to-face, internet delivered, web-based, psychopathology, and outcome. The specific searches and booleans used in each of the databases were: “cognitive behaviour therapy and perfectionism”, “cognitive behaviour therapy and perfectionism symptom”, “cognitive behaviour therapy for perfectionism and depression”, “cognitive behaviour therapy for perfectionism and anxiety”, “cognitive behaviour therapy for perfectionism and social anxiety or generalised anxiety”, “cognitive behaviour therapy for perfectionism and eating disorder”, “cognitive behaviour therapy for perfectionism and anorexia nervosa or bulimia nervosa”, “cognitive behaviour therapy for perfectionism internet delivered”, cognitive behaviour therapy for perfectionism web-based” “efficacy cognitive behaviour therapy for perfectionism intervention and outcome”, “efficacy cognitive behaviour therapy for perfectionism intervention and psychopathology”, “efficacy cognitive behaviour therapy for perfectionism and outcome”, “efficacy cognitive behaviour therapy for perfectionism and depression”, “efficacy cognitive behaviour therapy for perfectionism and anxiety”, “efficacy cognitive behaviour therapy for perfectionism and eating disorder”, “efficacy cognitive behaviour therapy for perfectionism face-to-face”, “efficacy cognitive behaviour therapy for perfectionism web-based”, “efficacy cognitive behaviour therapy for perfectionism internet delivered”. No MESH terms were used.

Study Selection

The literature search resulted in a total of 384 studies. Of these, 107 were excluded following de-duplication, 254 were excluded as they were not appropriate, and a further 8 were excluded following eligibility screening. A total of 15 studies were included in the meta-analysis. Egan, van Noort et al. (2014) included both face-to-face and online treatment groups, as such, effect sizes from each delivery mode were included in the meta-analysis.

[Insert Figure 1 here]

Interrater Reliability

Following the completion of inclusion/exclusion of articles from the literature search and quality ratings, a second independent researcher (AO) reviewed the articles and provided a second rating on the included and excluded articles, as well as quality ratings for the included studies. The second researcher completed a random 30% of quality ratings of the included studies and a random 30% of all the articles screened for inclusion/exclusion. The second independent researcher was blind to the initial ratings. Interrater agreement was calculated with Cohen's kappa and was interpreted by conventions: 0 = agreement equivalent to chance, 0.1-0.2 = slight, 0.21-0.4 = fair, 0.41-0.6 = moderate, 0.61-0.8 = substantial, 0.81-0.99 = near perfect, 1 = perfect.

Effect Size Calculations

Hedge's g standardized mean difference was used which is advantageous over correlational statistics in terms of interpretation and is able to account for small sample biases (Rosenthal & Rosnow, 1991; Watson et al., 2016). Effect sizes were calculated through the N s, means, and standard deviations (or standard errors) which were reported within the research or with data supplied from the primary study authors where it was missing from the published article. Cohen's (1988) conventions were used for interpretation, where: small = 0.2, medium = 0.5, and large = 0.8.

Quality Assessment

An adapted version of the quality assessment measure of Moncrieff et al. (2001) was used to assess quality. This instrument was developed for the Cochrane Collaboration Depression, Anxiety and Neurosis review group (CCDAN) to assess treatment trials. The measure was adapted for use in the current study following Watson et al. (2016) where Item 7 (“Clear description of treatments (including doses of drugs used) and adjunctive treatment”) was modified to “Clear description of treatments and adjunctive treatment(s)”. Item 10 (“Use of diagnostic criteria”) was modified to “Clear specification of inclusion criteria”. Item 8 (“Blinding of subjects” and Item 15 (“Details on side-effects”) were dropped, and item 16 (“Record of number and reasons for withdrawal by group”) was modified to “Record of attrition rate per group”. Items were rated between 0 and 2. A percentage of the total score was calculated, with higher scores indicating better quality.

Publication Bias

An evaluation of publication bias was carried out through visual inspection of funnel plots and Egger’s test for plot asymmetry (Rothstein et al., 2006; Watson et al., 2016).

Data Analysis

JASP (JASP team, 2020) was used to calculate the pooled between-groups effect sizes (Hedge’s g). Hedge’s g was calculated such that a positive effect indicates that the intervention group scored lower on the outcome in comparison to the control group. The first set of analyses summarised data from all RCTs in order to evaluate the efficacy of CBT for perfectionism overall, including both face-to-face and self-help conditions. The second set of analyses summarised data obtained from face-to-face, and the final set of analyses summarised data obtained from self-help only. In all analyses, effect sizes were derived from post-intervention descriptive statistics for intervention and waitlist/control for each study. Effect sizes were independent of each other (i.e., there was no overlap in participants). We

assessed possible pre-test non-equivalence between intervention and control groups on all outcome variables (i.e., effect size between-groups is larger than .20 at pre-test; Cohen, 1988). For outcomes where control and intervention groups did not match at baseline, we used the method described by Klauer (2001), whereby within-group effect sizes are calculated for both groups than subtracted (i.e., intervention group effect – control group effect). Data were pooled across studies using the random effects method described by DerSimonian and Laird (1986).

Outcome Measures

Outcomes were calculated for perfectionism, depression, anxiety, and eating disorders on the basis of the construct for the latter three outcomes rather than the specific assessment measure. Perfectionism outcomes consisted of the following: personal standards and concern over mistakes, both measured with the respective subscales of the FMPS (Frost et al., 1990), and clinical perfectionism measured with the Clinical Perfectionism Questionnaire (CPQ; Fairburn et al., 2003). The HMPS scale and the Perfectionism Cognitions Inventory (PCI; Flett et al., 1998) were not included due to an insufficient number of studies. These measures have been found to represent different dimensions, and have theoretical differences, therefore they were not combined into a single outcome construct of “perfectionism” (Limburg et al., 2017; Shafran et al., 2002). Measures of symptoms of depression, anxiety and eating disorders are listed in Table 1.

Results

Study Characteristics

There were 15 RCTs which met inclusion criteria (Figure 1, Table 1). Comparisons were made between intervention and waitlist/control groups for all studies. Egan, van Noort et al. (2014) included two CBT for perfectionism intervention groups, one delivered as a self-help intervention and the other face-to-face. Effect sizes for both intervention groups were

included in the overall analysis. Thirteen of the 15 studies included used intention-to-treat analysis, with only two studies analysing data from completers only. A total of 912 participants were involved across the fifteen studies (mean age range = 16.20 - 40.00 years, mean pooled age = 22.58 years), n female = 746 (82%). Most studies were conducted in Australia ($n = 10$), followed by the UK ($n = 2$), Canada ($n = 2$) and Sweden ($n = 1$), the racial background of participants in these studies was not reported. Treatment duration varied from 3 to 10 weeks ($M = 7.1$) and 3 to 13 modules/sessions ($M = 8.20$). The majority of interventions ($n = 10$, 63%) used online treatment delivery, and self-help methods ($n = 12$, 75%). Of the interventions that used self-help methods, five were guided and seven were unguided (see Table 1). In the studies which included therapists in either guided or face to face treatment ($n = 7$, see Table 1), all therapists were postgraduate trainee Clinical Psychologists who were trained in CBT and specifically trained and supervised in the CBT for perfectionism protocol by senior study authors who developed CBT for perfectionism. Most studies did not report on the diagnosis of a psychological disorder in the sample and were therefore classified as non-clinical samples ($n = 9$), four studies reported some participants diagnosed with a psychological disorder (clinical diagnoses range 45-90% of participants), and two studies were with clinical samples where all participants were diagnosed with a psychological disorder (see Table 1). Nine studies included anxiety and depression outcomes, and 6 included eating disorder outcomes. While all studies met the inclusion criteria of a measure of anxiety/depression, not all studies were able to be included in the effect size calculation for anxiety and depression, for example, due to aggregating scores into a general psychological distress variable.

Interrater Agreement and Study Quality

Interrater agreement for quality ratings was substantial (Cohen's kappa = 0.80, $p < 0.001$), and interrater agreement for inclusion and exclusion of articles was near perfect

(Cohen's kappa = 0.85, $p < 0.01$). As measured by the CCDAN, the average quality rating for the studies was 82% ($SD = 9\%$; range 67% to 95%).

Efficacy of CBT for Perfectionism

Mean standardized differences between CBT for perfectionism and control for all delivery formats, face-to-face only, and self-help only are shown in Table 2. For all delivery formats there were large significant effect sizes favouring CBT for perfectionism regarding concern over mistakes ($g = 0.89$), and clinical perfectionism ($g = 0.87$). There were significant medium effect sizes favouring CBT for perfectionism for personal standards ($g = 0.57$), eating disorders ($g = 0.61$), depression ($g = 0.60$), and anxiety ($g = 0.42$; small-medium; see supplementary materials for forest plots). Moderate levels of heterogeneity were observed for concern over mistakes ($I^2 = 38.80\%$), and high levels of heterogeneity were observed for depression ($I^2 = 66.15\%$). Anxiety ($I^2 = 23.62\%$) clinical perfectionism, personal standards, and eating disorder symptom analyses showed low levels of heterogeneity ($I^2 = 0.00\%$).

For face-to-face only CBT for perfectionism, there were moderate-large effect sizes favouring CBT for perfectionism on personal standards ($g = 0.66$), concern over mistakes ($g = 1.29$), and clinical perfectionism ($g = 0.73$; see supplementary materials for forest plots). Levels of heterogeneity were low across all outcomes ($I^2 = 0.00\%$). There were not sufficient studies to test anxiety, depression, and eating disorders for face-to-face studies only.

For self-help CBT for perfectionism, there were medium or large, statistically significant effect sizes favouring CBT for perfectionism on personal standards ($g = 0.56$), concern over mistakes ($g = 0.83$), and clinical perfectionism ($g = 0.91$). There was a medium, statistically significant effect size for eating disorders ($g = 0.61$), and small-medium significant effect sizes for anxiety ($g = 0.43$) and depression ($g = 0.48$). Moderate levels of

heterogeneity were observed for concern over mistakes ($I^2 = 39.16\%$), Anxiety ($I^2 = 39.50\%$), and depression ($I^2 = 55.52\%$). Low levels of heterogeneity were observed on all other outcomes ($I^2 = 0.00\%$). Whether the delivery was guided or unguided did not have a significant influence on the effect size for concern over mistakes $\beta = 0.20$, 95% CI [-0.31, .56], $p = .584$), depression ($\beta = 0.29$, 95% CI [-0.28, 0.86], $p = 0.321$), or anxiety ($\beta = 0.17$, 95% CI [-.34, .66], $p = 0.501$; see supplementary materials for forest plots).

Publication Bias

Funnel plots and Egger's test for each analysis were investigated and did not show evidence of publication bias ($Z = -1.64$ - 1.29 , $p = .100$ -. 889).

Discussion

The results of the meta-analysis indicated that CBT for perfectionism, both in face-to-face and self-help delivery, results in improvement in perfectionism and symptoms of depression, anxiety, and eating disorders at post-treatment relative to control. When considering combined face-to-face and self-help studies, there were large effect sizes found on perfectionism, concern over mistakes and clinical perfectionism. The effect size for personal standards was medium. There were also medium effects for depression and eating disorder symptoms, and a small-medium effect on anxiety symptoms. These results are consistent with the effect sizes found for perfectionism and psychological symptoms in previous meta-analyses (Lloyd et al., 2015; Robinson & Wade, 2021; Suh et al., 2019), suggesting that CBT for perfectionism has efficacy as a transdiagnostic intervention. A strength of this meta-analysis was of the 15 studies we included, there were eight studies that were not included in Suh et al (2019) which were Shafran et al. (2017), Lowndes et al. (2019), Shu et al. (2019), Steele and Wade (2008), Valentine et al. (2018), Wade et al. (2019), Grieve et al. (2021) and one unpublished study. Of these eight studies, only one was

included in the Lloyd et al (2015) review. Moreover, Robinson and Wade's (2021) meta-analysis did not overlap completely with this meta-analysis, seven studies in their review were not included in the current meta-analysis as they met our exclusion criteria (Goldstein et al., 2014; Hurst & Zimmer-Gembeck, 2015; Larsson et al., 2018; Levinson et al., 2017; Lloyd et al., 2014; Tchanturia et al., 2016; Wilksch et al., 2008). By including only randomised controlled trials and also adding more recent studies, broadening the inclusion criteria to include both studies of participants with any symptom levels as well as studies that selected participants on the basis of elevated perfectionism or psychological disorders, and evaluating efficacy in terms of between-group effect sizes (i.e., intervention v control) rather than within-group effect sizes (i.e., pre- v post- intervention group only), lends added robustness to support the conclusion that CBT for perfectionism is an efficacious intervention that improves eating disorder, depression, and anxiety symptoms.

With regards to perfectionism, whether the intervention was face-to-face, or self-help did not have a significant impact on effect size (CI's substantially overlap). Given the medium-large effects for perfectionism demonstrated with self-help delivered treatment, the results provide support for continued work in evaluation of the treatment in these scalable formats, particularly given the benefit in widescale dissemination of self-help interventions. Whether the self-help delivered treatment was guided or unguided did not significantly influence the efficacy of the treatment regarding concern over mistakes, depression, and anxiety. However, this analysis was based on limited studies, and thus no strong conclusions can be drawn. Future research could compare the benefits of guided and unguided CBT for perfectionism, given that research into general internet CBT demonstrates that guidance has a positive impact on the efficacy of the intervention (Andersson, 2016).

Strengths of this meta-analysis are that we attempted to reduce publication bias by contacting authors for unpublished manuscripts. The suggestion by Egan et al. (2011) that

perfectionism is a transdiagnostic process, with transdiagnostic being defined as a risk and maintenance process which operates across diagnostics boundaries (Dalglish et al., 2020), is supported by these findings, indicating that the treatment results in changes in a range of psychological symptoms. The medium-large effect sizes for self-help delivery are promising as it may be beneficial for increased access. However, there is a gap in the literature as there are currently no studies that specifically compare CBT for perfectionism to disorder-specific treatment or other transdiagnostic treatments, and this is a question for future research. There is also a gap in the literature surrounding CBT for perfectionism in younger populations with few studies examining youth, with only one study in this review examining adolescents (Shu et al., 2019). In particular there are no studies which have examined CBT for perfectionism in young people with diagnoses of psychological disorders. Another strength of this meta-analysis is that most studies used intention-to-treat analysis rather than completer only analysis. Intention-to-treat analysis can account for various misleading results that can occur in intervention research such as non-random attrition (McCoy, 2017). Analysing completers only can increase the chance of type 1 errors and inflate the effectiveness of the intervention (McCoy, 2017). Due to only two included studies using completer only analysis we were not powered to enter analysis type as a moderator. For a more accurate representation of intervention efficacy, future research should continue using intention to treat analysis instead of completer only analysis. Similarly, where applicable we accounted for meaningful baseline differences between intervention and control groups, which allowed for a more accurate representation of intervention effectiveness when groups were not equivalent at baseline (Kaur, 2001).

There were several limitations. First, there were a small number of face-to-face only studies included in the meta-analysis. Caution should therefore be taken when interpreting the results of the analysis. The small number of face-to-face studies precluded an examination of

the efficacy of face to face versus self-help delivered CBT for perfectionism which is a limitation and direction for future research. There were also insufficient studies with pure clinical samples to enable an examination of efficacy between clinical versus non-clinical samples, and this is important for a future meta-analysis to examine. Further, although there were 15 RCTs included in the meta-analysis which is the largest to date of CBT for perfectionism, more studies in future meta-analyses are required to be able to explore moderators of intervention effects. The moderate heterogeneity across some outcomes suggests that moderator analyses may be beneficial to better understanding of the outcome effects. Finally, it would be helpful to evaluate the percentage of patients who achieved reliable or clinically significant change, to consider whether CBT for perfectionism results in clinically significant changes to patient outcomes, not just statistically significant effects. Unfortunately, we could not synthesize these findings because this was reported on in only 9 studies and the studies used different measures and methods to compute change, resulting in too few trials with which to aggregate data.

In summary, CBT for perfectionism is efficacious in reducing perfectionism and symptoms of depression, anxiety and eating disorders. This is a promising area of research, given the large effect sizes observed. Further research is needed to continue to evaluate the efficacy of CBT for perfectionism.

References

- Andersson, G. (2016). Internet-delivered psychological treatments. *Annual Review of Clinical Psychology, 12*, 157-179. <https://doi.org/10.1146/annurev-clinpsy-021815-093006>.
- *Arpin-Cribbie, C., Irvine, J., & Ritvo, P. (2012). Web-based cognitive-behavioral therapy for perfectionism: A randomized controlled trial. *Psychotherapy Research, 22*, 194-207. <https://doi.org/10.1080/10503307.2011.637242>
- Ashbaugh, A., Antony, M.M., Liss, A., Summerfeldt, L.J., McCabe, R.E., & Swinson, R.P. (2007). Changes in perfectionism following cognitive-behavioral treatment for social phobia. *Depression and Anxiety, 24*, 169-177. <https://doi.org/10.1002/da.20219>
- Beck, A. T., & Steer, R. A. (1990). *Manual for the Beck Anxiety Inventory*. The Psychological Corporation.
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *BDI-II: Beck Depression Inventory Manual* (2nd ed.). The Psychological Corporation.
- Chorpita, B. F., Yim, L., Moffitt, C., Umemoto, L. A., & Francis, S. E. (2000). Assessment of symptoms of DSM-IV anxiety and depression in children: A revised child anxiety and depression scale. *Behaviour Research and Therapy, 38*, 835-855. [https://doi.org/10.1016/s0005-7967\(99\)00130-8](https://doi.org/10.1016/s0005-7967(99)00130-8)
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Erlbaum.
- Dalglish, T., Black, M., Johnston, D., & Bevan, A. (2020). Transdiagnostic approaches to mental health problems: Current status and future directions. *Journal of Consulting and Clinical Psychology, 88*, 179-195. <http://dx.doi.org/10.1037/ccp00482>
- DerSimonian, R., & Laird, N. (1986). Meta-analysis in clinical trials. *Controlled Clinical Trials, 7*(3), 177-188. [https://doi.org/10.1016/0197-2456\(86\)90046-2](https://doi.org/10.1016/0197-2456(86)90046-2)

- *Egan, S. J., Van Noort, E., Chee, A., Kane, R. T., Hoiles, K. J., Shafran, R., & Wade, T. D. (2014). A randomised controlled trial of face to face versus pure online self-help cognitive behavioural treatment for perfectionism. *Behaviour Research and Therapy*, *63*, 107-113. <https://doi.org/10.1016/j.brat.2014.09.009>
- Egan, S. J., Wade, T. D., & Shafran, R. (2011). Perfectionism as a transdiagnostic process: A clinical review. *Clinical Psychology Review*, *31*, 203-212. <https://doi.org/10.1016/j.cpr.2010.04.009>
- Egan, S.J., Wade, T.D., Shafran, R., & Antony, M.M. (2014). *Cognitive-behavioral treatment of perfectionism*. NY: Guilford.
- Fairburn, C. G., Cooper, Z., & Shafran, R. (2003). *The Clinical Perfectionism Questionnaire*. Unpublished scale. Oxford University.
- Fairburn, C. G., & Belgin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *The International Journal of Eating Disorders*, *16*, 363-370. <http://doi.org/10.1002/1098-108X>
- Flett, G. L., Hewitt, P. L., Blankstein, K. R., & Gray, L. (1998). Psychological distress and the frequency of perfectionistic thinking. *Journal of Personality and Social Psychology*, *75*(5), 1363-1381. <https://doi.org/10.1037/0022-3514.75.5.1363>
- Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research*, *14*, 449-468. <https://doi.org/10.1007/bf01172967>
- Goldstein, M., Peters, L., Thornton, C.E., & Touyz, S.W. (2014). The treatment of perfectionism within the eating disorders: A pilot study. *European Eating Disorders Review*, *22*, 217-221.
- *Grieve, P., Egan, S.J., Andersson, G., Carlbring, P., Shafran, R., & Wade, T.D. (2021). The impact of internet-based cognitive behaviour therapy for perfectionism on different

- measures of perfectionism: A randomised controlled trial. *Cognitive Behaviour Therapy*. doi:10.1080/16506073.2021.1928276
- *Handley, A. K., Egan, S. J., Kane, R. T., & Rees, C. S. (2015). A randomised controlled trial of group cognitive behavioural therapy for perfectionism. *Behaviour Research and Therapy*, 68, 37-47. <https://doi.org/10.1016/j.brat.2015.02.006>
- Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology*, 60, 456-470. <https://doi.org/10.1037/0022-3514.60.3.456>
- Higgins, J. P. (2003). Measuring inconsistency in meta-analyses. *British Medical Journal*, 327, 557-560. <https://doi.org/10.1136/bmj.327.7414.557>
- *Hoiles, K., Rees, C. S., Kane, R. T., Howell, J., & Egan, S. J. (2021). *A randomised controlled trial of guided online self-help treatment for clinical perfectionism*. [unpublished data]. Curtin University.
- Hurst, K., & Zimmer-Gembeck, M. (2015). Focus on perfectionism in female adolescent anorexia nervosa. *International Journal of Eating Disorders*, 48, 936-941. <https://doi.10/1002/eat.22417>
- James, K., & Rimes, K. A. (2017). Mindfulness-based cognitive therapy versus pure cognitive behavioural self-help for perfectionism: A pilot randomised study. *Mindfulness*, 9, 801-814. <https://doi.org/10.1007/s12671-017-0817-8>
- JASP Team (2020). JASP (Version 0.14.1) [Computer software]
- Klauer, K. J. (Ed.). (2001). *Handbuch kognitives training* [Handbook of cognitive training]. Göttingen: Hogrefe
- Kothari, R., Barker, C., Pistrang, N., Rozentel, A., Egan, S., Wade, T., Allcott-Watson, H., Andersson, G., & Shafran, R. (2019). A randomised controlled trial of guided

- internet-based cognitive behavioural therapy for perfectionism: Effects on psychopathology and transdiagnostic processes. *Journal of Behavior Therapy and Experimental Psychiatry*, 64, 113-122. <https://doi.org/10.1016/j.jbtep.2019.03.007>
- Kroenke, K., Spitzer, R.L., & Williams, J.B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16, 606-613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>
- Larsson, E., Lloyd, S., Westwood, H., & Tchanturia, K. (2018). Patients perspective of a group intervention for perfectionism in anorexia nervosa. *Journal of Health Psychology*, 23, 1521-1532. <https://doi.org/10.1177/1359105316660183>
- Levinson, C.A., Brosf, L.C., Vanzhula, I.A., Bumberry, L., Zerwas, S., & Bulik, C.M. (2017). Perfectionism group treatment for eating disorders in an inpatient, partial hospitalization and outpatient setting. *European Eating Disorders Review*, 25, 579-585. <https://doi.10.1002/erv.2257>
- Light, R., & Pillemer, D. (1984). *Summing up: The science of reviewing research*. Harvard University Press.
- Limburg, K., Watson, H. J., Hagger, M. S., & Egan, S. J. (2017). The relationship between perfectionism and psychopathology: A meta-analysis. *Journal of Clinical Psychology*, 73(10), 1301-1326. <https://doi.org/10.1002/jclp.224>
- Lloyd, S., Fleming, C., Schmidt, U., & Tchanturia, K. (2015). Targeting perfectionism in anorexia nervosa using a group-based cognitive behavioural approach: A pilot study. *European Eating Disorders Review*, 22(5), 366-372. <https://doi.org/10.1002/erv.231>
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck

depression and anxiety inventories. *Behaviour Research and Therapy*, 33(3), 335-343.

[https://doi.org/10.1016/0005-7967\(94\)00075](https://doi.org/10.1016/0005-7967(94)00075)

*Lowndes, T. A., Egan, S. J., & McEvoy, P. M. (2019). Efficacy of brief guided self-help cognitive behavioral treatment for perfectionism in reducing perinatal depression and anxiety: A randomized controlled trial. *Cognitive Behaviour Therapy*, 48(2), 106-120.
<https://doi.org/10.1080/16506073.2018.149081>

McCoy, E. (2017). Understanding the intention-to-treat principle in randomized controlled trials. *Western Journal of Emergency Medicine*, 18(6), 1075-1078. <https://doi.org/10.5811/westjem.2017.8.35985>

Moncrieff, J., Churchill, R., Drummond, D. C., & McGuire, H. (2001). Development of a quality assessment instrument for trials of treatments for depression and neurosis. *International Journal of Methods in Psychiatric Research*, 10(3), 126-133.
<https://doi.org/10.1002/mpr.108>

Pleva, J., & Wade, T. D. (2007). Guided self-help versus pure self-help for perfectionism: A randomised controlled trial. *Behaviour Research and Therapy*, 45(5), 849-861.
<https://doi.org/10.1016/j.brat.2006.08.000>

*Radhu, N., Daskalakis, Z. J., Arpin-Cribbie, C. A., Irvine, J., & Ritvo, P. (2012). Evaluating a web-based cognitive-behavioral therapy for maladaptive perfectionism in university students. *Journal of American College Health*, 60(5), 357-366.
<https://doi.org/10.1080/07448481.2011.630703>

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385-401.
<https://doi.org/10.1177/014662167700100306>

- Richards, D., & Richardson, T. (2012). Computer-based psychological treatments for depression: A systematic review and meta-analysis. *Clinical Psychology Review, 32*, 329-342. <https://doi.org/10.1016/j.cpr.2012.02.004>
- *Riley, C., Lee, M., Cooper, Z., Fairburn, C. G., & Shafran, R. (2007). A randomised controlled trial of cognitive-behaviour therapy for clinical perfectionism: A preliminary study. *Behaviour Research and Therapy, 45*(9), 2221-2231. <https://doi.org/10.1016/j.brat.2006.12.003>
- Robinson, K., & Wade, T. D. (2021). Perfectionism interventions targeting disordered eating: A systematic review and meta-analysis. *International Journal of Eating Disorders, 54*, 473-487. <https://doi.org/10.1002/eat.23483>
- Rosenthal, R., & Rosnow, R. L. (1991). *Essentials of Behavioural Research: Methods and Data Analysis* (2nd ed.). McGraw-Hill.
- Rothstein, H. R., Borenstein, M., & Sutton, A. J. (2006). *Publication bias in meta-analysis: Prevention, assessment and adjustments*. Wiley.
- *Rozentel, A., Shafran, R., Wade, T., Egan, S. J., Nordgren, L., Carlbring, P., Landström, A., Roos, S., Skoglund, M., Thelander, E., Trosell, L., Örténholm, A., & Andersson, G. (2017). A randomized controlled trial of internet-based cognitive behavior therapy for perfectionism including an investigation of outcome predictors. *Behaviour Research and Therapy, 95*, 79-86. <https://doi.org/10.1016/j.brat.2017.05.015>
- Rozentel, A., Shafran, R., Wade, T. D., Kothari, R., Egan, S. J., Ekberg, L., Wiss, M., Carlbring, P., & Andersson, G. (2018). Guided web-based cognitive behavior therapy for perfectionism: Results from two different randomized controlled trials. *Journal of Medical Internet Research, 20*(4), 1-10. <https://doi.org/10.2196/jmir.9823>

Rücker, G., Schwarzer, G., Carpenter, J. R., & Schumacher, M. (2008). Undue reliance on I^2 in assessing heterogeneity may mislead. *BMC Medical Research Methodology*, 8(1), 11-17. <https://doi.org/10.1186/1471-2288-8-79>

*Sadri, S. K., Anderson, R. A., McEvoy, P. M., Kane, R., T., & Egan, S. J. (2017). A pilot investigation of cognitive behavioural therapy for clinical perfectionism in obsessive compulsive disorder. *Behavioural and Cognitive Psychotherapy*, 45(3), 312-320. <https://doi.org/10.1017/S1352465816000618>

Shafran, R., Cooper, Z., & Fairburn, C. G. (2002). Clinical perfectionism: A cognitive-behavioural analysis. *Behaviour Research and Therapy*, 40(7), 773-791. [https://doi.org/10.1016/s0005-7967\(01\)00059-6](https://doi.org/10.1016/s0005-7967(01)00059-6)

Shafran, R., Egan, S., & Wade, T. (2010). *Overcoming perfectionism: A self-help guide using cognitive behavioral techniques*. Constable Robinson.

*Shafran, R., Wade, T., Egan, S., Kothari, R., Allcott-Watson, H., Carlbring, P., Rozentel, A., & Andersson, G. (2017). Is the devil in the detail? A randomised controlled trial of guided internet-based CBT for perfectionism. *Behaviour Research and Therapy*, 95, 99-106. <https://doi.org/10.1016/j.brat.2017.05.01>

*Shu, C. Y., Watson, H. J., Anderson, R. A., Wade, T. D., Kane, R. T., & Egan, S. J. (2019). A randomized controlled trial of unguided internet cognitive behaviour therapy for perfectionism in adolescents: Impact on risk for eating disorders. *Behaviour Research and Therapy*, 120, 1-9. <https://doi.org/10.1016/j.brat.2019.103429>

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, 166(10), 1092-1097. <https://doi.org/10.1001/archinte.166.10.1092>

- *Steele, A. L., & Wade, T. D. (2008). A randomised trial investigating guided self-help to reduce perfectionism and its impact on bulimia nervosa: A pilot study. *Behaviour Research and Therapy*, *46*(12), 1316-1323. <https://doi.org/10.1016/j.brat.2008.09.006>
- Stoeber, J., & Gaudreau, P. (2017). The advantages of partialling perfectionistic strivings and perfectionistic concerns: Critical issues and recommendations. *Personality and Individual Differences*, *104*, 379-386. <https://doi.org/10.1016/j.paid.2016.08.039>
- Suh, H., Sohn, H., Kim, T., & Lee, D. (2019). A review and meta-analysis of perfectionism interventions: Comparing face-to-face with online modalities. *Journal of Counselling Psychology*, *66*(4), 473-486. <https://doi.org/10.1037/cou0000355>
- Tchanturia, K., Larsson, E., & Adamson, J. (2016). Brief group intervention targeting perfectionism in adults with anorexia nervosa: Empirically informed protocol. *European Eating Disorders Review*, *24*, 489-493. <https://doi.org/10.1002.erv.2467>
- *Valentine, E. G., Bodill, K. O., Watson, H. J., Hagger, M. S., Kane, R. T., Anderson, R. A., & Egan, S. J. (2018). A randomized controlled trial of unguided internet cognitive-behavioral treatment for perfectionism in individuals who engage in regular exercise. *International Journal of Eating Disorders*, *51*(8), 984-988. <https://doi.org/10.1002/eat.22888>
- *Wade, T. D., Kay, E., Valle, M. K., Egan, S. J., Andersson, G., Carlbring, P., & Shafran, R. (2019). Internet-based cognitive behaviour therapy for perfectionism: More is better but no need to be prescriptive. *Clinical Psychologist*, *23*(3), 196-205. <https://doi.org/10.1111/cp.12193>
- Watson, H. J., Joyce, T., French, E., Willan, V., Kane, R. T., Tanner-Smith, E. E., McCormack, J., Dawkins, H., Hoiles, K. J., & Egan, S. J. (2016). Prevention of eating disorders: A systematic review of randomized, controlled trials: Eating disorders

prevention review. *The International Journal of Eating Disorders*, 49(9), 833-862.

<https://doi.org/10.1002/eat.22577>

Wilksch, S.M., Durbridge, M., & Wade, T. (2008). A preliminary controlled comparison of programs designed to reduce risk of eating disorders targeting perfectionism and media literacy. *Journal of the American Academy of Child and Adolescent Psychiatry*, 47, 939-947. <https://doi.org/10.1097/CHI.0b013e3181799f4a>

*Denotes that the study was included in the meta-analysis.

Table 1 Study characteristics of included studies

First author	Sample size ^a	Mean age(range)	%female	Country	Population	Delivery (N sessions/modules)	Measure(s) Perfectionism	Other outcome measures
Arpin-Cribbie (2012)	T: 29 WC: 22	20.14 (18-48)	70.00%	Canada	EP, NC	Online self-help ^{UG} (13)	FMPS-CM	CES-D, BAI
Egan (2014)	TF: 18 TO: 16 WC: 18	39.88 (20-65)	57.69%	Australia	EP, 54%C	Face-to-face (8) Online self-help ^{UG} (8)	FMPS-PS, FMPS-CM, CPQ	EDE-Q, DASS
Grieve (2021)	T: 51 WC: 51	24.74 (18-64)	89.00%	Australia	SRP, NC	Online self-help ^{UG} (8)	FMPS-PS, FMPS-CM	DASS-D, DASS-A
Handley (2015)	T: 21 WC: 21	T: 28.86 (NR) WC: 33.00 (NR)	80.95%	Australia	EP, 90%C	Group therapy (8)	FMPS-PS, FMPS-CM, CPQ	BDI, DASS-A, EDE-Q
Hoiles (unpublished)	T: 20 WC: 20	35.43 (19-57)	70.00%	Australia	EP, 80%C	Online self-help ^G (8)	FMPS-PS, FMPS-CM, CPQ	DASS-D, DASS-A
Lowndes (2019)	T: 30 WC: 30	32.41 (24-41)	100%	Australia	EP, NC	Book self-help ^G (4)	FMPS-PS, FMPS-CM	EPDS
Radhu (2012)	T:22 WC:25	T: 23.82 (NR) WC: 21.44 (NR)	72.34%	Canada	EP, NC	Online self-help ^{UG} (13)	FMPS-PS, FMPS-CM	CES-D, BAI
Riley (2007)	T: 10 WC: 10	29.90(NR)	90.00%	UK	EP, 45%C	Face-to-Face (10)	CPQ	BDI, BAI
Rozental (2017)	T: 78 WC:78	34.10 (NR)	86.54%	Sweden	SRP, NC	Online self-help ^G (8)	FMPS-PS, FMPS-CM, CPQ	PHQ-9, GAD-7
Sadri (2017)	T:4 WC: 7	40 (26-61)	72%	Australia	EP,100% C (OCD)	Group therapy (8)	FMPS-PS, FMPS-CM, CPQ	YBOCS
Shafran (2017)	T:62 WC:58	28.85 (17-58)	81.67%	UK	EP, NC	Online self-help ^G (8)	FMPS-PS, FMPS-CM, CPQ	DASS
Shu (2019)	T: 36 WC: 24	16.20 (NR)	100%	Australia	SRP, NC	Online self-help ^{UG} (8)	CPQ	RCADS, EDE-Q
Steele (2008)	T: 17 PC:16	T: 24.65(17-39) PC: 27.75(17-39)	96.67%	Australia	100% C (BN/ED)	Book self-help ^G (8)	FMPS-PS, FMPS-CM	DASS-D, DASS-A, EDE-Q
Valentine (2018)	T: 38	37 (NR)	61.19%	Australia	EP, NC	Online self-help ^{UG}	FMPS-CM, CPQ	EDE-Q, ABQ

Wade (2019)	WC: 29 T: 28 WC: 23	25.18 (17-60)	78.43%	Australia	SRP, NC	(8) Online self-help ^{UG} (3)	FMPS-PS, FMPS-CM	DASS
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Notes. ^aAnalysed sample sizes; ABQ = Athlete Burnout Questionnaire; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; BN: bulimia nervosa; C: clinical i.e., diagnosis of a psychological disorder reported on a structured diagnostic measure; CES-D: Center for Epidemiologic Studies Depression Scale; CPQ: Clinical Perfectionism Questionnaire; DASS: Depression Anxiety Stress Scales; DASS-A: Depression Anxiety Stress Scales-Anxiety subscale; DASS-D: Depression Anxiety Stress Scales-Depression subscale; ED: eating disorder not otherwise specified; EDE-Q: Eating Disorders Examination Questionnaire; EP: elevated perfectionism on a perfectionism measure; EPDS: Edinburgh Postnatal Depression Scale; FMPS-CM: Frost Multidimensional Perfectionism Scale Concern over Mistakes; FMPS-PS: Frost Multidimensional Perfectionism Scale Personal Standards; G: guided internet intervention; GAD-7: Generalised Anxiety Disorder-7; NC: non-clinical i.e., no diagnosis of a psychological disorder reported on a structured diagnostic measure; NR: not reported; OCD: obsessive-compulsive disorder; PC: placebo control; PHQ-9: Patient Health Questionnaire-9; RCADS-D: Revised Child Anxiety and Depression Scale; SRP: self-reported current difficulties with perfectionism; T: treatment group; TF: treatment – face-to-face arm; TO: treatment – online self-help arm; UG: unguided internet intervention; WC: waitlist control. YBOCS: Yale-Brown Obsessive Compulsive Scale.

Table 2*Efficacy of CBT for perfectionism*

Outcome	<i>k</i>	<i>N</i>	Hedges <i>g</i>	95% CI	<i>I</i>²
Face-to-face and self-help					
FMPS PS	12	714	0.57**	0.43-0.72	0.00%
FMPS CM	14	832	0.89**	0.71-1.08	38.80%
CPQ	10	568	0.87**	0.70-1.04	0.00%
Depression	9	551	0.60**	0.28-0.91	66.15%
Anxiety	9	551	0.42**	0.21-0.62	23.62%
Eating disorders	6	254	0.61**	0.36-0.87	0.00%
Face-to-face only					
FMPS PS	3	89	0.66**	0.25-1.08	0.00%
FMPS CM	3	89	1.29**	0.84-1.73	0.00%
CPQ	4	109	0.73**	0.35-1.11	0.00%
Self-help only					
FMPS PS	9	643	0.56**	0.41-0.72	0.00%
FMPS CM	11	761	0.83**	0.64-1.03	39.16%
CPQ	6	477	0.91**	0.72-1.10	0.00%
Depression	7	489	0.48*	0.19-0.76	55.52%
Anxiety	7	489	0.43**	0.19-0.67	39.50%
Eating disorders	4	194	0.61**	0.31-0.91	0.00%

Notes. * $p < 0.01$. ** $p < 0.001$. All comparisons are made with waitlist/control group. *k*: number of studies; *N*: total number of participants analysed; FMPS CM = concern over mistakes subscale of the Frost Multidimensional Perfectionism Scale (Frost et al., 1990); FMPS PS =

personal standards subscale of the Frost Multidimensional Perfectionism Scale (Frost et al., 1990); CPQ = Clinical Perfectionism Questionnaire (Fairburn et al., 2003).

Figure 1

Flow diagram depicting study selection in accordance with PRISMA guidelines

