Guided Internet-based Cognitive Behavioural Therapy for Perfectionism, and its Impact on Self-esteem and Intolerance of Uncertainty: A Randomised Controlled Trial

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I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Overview

Perfectionism, low self-esteem, and intolerance of uncertainty are transdiagnostic processes, elevated across, and implicated in the aetiology and maintenance of, a number of mental health disorders. The present research explores the relationship between these transdiagnostic processes, and whether a change in one (perfectionism), can effect a change in the others (self-esteem and intolerance of uncertainty).

Part one is a meta-analytic review of 21 studies investigating the relationship between perfectionism and self-esteem. A negative association was found between self-esteem and perfectionism, particularly the unhelpful or maladaptive aspects of perfectionism known as perfectionistic concerns.

Part two presents the findings of a randomised controlled trial (RCT) of a guided internet-based cognitive behaviour therapy (ICBT) for perfectionism, which was conducted jointly with Professor Roz Shafran and her research team. A total of 120 participants took part (experimental = 62, control = 58). Negative associations were observed between perfectionism and self-esteem, and self-esteem and intolerance of uncertainty. A positive association was observed between perfectionism and intolerance of uncertainty. ICBT for perfectionism significantly reduced levels of perfectionism and intolerance of uncertainty, and increased self-esteem, post-intervention (12 weeks). Changes in perfectionism and intolerance of uncertainty, but not self-esteem, were maintained at follow-up (24 weeks).

Part three considers the broader challenges of internet-based interventions, treating perfectionism, conducting RCTs, and the advantages and disadvantages of being a clinician-researcher.

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Part I: Meta-analytic Literature Review

The Relationship between Perfectionism and Self-esteem

Abstract

Aims: This meta-analytic review had two aims: (i) to review evidence of a relationship between two transdiagnostic processes: perfectionism and self-esteem; and (ii) to investigate the relationship between self-esteem and two components of perfectionism separately, perfectionistic concerns (maladaptive perfectionism), and perfectionistic strivings (adaptive perfectionism).

Method: A systematic search of the literature for studies investigating an association between perfectionism and self-esteem was conducted using electronic databases (PyschINFO, Medline, SCOPUS, and Web of Science). The quality of eligible studies was assessed using the Quality Assessment Tool for Observational, Cohort, and Cross-Sectional Studies. The correlational meta-analysis was conducted using the metafor program in R.

Results: The quality of the 21 studies included was mainly fair, with some rated as good. A small negative association was observed between self-esteem and perfectionism as a single construct ($r = -0.1$). Self-esteem was negatively associated with perfectionistic concerns ($r = -0.5$), and positively associated with perfectionistic strivings ($r = 0.1$).

Conclusions: Findings suggest that self-esteem is differentially associated with perfectionistic concerns and perfectionistic strivings, highlighting the importance of separately considering the maladaptive and adaptive aspects of perfectionism clinically and in research. Further research is required to understand the nature of the relationship between these two transdiagnostic processes.

Introduction

To suppose a relationship between perfectionism and low self-esteem might seem somewhat intuitive. Having very high and often unachievable standards, which is a key component of perfectionism, will increase the risk of those standards not being met; since perfectionists also tend to base their self-worth upon their ability to meet their high standards, it follows that not meeting these standards would lead to lowered self-esteem (i.e. a more negative subjective appraisal of the self). For example, a perfectionistic student might base her self-worth on her academic performance, and fear making mistakes. As a result, the presence of any perceived errors, or the judgement that standards were not met, might lead to the student believing that they are "not good enough."

Both perfectionism and self-esteem have been implicated in the development and maintenance of a range of psychological disorders (Egan, Wade, & Shafran, 2011; Zeigler-Hill, 2011). Although many studies include measures of both constructs (and report their observed associations), studies explicitly investigating the relationship between perfectionism and self-esteem as a primary objective are few, and discussion of the theoretical nature of the relationship is often limited. The present study used meta-analytic techniques to investigate the relationship between perfectionism and self-esteem.

Perfectionism

Being a "perfectionist" has both positive and negative connotations. That a moderate level of perfectionism is associated with success and achievement is a commonly held belief, but extreme perfectionism has been identified as a transdiagnostic risk and maintaining factor across a number of psychological disorders, including eating disorders, anxiety disorders, obsessive compulsive

disorder, and depression (Egan et al., 2011; Shafran & Mansell, 2001; Stoeber &

Otto, 2006).

Key to the definition of perfectionism is the pursuit of high standards, and

self-criticism in response to those high standards not being met (Frost, Marten,

Lahart, & Rosenblate, 1990). Perfectionism is widely conceptualised as a multi-

dimensional construct, and this is supported by research investigating genetic

heritability (Zeigler-Hill, 2011). There are however different conceptualisations of the

construct of perfectionism, each posits the presence of different dimensions and

provides a different measurement tool. The most commonly used measures of

perfectionism are the Frost Multi-dimensional Perfectionism Scale (FMPS; Frost et

al., 1990), the Hewitt Multi-dimensional Perfectionism Scale (HMPS; Hewitt & Flett,

1991b), and the Almost Perfect Scale – Revised (APS-R; Slaney, Rice, Mobley,

Trippi, & Ashby, 2001), and each is based on a slightly different conceptualisation of

perfectionism.

Frost and colleagues define perfectionism as the setting of excessively high

standards accompanied by overly critical self-evaluation (Frost et al., 1990). They

derived their understanding of the dimensions of perfectionism through development

of the the Frost Multi-dimensional Perfectionism Scale (FMPS), which was

developed through factor analysis of theoretically based items, and items from

existing measures that reflect perfectionism (Frost et al., 1990). A six factor solution

was found, and the factors were labelled concern over mistakes, doubts about

actions, personal standards, parental expectations, parental criticism, and

organisation. These dimensions of perfectionism are representative of the high

standards and self-criticism commonly associated with perfectionism, and also

include a developmental perspective.

Hewitt and Flett's understanding of perfectionism takes into account both

self-focused and interpersonal aspects, and this is reflected in their Hewitt Multi-

dimensional Perfectionism Scale (HMPS) which divides the construct into three dimensions (Hewitt & Flett, 1991b). The first, self-oriented perfectionism, is defined as the setting of high standards and excessive self-criticism in the event of those standards not being met. This is similar to the definition of perfectionism posited by Frost et al. (1990). Hewitt and Flett's other two dimensions represent the interpersonal aspects of perfectionism: Other-oriented perfectionism, which is defined as having high and unrealistic standards for others; and socially-prescribed perfectionism, defined as the belief that others hold high and unrealistic standards for oneself.

Slaney and colleagues regard the key aspect of perfectionism to be the perceived discrepancy between the high standards that an individual sets for themselves and their performance, and in line with this they have developed the Almost Perfect Scale (APS) and the Almost Perfect Scale – Revised (APS-R) which also divides perfectionism into three dimensions: high standards, order (and organisation), and the perceived discrepancy between standards and performance (Slaney & Johnson, 1992; Slaney, Rice, & Ashby, 2002; Slaney et al., 2001). Despite taking different approaches to understanding perfectionism, the overlap between these three measures (the FMPS, the HMPS, and the APS-R) is substantial, with particular subscales from each being highly correlated in expected directions (Frost, Heimberg, Holt, Mattia, & Neubauer, 1993; Slaney et al., 2001).

Theorists and researchers have, for some time, distinguished between two types of perfectionism: maladaptive perfectionism, and a form of adaptive or benign perfectionism (Bieling, Israeli, & Antony, 2004; Slade & Owens, 1998). On the whole, factor analytic studies conducted on the most commonly used measures of perfectionism also tend to result in a two-factor solution, separating subscales thought to be representative of the adaptive/benign aspects of perfectionism (commonly referred to as perfectionistic strivings), from those more representative of

the maladaptive aspects (commonly referred to as perfectionistic concerns) (Bieling et al., 2004; Frost et al., 1993; Moroz & Dunkley, 2015; Rice, Ashby, & Slaney, 1998; Stoeber & Otto, 2006).

The dimension of perfectionistic concerns is associated with maladaptive outcomes such as stress and negative affect, and is elevated among individuals with obsessive compulsive disorder (OCD), social anxiety disorder, generalised anxiety disorder (GAD), depression, post-traumatic stress disorder (PTSD), and panic disorder (Antony, Purdon, Huta, & Swinson, 1998; Enns, Cox, & Borger, 2001; Hewitt & Flett, 1991a; Huprich, Porcerelli, Keaschuk, Binienda, & Engle, 2008; Norman, Davies, Nicholson, Cortese, & Malla, 1998; Sassaroli et al., 2008). In contrast, there is some evidence to suggest that the dimension of perfectionistic strivings is associated with positive affect (Bieling et al., 2004; Frost et al., 1993). However, a recent meta-analysis found that while both dimensions are associated with depression, the anxiety disorders, OCD, and the eating disorders, psychopathology was more strongly associated with perfectionistic concerns than perfectionistic strivings, with the exception of the eating disorders which were found to be strongly associated with both (Limburg, Watson, Hagger, & Egan, 2016).

The wide use of the FMPS, HMPS, and the APS-R is useful in that it enables cross-study comparison; however, the measures have attracted criticism. Items that make up the parental expectations and parental criticism subscales of the FMPS focus on development and relationships with parents. These dimensions could therefore be considered to reflect the aetiology of perfectionism, rather than perfectionism itself (Rhéaume et al., 2000). Furthermore, items that make up the doubts about actions subscale of the FMPS were mostly derived from the Maudsley Obsessive Compulsive Inventory (MOCI; Hodgson & Rachman, 1977), leading to questionability over whether this subscale measures a dimension of perfectionism, or rather, is reflective of the checking symptoms associated with OCD (Shafran &

Mansell, 2001). All three measures are also limited in their clinical utility in that they do not assess perfectionism over a specific time frame (e.g. "over the last month…"), and do not therefore lend themselves to the measurement of clinical change.

Shafran, Cooper and Fairburn (2002) have suggested that the understanding of perfectionism as a group of constructs, some of which could be understood as features associated with perfectionism rather than being part of the core process, might limit research investigating the development, maintenance, and treatment of perfectionism as a psychopathology. They therefore propose that 'clinical perfectionism', defined as "the overdependence of self-evaluation on the determined pursuit of personally demanding, self-imposed, standards in at least one highly salient domain, despite adverse consequences" (p.778), may be useful in its focus on the more dysfunctional and core aspects of perfectionism. A cognitive behavioural model of, and intervention for, perfectionism has been developed from this definition, and has been found to be effective (Egan, Wade, Shafran, & Antony, 2014; Lloyd, Schmidt, Khondoker, & Tchanturia, 2015).

Self-esteem

A variety of definitions of self-esteem can be found in the literature (Guindon, 2002). Those that have stood the test of time define self-esteem as an individual's subjective appraisal of the self, at both an affective and evaluative level (Cooley, 1902; Coopersmith, 1967, 1981; James, 1980; Mead, 1934; Pope, McHale, & Craighead, 1988; Rosenberg, 1965, 1979; Smelser, 1989; Wells & Marwell, 1976). Self-esteem can be defined as being high or low (having a positive or negative opinion of the self); stable or unstable (consistent or fluctuating over time); and global (the overall value we place on ourselves) or specific (the value we place on a specific domain of the self, e.g. achievement or physical appearance; Baumeister,

1993; Brown, 1993; Kernis, Cornell, Sun, Berry, & Harlow, 1993; Orth & Robins, 2014).

Intergenerational transmission of self-esteem is thought to occur through social environmental pathways, and be influenced by parenting style, family relationships and family structure (Bynum & Durm, 1996; Jacobvitz & Bush, 1996; Lamborn, Mounts, Steinberg, & Dornbusch, 1991; McCormick & Kennedy, 2000). There is also substantial evidence for genetic influences on both global and domain specific self-esteem, and stability of self-esteem (30 – 50%; Neiss, Sedikides, & Stevenson, 2002). High self-esteem is protective against the development of mental health difficulties, and postively associated with well-being (Diener & Diener, 2009; Mann, Hosman, Schaalma, & De Vries, 2004), while low self-esteem has been associated with risk for and maintenance of depression, anxiety disorders, eating disorders, and psychosis (Fairburn, Cooper, & Shafran, 2003; Fennell, 1997; Krabbendam et al., 2002; Mann et al., 2004; Orth, Robins, Trzesniewski, Maes, & Schmitt, 2009; Sowislo & Orth, 2013a).

The most well-known and commonly used measure of self-esteem is Rosenberg's Self-Esteem Scale (RSES; Rosenberg, 1965). Rosenberg's theory, based on research investigating the develoment of positive self-image during adolescence, describes self-esteem as a unidimensional and global construct made up of attitudes towards every aspect and characteristic of the self. Rosenberg postited that elements of the self are evaluated against a value of self that developed during childhood and adolescence. At a similar time Coopersmith (1967, 1981) posited another empirically based theory of self-esteem which also suggested that an individual judges their self-worth relative to standards and values that have developed during childhood. In contrast to Rosenberg's theory of self-esteem, Coopersmith identified two parts to self-esteem, true self-esteem (resulting from feelings of worth and value) and defensive self-esteem (manifest in those who lack

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feelings of worth and value but avoid confronting this). Many have gone on to refine and extend these principal theories of Rosenberg and Coopersmith (see Guindon, 2002 for a full review).

The Relationship between Perfectionism and Self-esteem

As early as 1950, Horney posited a relationship between perfectionism and self-esteem, stating that for the perfectionist, low self-esteem is unavoidable due to negative feedback being perceived as evidence of the difference between the real and idealised self (Horney, 1950). Supporting the notion that low self-esteem is a consequence of perfectionism, Beck posited that repeatedly identifying a descrepancy between perfectionistic goals and actual performance results in lowered self-esteem (Beck, 1976; Burns & Beck, 1978). Sorotzkin (1985) extended this to suggest that perfectionists base their self-worth and value on the attainment of often unachievable goals, which results in self-criticism and therefore lowered self-esteem.

Focussing on the maintenance rather than the development of perfectionism and low self-esteem, the cognitive behavioural model of clinical perfectionism describes the relationship as one where an individual's subjective appraisal of their own self-worth (i.e. self-esteem) is dependent upon the pursuit of demanding and self-imposed standards, and therefore their self-esteem is affected by how well they perceive themselves to be doing at meeting those standards. In this model, perfectionism is a dysfunctional schema for self-evaluation in which a failure to meet one's demanding and often unattainable standards leads to self-criticism and low self-esteem (Egan, Wade, Shafran, & Antony, 2014).

An alternative hypothesis regarding the relationship between perfectionism and self-esteem is that low self-esteem results in the development of perfectionism. Ambivalent attachment relationships with parents or caregivers may lead an

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individual to develop an ambivalence or insecurity regarding their self-worth (Guidano & Liotti, 1983). Perfectionism may therefore develop as a means of gaining approval, developing a secure evaluation of the self as a valued and loveable person, and therefore increasing self-esteem (Doron & Kyrios, 2005).

Similarly, the cognitive behavioural model of self-esteem proposes that the essence of low self-esteem is negative beliefs about the self (Fennell, 1997). Perfectionistic behaviours are perceived to be an attempt to compensate for low self-esteem through performance of required tasks to a high standard. The model suggests, however, that while perfectionistic behaviours may have a temporary compensatory effect, they do not lead to a change in core negative beliefs about the self, or to increased self-esteem (Fennell, 1998).

Evidence for the association between self-esteem and perfectionism is mixed. There is good evidence to suggest a negative correlation between self-esteem and maladaptive forms of perfectionism, and some evidence to indicate a positive correlation between self-esteem and adaptive or benign aspects of perfectionism (Ashby & Rice, 2002; Athulya et al., 2016; Flett et al., 1991; Gotwals et al., 2003; Park & Jeong, 2015; Preusser et al., 1994; Trumpeter et al., 2006; Zhang & Cai, 2012). It is, however, difficult to gain an objective picture of the relationship between self-esteem and perfectionism by generally reviewing the literature. While there are studies that investigate this relationship explicitly and identify this as an aim of the research, there are many more studies that include measures of both perfectionism and self-esteem, and report their relationship, but do not identify this as an explicit aim of the research or report this in the abstract (e.g. Aldea, Rice, Gormley, & Rojas, 2010; Allen & Wang, 2014; Boelen & Reijntjes, 2009). Due to this, and the current lack of a systematic review of the literature, it was determined that a meta-analytic study investigating the correlational relationship between perfectionism and self-esteem was warranted.

Aims and Hypotheses

The primary aim of this review was to investigate the relationship between perfectionism and self-esteem using meta-analytic techiniques. Due to the accumulating evidence supporting a two-factor solution to perfectionism, a secondary aim of this review was to investigate the relationship of self-esteem to two components of perfectionism, perfectionistic strivings and perfectionistic concerns, separately. Based on both theoretical explanations of the relationship, and evidence in the literature described above, it was hypothesised that:

1. A moderate negative correlation would be observed between self-esteem and perfectionism (i.e. inclusive of both adaptive and maladaptive aspects of perfectionism).

2. A stronger negative correlation would be oberved between self-esteem and perfectionistic concerns (considered to be more representative of maladaptive perfectionism).

3. There would be a weak positive correlation between self-esteem and perfectionistic strivings (considered to be more representative of adaptive perfectionism).

Methods

Literature Search

The aim of this review was to investigate whether perfectionism and self-esteem are correlated using meta-analytic techniques. It follows that all studies included in the meta-analysis had to include a measure of perfectionism and a measure of self-esteem. Due to this it was decided that the names of commonly used, standardised measures should be used as the search terms for the literature

search. An informal search of the literature was conducted to identify commonly used standardised measures of perfectionism and self-esteem. A list of the measures was compiled and an expert in each of these fields was consulted to determine whether there were any further measures that had not already been identified, (Professor Roz Shafran was consulted on measures of perfectionism, and Professor Ulrich Orth was consulted on measures of self-esteem). Table 1 gives the final list of measures that were entered as search terms for the literature search. Electronic databases (PsychINFO, Scopus, Medline, and Web of Science) were searched using a two component strategy to identify published articles using at least one measure of perfectionism and at least one measure of self-esteem. Searches were limited according to the following additional criteria:

- study includes a human adult population ($\geq$ 16 years).
- peer reviewed publications, written in English.
- papers published any time up to the end of July, 2016.

Results from each database were cross checked against each other and duplicates excluded. A further search was conducted on Google Scholar to identify recently published studies that had not yet been registered onto search databases. Finally, reference sections of eligible studies were reviewed, and editions of three journals from 2006 – 2016 in which eligible studies were commonly published, were hand searched to identify any additional studies that might meet inclusion criteria. The journals identified for hand searching were *Personality and Individual Differences, The Journal of Counselling Psychology,* and *The Journal of Counselling and Development.*

Table 1 Measures of Perfectionism and Self-esteem, used as literature search terms

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Measures of Perfectionism

Almost Perfect Scale (Slaney & Johnson, 1992)

Clinical Perfectionism Questionnaire (Fairburn, Cooper, & Shafran, 2003)

Frost Multidimensional Perfectionism Questionnaire (Frost et al., 1990)

Hewitt and Flett Multidimensional Perfectionism Questionnaire (Hewitt & Flett, 1991b)

Positive and Negative Perfectionism Scale (Terry-Short, Owens, Slade, & Dewey, 1995)

Perfectionist Cognitions Inventory (Flett, Hewitt, Whelan, & Martin, 2007)

Revised Almost Perfect Scale (Slaney et al., 2001)

Measures of Self-esteem

McFarland and Ross Self-Esteem (McFarland & Ross, 1982)

Revised Janis-Field Feelings of Inadequacy (Fleming & Courtney, 1984)

Rosenberg Self-Esteem Scale (Rosenberg, 1965)

Rosenberg-Simmons Self-Esteem (Rosenberg, 1979)

Self-Description Questionnaire (Marsh, 1990, 1992)

Self-Esteem Inventory (Coopersmith, 1967)

Self-Esteem Rating Scale (Nugent & Thomas, 1994)

Self-Liking Competence Scale / Self-Liking and Competence Scale / Self Liking Self Competence Scale (Tafarodi & Swann Jr, 1995)

Self-Perception Profile (Harter, 1988)

Single Item Self-Esteem Scale (Robins, Hendin, & Trzesniewski, 2001)

Sorensen Self-Esteem Test (Sorensen, 2006)

State Self-Esteem Scale (Heatherton & Polivy, 1991)

Study Selection

To determine whether articles met criteria for inclusion the abstract was read, and the results section checked to ensure that the correlational analyses between measures of perfectionism and self-esteem were presented. If it was still not possible to determine whether the article met criteria for inclusion, the entire article was read. In cases where there was any remaining doubt, the paper was further checked by a supervisor (CB; see Figure 1).

Papers were read in full and it was found that only five studies did not use one of the three most commonly used measures of perfectionism: 18 used the Frost Multi-dimensional Perfectionism Scale, 15 used the Hewitt and Flett Multi-dimensional Perfectionism Scale, and 17 used the Almost Perfect Scale – Revised. Furthermore, only four additional studies did not use the Rosenberg Self-Esteem Scale to measure self-esteem. To increase consistency, and allow for moderator analysis examining the effect of perfectionism measure on the relationship between perfectionism and self-esteem, these nine studies were excluded from the meta-analysis.

A further 16 studies were excluded because they only reported correlation coefficients for the relationship between self-esteem and particular subscales of the FMPS, HMPS, or APS-R. Finally, only two studies were found to examine clinical samples. Due to this low number, these studies were excluded and it was decided that the meta-analysis would focus on investigating the degree to which perfectionism and self-esteem are inter-correlated among non-clinical samples. Due to time limitations it was outside of the scope of this study to request missing data from authors. Therefore a total of 21 studies were determined to be eligible for inclusion.

Figure 1 Flow chart depicting literuture search and study selection.

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┌─────────────────────┐        ┌─────────────────────┐
│ Records identified  │        │  Additional records │
│ through database    │        │ identified through  │
│    searching        │        │    other sources    │
│    (n = 309)        │        │     (n = 4)         │
└─────────────────────┘        └─────────────────────┘
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Records screened after duplicates removed (n = 273)	Records excluded:
	Not written in English = 1
	Not published in peer review journal = 1
	Not experimental = 42
	Perfectionism and/or self-esteem not measured = 26
	Commonly used, standardised measure of self-esteem not used = 8
	Sample included people under 16 years old = 101
	Correlation between perfectionism and self-esteem not reported = 49
	(n = 225)

Full-text articles assessed for eligibility (n = 48)	Full-text articles excluded due to:
	-Commonly used measure of perfectionism not used.
	-Commonly used measure of self-esteem not used.
	-Correlation between self-esteem and all subscales of perfectionism not reported.
	-Studies investigated clinical samples.
	(n = 27)

Studies included in quantitative synthesis (meta-analysis) (n = 21)

The studies included in the meta-analysis therefore met the following criteria:

- Study included a human adult population (≥ 16 years).
- The sample was taken from the general population, rather than a clinical population.
- Perfectionism was measured using the Frost Multi-dimensional Perfectionism Scale, The Hewitt and Flett Multi-dimensional Scale, or the Almost Perfect Scale – Revised.
- Self-esteem was measured using the Rosenberg Self-Esteem Scale.
- Correlation was reported for the relationship between perfectionism and self-esteem.
- Complete measures of perfectionism and self-esteem were used, not particular subscales or items only.
- Papers were peer reviewed publications, written in English.
- Papers were published any time up to the end of July, 2016.

Data Extraction

Basic descriptive information was extracted for each study. These variables included: sample size, sample composition (i.e. college sample, general population sample, clinical sample etc.), ethinicity of sample, type of perfectionism measure, type of self-esteem measure, language in which measures were administered, country in which study was conducted, method of administration (online or in person), and the full citation of the paper including authors and year of publication. Information was input into a specifically designed excel database.

Effect Size Computation

Effect sizes were directly reported correlation coefficients. All but one study reported a number of r values corresponding to the number of subscales in the

measure of perfectionism that was used (FMPS = 6 subscales, HMPS and APS-R = 3 subscales). The additional study reported a total effect size for the FMPS total score, and one paper presented results for both the HMPS and the APS-R. In accordance with aims of this meta-analytic study, three individual meta-analyses were conducted: the first investigating the association between self-esteem and all subscales of perfectionism, the second investigating the correlation between self-esteem and subscales representative of perfectionistic strivings, and the third investigating the correlation between self-esteem and subscales representative of perfectionistic concerns. Three average effect sizes were calculated for each study using the relevant subscales: r^1 = all subscales; r^2 = subscales identified as perfectionistic concerns; r^3 = subscales identified as perfectionistic strivings. As sample sizes within studies did not significantly vary across subscales, this was done by transforming correlation coefficients to Fisher's Z values, averaging these values across sub-scales, and then converting these back to non-transformed r values.

Formation of Perfectionistic Strivings and Perfectionistic Concerns

Formation of the perfectionistic concerns and perfectionistic strivings dimensions, from the subscales of the FMPS, HMPS and APS-R, was based upon the recommendations of Stoeber and Otto (2006), also used in a recent meta-analysis reviewing the relationship between perfectionism and mental health disorders (Limburg et al., 2016). The perfectionistic strivings dimension was constructed from the FMPS subscale of personal standards, the HMPS subscale of self-oriented perfectionism, and the APS-R subscale of high standards. The perfectionistic concerns dimension was constructed from the FMPS subscales of concern over mistakes and doubts about actions, the HMPS subscale of socially-prescribed perfectionism, and the APS-R subscale discrepency. As per Stoeber and

Otto's (2006) recommendations, the FMPS organisation subscale, and the HMPS other-oriented perfectionism subscale, were not included due to a lack of clear evidence indicating whether they are representative of perfectionistic concerns or perfectionistic strivings.

Analytic Procedure

Weighted mean effect sizes, heterogeneity tests (Q statistics), and moderator analyses were conducted using the statistical package R. To measure the strength of the linear relationship between two quantitative variables using R it is necessary to specify the raw correlation coefficient and corresponding sample size for each study. In accordance with Rosenthal's recommendations, correlation coefficients were first transformed using the Fisher's r-to-Z transformations to reduce the skew of the standard error (Rosenthal, 1991). The formula is defined as follows:

$$ES_{zr} = .5 * \log_e \left[\frac{1 + r}{1 - r} \right]$$

where ES_{zr} = Fisher's Z, and r = reported correlation. The standard error was then calculated using the following formula:

$$SE_{zr} = \sqrt{\frac{1}{n-3}}$$

where n represents the number of participants contributing to the effect size. Effect sizes are then weighted by their inverse sampling variance, calculated using the following formula:

$$W_{zr} = \frac{1}{(SE_{zr})^2} = n-3$$

A random effects model was used to conduct all meta-analyses. Though less powerful than a fixed effects model, a random effects model allows for inferences to be made that generalise to the hypothetical population of studies that might exist, rather than just the studies included in the present sample (Rosenthal, 1995). A random effects model is also better suited to data that violates the assumption of homogeneity, and is therefore recommended for use by the National Research Council (1992).

A Q statistic was computed for each meta-analysis to test for heterogeneity between studies. A significant Q statistic indicates that the distribution of effect sizes around the mean is greater than expected based on the sampling error. If heterogeneity between studies is found to be significant according to the Q statistic, the use of a random effects model to conduct the meta-analysis will reduce the likelihood of a type 1 error (Diener, Hilsenroth, & Weinberger, 2009). In this case, the I^2 statistic was also calculated to estimate what proportion of the total variance between studies can be attributed to between study variance, using the formula:

$$I^2 = 100 * \frac{Q - df}{Q}$$

where Q represents the heterogeneity statistic, and df represents the degrees of freedom. Recommended cut-offs of 25%, 50% and 75% are used to indicated low, medium, and high heterogeneity, respectively (Higgins, Thompson, Deeks, & Altman, 2003).

Publication Bias

Nonsignificant findings are less likely to be published, and the resulting publication bias can lead to an inflation of the mean effect size resulting from a meta-analysis (Diener et al., 2009). To assess for publication bias, a funnel plot was created by plotting each study's standard error against its Fisher's Z correlation coefficient. Due to the large sample sizes of studies included in the meta-analysis, which can make funnel plots difficult to interpret, Orwin's fail safe N was also calculated for each analysis (Orwin, 1983). This method determines the number of studies with an effect size considered to be negligible that would be required to reduce the weighted mean effect size to 0. The formula is:

$$\text{Fail safe N} = \frac{k*(ES-ES_C)}{ES_C}$$

where ES represents the observed effect size, ESc represents the criterion effect size by which an effect is determined to be negligible, and k represents the number of studies contributing to the observed effect size. In accordance with recommendations, a criterion effect size of $r = .10$ was used for all analysis (Hunter & Schmidt, 1990; Orwin, 1983).

Quality Assessment

The quality of papers included in meta-analytic studies are often evaluated using quality assessment tools; however, such tools are usually designed to assess papers reporting on randomised controlled trials. To assess the quality of correlational studies included in this meta-analysis, a quality assessment tool designed for use with observational cohort and cross-sectional studies was adapted (Appendix A). The areas addressed by the quality assessment tool included the

objective of the study, the recruitment and description of the sample, use and description of measures, and description of power. Each study was rated as meeting or not meeting the defined criteria, and then rated overall as being good, fair, or poor. The original tool can be found at https://www.nhlbi.nih.gov/health-pro/guidelines/in-develop/cardiovascular-risk-reduction/tools/cohort.

Results

Description of Studies

Of the 21 studies included in the meta-analyses, the majority (n = 18) consisted of student samples, one study investigated a sample of student athletes (Gotwals et al., 2003), and two studies general population samples (Allen & Wang, 2014; Kuennen & Waldron, 2007). Studies were based in the USA (n = 14), India (n = 2), Australia (n = 2), Canada (n = 1), South Korea (n = 1), and Taiwan (n = 1). The total number of participants was 4,519, of which 2,883 (63.8%) were female (see Table 2).

Associations between Self-esteem and Perfectionism, Perfectionistic Strivings, and Perfectionistic Concerns

Summary statistics for the meta-analytic models are displayed in Table 3. The null hypothesis, that the weighted average random effects estimate for the relationship between self-esteem and global perfectionism would be zero, was rejected (r = -0.13; 95% CI = -0.19 to -0.07; z = -4.58; p = 0.001). This indicates that perfectionism and self-esteem are negatively correlated, with higher perfectionism being associated with lower self-esteem, and vice versa. The effect size of 0.13 is small according to Cohen's convention (Cohen, 1990, 1992).

Table 2 Summary of Studies Included in Analyses.

Study	n	No. of Females (%)	Age, m (SD)	Country	Perfectionism Measure(s)	r₁	r₂	r₃	QAR
Allen and Wang (2014)	267	160 (60)	23.6 (NR)	USA	APS-R	-0.15	0.26	0.67	Fair
Ashby and Rice (2002)	262	180 (68.7)	21.7 (4.8)	USA	APS-R	-0.13	0.12	-0.52	Fair
Athulya, Sudhir, and Philip (2016)	192	132 (68.8)	21.2 (2.4)	India	FMPS	-0.36	-0.16	-0.50	Fair
Elion, Wang, Slaney, and French (2012)	219	105 (47.9) 22.4 (4.4)	20.5 (1.9)[1]	USA	APS-R	-0.05	0.22	-0.45	Fair
Flett, Hewitt, Blankstein, and O'Brien (1991)	103	68 (66.0)	24.3 (8.4)	Canada	HMPS	-0.21	0.17	-0.26	Fair
Gotwals, Dunn, and Wayment (2003)	87	51 (58.6)	19.7 (1.6)	USA	FMPS	-0.10	0.09	-0.51	Fair
Grzegorek, Slaney, Franze, and Rice (2004)	273	201 (73.6)	19.9 (3.3)	USA	APS-R	-0.1	0.2	-0.46	Good
Hibbard and Davies (2011)	231	171 (74.0) 22.2 (5.6)	19.1 (1.1)[2]	USA	FMPS	-0.04	0.02	-0.23	Fair
Kuennen and Waldron (2007)	49	0 (0)	28.27 (8.35)	USA	FMPS	-0.43	n/a	n/a	Fair
Lo and Abbott (2013)	161	93.38 (58)	19.4 (2.9)	Australia	HMPS	-0.02	-0.04	-0.33	Fair
Murray, Rieger, Karlov, and Touyz (2013)	119	0 (0)	21.86 (2.49)	Australia	HMPS	-0.27	-0.33	-0.55	Fair

[1] Two means reported for student samples from two different university samples.
[2] Two means reported for private and public school students.
QAR = Quality Assessment Rating
r₁ = Correlation between global perfectionism (all subscales) and self-esteem.
r₂ = Correlation between perfectionistic concerns and self-esteem.
r₃ = Correlation between perfectionistic strivings and self-esteem.

Table 2 Summary of Studies Included in Analyses (continued).

Study	n	No. of Females (%)	Age, m (SD)	Country	Perfectionism Measure(s)	r_1	r_2	r_3	QAR
Ortega, Wang, Slaney, Hayes, and Morales (2014)	207	157 (75.85)	21.13 (NR)	USA	APS-R	-0.27	0.32	-0.55	Good
Park and Jeong (2015)	200	86 (43)	20.3 (2.08)	South Korea	FMPS	-0.07	-0.02	-0.49	Fair
Pearson and Gleaves (2006)	286	286 (100)	18.75 (1)	USA	FMPS	-0.08	0.14	-0.63	Good APS-R
Preusser, Rice, and Ashby (1994)	167	124 (74.25)	25.6 (8.9)	USA	HMPS	0.10	-0.18	-0.39	Fair
K. G. Rice, Ashby, and Slaney (2007) Fair	208	154 (74.04)	19.38 (1.54)	USA	APS-R	-0.59	-0.10	0.23	
Sherry, Sherry, Hewitt, Mushquash, and Flett (2015)	269	128 (47.58)	M = 19.26 (2.43) F = 19.55 (3.18)	USA	HMPS	-0.12	0.05	-0.39	Good
Trumpeter, Watson, and O'Leary (2006)	531	343 (64.60)	19.3 (4.0)	USA	HMPS	-0.12	0.28	-0.26	Fair
K. T. Wang, Slaney, and Rice (2007)	273	111 (40.66)	19.75 (1.28)	Taiwan	APS-R	0.04	0.18	-0.51	Fair
K. T. Wang (2010)	283	224 (79.15)	19.67 (2.39)	USA	APS-R	-0.21	0.11	-0.56	Fair
Y. Wang et al. (2012)	132	109 (82.58)	21.22 (1.17)	India	APS-R	-0.71	0.1	-0.05	Fair

[1] Two means reported for student samples from two different university samples.
[2] Two means reported for private and public school students.
QAR = Quality Assessment Rating
r_1 = Correlation between global perfectionism (all subscales) and self-esteem.
r_2 = Correlation between perfectionistic concerns and self-esteem.
r_3 = Correlation between perfectionistic strivings and self-esteem.

Table 3 Summary statistics for meta-analytic models of association between self-esteem and perfectionism, perfectionistic strivings, and perfectionistic concerns.

Random effects model	k	N	Mean ES (*r*)	95% CI	z-value	p-value
Perfectionism	21	4519	-0.13	-0.19 to -0.07	-4.58	<.001
Perfectionistic Strivings	20	4470	0.09	0.02 to 0.17	2.52	.05
Perfectionistic Concerns	20	4470	-0.49	-0.58 to -0.41	-11.46	<.001

k = number of studies, N = total sample size, Mean ES (*r*) = average uncorrected correlation.

The estimated correlation coefficients, relative to the overall result is represented graphically in Figure 2. The null hypothesis of homogeneity between studies was also rejected (Q = 72.08, p = <.0001). Variability between studies was substantial (I^2 = 70.56), indicating that 71% of the total variance could be attributed to variability between studies. This is just below the cut-off of 75% indicating high heterogeneity (Higgins et al., 2003).

The weighted average effect size for the relationship between self-esteem and perfectionistic strivings was statistically significant (*r* = -0.09; 95% CI = 0.02 to 0.17; z = 2.52; p = 0.05). This indicates that higher perfectionistic strivings were associated with higher levels of self-esteem. However according to Cohen's conventions, this is a small effect (*r* = 0.1; Cohen, 1990, 1992). The estimated correlation coefficients, relative to the overall result, have been depicted graphically in Figure 3. Analysis indicated heterogeneity between studies (Q = 104.82, p = <0.0001) which was substantial (I^2 = 83.35), estimating that 83% of total variance could be attributed to variability between studies (Higgins et al., 2003).

In contrast, the weighted average effect size for the relationship between self-esteem and perfectionistic concerns was substantial (r = -0.49; 95% CI = -0.58 to -0.41; z = 11.46; p = 0.001). This indicates that perfectionistic concerns and self-esteem are negatively correlated, with higher perfectionistic concerns associated with lower levels of self-esteem and vice versa. According to Cohen's conventions, the observed effect size is large (r = 0.5). The estimated correlation coefficients, relative to the overall result have been depicted graphically in Figure 4. Significant heterogeneity between studies was observed (Q = 168.65, p = <0.0001), with 87% of total variance estimated to be attributable to variability between studies (I^2 = 87.33).

Figure 2 Forest plot from meta-analysis of correlations between global perfectionism and self-esteem.
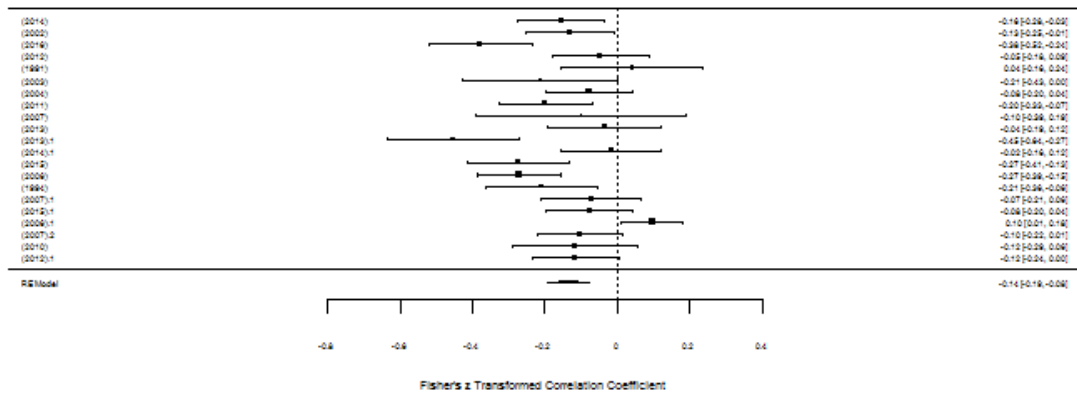
Figure 3 Forest plot from meta-analysis of correlations between perfectionistic strivings and self-esteem.
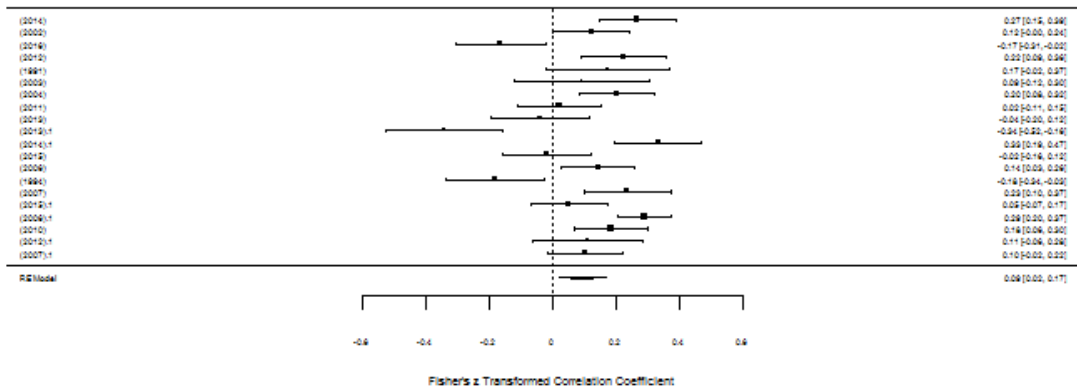
Figure 4 Forest plot from meta-analysis of correlations between perfectionistic concerns and self-esteem.
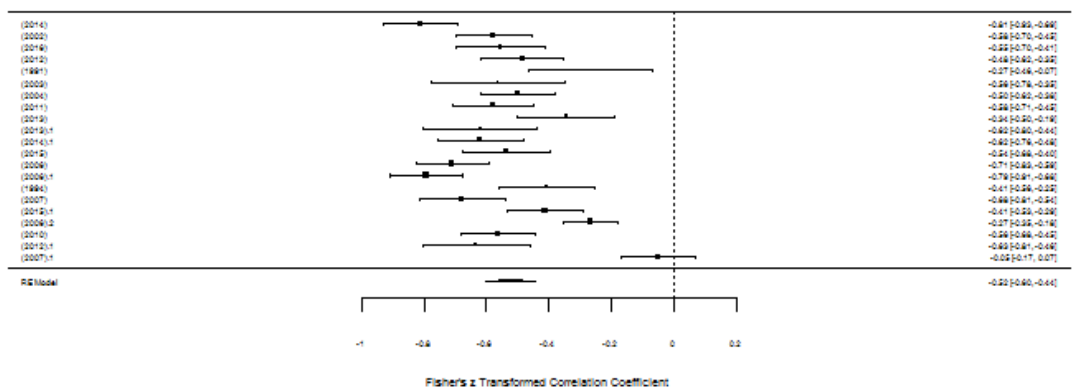
Moderator Analysis

The high variability found between studies in all three meta-analyses indicates the existence of moderator variables (Diener et al., 2009). To explore whether the measure of perfectionism used might explain the variability observed, a series of further analyses were conducted including studies specific to each measure (i.e. FMPS, HMPS, and APS-R), the results of which can be found in Table 4.

The weighted average effect size for the relationship between self-esteem and perfectionism as measured by the FMPS was significant (r = -0.22; 95% CI = -0.31 to -0.13; z = -4.94; p < 0.001). This indicates that the FMPS and self-esteem are inter-correlated, with higher perfectionism associated with lower levels of self-esteem and vice versa, meeting criteria for a small to medium effect size (Cohen, 1990, 1992). Perfectionism as measured by the APS-R and self-esteem were also found to be significantly inter-correlated (r = -0.09; 95% CI = -0.13 to -0.05; z = -4.61; p < 0.001), with high perfectionism associated with lower levels of self-esteem, meeting criteria for a small effect size. There was low variability between studies for analyses of the associations between self-esteem and both the FMPS and the APS-R (Q = 9.29, p = 0.1, I^2 = 48.01; Q = 3.41, p = 0.95, I^2 = 0, respectively).

Publication Bias

Inspection of the funnel plot for effect sizes reporting the correlation between self-esteem and perfectionism (inclusive of all measures of perfectionism) indicated the potential for some bias (Figure 5). Orwin's fail safe N statistics were calculated for each meta-analysis. For meta-analytic models investigating the relationship between self-esteem and perfectionism as measured by the FMPS, the HMPS, and the APS-R, an additional 48.3

Figure 5 Funnel plot for effect sizes showing the correlation between global perfectionism and self-esteem.
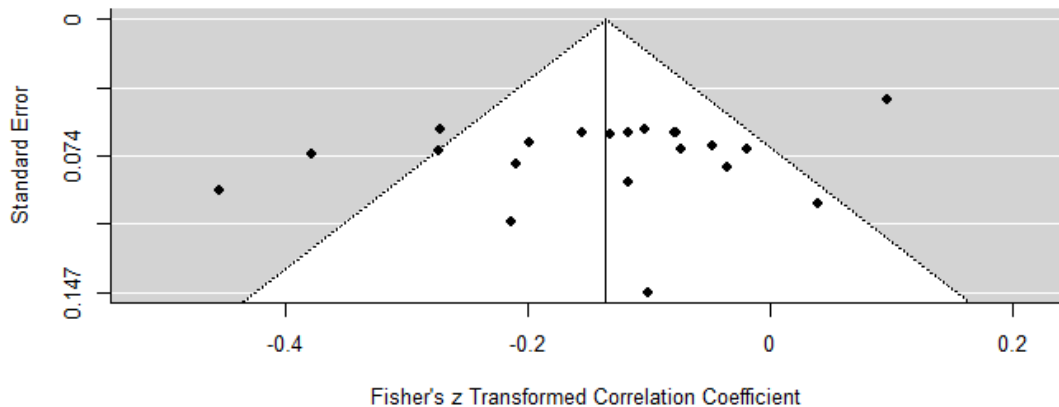
studies with an effect size of 0.1 would be required to reduce the observed

weighted effect size for perfectionism to zero. This figure would be 2 for

perfectionistic strivings, and 118 for perfectionistic concerns. This indicates

that the weighted mean effect size observed for perfectionistic strivings is

likely to be inflated by publication bias. For meta-analytic models

investigating the relationship between self-esteem and perfectionism as

measured by the FMPS and the APS-R separately, the number of additional

studies with an effect size of 0.1 that would be required to reduce the

observed weighted effect size to zero would be 19.2 and 1 respectively.

These figures indicate that the weighted mean effect size for the APS-R is

likely to be inflated due to publication bias.

Quality Assessment

Studies included were all rated as being of fair (n = 17) or good (n = 4)

quality (Table 2). None of the papers included provided a justification of the sample

size or a power analysis, and only four papers reported the participation rate of

eligible participants, though this is not uncommon for studies investigating the correlation between personality traits. For a third of the studies (n = 7) the primary aim was not to investigate the relationship between self-esteem and perfectionism, but correlations were reported. For the majority of studies the study population was clearly specified and defined (n = 20), and participants were recruited from the same or similar populations over the same time period (n = 19). For all studies the variables were clearly defined, valid, reliable, and implemented consistently across all study participants. The complete table of ratings can be found in Appendix B.

Discussion

The primary aim of this review was to investigate the relationship between perfectionism and self-esteem using meta-analytic techniques. A secondary aim was to investigate the relationship between self-esteem and two well researched and commonly accepted dimensions of perfectionism: perfectionistic strivings and perfectionistic concerns.

A negative correlation was found between self-esteem and perfectionism, meaning low self-esteem was associated with high perfectionism and vice versa; however, this relationship had a small average effect size of -0.1, rather than the hypothesised moderate effect size. As predicted, a significant negative correlation was also found between self-esteem and perfectionistic concerns with a large average effect size (-0.5), meaning low self-esteem was associated with high perfectionistic concerns, and vice versa. Self-esteem was also positively associated with perfectionistic strivings, meaning that high self-esteem was associated with high perfectionistic strivings. As expected, the relationship had a small average effect size (0.1).

The observed associations between self-esteem and perfectionism, perfectionistic strivings, and perfectionistic concerns were all in the expected directions based on evidence in the literature, but the current correlational findings do not imply causality. Therefore, questions regarding causal directions, if any, still remain. Do individuals with low self-esteem develop high perfectionism as a compensatory strategy as suggested by Fennell (1998), or in an attempt to gain approval and therefore increase self-esteem as suggested by Doron and Kyrios (2005)? Do individuals high in perfectionism develop low self-esteem in response to the perceived discrepancy between perfectionistic standards and actual performance, and the self-criticism that follows (Beck, 1976; Egan, Wade, Shafran, & Antony, 2014; Sorotzkin, 1985)? Alternatively, could there be a third variable that is causing both?

One could perhaps conceive of perfectionistic strivings as being more likely to develop in response to low self-esteem, if the aim is to compensate or increase self-esteem. It is also conceivable that low self-esteem would be a consequence of perfectionistic concerns rather than perfectionistic strivings. If this is the case, the findings from the present review could be taken to provide support for the theory that low self-esteem is a consequence of perfectionism, as the strongest association observed was between perfectionistic concerns and low self-esteem. The finding that high self-esteem was associated with high levels of perfectionistic strivings was small in effect, and also warrants caution due to the potential presence of publication bias. This review therefore provides little support for the theory that high perfectionistic strivings might result in high self-esteem (or vice versa). Although theoretically interesting, it is important to bear in mind that the present findings do not go so far as to imply causality. They do however indicate that further investigation into the nature of the relationship between perfectionism and self-esteem is warranted.

Moderator Analysis

      The heterogeneity observed between studies was both substantial and statistically significant for the relationships between self-esteem and perfectionism, perfectionistic concerns, and perfectionistic strivings, suggesting the presence of moderator variables (Diener et al., 2009). This is perhaps not surprising given that perfectionism was measured using three different measures: the Frost Multidimensional Perfectionism Scale (FMPS), the Hewitt Multidimensional Perfectionism Scale (HMPS), and the Almost Perfect Scale-Revised (APS-R; Frost et al., 1990; Hewitt & Flett, 1991b; Slaney et al., 2001). Moderator analysis investigating the relationship of self-esteem to perfectionism, as measured by each scale separately, supported the theory that the measure of perfectionism used was a moderator. Self-esteem was found to be negatively associated with perfectionism as measured by the FMPS with a moderate effect size, and as measured by the APS-R with a small effect size, meaning that high scores on either of these measures is associated with low self-esteem. In addition, the homogeneity index was statistically non-significant for both analyses, implying that there were no further moderator variables. In contrast, the correlation between self-esteem and perfectionism as measured by the HMPS was not statistically significant, with 95% confidence intervals being both wide and crossing zero, indicating high variability in the data.

      Although there is evidence of overlap between the FMPS, the HMPS, and the APS-R, the fact that all three take a different approach to understanding the multi-dimensional nature of perfectionism may be particularly relevant when considering the relationship of perfectionism to self-esteem (Frost et al., 1993; Slaney et al., 2001). The FMPS could be considered to represent the broadest view of perfectionism, for which there has been some criticism; for example, the inclusion of items that represent parental expectations and parental criticism have been

described as tapping into factors that might contribute to the development of perfectionism, rather than the core aspects of perfectionism as a construct (Shafran & Mansell, 2001; Stoeber & Otto, 2006). The inclusion of these dimensions in the FMPS might go some way to explain its stronger relationship with self-esteem as both factors could conceivably contribute to development of low self-esteem independently of perfectionism, as well as being construed as a part of perfectionism. The literature provides some support for this with evidence suggesting that parenting style, level of parental support, and parental criticism, all affect child self-esteem (Cheng & Furnham, 2004; Felson & Zielinski, 1989; Furnham & Cheng, 2000; Robertson & Simons, 1989).

The APS-R consists of three subscales: high standards, order, and discrepancy. Items in the discrepancy subscale are theorised to tap into an individual's subjective perception of the difference between their ideal standards and their actual performance. This dimension of perfectionism is similar to theoretical accounts of the relationship between perfectionism and self-esteem. Horney (1950) theorised that low self-esteem was a consequence of negative feedback, which is perceived by the individual as evidence of the difference between the ideal and actual self. Perhaps even closer to the perfectionistic dimension of discrepancy is Beck's theory that the repeated identification of a difference between perfectionistic goals and actual performance results in low self-esteem (Beck, 1976; Burns & Beck, 1978). The significant correlation between self-esteem and perfectionism as measured by the APS-R may be reflective of this specific dimension, which is not similarly represented in the FMPS or the HMPS. This could be interpreted as support for the theoretical accounts of Horney and Beck; however, any such interpretation is difficult to make in light of the small size of the effect observed.

It is particularly interesting that the relationship between self-esteem and perfectionism as measured by the HMPS was not statistically significant. This scale

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conceptualises perfectionism to have three dimensions: self-oriented perfectionism (unrealistic standards and perfectionistic motivation for the self), other-oriented perfectionism (unrealistic standards and perfectionistic motivations for others), and socially prescribed perfectionism (the belief that significant others expect oneself to be perfect). The other-oriented dimension is unlike other dimensions of perfectionism described in the HMPS, FMPS and APS-R (Stoeber & Otto, 2006). In a recent meta-analysis investigating the relationship between perfectionism and psychopathology, associations made with other-oriented perfectionism were found to have a lower effect size than other dimensions in the HMPS and the FMPS (Limburg et al., 2016). The present finding might be reflective of self-esteem being comparatively less associated with the other-oriented dimension, however further research would be required to conclude whether this is the case.

Publication Bias and Quality Assessment

Evidence of publication bias was found to vary across the relationships observed. Statistical analysis investigating the level of potential bias (fail safe N) suggested that due to the small effect sizes observed, a great deal of caution is warranted when interpreting the relationship between self-esteem and perfectionistic strivings, and self-esteem and perfectionism as measured by the APS-R. In contrast, analysis suggests that we can be moderately confident in the relationship observed between self-esteem and perfectionism as measured by the FMPS, and very confident in observed correlations between self-esteem and both perfectionism (all measures) and perfectionistic concerns.

Quality assessment of the studies included in the meta-analysis showed that no papers were of poor quality, the majority were of fair quality, and a small number were rated as being of good quality. Articles reported as fair rather than good had two main limitations, the size of the sample employed was not justified and the

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percentage of eligible participants that participated was not reported. Given the large samples employed by all of the included studies, it is unlikely that this increased the risk of findings being significantly biased.

Strengths and Limitations

Although self-esteem and perfectionism are both commonly measured in many studies investigating personality, psychopathology, symptoms of mental health disorders, and research investigating the effectiveness of interventions (e.g. randomised controlled trials), the relationship between these two constructs is frequently not reported. While it is commonly accepted that reporting the relationships between all included variables is good practice, it is also the case that authors are limited by journals as to how many tables can be included for publication. As the relationship between perfectionism and self-esteem is very often not the main focus of a study, it is perhaps to be expected that correlation coefficients are not reported, but this might also suggest that authors do not determine the strength of the relationship to be important enough to include. However, it is important to understand the relationship between perfectionism and self-esteem because of the theoretical implications, and also to understand how the relationship might contribute to decision making when identifying the ideal treatment protocol for individuals both high in perfectionism and low in self-esteem. In addition, the perhaps too common practice of not reporting the relationship between variables resulted in 49 articles being excluded from this meta-analysis, increasing risk of publication bias.

It was also the case that some studies, due to having very specific hypotheses, only reported correlation coefficients for the relationship between self-esteem and some of the dimensions of perfectionism within a scale (e.g. only the FMPS doubts about actions and concern over mistakes subscales). Again, although

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the specific aims of the study might be considered justification for this, one might question whether it is reliable and valid to use individual subscales of a measure, and in this case partial reporting resulted in 16 articles being excluded from analysis.

A choice was made to include studies using only one of three commonly used measures of perfectionism. This may have biased results regarding the relationship between self-esteem and perfectionism. However, given that only five articles were excluded due to use of an alternative perfectionism scale, the risk of this is likely to be low. In addition, exclusion of these studies allowed for two things: (i) analysis of the relationship of self-esteem with perfectionistic concerns and perfectionistic strivings, based on a sound evidence base (Bieling et al., 2004; Frost et al., 1993; Limburg et al., 2016; Moroz & Dunkley, 2015; Rice et al., 1998); and (ii) moderator analysis investigating whether the relationship between self-esteem and perfectionism was affected by which measure was used. This is useful for comparison within this review, and with other research in the field.

A choice was also made to exclude studies that did not use the Rosenberg Self-esteem Scale (RSES; Rosenberg, 1965). This scale is based upon an understanding of self-esteem as a unidimensional and global construct; therefore further research investigating the relationship between perfectionism and specific forms of self-esteem, or the interaction of perfectionism with the instability of self-esteem, is warranted. It is worth noting that only four articles were excluded from the current review for this reason, which speaks to the common use of the RSES for the measurement of self-esteem.

Applicability of the findings is limited to a general population sample. Only two articles reporting the relationship between self-esteem and perfectionism in clinical samples using validated and commonly used measures were found. This may be because the primary aim of studies that did include clinical samples was not to investigate the relationship between self-esteem and perfectionism, and therefore

correlation coefficients were not reported even if relevant measures were included. Unfortunately, this makes it difficult to predict whether self-esteem and perfectionism would be similarly associated within clinical samples, and whether diagnosis would have an effect on the strength or direction of any associations observed. Although there is no data that indicates this, it would be an interesting area of further study which might increase our understanding of mental health disorders and inform treatment.

It is worth noting that studies investigating the association between self-esteem and perfectionism, and therefore studies included in this meta-analysis, predominantly employ student samples. This is often the case for personality research which tends to use student samples for convenience. It is possible that students may be higher in perfectionism than the general population, and if this is indeed the case, associations between perfectionism and self-esteem may also vary in the general population. Further research investigating whether the relationship between self-esteem and perfectionism is different among students, in comparison to the general population, might inform how to best support students who are often under a great deal of pressure at very particular time points (i.e. prior to exams or important submissions). Finally, correlational analysis only addresses a linear relationship; however, it might be that the relationship between self-esteem and perfectionism, or particular dimensions of perfectionism, is curvilinear. Further research is required to investigate this.

Implications

The present findings suggest that further research investigating the nature of the relationship between perfectionism and self-esteem is warranted, particularly investigating whether the presence of one might increase risk for the other, whether

high self-esteem might be protective against the development of perfectionistic concerns, and whether treatment of one might have an effect on the other.

The finding that low self-esteem was positively correlated with perfectionistic strivings, but negatively correlated with perfectionistic concerns, provides further support for the existence of two perfectionism dimensions reflecting adaptive and maladaptive aspects of the construct (Bieling et al., 2004; Limburg et al., 2016; Moroz & Dunkley, 2015; Rice et al., 1998; Stoeber & Otto, 2006). Although a negative correlation was also observed with perfectionism (all subscales), the small effect size for this relationship (compared to the large effect size observed for the relationship with perfectionistic concerns) is a powerful indication that perfectionism, when being conceptualised as a personality trait rather than a pathology (e.g. clinical perfectionism), should not be treated as a unidimensional construct. In addition to this, the findings of this review provide moderate evidence for the FMPS being most likely to tap into the dimensions of perfectionism that are associated with self-esteem.

High perfectionism and low self-esteem have individually been implicated in the development and maintenance of a range of mental health disorders (Egan et al., 2011; Zeigler-Hill, 2011). In addition, perfectionistic concerns have been found to have a stronger association with psychopathology than perfectionistic strivings (Limburg et al., 2016). In light of this, an individual with both low self-esteem and high levels of perfectionistic concerns could be considered at particularly high risk of developing a mental health disorder. It is also possible, however, that the strong correlation between both constructs provides an opportunity for positive improvement of both during treatment. In addition, when clients are identified as having either low self-esteem or high perfectionism in a clinical setting, it may be advisable to assess for the other.

Conclusion

The findings of this meta-analysis indicate the presence of a complex relationship between perfectionism and self-esteem, and confirm the importance of research in perfectionism considering both perfectionistic concerns and perfectionistic strivings. The strong relationship found between self-esteem and perfectionistic concerns is good reason for further research. A better understanding of how self-esteem and perfectionism interact over time, and whether the presence of one might have a causal effect on the other, could lead to the development of early interventions for children and adolescents. Furthermore, research investigating whether changes in perfectionism might lead to changes in self-esteem (or vice versa) could inform decisions about which treatment protocol is preferable in clinical settings, and contribute to further development of existing treatment protocols, eventually leading to improved treatment for individuals experiencing high perfectionism and low self-esteem.

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Part II: Empirical Paper

Guided Internet-Based Cognitive Behavioural Therapy for Perfectionism, and its effects on Self-esteem and Intolerance of Uncertainty: A Randomised Controlled Trial

Abstract

Aims: The present research was part of a randomised controlled trial investigating the efficacy of a guided internet-based cognitive behavioural therapy for perfectionism. It aimed to examine: (i) The relationship between three transdiagnostic processes, perfectionism, self-esteem, and intolerance of uncertainty; (ii) the effects of the intervention on self-esteem and intolerance of uncertainty; and (iii) whether any changes observed post-intervention, were maintained at follow-up.

Method: A total of 120 participants who presented with clinical levels of perfectionism were randomised to an experimental group that received the intervention (n = 62), or a control group (n = 58). Participants completed measures of perfectionism, self-esteem, and intolerance of uncertainty pre and post-intervention (12 weeks), and at follow-up (24 weeks). ANCOVA analyses were conducted using the residualised gains procedure to compare change over time between experimental and control groups.

Results: Perfectionism and self-esteem were negatively correlated, as were self-esteem and intolerance of uncertainty. Perfectionism was positively associated with intolerance of uncertainty. The intervention led to significant decreases in perfectionism (d = 0.9), and intolerance of uncertainty (d = 0.6), and an increase in self-esteem (d = 0.5). At follow-up, changes were maintained in perfectionism (d = 0.9) and intolerance of uncertainty (d = 0.5), but not self-esteem.

Conclusion: The study provides preliminary evidence that a change in one transdiagnostic process (perfectionism) can lead to change in others (self-esteem and intolerance of uncertainty). Further research could investigate the nature of the relationship between these transdiagnostic processes, how they interact with mental health difficulties, and why the increase in self-esteem was not maintained at follow-up.

Introduction

Perfectionism, low self-esteem, and intolerance of uncertainty have been associated with a range of mental health diagnoses and are often described as being transdiagnostic processes, defined here as processes implicated in the aetiology and maintenance of a range of mental health disorders (Egan et al., 2011; Mahoney & McEvoy, 2012; Zeigler-Hill, 2011). The present study is concerned with the treatment of transdiagnostic processes, specifically perfectionism. It addresses the following questions: are the transdiagnostic processes of perfectionism, self-esteem, and intolerance of uncertainty associated with each other, and if so, does an intervention with the goal of changing one transdiagnostic process (perfectionism) lead to change in others (self-esteem and intolerance of uncertainty)?

Perfectionism

A moderate level of perfectionism might be considered instrumental to achievement and success in everyday life. Extreme perfectionism, however, has been identified as a transdiagnostic process, increasing risk for and contributing to maintenance of a range of mental health disorders, including anxiety disorders, depression, obsessive compulsive disorder (OCD), anxiety disorders, and eating disorders (Egan et al., 2011; Shafran & Mansell, 2001; Stoeber & Otto, 2006). Many researchers have endeavoured to understand and define the construct of perfectionism, leading to a range of definitions and measurement tools. Common across most definitions are two factors, the pursuit of high standards (relative to what is achievable), and intense self-criticism in response to these high standards not being met (Frost et al., 1990). Also common to most explanations is the understanding that perfectionism is a multi-dimensional construct (Frost et al., 1990;

Hewitt & Flett, 1991b; Shafran & Mansell, 2001; Slaney et al., 2002). For a review see Shafran et al. (2016), and part one of this thesis.

Early theorists posited the existence of two types of perfectionism: adaptive and maladaptive (Burns, 1980; Hamachek, 1978). It has been suggested that individuals high in adaptive perfectionism are able to enjoy striving for success, are likely to be successful, and are able to take joy in their achievements. In contrast, individuals high in maladaptive perfectionism have unattainable goals and standards, leading to an ongoing belief that their high and perfectionistic standards have not been met, resulting in distress (Hamachek, 1978). This distinction is supported by factor analytic studies of the most commonly used measures of perfectionism, which have resulted in a two-factor solution: perfectionistic strivings, representative of the benign or adaptive aspects of perfectionism; and perfectionistic concerns, representative of the maladaptive aspects of perfectionism (Bieling et al., 2004; Frost et al., 1993; Moroz & Dunkley, 2015; Rice et al., 1998; Stoeber & Otto, 2006). While both dimensions have been found to be associated with generalised anxiety disorder (GAD), depression, eating disorders, and panic disorder, a recent meta-analysis found that pathology was more strongly associated with perfectionistic concerns, apart from eating disorders which were found to be strongly associated with both (Antony et al., 1998; Enns et al., 2001; Hewitt & Flett, 1991a; Huprich et al., 2008; Limburg et al., 2016; Norman et al., 1998; Sassaroli et al., 2008).

Self-esteem

Self-esteem is commonly defined as an individual's subjective appraisal of the self, at an affective and evaluative level (Cooley, 1902; Coopersmith, 1967, 1981; James, 1980; Mead, 1934; Pope et al., 1988; Rosenberg, 1965, 1979; Smelser, 1989; Wells & Marwell, 1976). Self-esteem can be described as being high

or low, indicating whether someone has a postive or negative opinion of themselves. Self-esteem can also be described on two other dimensions: (i) stable or unstable (i.e. consistent or fluctuating over time); and (ii) global or specific (the value an individual places on their overall self versus the value placed on specific domains of the self; Baumeister, 1993; Brown, 1993; Kernis et al., 1993; Orth & Robins, 2014). Low self-esteem has been implicated as a transdiagnostic process, having been associated with risk for and maintenance of anxiety disorders, depression, psychosis, and eating disorders (Fairburn et al., 2003; Fennell, 1997; Krabbendam et al., 2002; Mann et al., 2004; Orth et al., 2009; Sowislo & Orth, 2013a).

Intolerance of Uncertainty

Intolerance of uncertainty has been defined as a negative and fearful style of responding, at a cognitive, emotional, and behavioural level, to uncertain situations (Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994). More specifically, it may be understood as difficulty enduring uncertain situations, especially if there is the chance of a negative outcome, no matter how small (Dugas, Gosselin, & Ladouceur, 2001). Much like perfectionism, many researchers have attempted to further understand and define the construct, and a critical review of factor analytic studies identified two common factors across definitions and measures: (i) the desire for predictability and the resulting certainty seeking behaviours; and (ii) paralysis of both cognition and behaviour in uncertain situations (Birrell, Meares, Wilkinson, & Freeston, 2011). Intolerance of uncertainty has been implicated as a transdiagnostic process, associated with social phobia, GAD, OCD, and major depressive disorder (MDD), and contributing to the development and maintenance of most anxiety disorders, depression, and OCD (Boelen & Reijntjes, 2009; Carleton, 2012; Carleton et al., 2012; Dugas, Buhr, & Ladouceur, 2004; Dugas et al., 2005; Gentes & Ruscio,

2011; Mahoney & McEvoy, 2012; Obsessive Compulsive Cognitions Working Group, 1997).

Are Perfectionism, Self-Esteem, and Intolerance of Uncertainty Associated?

Given that perfectionism, low self-esteem, and intolerance of uncertainty have been associated with many of the same mental health disorders, it is reasonable to question whether these transdiagnostic processes are directly associated.

Perfectionism and Self-Esteem

A relationship between perfectionism and self-esteem has been theorised for some time (Horney, 1950). One explanation of the nature of this relationship is that extreme perfectionism, leading to a constant comparison between the real and ideal self, or comparison between perfectionistic goals and actual performance, results in low self-esteem (Beck, 1976; Burns & Beck, 1978). In addition, an understanding of perfectionists as people who base their self-worth on their ability to achieve unattainable standards, suggests that they are likely to be highly self-critical, which leads to lowered self-esteem (Egan, Wade, Shafran, & Antony, 2014; Sorotzkin, 1985). In contrast to this, it has also been postulated that individuals begin by having negative beliefs about the self (low self-esteem), or insecurity regarding their self-worth due to insecure attachment relationships, and the development of extreme perfectionism is an attempt to compensate for low self-esteem through achievement and gaining approval from others (Doron & Kyrios, 2005; Fennell, 1997, 1998; Guidano & Liotti, 1983). To date, empirical research has been unable to determine the direction of the relationship between the two constructs, or indeed whether the relationship is bi-directional, or due to a third variable.

Results of empirical research investigating the relationship between perfectionism and self-esteem have been inconsistent (Aldea et al., 2010; Allen & Wang, 2014; Ashby & Rice, 2002; Athulya et al., 2016; Boelen & Reijntjes, 2009; Flett et al., 1991; Gotwals et al., 2003; Park & Jeong, 2015; Preusser et al., 1994; Trumpeter et al., 2006; Zhang & Cai, 2012). However, the results of a meta-analysis conducted as part one of this thesis found that self-esteem was negatively correlated with perfectionism in the general population (ES: $r = -0.1$), meaning individuals high in perfectionism are likely to have low self-esteem (and vice versa). Breaking this down into the two dimensions of perfectionism, a strong negative correlation was found between perfectionistic concerns and self-esteem (ES: $r = -0.5$), and a weak positive correlation was found between perfectionistic striving and self-esteem (ES: $r = 0.1$; see part one of this thesis). Perfectionism and self-esteem have also been found to be negatively correlated in a sample of women with eating disorders (Renjan, McEvoy, Handley, & Fursland, 2016).

Intolerance of Uncertainty and Perfectionism

Individuals high in intolerance of uncertainty are, by definition, averse to the experience of uncertainty, which can be thought of as a need for predictability. It has been hypothesised that this need for predictability is influenced by perfectionism and high standards (Einstein, 2014). The Obsessive Compulsive Cognitions Working Group (OCCWG; 2003) have also suggested that among individuals with OCD, perfectionism acts in conjunction with intolerance of uncertainty, and that the need to achieve perfectionism is an attempt to make the future more certain, particularly in domains that are experienced as particularly uncertain or distressing. The OCCWG have identified the combined effect of perfectionism and intolerance of uncertainty to be one of four domains of dysfunctional beliefs that underlie OCD, the others being importance and control of thoughts, responsibility, and overestimation

of threat (Obsessive Compulsive Cognitions Working Group, 1997). Perfectionism/intolerance of uncertainty is one of the three subscales of the Obsessive Beliefs Questionnaire (OBQ-44) under the heading "Perfectionism" (Obsessive Compulsive Cognitions Working Group, 2003, 2005).

Empirical research supports the theorised relationship between perfectionism and intolerance of uncertainty, with most studies finding a positive correlation between the two constructs in the general population, and among eating disordered and socially anxious samples (Boelen & Reijntjes, 2009; Buhr & Dugas, 2006; Fergus & Wu, 2011; Fracalanza, Koerner, Deschênes, & Dugas, 2014; Renjan et al., 2016; Sica et al., 2004; Whiting et al., 2014). This suggests that individuals high in perfectionism are also highly intolerant of uncertainty (and vice versa). One study however reported no correlation, and many studies measure both constructs but do not report the correlation between them (e.g. Jacoby, Abramowitz, Reuman, & Blakey, 2016; Katzman et al., 2012; Reuther et al., 2013). Research to date has not determined whether this is a direct association, with one transdiagnostic process directly affecting the other, or whether the relationship is mediated by an unknown variable.

Self-Esteem and Intolerance of Uncertainty

Theoretical and empirical literature on the relationship between self-esteem and intolerance of uncertainty is sparse. It has been posited that individuals high in intolerance of uncertainty may not believe they have the problem solving skills to effectively deal with uncertain situations, resulting in low self-esteem (Yook, Kim, Suh, & Lee, 2010). It seems possible however, that low self-esteem may cause people to believe that they do not have the problem solving skills to effectively deal with uncertain situations, which might in turn lead to an intolerance of uncertainty. Three studies reported a negative correlation between the two constructs, in the

general population and eating disordered samples, suggesting that individuals low in self-esteem are highly intolerant of uncertainty, and vice versa (Bhar & Kyrios, 2007; Lee, 2014; Renjan et al., 2016). One study reported a positive correlation between self-esteem and intolerance of uncertainty; however, this study reported that higher scores on the Rosenberg Self-Esteem Scale indicated lower self-esteem, which is not the case, and suggests that the scale was used differently or incorrectly (the authors of this study have been contacted in an attempt to clarify the scoring; Boelen & Reijntjes, 2009). There are also studies which use measures of self-esteem and intolerance of uncertainty, but do not report the relationship between the two (Merrill et al., 1994; Oshio, 2009).

Treatment of Transdiagnostic Traits

Clinicians are traditionally encouraged to use disorder specific cognitive behavioural therapies (CBT) to treat common mental health disorders, despite high comorbidity and increasing evidence for the suggestion that there are more similarities between disorders than differences (Kessler et al., 2005; McEvoy, Nathan, & Norton, 2009; Merikangas et al., 2010). Extreme perfectionism, low self-esteem, and intolerance of uncertainty appear to be inter-correlated in the general population, and potentially in some anxiety disorders, eating disorders, and OCD (see review above). This combination of transdiagnostic processes may create a particular vulnerability for the development and maintenance of a cluster of mental health disorders, potentially contributing to comorbidity, or the development of different mental health disorders over the lifetime.

The treatment of transdiagnostic traits may be more effective than disorder specific treatment protocols in a number of ways. For patients presenting with comorbidity, treating underlying transdiagnostic traits may improve symptoms across disorders in fewer sessions than disorder specific protocols. Treatment of

transdiagnostic traits may also help to decrease vulnerability for the development of mental health difficulties in the future, and maintain recovery for longer, leading to lower treatment costs in the long-term. CBT protocols that target the transdiagnostic traits of low self-esteem and extreme perfectionism have been developed (Egan, Wade, Shafran, & Antony, 2014; Fennell, 1998).

CBT for Perfectionism

CBT for perfectionism has been found to be effective in individual, group, and guided self-help settings (Lloyd et al., 2015). There is also some evidence to suggest that CBT for perfectionism can increase self-esteem (Egan, van Noort, et al., 2014; Handley, Egan, Kane, & Rees, 2015; Steele & Wade, 2008). Due to the increased desire for internet-based CBT (ICBT), an ICBT intervention for perfectionism has been developed (Egan, van Noort, et al., 2014). Internet-based interventions, where patients work with or without the support of a therapist, are able to fill the gap between need and availability, and have been associated with a number of advantages such as increased convenience, patient anonymity, and lower cost to health care providers (Andersson & Cuijpers, 2009; Cuijpers, Van Straten, & Andersson, 2008; Lauder, Chester, & Berk, 2007; Musiat, Goldstone, & Tarrier, 2014). ICBT for perfectionism has been found to be effective at decreasing perfectionism post-intervention (ES: $d = 0.84$), with improvements largely maintained at 6 month follow-up (ES: $d = 0.73$); however, ICBT for perfectionism was not found to increase self-esteem (Egan, van Noort, et al., 2014). To date, no studies have investigated whether CBT for perfectionism has an impact on intolerance of uncertainty.

Rationale and Aims of the Current Study

The present study is part of a larger randomised controlled trial (RCT) evaluating the efficacy of a guided ICBT intervention for perfectionism (described below), the main findings of which have been reported in Shafran, Wade, Egan, Kothari, Allcott-Watson, Carlbring, Rozental, and Andersson (2017). Evidence suggests that internet-based interventions with a personal component, in the form of support and guidance, result in improved recovery rates and less drop-out in the treatment of depression and anxiety, compared to ones without such a component (Andersson & Cuijpers, 2009; Spek et al., 2007). This has also been found to be the case when guides are trained on the intervention, but are not clinically trained therapists (Richards & Richardson, 2012). The aim of the RCT was to investigate whether written guidance might also improve the effectiveness of ICBT for perfectionism. Participants were either allocated to the intervention group or a control group where participants did not receive the intervention. The present authors contributions to the RCT, as reported in this thesis, were the inclusion of scales measuring self-esteem and intolerance of uncertainty (appendices F and G), and a six month follow-up evaluation of all outcomes.

Though a previous study (Egan, van Noort, et al., 2014) found that ICBT for perfectionism did not increase self-esteem, based on research indicating improved recovery rates for guided ICBT, and improved self-esteem as a result of guided self-help for perfectionism, it was theorised that this guided ICBT for perfectionism may improve self-esteem within participants high in perfectionism. In addition, based on evidence of a positive association between perfectionism and intolerance of uncertainty, it was posited that ICBT for perfectionism may also have an impact on intolerance of uncertainty. Therefore, the present study aimed to answer the following questions:

1. Are perfectionism, self-esteem, and intolerance of uncertainty inter-correlated in people who have high levels of perfectionism?

2. Does guided ICBT for perfectionism lead to the following improvements post-intervention, compared to a control group: (i) increased self-esteem and (ii) decreased intolerance of uncertainty. The intervention has already been shown to be effective at reducing perfectionism post-intervention (Shafran et al., 2017).

3. Are any differences observed post-intervention maintained at follow-up?

Hypotheses

The following hypotheses were made:

1. Perfectionism, self-esteem, and intolerance of uncertainty would be inter-correlated in the following way: (i) high perfectionism would be negatively associated with low self-esteem; in particular, aspects of perfectionism considered to be part of the 'perfectionistic concerns' domain; (ii) high perfectionism would be positively associated with high intolerance of uncertainty; and (iii) low self-esteem would be negatively associated with high intolerance of uncertainty.

2. Guided ICBT for perfectionism would (a) improve low self-esteem, and (b) lead to a decrease in intolerance of uncertainty.

3. Changes in perfectionism, self-esteem, and intolerance of uncertainty would be maintained at follow-up.

Methods

Procedure

Ethical approval for this study was obtained from the UCL ethics board (Project ID: 6222/001). The RCT was registered at www.clinicaltrials.gov and a protocol was published in accordance with the Consolidated Standards of Reporting Trials Statement for Randomised Controlled Trials of Electronic and Mobile Health Applications and Online TeleHealth (Eysenbach, 2011; Kothari, Egan, Wade, Andersson, & Shafran, 2016). Consideration was given to the principles and guidelines outlined in the British Psychological Societies Ethics Guidelines for Internet Mediated Research (British Psychological Society, 2013).

Setting and Intervention

The present study was part of a larger randomised controlled trial of an internet-based guided self-help intervention for clinical perfectionism called *Overcoming Perfectionism*, found during the trial at www.overcomingperfectionism.co.uk. This version of the treatment was adapted from the *Cognitive Behavioural Treatment of Perfectionism* (Egan, Wade, Shafran, & Anthony, 2014), the manual for perfectionism-specific CBT. For the internet-based version, the content was made briefer, video was used, and worksheets were adapted to be interactive. The intervention was divided into eight modules (Table 1), designed to be completed weekly; however, participants were provided with guidance and support for 12 weeks for completion to allow for breaks such as holidays. Though participants still had access to the intervention after 12 weeks, on-going guidance was not provided. Post-intervention measures were collected 12 weeks after participants were randomly allocated to the experimental or control group (T_2), and follow-up measures were collected 24 weeks after (T_3).

Table 1 Modules and components of Overcoming Perfectionism, an internet-based guided self-help intervention for perfectionism, taken from (Kothari et al., 2016).

Module	Module Components
1. Understanding Perfectionism	1.1. What is unhelpful perfectionism? 1.2. Why perfectionism continues 1.3. Fact or fiction? 1.4. "The harder you work, the better you'll do" Fact or fiction? 1.5. Facts about perfectionism and performance 1.6. Preparing for change 1.7. Key take away 1.8. Between-module work
2. Your Perfectionism Cycle	2.1. Between-module work 2.2. A reminder 2.3. The first steps 2.4. Drawing your own diagram 2.5. Between-module work 2.6. Take-home message
3. Surveys and Experiments	3.1. Between-module work 3.2. Perfectionism behaviors 3.3. Surveys 3.4. Reflect on the responses 3.5. Behavioral experiments 3.6. Different forms of behavioral experiments 3.7. An added benefit 3.8. Between-module work 3.9. Take home message
4. New Ways of Thinking	4.1. Between-module work 4.2. Changing thinking 4.3. Imagining vivid future positive outcomes 4.4. From all or nothing thinking to flexibility and freedom 4.5. "Rules break, guidelines bend:" Turning rigid rules into guidelines 4.6. Changing thinking styles 4.7. Between-module work 4.8. Key take away
5. Useful Skills for Managing Unhelpful Perfectionism	5.1. Procrastination 5.2. Problem-solving 5.3. Pleasant events 5.4. Take home message 5.5. Before the next module
6. Self-Criticism or Self-Compassion	6.1. How to respond 6.2. Take home message 6.3. Before the next module
7. Re-examining the Way We Examine our Self-Worth	7.1. Your self-worth 7.2. Step 1. Recognizing that your self-worth can be independent of your achievements 7.3. Step 2. Encouraging flexible and realistic goals 7.4. Step 3. Spreading your self-worth across as many areas of your life as possible 7.5. Step 4. Develop more balance in what you pay attention to daily 7.6. Take home message 7.7. Before the next module
8. Staying Well—Managing Unhelpful Perfectionism in the Long-Term	8.1. Improve your sense of self-worth 8.2. Questions 8.3. Thank you!

Psychoeducation and examples were provided in each module, followed by an interactive section requiring participants to answer questions and complete worksheets. In this way participants were able to create an idiosyncratic model (or formulation) of their own unhelpful perfectionism, challenge and restructure unhelpful cognitions and beliefs, and also design surveys and behavioural experiments. In line with the principles of CBT, participants were encouraged to integrate their learning into their day-to-day lives by completing thought records, challenging cognitions, and conducting the surveys and behavioural experiments between sessions.

Guidance and Feedback

Guidance and feedback was provided by 12 guides (including myself) who were psychology undergraduates, masters' students, PhDs, or trainee clinical psychologists. Each participant was allocated a guide who was able to view submitted worksheets and responses. Guides provided feedback and suggestions to the participant in the form of internet-based written communication, and participants were also able to communicate directly with their guide which allowed them to ask questions and respond to feedback. Participants received feedback and guidance as they completed each module and submitted the relevant worksheets. The average length of feedback for each worksheet was 1 to 2 paragraphs. Participants also received guidance if they specifically requested help with understanding or completing modules and between-session work.

Training

As part of their training, guides read the manual, *Cognitive Behavioural Therapy of Perfectionism* (Egan, Wade, Shafran, & Anthony, 2014), and all guidance was as closely aligned to this as possible. A range of sample responses

for each module were also provided and studied as part of the training, and used for reference when writing feedback. A number of mechanisms of action through which feedback is effective have been highlighted in the literature. The mechanisms that were employed have been detailed in Figure 1, taken from the protocol for the overall RCT (Kothari et al., 2016). Guides were taught about these mechanisms and encouraged to adopt them when drafting feedback (Musiat et al., 2012).

Supervision

Ongoing supervision and training was provided in the form of all feedback being checked by myself, a qualified research psychologist and trainee clinical psychologist, and through this the guides were encouraged to develop their responses and consider different methods of engaging and supporting participants. This also helped to keep responses to participants consistent. Supervision meetings were attended by all guides and facilitated by myself and/or Roz Shafran, providing a space to discuss complex cases and challenges, and gain support with case management.

Participants

Participant recruitment was mainly internet-based, using online recruitment websites such as https://www.callforparticipants.com/, social media platforms such as Twitter and Facebook, and forums dedicated to the discussion of mental health difficulties. Additionally, posters were placed on university notice boards. Interested individuals were directed to the study website (https://www.overcomingperfectionism.co.uk/) where they were able to find out more about the study, read the information sheet, and give consent for participation. After this, participants were asked to complete a battery of online questionnaires which included screening measures to determine their eligibility for the study.

Figure 1 Mechanisms of Action for Effective Feedback Employed when Providing Feedback description taken from (Kothari et al., 2016).

1. Guides will summarize and reflect information, thoughts, and experiences provided by participants, enabling participants to process their thoughts and feelings and reflect upon their experiences (Musiat, Hoffmann, & Schmidt, 2012).

2. Feedback that is personally relevant is more likely to lead to deeper processing and is therefore more likely to be examined for its content (Rogers, 1951). Addressing recipients by their name is thought to sufficiently personalize feedback, but in addition to this guides will refer to specific experiences and examples that have been provided by participants when responding (Petty & Cacioppo, 1986).

3. Cognitive theories highlight the importance of providing information that will support participants in changing their knowledge, thinking, and behaviour, particularly if participants have misunderstood or mistaken elements of the intervention (Dijkstra, 2005). Guides will directly address the thought challenging, behavioural experiments, and other cognitive behavioural tasks that participants engage with to support them in thinking about the impact of the changes made and the potential for transferring their new skills to other situations. Guides will also support participants in the design of behavioural experiments so that participants gain the maximum benefit from challenging their behaviour.

4. Adopting the principles of motivational interviewing can make personalized feedback effective in strengthening motivation for change (Kulhavy, 1977). Guides will remind participants of their goals and personal motivations for change, emphasizing the discrepancy between where they are and where they would like to be with regard to problematic behaviours and how much progress they have made since the start of the intervention, so as to support participants and strengthen continued engagement.

To be eligible for inclusion participants had to:

- Be 18 or over, with no upper age limit.

- Score one standard deviation above published norms on the 'concern over mistakes' subscale of the Frost Multidimensional Perfectionism Scale (Frost et al., 1990), a score of ≥ 29 (Suddarth & Slaney, 2001).

- Be fluent in English.

Participants were excluded from the present study if they reported suicidal thoughts or intent, either current or in the past, at any point over the duration of the intervention. This occurred on two occasions and both participants were telephoned by a clinical psychologist to be assessed for risk and signposted to the relevant services. Due to the established co-morbidity between psychopathology and clinical perfectionism, participants reporting elevated levels of psychopathology were not excluded from the study.

If eligible, participants were randomly allocated to the experimental group to complete the intervention, or the control group (no intervention). Randomisation of participants was performed by a third party, unconnected to the study, who created a randomization schedule using a Web-based randomizer (Sealed Envelope).

A total of 156 participants registered for participation and completed the screening measures, of which 35 (22.4%) participants were excluded as they did not meet the inclusion criteria of ≥29 on the FMPS concern over mistakes subscale (Frost et al., 1990), and one participant refused to be randomised, resulting in a total of 120 participants that were randomised into the experimental (n = 62) and control (n = 58) groups (Figure 2). Participants allocated to the experimental group were paired with guides after randomisation. Participants who did not meet criteria for inclusion in the study were sent a copy of *Overcoming Perfectionism: A Self-Help*

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Guide Using Cognitive Behavioural Techniques (2010), and were signposted to other services.

Sample Size

An a priori power calculation was conducted using a tool designed by Hedeker and colleagues which is appropriate for determining power for longitudinal designs (Hedeker, Gibbons, & Waternaux, 1999). A 2-tailed alpha of .05, 3 assessment points (pre, post, and follow-up), a pre-post correlation for the primary outcome measure (concern over mistakes subscale) of 0.61, and attrition rates of 50%, were used. Both the pre-post correlation and expected attrition rate were based upon a similar RCT of a web-based intervention for perfectionism (Egan, van Noort, et al., 2014). A sample size of 40 enrolled participants per group, with 20 participants completing per group, was found to provide 80% power at a 2-tailed $p<.05$ to detect a large effect size (0.80) difference between the control and intervention groups. This use of a large effect size was also based upon the previous RCT conducted by Egan and colleagues (Egan, van Noort, et al., 2014).

Measures

Self-report questionnaire measures of perfectionism, self-esteem, and intolerance of uncertainty (described below), were collected at three time points: (i) prior to any intervention at baseline, (ii) 12 weeks after the participant was randomised to the experimental or control group, to assess change post-intervention; and (iii) 24 weeks after the participant was randomised, to assess whether change was maintained at follow-up. Additional measures, included in the RCT but not reported on here, assessed depression and anxiety, fear of compassion, and well-being.

Figure 2 Flow of participants through the trial


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┌─────────────────────────────────┐
│   Assessed for eligibility (T₁) │
│            N = 156              │
└─────────────────────────────────┘
                │
                │        ┌──────────────────────────────────────┐
                │        │ Excluded for not meeting eligibility │
                ├───────▶│         criteria (n = 35).          │
                │        │ Did not agree to be randomised (n = 1)│
                │        │              n = 36                 │
                │        └──────────────────────────────────────┘
                ▼
┌─────────────────────────────────┐
│          Randomised             │
│           n = 120               │
└─────────────────────────────────┘
```

Assessed for eligibility (T_1)
N = 156

Excluded for not meeting eligibility criteria (n = 35).
Did not agree to be randomised (n = 1)
n = 36

Randomised
n = 120

Allocated to experimental group
n = 62

Allocated to control group
n = 58

Post-treatment measures completed (T_2, 12 weeks)
n = 30

Post-treatment measures completed (T_2, 12 weeks)
n = 41

Follow-up measures completed (T_3, 24 weeks)
n = 27

Follow-up measures completed (T_3, 24 weeks)
n = 39

Intention to treat analysis
n = 62

Intention to treat analysis
n = 58

Engagement with the website was assessed through questions asking participants the length of time they spent on each module and on between session tasks. Feedback on the intervention was gained through a specifically designed questionnaire which was completed by participants post intervention (12 weeks after randomisation; Appendix C). Neither level of engagement, or participant feedback on the intervention is reported on here.

The *Frost Multidimensional Perfectionism Scale (FMPS;* Frost et al., 1990; Appendix D) self-report measure consists of 35 items grouped into six subscales: Concern over mistakes (e.g. "I should be upset if I make a mistake"), doubts about actions (e.g. "I usually have doubts about the simple everyday things I do"), personal standards ("I set higher goals than most people"), parental expectations ("My parents set very high standards for me"), parental criticism ("My parents never tried to understand my mistakes"), and organization ("I try to be an organized person"). Participants respond on a five-point scale ranging from 1 = "strongly disagree" to 5 = "strongly agree." The measure has been found to be both reliable and valid for use with nonclinical and clinical populations (Frost et al., 1990; Hewitt & Flett, 1991a; Hewitt, Flett, Turnbull-Donovan, & Mikail, 1991). Cronbach's alphas were calculated for each subscale. Adequate to good internal consistency was found for concern over mistakes (9 items; $\alpha = .74$), doubts about actions (4 items; $\alpha = .72$), personal standards (7 items; $\alpha = .72$), parental expectations (5 items; $\alpha = .92$), parental criticism (4 items; $\alpha = .84$), and organisation (6 items; $\alpha = .92$). The Cronbach alpha for the full scale was found to be highly reliable (35 items; $\alpha = .84$).

Participants were eligible for inclusion in the study if they scored one standard deviation above published means on the concern over mistakes subscale (i.e., a score of ≥ 29; Suddarth & Slaney, 2001). The concern over mistakes subscale of the FMPS was the primary outcome measure for the overall RCT, for consistency with previous research investigating interventions for perfectionism

(Egan, Wade, Shafran, & Anthony, 2014; Lloyd et al., 2015). The FMPS was amended to reflect participant experience over the past month, allowing us to measure change.

The Clinical Perfectionism Questionnaire (CPQ; Fairburn, Cooper, & Shafran, 2003*; Appendix E)* is a self-report measure consisting of 12 items reflecting participant experience over the past month (egg, "Have you pushed yourself really hard to meet your goals?" and "Have you raised your standards because you thought they were too easy?"). The CPQ is designed to measure *clinical perfectionism,* defined as the striving to meet high standards despite adverse consequences, combined with self-esteem being based upon achieving these standards (Shafran et al., 2002). The core difference of this definition, compared to previous definitions, is the emphasis on self-worth being based upon the achievement of high standards. Participants respond on a 4-point scale ranging from 1 = "not at all" to 4 = "all the time." This measure has been found to have good reliability and validity in two community samples and an eating disordered sample (Egan et al., 2016). The original version of this measure excluded perfectionism in the domain of eating, shape, and weight due to the design of the study in which it was developed, but for this study it was amended to allow for perfectionism in this domain. Cronbach's alpha indicated adequate internal consistency (α = .74).

The Rosenberg Self-esteem Scale (RSES; Rosenberg, 1965; Appendix F) is a self-report measure consisting of 10 items (e.g. "On the whole I am satisfied with myself" and "I wish I could have more respect for myself") and is rated on a four point scale ranging from 1 = "strongly disagree" to 4 = "strongly agree". It has been found to be reliable, and has been validated for use among clinical and community samples (Bagley & Mallick, 2001; Ferring & Filipp, 1996; Martín-Albo, Núñez, Navarro, & Grijalvo, 2007; Phillips, Pinto, & Jain, 2004; Schmitt & Allik, 2005; Shaw-

Zirt, Popali-Lehane, Chaplin, & Bergman, 2005). Cronbach's alpha in the present study was .87.

The Intolerance of Uncertainty Scale (IoU; Freeston et al., 1994; Appendix G) is a self-report measure consisting of 27 items (e.g. "Uncertainty stops me from having a firm opinion" and "It's unfair not having any guarantees in life"), and is rated on a five point scale ranging from 1 = "Not at all characteristic of me" to 5 = "Entirely characteristic of me." It has been found to be reliable, and has been validated for use among clinical and community samples (Buhr & Dugas, 2002, 2006; Jacoby, Fabricant, Leonard, Riemann, & Abramowitz, 2013). The scale was highly reliable in the present study (α = .94)

Statistical Analysis

Analyses were conducted using SPSS version 24 and R version 3.3.2. To compare change over time between experimental and control groups in perfectionism, self-esteem, and intolerance of uncertainty, ANCOVA analyses were conducted using the residualised gains procedure. Observations at T_2 (post-intervention and primary endpoint, 12 weeks after randomisation) were adjusted for observations at T_1 (baseline, pre-intervention). The follow-up effect of the intervention was investigated in the same way, using observations at T_3 (follow-up, 24 weeks after randomisation) as the outcome variable, adjusted for observations at T_1.

Completer and intention-to-treat (ITT) analyses were conducted. Logistic regression analyses were conducted to determine whether demographic and baseline characteristics were predictive of missing data at T_2 and T_3. Little MCARs test indicated that data was missing at random. Multiple imputation was used to manage missing data for intention-to-treat analysis as this has been shown to be superior to last observation carried forward (Elobeid et al., 2009). Demographic data

and outcome data from all three time points were included in the multiple imputation model and ten datasets were imputed.

Criteria for reliable change were used to determine whether the difference on all outcomes was reliable and due to the intervention, rather than due to measurement error. A Reliable Change Index (RCI) was computed using the formula $SE_{diff} = SD_1\sqrt{(2(1-r))}$, where SD_1 is the standard deviation at baseline and r is the Cronbach Alpha reliability coefficient of the measure (Jacobson & Truax, 1991). Change scores are required to exceed 1.96 times the SE_{diff} to show improvement (Evans, Margison, & Barkham, 1998). A negative change score exceeding the RCI was used to determine deterioration (Rozental et al., 2014).

Clinically significant change was determined for the primary outcome measure (FMPS concern over mistakes subscale) by identifying the number of participants that had scores closer to the mean of a community sample than the mean of the clinical sample at T_2 and T_3. This criterion for calculating clinically significant change has previously been described as being the least arbitrary (Jacobson & Truax, 1991). The normative mean used was 22.32 (SD = 6.39), resulting in a clinically significant change cut-off of ≤ 33.68 (Suddarth & Slaney, 2001). Both reliable and clinically significant change were calculated as intent to treat analyses.

Results

Descriptive Statistics

The mean age of the 120 participants eligible for participation was 28.9 years (SD = 8), the majority were female (n = 98; 82%), and had an educational qualification certificate (unspecified; n = 109; 91%). Just over half were studying for a degree level qualification during participation in the trial (n = 62; 52%). A notable

proportion of participants had previously received (n = 47; 40%), or were currently receiving (n = 34; 28%), treatment for a mental health disorder. Full details of participant characteristics can be found in Table 2. Of the 120 participants, 62 were randomised to the experimental group (49 female, 79% of the group), and 58 were randomised to the control group (49 female, 84% of the group). No differences were found between participant groups on any demographic variables (Table 3), or measures of perfectionism, self-esteem, or intolerance of uncertainty at baseline (Table 4).

The sample of individuals included in the current research were identified as being high in unhelpful perfectionism, as a result of scoring at least one standard deviation above the general population on the concern over mistakes subscale of the FMPS (Suddarth & Slaney, 2001). In addition to being high in unhelpful perfectionism, this sample was also found to have lower self-esteem than the general population (RSES: current sample mean = 11.9, SD = 5.3; general population mean = 30.6, SD = 4.95), and to be more intolerant of uncertainty (IUS: current sample mean = 91.4, SD = 21.0; general population mean = 54.8, SD = 17.4; Buhr & Dugas, 2002; Schmitt & Allik, 2005).

Missingness Analysis

At T_2 (post-intervention at 12 weeks) data was available on 71 participants (experimental = 30, control = 41), and at T_3 (follow-up at 24 weeks) data was available on 66 participants (experimental = 27, control = 39). The flow of participants through the trial is shown in Figure 2.

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Table 2 Demographic characteristics of overall sample and logistic regression analysis of whether demographic factors predict missing data post-intervention and at follow-up.

	Frequency (%)	Post-intervention OR (95% CI), p-value	Follow-up OR (95% CI), p-value
Gender			
Female	98 (81.7)	Ref.	Ref.
Male	22 (18.3)	1.26 (0.5 – 3.2), 0.63	1.6 (0.63 – 4.05), 0.32
Age (years)	28.93 (7.98)	0.96 (0.92 – 1.01), 0.15	0.98 (0.93 – 1.02), 0.31
Marital Status			
Single (never married)	88 (73.3)	Ref.	Ref.
Married/domestic Partnership	27 (22.5)	3.04 (0.33 – 28.32), 0.33	1.14 (0.18 – 7.17), 0.89
Divorced/separated/ Widowed	5 (4.1)	2.35 (0.23 – 24.1), 0.47	1.62 (0.23 – 11.26), 0.63
Educational Qualification Certificate			
No	11 (9.2)	Ref.	Ref.
Yes	109 (90.8)	0.23 (0.06 – 0.9), 0.04*	0.27 (0.07 – 1.09), 0.06
Professional Vocational Certificate			
No	63 (52.5)	Ref.	Ref.
Yes	57 (47.5)	0.73 (0.35 – 1.52), 0.4	0.92 (0.45 – 1.88), 0.81
Currently studying for degree level qualification			
No	58 (48.3)	Ref.	Ref.
Yes	62 (51.7)	0.96 (0.46 – 1.98), 0.91	0.68 (0.33 – 1.39), 0.29
Ethnicity			
White British	52 (44.1)	Ref.	Ref.
Other Ethnicity	66 (55.9)	1.48 (0.7 – 3.14), 0.31	1.14 (0.55 – 2.37), 0.73
Currently receiving treatment for a mental health problem			
No	86 (71.7)	Ref.	Ref.
Yes	34 (28.3)	1.21 (0.54 – 2.7), 0.65	1.32 (0.6 – 2.94), 0.49
Previously received treatment for a mental health problem			
No	73 (60.8)	Ref.	Ref.
Yes	47 (39.2)	1.12 (0.53 – 2.37), 0.76	1.3 (0.62 – 2.71), 0.49
Group			
Control	58 (48.3)	Ref.	Ref.
Experimental	62 (51.7)	2.57 (1.21 – 5.47), 0.01*	2.66 (1.27 – 5.6), 0.01*

* Indicates statistical significance.
1. OR = odds ratio; 95% CI = 95% confidence intervals.

Table 3 Comparisons between control and experimental groups on demographic characteristics using chi-square analysis.

	Control	Experimental	χ^2 (df)	p-value
Gender			0.6 (1)	0.44
Female	49 (84.5)	49 (79)		
Male	9 (15.5)	13 (21)		
Marital Status			5.64 (2)	0.06
Single, never married	40 (69)	48 (77.4)		
Married/domestic partnership	13 (22.4)	14 (22.6)		
Divorced/Separated	5 (8.6)	0 (0)		
Educational Qualification Certificate			0.19 (1)	0.67
No	6 (10.3)	5 (8.1)		
Yes	52 (89.7)	57 (91.9)		
Vocational Certificate			0.8 (1)	0.37
No	28 (48.3)	35 (56.5)		
Yes	30 (51.7)	27 (43.5)		
Currently studying for a degree level qualification			0.55 (1)	0.46
No	26 (44.8)	32 (51.6)		
Yes	32 (55.2)	30 (48.4)		
Ethnicity			2.07 (1)	0.15
White British	29 (50.9)	23 (37.7)		
Other	28 (49.1)	38 (62.3)		
Current mental health problem			0.11 (1)	0.74
No	40 (72.7)	46 (75.4)		
Yes	15 (27.3)	15 (24.6)		
Currently receiving treatment for a mental health problem			0.40 (1)	0.53
No	40 (69)	46 (74.2)		
Yes	18 (31)	16 (25.8)		
Previous mental health problem			0.23 (1)	0.63
No	35 (60.3)	42 (67.7)		
Yes	23 (39.7)	20 (32.3)		
Previous treatment for a different mental health problem			0.71 (1)	0.40
No	35 (60.3)	42 (67.7)		
Yes	23 (39.7)	20 (32.3)		
Age[1]	29.3 (7.7)	28.6 (8.3)	0.51 (118)	0.61

[1]Continuous variable therefore means, standard deviations, and results of t-test reported: *t (df)*.

Table 4 Comparisons between control and experimental groups on baseline characteristics.

	Control M (SD)	Experimental M (SD)	t (df)	p-value
Clinical Perfectionism Questionnaire	36.34 (5.43)	35.69 (4.73)	0.70 (118)	0.48
Frost Multidimensional Perfectionism Scale				
Sum	132.74 (14.54)	132.61 (14.01)	0.05 (118)	0.96
Concern over mistakes	37.14 (4.44)	36.71 (4.42)	0.53 (118)	0.6
Doubts about actions	16.07 (3.02)	15.61 (2.91)	0.84 (118)	0.4
Parental expectations	14.47 (5.62)	14.94 (5.33)	-0.47 (118)	0.64
Parental criticism	11.48 (4.53)	10.9 (4.04)	0.74 (118)	0.46
Personal standards	29.14 (3.97)	30.21 (3.2)	-1.63 (118)	0.11
Organisation	24.45 (5.07)	24.24 (5.55)	0.21 (118)	0.83
Rosenberg Self-Esteem Scale	11.14 (5.25)	12.52 (5.3)	-1.43 (118)	0.16
Intolerance of Uncertainty Scale	93.36 (20.22)	89.52 (21.61)	1.01 (118)	0.32

1. Analysis conducted using independent t-tests.

Completers and non-completers at each time point were compared on baseline scores of perfectionism, self-esteem, and intolerance of uncertainty using t-tests, and on descriptive characteristics using chi-square analysis and t-tests. At T_2, significant differences were observed on the FMPS sum score, and two FMPS subscales (parental expectations and parental criticism), with completers showing slightly lower mean scores (Table 5). Additionally, a significantly greater proportion of completers reported having an educational qualification certificate at T_2, but not T_3 (Tables 6 and 7).

Logistic regression analysis conducted to identify predictors of missing data showed that having an educational qualification certificate was associated with lower odds of having missing data at T_2, while being in the experimental group was associated with having higher odds of having missing data at T_2 and T_3 (Table 2). Having missing data at T_2 was also predicted by a higher FMPS sum score, and higher scores on the FMPS subscales of parental expectations and parental criticism (Table 8).

Modules Completed

Of participants in the experimental group, 17 (27.4%) completed no modules, 36 (58.1%) completed one to four modules (half or less), and nine (14.5%) completed five to eight modules. The mean number of modules completed was 2.48 (SD = 2.37).

Table 5 Comparison of baseline scores between completers and non-completers.

	Completers M (SD)	Non-completers M (SD)	t (df)	p-value
Post-intervention (Time-point two)	n = 71	n = 49		
CPQ	35.49 (4.88)	36.76 (5.29)	-1.35 (118)	0.18
FMPS				
Sum score	130.07 (13.27)	136.45 (14.8)	-2.47 (118)	0.02*
Concern over mistakes	36.46 (4.28)	37.57 (4.56)	-1.35 (118)	0.18
Doubts about actions	15.56 (3.01)	16.22 (2.87)	-1.21 (118)	0.23
Parental expectations	13.63 (5.44)	16.27 (5.14)	-2.66 (118)	0.01*
Parental criticism	10.45 (4.22)	12.24 (4.17)	-2.30 (118)	0.02*
Personal standards	29.39 (3.8)	30.12 (3.32)	-1.09 (118)	0.28
Organisation	24.56 (5.49)	24.02 (5.06)	0.55 (118)	0.54
RSES	12.06 (5.53)	11.55 (4.98)	0.51 (118)	0.61
IUS	91.93 (21.72)	90.57 (19.99)	0.35 (118)	0.73
Follow-up (Time-point three)	n = 66	n = 54		
CPQ	35.45 (4.58)	36.69 (5.58)	-1.33 (118)	0.19
FMPS				
Sum score	131.09 (13.77)	134.61 (14.62)	-1.36 (118)	0.18
Concern over mistakes	36.55 (4.24)	37.37 (4.62)	-1.02 (118)	0.31
Doubts about actions	15.56 (2.97)	16.17 (2.93)	-1.12 (118)	0.27
Parental expectations	14.32 (5.46)	15.19 (5.45)	-0.87 (118)	0.39
Parental criticism	10.8 (4.21)	11.65 (4.34)	-1.08 (118)	0.28
Personal standards	29.30 (3.75)	30.17 (3.42)	-1.31 (118)	0.19
Organisation	24.56 (5.23)	24.07 (5.44)	0.5 (118)	0.62
RSES	12.33 (5.28)	11.26 (5.31)	1.11 (118)	0.27
IUS	92.15 (19.78)	90.43 (22.46)	0.45 (118)	0.66

* Indicates statistical significance.
1. CPQ = Clinical Perfectionism Questionnaire
2. FMPS = Frost Multidimensional Perfectionism Scale
3. RSES = Rosenberg Self-Esteem Scale
4. IUS = Intolerance of Uncertainty Scale
5. Analysis conducted using independent t-tests.

Table 6 Comparison of demographic characteristics between completers and non-completers at post-intervention (T_2, 12 weeks)

	Completers n (%)	Non-completers n (%)	χ^2 (df), p-value
Gender			0.24 (1), 0.63
Female	59 (83.1)	39 (79.6)	
Male	12 (16.9)	10 (20.4)	
Marital Status			1.26 (2), 0.53
Single, never married	50 (70.4)	38 (77.6)	
Married/domestic partnership	17 (23.9)	10 (20.4)	
Divorced/Separated	4 (5.6)	1 (2.0)	
Educational Qualification Certificate			5.1 (1), 0.02*
No	3 (4.2)	8 (16.3)	
Yes	68 (95.8)	41 (83.7)	
Vocational Certificate			0.72 (1), 0.4
No	35 (49.3)	28 (57.1)	
Yes	36 (50.7)	21 (42.9)	
Currently studying for a degree level qualification			0.01 (1), 0.91
No	34 (47.9)	24 (49)	
Yes	37 (52.1)	25 (51)	
Ethnicity			1.06 (1), 0.3
White British	34 (47.9)	18 (38.3)	
Other	37 (52.1)	29 (61.7)	
Current mental health problem			0.13 (1), 0.72
No	52 (75.3)	34 (72.3)	
Yes	17 (24.6)	13 (27.7)	
Currently receiving treatment for a mental health problem			0.21 (1), 0.65
No	52 (73.2)	34 (69.4)	
Yes	19 (26.8)	15 (30.6)	
Previous mental health problem			0.89 (1), 0.34
No	48 (67.6)	29 (59.2)	
Yes	23 (32.4)	20 (40.8)	
Previous treatment for a different mental health problem			0.1 (1), 0.76
No	44 (62)	29 (59.2)	
Yes	27 (38)	20 (40.8)	
Age[†]	29.8 (8.5)	27.6 (7)	1.47 (118), 0.14

1. Chi-square analysis used for comparisons.
* Indicates statistical significance.
[†]Continuous variable therefore means, standard deviations, and results of t-test reported: *t (df)*.

Table 7 Comparison of demographic characteristics between completers and non-completers at follow-up (T$_3$, 24 weeks)

	Completers n (%)	Non-completers n (%)	X^2 (df), p-value
Gender			0.99 (1), 0.32
Female	56 (84.8)	42 (77.8)	
Male	10 (15.2)	12 (22.2)	
Marital Status			0.68 (2), 0.71
Single, never married	50 (75.8)	38 (70.4)	
Married/domestic partnership	13 (19.7)	14 (25.9)	
Divorced/separated	3 (4.5)	2 (3.7)	
Educational Qualification Certificate			3.76 (1), 0.052
No	3 (4.5)	8 (14.8)	
Yes	63 (95.5)	46 (85.2)	
Vocational Certificate			0.06 (1), 0.81
No	34 (51.5)	29 (53.7)	
Yes	32 (48.5)	25 (46.3)	
Currently studying for a degree level qualification			1.13 (1), 0.29
No	29 (43.9)	29 (53.7)	
Yes	37 (56.1)	25 (46.3)	
Ethnicity			0.12 (1), 0.73
White British	30 (45.5)	22 (42.3)	
Other	36 (54.5)	30 (57.7)	
Currently receiving treatment for a mental health problem			0.48 (1), 0.49
No	49 (74.2)	37 (68.5)	
Yes	17 (25.8)	17 (31.5)	
Current mental health problem			0.44 (1), 0.51
No	49 (76.6)	37 (71.2)	
Yes	15 (23.4)	15 (28.8)	
Previous treatment for a different mental health problem			0.48 (1), 0.49
No	42 (63.6)	31 (57.4)	
Yes	24 (36.4)	23 (42.6)	
Previous mental health problem			0.06 (1), 0.80
No	43 (65.2)	34 (63)	
Yes	23 (34.8)	20 (37)	
Age†	29.6 (8)	28.1 (7.9)	1.02 (118), 0.31

1. Chi-square analysis used for comparisons.
†Continuous variable therefore means, standard deviations, and results of t-test reported: t (df).

Table 8 Logistic regression analysis of whether baseline characteristics predict missing data post-intervention and at follow-up.

N = 120	Mean (SD)	Post-intervention OR (95% CI), p-value	Follow-up OR (95% CI), p-value
CPQ	36.01 (5.07)	1.05 (0.98 – 1.13), 0.18	1.05 (0.98 – 1.13), 0.19
FMPS			
Sum score	132.67 (14.21)	1.03 (1.01 – 1.06), 0.02*	1.02 (0.99 – 1.05), 0.18
Concern over mistakes	36.92 (4.42)	1.06 (0.97 – 1.15), 0.18	1.04 (0.96 – 1.13), 0.31
Doubts about actions	15.83 (2.96)	1.08 (0.95 – 1.23), 0.23	1.07 (0.95 – 1.22), 0.26
Parental expectations	14.71 (5.45)	1.10 (1.02 – 1.18), 0.01*	1.03 (0.96 – 1.10), 0.39
Parental criticism	11.18 (4.27)	1.11 (1.01 – 1.21), 0.03	1.05 (0.96 – 1.14), 0.28
Personal standards	29.69 (3.62)	1.06 (0.96 – 1.17), 0.28	1.07 (0.97 – 1.19), 0.19
Organisation	24.34 (5.3)	0.98 (0.92 – 1.05), 0.58	0.98 (0.92 – 1.05), 0.61
RSES	11.85 (5.3)	0.98 (0.92 – 1.05), 0.61	0.96 (0.9 – 1.03), 0.27
IUS	91.38 (20.95)	1 (0.98 – 1.01), 0.73	1 (0.98 – 1.01), 0.65

1. CPQ = Clinical perfectionism questionnaire
2. FMPS = Frost Multidimensional Perfectionism Questionnaire
3. RSES = Rosenberg Self-Esteem Scale
4. IUS = Intolerance of Uncertainty Scale
5. OR = odds ratio; 95% CI = 95% confidence intervals.

Relationship between Variables

In this sample of individuals high in perfectionism, self-esteem (RSES) was negatively correlated with perfectionism as measured by the CPQ ($r = -0.4$), and also with the FMPS subscales of concern over mistakes ($r = -0.4$) and doubts about actions ($r = -0.3$). Intolerance of uncertainty was positively correlated with perfectionism as measured by the CPQ ($r = 0.4$), the FMPS sum score ($r = 0.4$), and the FMPS sub-scales of concern over mistakes ($r = 0.4$) and personal standards ($r = 0.3$). A negative correlation was also found between self-esteem and intolerance of uncertainty ($r = 0.4$). Findings reported are significant after correcting for multiple comparisons using a Bonferroni correction (adjusted $p ≤ 0.001$). Correlations between the CPQ and the FMPS can be found in Table 9.

Between Group Differences on the Primary Outcome Measure (FMPS Concern over Mistakes Subscale)

Completer and intention-to-treat analysis showed that participants in the experimental group had significantly lower scores on the primary outcome measure, the concern over mistakes subscale of the FMPS, than participants in the control group at T_2 (ES = 0.9, 95% CI: 0.5 – 1.3) and T_3 (ES = 0.9, 95% CI: 0.5 – 1.3), indicating that the intervention was effective and that changes were maintained at follow-up. Reported effect sizes result from intention-to-treat analysis. Effect sizes from completer analysis can be found in Tables 10 (T_2) and 11 (T_3).

Between Group Differences in Perfectionism

At T_2, completer and intention-to-treat analysis showed that participants in the experimental group had lower scores than those in the control group on the CPQ (ES: d = 0.7, 95% CI: 0.3 – 1.1), the FMPS sum score (ES: d = 1.0, 95% CI: 0.6 – 1.3), and all of the FMPS subscales except for organisation, for which only

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Table 9 Correlations between baseline characteristics

	Mean (SD)	1	2	3	4	5	6	7	8	9	10
1. CPQ	36.01 (5.07)	1	-	-	-	-	-	-	-	-	-
2. FMPS-Sum	132.67 (14.21)	0.35*	1	-	-	-	-	-	-	-	-
3. FMPS-CM	36.92 (4.42)	0.43*	0.61*	1	-	-	-	-	-	-	-
4. FMPS-DA	15.83 (2.96)	0.36*	0.3*	0.22	1	-	-	-	-	-	-
5. FMPS-PE	14.71 (5.45)	-0.08	0.71*	0.19	0.05	1	-	-	-	-	-
6. FMPS-PC	11.18 (4.27)	0.05	0.64*	0.25	0.07	0.74*	1	-	-	-	-
7. FMPS-PS	29.69 (3.62)	0.36*	0.53*	0.44*	0.02	0.12	-0.002	1	-	-	-
8. FMPS-O	24.34 (5.3)	0.18	0.4*	-0.01	-0.05	0.01	-0.1	0.25	1	-	-
9. RSES	11.85 (5.3)	-0.36*	-0.19	-0.36*	-0.31*	0.03	-0.12	-0.05	0.07	1	-
10. IUS	91.38 (20.95)	0.41*	0.41*	0.41*	0.19	0.1	0.17	0.3*	0.22	-0.35*	1

* Significant to Bonferroni corrected significance level = ≤ 0.001
1. CPQ = Clinical Perfectionism Questionnaire; 2. FMPS-Sum = Frost Multidimensional Perfectionism Questionnaire Sum Score; 3. FMPS-CM = Frost Multidimensional Perfectionism Questionnaire – concern over mistakes; 4. FMPS-DA = Frost Multidimensional Perfectionism Questionnaire – doubts about actions; 5. FMPS-PE = Frost Multidimensional Perfectionism Questionnaire – parental expectations; 6. FMPS-PC = Frost Multidimensional Perfectionism Questionnaire – parental concerns; 7. FMPS-PS = Frost Multidimensional Perfectionism Questionnaire – personal standards; 8. FMPS-O = Frost Multidimensional Perfectionism Questionnaire - organisation

Table 10 ANCOVA analysis comparing control and experimental groups on scores at 12 weeks, adjusted for pre-intervention scores

	Control, M (SE) n = 58 (42 Completers)	Experimental, M (SE) n = 62 (31 Completers)	F (df), p-value	Effect size d, 95% C.I.
CPQ	32.77 (0.85)	24.93 (0.99)	35.81 (1, 63), <0.001	1.42 (0.90, 1.94)*
	32.55 (1.12)	*26.08 (1.3)*	*14.46 (1, 38.54), <0.001*	*0.69 (0.32 – 1.06)**
FMPS				
Sum	130.37 (2.24)	105.39 (2.65)	51.73 (1 - 69), <0.001	1.7 (1.16, 2.24)*
	127.57 (1.94)	*112.74 (1.97)*	*27.92 (1, 951.15), <0.001*	*0.97 (0.58 – 1.34)**
CM	36.31 (0.99)	26.09 (1.17)	44.38 (1, 69), <0.001	1.58 (1.05 – 2.11)*
	35.23 (0.82)	*29 (0.83)*	*23.25 (1, 132.54), <0.001*	*0.88 (0.51 – 1.26)**
DA	15.04 (0.43)	13.05 (0.51)	8.83 (1, 69), 0.004	0.7 (0.23 – 1.18)*
	14.82 (0.391)	*13.56 (0.39)*	*5.45 (1, 1256.82), 0.02*	*0.43 (0.06 – 0.79)**
PE	14.57 (0.55)	11.14 (0.65)	16.0 (1, 69), <0.001	0.95 (0.46 – 1.44)*
	14.3 (0.51)	*12.08 (0.52)*	*9.38 (1, 1309.41), 0.002*	*0.56 (0.19 – 0.92)**
PC	10.75 (0.37)	8.72 (0.44)	12.41 (1, 69), 0.001	0.83 (0.35 – 1.32)*
	10.51 (0.39)	*9.33 (0.41)*	*4.31 (1, 302.58), 0.04*	*0.38 (0.02 – 0.74)**
PS	29.23 (0.6)	24.11 (0.71)	29.98 (1, 69), <0.001	1.3 (0.79 – 1.81)*
	28.83 (0.51)	*25.54 (0.5)*	*21.71 (1, 2689.85),<0.001*	*0.85 (0.48 – 1.23)**
O	24.52 (0.36)	22.20 (0.43)	16.85 (1, 69), <0.001	0.97 (0.48 – 1.46)*
	23.93 (0.47)	*23.19 (0.47)*	*1.12 (1, 141.29), 0.29*	*0.19 (-0.17 – 0.55)*
RSES	13.1 (0.54)	15.6 (0.63)	8.94 (1, 68), 0.004	*0.71 (0.23 – 1.19)**
	12.75 (0.75)	*15.25 (0.78)*	*5.96 (1, 109.87), 0.02*	*0.45 (0.08 – 0.81)**
IUS	89.95 (3.06)	71.71 (3.58)	14.98 (1, 68), <0.001	0.92 (0.43 – 1.40)*
	87.38 (2.21)	*77.4 (2.14)*	*10.25 (1, 4376.6), 0.001*	*0.58 (0.22 – 0.95)**

* Indicates statistical significance.
1. Top line = completer analysis, second line in italics = intention to treat analysis using multiple imputation.
2. M (SE) = adjusted mean and standard error
3. CPQ = Clinical Perfectionism Questionnaire; FMPS-Sum = Frost Multidimensional Perfectionism Questionnaire Sum Score; FMPS-CM = Frost Multidimensional Perfectionism Questionnaire – concern over mistakes; FMPS-DA = Frost Multidimensional Perfectionism Questionnaire – doubts about actions; FMPS-PE = Frost Multidimensional Perfectionism Questionnaire – parental expectations; FMPS-PC = Frost Multidimensional Perfectionism Questionnaire – parental concerns; FMPS-PS = Frost Multidimensional Perfectionism Questionnaire – personal standards; FMPS-O = Frost Multidimensional Perfectionism Questionnaire - organisation

Table 11 ANCOVA analysis comparing control and experimental groups on scores at 24 weeks, adjusted for pre-intervention scores

	Control, M (SE) n = 58 (40 Completers)	Experimental, M (SE) n = 62 (30 Completers)	F (df), p-value	Effect Size d, 95% C.I.
CPQ	32.03 (0.81)	24.89 (0.93)	33.64 (1, 67), <0.001	1.37 (0.86 – 1.89)*
	31.63 (1.46)	*27.74 (2.09)*	*1.26 (1, 15.06), 0.28*	*0.21 (-0.15 – 0.56)*
FMPS Sum	126.63 (2.45)	105. 72 (2.88)	30.44 (1, 66), <0.001	1.31 (0.8 – 1.82)*
	124.54 (1.87)	*111.60 (1.87)*	*23.72 (1, 1685.84),<0.001*	*0.89 (0.51 – 1.27)*
CM	35.14 (1)	26.01 (1.18)	34.55 (1, 66), <0.001	1.39 (0.88 – 1.91)*
	34.23 (0.77)	*28.72 (0.77)*	*24.97 (1, 862.3), <0.001*	*0.91 (0.54 – 1.29)*
DA	14.39 (0.42)	13.53 (0.49)	1.79 (1, 66), 0.19	0.32 (-0.15 – 0.78)
	14.36 (0.36)	*13.7 (0.33)*	*1.9 (1, 1315.42), 0.17*	*0.25 (-0.11 – 0.61)*
PE	13.95 (0.6)	11.27 (0.71)	8.37 (1, 66), 0.005	0.69 (0.21 – 1.16)*
	14 (0.54)	*11.76 (0.52)*	*8.66 (1, 298.7), 0.004*	*0.54 (0.17 – 0.9)*
PC	10.64 (0.49)	8.63 (0.57)	7.16 (1, 66), 0.009	0.63 (0.16 – 1.11)*
	10.44 (0.45)	*9.15 (0.44)*	*4.6 (1, 3508.57), 0.03*	*0.39 (0.03 – 0.75)*
PS	28.44 (0.64)	23.94 (0.75)	20.93 (1, 66), <0.001	1.08 (0.59 – 1.58)*
	27.89 (0.51)	*25.23 (0.57)*	*11.62 (1, 223.86), <0.001*	*0.62 (0.26 – 0.99)*
O	24.11 (0.4)	22.27 (0.47)	9.07 (1, 66), 0.004	0.71 (0.23 – 1.19)*
	23.72 (0.45)	*22.95 (0.46)*	*1.46 (1, 620.44), 0.23*	*0.22 (-0.13 – 0.58)*
RSES	13.68 (0.83)	15.09 (1)	1.17 (1, 63), 0.28	0.26 (-0.21 – 0.74)
	13.15 (1.49)	*14.59 (2.78)*	*0.2 (1, 40.54), 0.66*	*0.08 (-0.28 – 0.44)*
IUS	83.65 (3.18)	68.44 (3.83)	9.34 (1, 63), 0.003	0.74 (0.25 – 1.23)*
	81.47 (2.13)	*73.72 (2.1)*	*6.7 (1, 10443.01), 0.001*	*0.47 (0.11 – 0.84)*

* Indicates statistical significance.
1. Top line = completer analysis, second line in italics = intention to treat analysis using multiple imputation.
2. M (SE) = adjusted mean and standard error
3. CPQ = Clinical Perfectionism Questionnaire; FMPS-Sum = Frost Multidimensional Perfectionism Questionnaire Sum Score; FMPS-CM = Frost Multidimensional Perfectionism Questionnaire – concern over mistakes; FMPS-DA = Frost Multidimensional Perfectionism Questionnaire – doubts about actions; FMPS-PE = Frost Multidimensional Perfectionism Questionnaire – parental expectations; FMPS-PC = Frost Multidimensional Perfectionism Questionnaire – parental concerns; FMPS-PS = Frost Multidimensional Perfectionism Questionnaire – personal standards; FMPS-O = Frost Multidimensional Perfectionism Questionnaire - organisation

completer analysis showed significant between group differences (Table 10). Both completer and intent-to-treat analysis showed that differences were maintained at T_3 on the FMPS sum score (ES: d = 0.9, 95% CI: 0.5 – 1.3), and the FMPS subscales of parental expectations (ES: d = 0.5, 0.2 – 0.9), parental criticism (ES: d = 0.4, 95% CI = 0.03 – 0.8), and personal standards (ES: d = 0.6, 95% CI: 0.3 – 1). Participants in the experimental group also showed lower scores on the CPQ and the FMPS subscale of organisation at T_3 when conducting completer analysis, but not when conducting intention-to-treat analysis.

Between Group Differences in Self-esteem and Intolerance of Uncertainty

Completer and intent-to-treat analysis showed that in comparison to the control group, participants in the experimental group had significantly higher self-esteem (higher scores on the RSES; ES: d = 0.5, 95% CI: 0.1 – 0.8), and lower intolerance of uncertainty (lower scores on the IUS; ES: d = 0.6, 95% CI: 0.2 - 1) at T_2 (Table 10). Changes were maintained at T_3 for intolerance of uncertainty (ES: d = 0.5, 95% CI: 0.1 – 0.8), but not for self-esteem (Table 11).

Reliable Change

Post-intervention, 33 (53.2%) participants in the experimental group met criteria for reliable improvement on the primary outcome measure (FMPS concern over mistakes subscale), 29 (46.8%) exhibited no change, and no participants met criteria for deterioration (Table 12). Participants in the experimental group also showed significantly higher odds of meeting criteria for reliable improvement than the control group (OR: 4.1, 95% CI: 1.6 – 10.0, p = 0.003). A similar level of reliable change on the primary outcome measure was maintained at follow-up, with 34 (54.8%) participants in the experimental group meeting criteria for reliable improvement, 28 (45.2%) showing no change, and no participants meeting criteria

Table 12 Frequency and **o**dds of participants in the experimental group (vs. control group) achieving reliable change on all outcomes, post-treatment.

	Cronbach's Alpha	Change Criterion	Control, n (%) Improvement	No Change	Det.	Experimental, n (%) Improvement	No Change	Det.	OR (95% CI), p-value
CPQ	0.74	± 7.17	10 (17.2)	46 (79.4)	2 (3.4)	40 (64.5)	20 (32.3)	2 (3.2)	9.02 (2.72 – 29.9), 0.001
FMPS									
Sum	0.84	± 15.76	12 (20.7)	45 (77.6)	1 (1.7)	36 (58.1)	26 (41.9)	0 (0)	5.18 (2.17 – 12.38), <0.001
CM	0.74	± 6.25	13 (22.4)	41 (70.7)	4 (6.9)	33 (53.2)	29 (46.8)	0 (0)	4.05 (1.64 – 10), 0.003
DA	0.72	± 4.34	7 (12.1)	50 (86.2)	1 (1.7)	17 (27.4)	43 (69.4)	2 (3.2)	2.69 (0.76 – 9.44), 0.12
PE	0.92	± 4.27	9 (15.5)	43 (74.2)	6 (10.3)	19 (30.6)	39 (64.6)	3 (4.8)	2.65 (1.0 – 7.05), 0.05
PC	0.84	± 4.73	5 (8.6)	52 (89.7)	1 (1.7)	12 (19.4)	47 (75.8)	3 (4.8)	2.31 (0.67 – 7.95), 0.18
PS	0.72	± 5.31	4 (6.9)	50 (86.2)	4 (6.9)	24 (38.7)	38 (61.3)	0 (0)	7.94 (2.33 – 27.12), 0.001
O	0.92	± 4.16	7 (12.1)	46 (79.3)	5 (8.6)	13 (21)	42 (67.7)	7 (11.3)	1.9 (0.6 – 6.06), 0.27
RSES	0.87	± 5.3	9 (15.5)	45 (75.9)	5 (8.6)	18 (29)	41 (64.5)	4 (6.5)	2.32 (0.78 – 6.92), 0.13
IUS	0.94	± 14.22	20 (34.5)	28 (48.3)	10 (17.2)	26 (41.9)	29 (46.8)	7 (11.3)	1.35 (0.62 – 2.95), 0.45

1. Reliable change criterion calculated using *Reliable Change Criterion Calculator* (Chris Evans, 1998).
2. Det. = Deterioration.
3. Table shows results of logistic regression analysis (OR, 95% CI, p-value).

for reliable deterioration (Table 13). Again, participants in the experimental group had higher odds than those in the control group of meeting criteria for reliable improvement at T_3 (OR: 3.6, 95% CI: 1.5 – 8.5, p = 0.003).

At T_2 and T_3, participants in the experimental group also had higher odds than the control group of meeting criteria for reliable improvement on the CPQ (T_2: OR: 9.0, 95% CI: 2.7 – 29.9, p = 0.001; T_3: OR: 3.3, 95% CI: 1.1 – 10.0, p = 0.03), the FMPS sum score (T_2: OR: 5.2, 95% CI: 2.2 – 12.4, p <0.001; T_3: OR: 3.9, 95% CI: 1.72 – 8.94, p = 0.001), and the FMPS subscales of parental expectations (T_2: OR: 2.7, 95% CI: 1.0 – 7.1, p = 0.05; T_3: OR: 4.4, 95% CI: 1.4 – 13.4, p = 0.01), and personal standards (T_2: OR: 7.9, 95% CI: 2.3 – 27.1, p = 0.001; T_3: OR: 5.0, 95% CI: 1.9 – 13.1, p = 0.001). Additionally, at T_3, participants in the experimental group had comparatively higher odds of meeting criteria for reliable improvement on the organisation subscale (OR: 2.8, 95% CI: 1.0 – 7.6, p = 0.05). The number of participants meeting criteria for reliable improvement or deterioration, and those showing no change, can be found in Table 12 (T_2) and Table 13 (T_3).

Clinically Significant Change on Primary Outcome Measure (FMPS – Concern over Mistakes)

At T_2, 22 participants in the control group (38%) and 47 participants in the experimental group (75.8%) met criteria for clinically significant change on the primary outcome measure, the FMPS concern over mistakes subscale. Participants in the experimental group had higher odds of meeting criteria for clinically significant change than those in the control group (OR: 5.32, 95% CI: 1.82 – 15.52, p = 0.003). At T_3, 26 participants in the control group (45%) and 52 participants in the experimental group (84%) met criteria for clinically significant change. Again, participants in the experimental group had significantly higher odds of meeting the

Table 13 Frequency and **o**dds of participants in the experimental group (vs. control group) achieving reliable change on all outcomes at follow-up.

	Cronbach's Alpha	Change Criterion	Control, n (%) Improvement	No Change	Det.	Experimental, n (%) Improvement	No Change	Det.	OR (95% CI), p-value
CPQ	0.74	± 7.17	17 (29.3)	39 (67.3)	2 (3.4)	36 (58.1)	21 (33.3)	5 (8.6)	3.34 (1.11 – 10.02), 0.03
FMPS									
Sum	0.84	± 15.76	15 (25.9)	42 (72.4)	1 (1.7)	36 (58.1)	26 (41.9)	0 (0)	3.92 (1.72 – 8.94), 0.001
CM	0.74	± 6.25	15 (25.9)	42 (72.4)	1 (1.7)	34 (54.8)	28 (45.2)	0 (0)	3.61 (1.53 – 8.5), 0.003
DA	0.72	± 4.34	9 (15.5)	49 (84.5)	0 (0)	14 (22.6)	45 (72.6)	3 (4.8)	1.68 (0.56 – 5.07), 0.36
PE	0.92	± 4.27	7 (12.1)	44 (74.1)	8 (13.8)	22 (35.5)	36 (58.0)	4 (6.5)	4.39 (1.44 – 13.35), 0.01
PC	0.84	± 4.73	8 (13.8)	46 (79.3)	4 (6.9)	14 (22.6)	45 (72.6)	3 (4.8)	1.77 (0.58 – 5.43), 0.32
PS	0.72	± 5.31	9 (15.1)	47 (81.5)	2 (3.4)	29 (46.8)	33 (53.2)	0 (0)	5 (1.91 – 13.13), 0.001
O	0.92	± 4.16	8 (13.8)	45 (77.6)	5 (8.6)	20 (32.3)	35 (56.4)	7 (11.3)	2.77 (1.01 – 7.58), 0.05
RSES	0.87	± 5.3	13 (22.4)	37 (63.8)	8 (13.8)	23 (37.1)	26 (41.9)	13 (21)	1.98 (0.74 – 5.26), 0.17
IUS	0.94	± 14.22	28 (48.3)	23 (39.6)	7 (12.1)	29 (46.8)	26 (41.9)	7 (11.3)	0.95 (0.45 – 1.99), 0.89

1. Reliable change criterion calculated using *Reliable Change Criterion Calculator* (Chris Evans, 1998).
2. Det. = Deterioation.
3. Table shows results of logistic regression analysis (OR, 95% CI, p-value).

clinically significant change index than those in the control group (OR: 6.86, 95% CI: 2.16 – 21.77, p = 0.001).

Post-intervention, 11 participants in the control group (19% of group) met criteria for both clinically significant and reliable change, compared to 30 in the experimental group (48% of group). This was slightly lower at follow-up with 9 (16%) participants in the control group and 26 (42%) in the experimental group meeting criteria for reliable and clinically significant change.

Discussion

The current study was part of a larger RCT assessing the efficacy of a guided ICBT intervention for unhelpful perfectionism (Kothari et al., 2016; Shafran et al., 2017). It addressed three questions: (i) are the transdiagnostic processes of perfectionism, self-esteem, and intolerance of uncertainty, inter-correlated; (ii) does an intervention with the goal of decreasing unhelpful perfectionism lead to a change in self-esteem and intolerance of uncertainty; and (iii) are any changes in perfectionism, self-esteem, and intolerance of uncertainty observed post-intervention (T_2, 12 weeks post randomisation), maintained at follow-up (T_3, 24 weeks post randomisation)?

In this sample of individuals high in perfectionism, the following associations were observed between transdiagnostic processes: high perfectionism was associated with low self-esteem; high perfectionism was associated with high intolerance of uncertainty; and low self-esteem was associated with high intolerance of uncertainty. The guided ICBT intervention aimed at decreasing perfectionism was effective at reducing unhelpful perfectionism, increasing self-esteem, and

decreasing intolerance of uncertainty. Improvements in perfectionism and intolerance of uncertainty, but not self-esteem, were maintained at follow-up.

The Association between Transdiagnostic Processes

Inclusion in the current study was based upon participants' scoring higher than the general population on unhelpful perfectionism (as measured by the concern over mistakes subscale of the FMPS). In comparison to general population means reported in the literature, this sample had considerably lower self-esteem (lower mean scores on the Rosenberg Self-Esteem Scale; RSES), and higher intolerance of uncertainty (higher mean scores on the Intolerance of Uncertainty Scale; IUS; Buhr & Dugas, 2002; Schmitt & Allik, 2005).

Self-esteem was negatively associated with perfectionism as measured by the Clinical Perfectionism Questionnaire (CPQ). This is perhaps to be expected as this measure assesses an individual's level of *clinical perfectionism*, a core aspect of which is that self-esteem is based upon achievement of the high standards that an individual is striving for (Shafran et al., 2002). Self-esteem was also negatively associated with subscales of the FMPS that have been identified as being part of the perfectionistic concerns dimension of perfectionism (Stoeber & Otto, 2006). This suggests that among individuals high in perfectionism, low self-esteem is associated with higher perfectionism of the type that is thought to be unhelpful or maladaptive (i.e. clinical perfectionism and perfectionistic concerns), a relationship that has also been observed among the general population (see part one of this thesis).

These findings align with the theory that low self-esteem is a product of high levels of unhelpful perfectionism, as the unhelpful and maladaptive aspects of perfectionism are representative of being highly self-critical, doubting one's own actions, and basing one's self-esteem on achievement (Beck, 1976; Burns & Beck, 1978; Horney, 1950; Sorotzkin, 1985). Although we can speculate, the results of a

cross-sectional correlational analysis do not imply causality; therefore, the question of whether there is a direct causal relationship between perfectionism and self-esteem still remains and further research is required.

Intolerance of uncertainty was moderately associated with clinical perfectionism (CPQ) and the FMPS subscales of concern over mistakes and personal standards. In contrast to self-esteem then, intolerance of uncertainty appears to be correlated with both the negative and positive aspects of perfectionism. Previous research has shown a positive association between perfectionism and intolerance of uncertainty in the general population, in individuals with social anxiety, and in those with eating disorders (Boelen & Reijntjes, 2009; Buhr & Dugas, 2006; Fergus & Wu, 2011; Fracalanza et al., 2014; Renjan et al., 2016; Sica et al., 2004; Whiting et al., 2014). The present study is the first to suggest that this relationship extends to individuals high in perfectionism, but again, it does not imply causality.

A moderate negative association was found between self-esteem and intolerance of uncertainty, meaning that individuals with low self-esteem were more intolerant of uncertainty. This relationship has also been observed among the general population and people with eating disorders (Bhar & Kyrios, 2007; Lee, 2014; Renjan et al., 2016). The finding adds to the minimal literature on the relationship between these two constructs, but further research is required to determine the nature of this relationship.

Does Guided ICBT for Perfectionism Impact on Self-Esteem and Intolerance of Uncertainty?

In comparison to the control group, participants in the experimental group showed decreases in perfectionism (primary and other outcome measures) with large effect sizes, and had higher odds of meeting criteria for reliable improvement

and clinically significant change. They also showed a comparative increase in self-esteem and decrease in intolerance of uncertainty, with large effect sizes. Together these findings suggest that guided ICBT for perfectionism is effective, and additionally increases self-esteem and decreases intolerance of uncertainty post-intervention.

It is possible that the impact on self-esteem and intolerance of uncertainty is because aspects of the intervention acted directly on these transdiagnostic processes. While modules one to four focus specifically on understanding and challenging perfectionistic thoughts and beliefs, modules five to eight are broader. For example, modules seven and eight target self-worth, effectively aiming to increase self-esteem. Module five also teaches problem solving skills, which may increase an individual's confidence in their ability to deal with uncertain situations and unexpected events, potentially leading to a decrease in intolerance of uncertainty.

It is worth bearing in mind, however, that fewer than 15% of participants completed more than four modules, meaning that the majority of participants only completed modules that focus specifically on perfectionism. Given this, the findings might be cautiously interpreted as support for the theorised causal relationship between perfectionism and self-esteem, and perfectionism and intolerance of uncertainty. Results of completer analysis may also be taken in support of this as effect sizes were found to be larger for both self-esteem and intolerance of uncertainty amongst completers.

Also worth noting is that odds of meeting criteria for reliable change in self-esteem and intolerance of uncertainty were not significantly higher for participants in the experimental group, raising doubts about whether the changes observed are reliable. Given this, more research is required, and should also investigate whether any causal relationships are direct, or are due to another unknown variable.

Are Changes Maintained at Follow-Up?

Participants in the experimental group continued to show comparatively lower scores on the concern over mistakes subscale of the FMPS (primary outcome measure) at follow-up, with a similarly large effect size as post-intervention. A previous study comparing face-to-face CBT for perfectionism with ICBT without guidance found effect sizes of 0.8 post-intervention, and 0.7 at 24 week follow-up, on the same outcome measure (Egan, van Noort, et al., 2014). The present study shows slightly higher effect sizes for intent-to-treat analysis, and much higher effect sizes for completer analysis (post-intervention = 1.6; 24 week follow-up = 0.9). The finding that ICBT for perfectionism is more effective with guidance than without is in line with similar research investigating the effectiveness of ICBT for anxiety and depression (Andersson & Cuijpers, 2009; Richards & Richardson, 2012; Spek et al., 2007). This may be because a therapeutic relationship, even if not developed face-to-face, is an important factor in psychological therapy (Lambert & Barley, 2001). Alternatively, it may be that guides are able to remind participants to engage with the intervention, helping them to stay on track.

Changes in perfectionism as measured by the FMPS sum score, and a number of subscales, were maintained at follow-up with large effect sizes; however, changes in clinical perfectionism were not. This is particularly interesting as clinical perfectionism was developed as a cognitive behavioural account of perfectionism, on which the perfectionism specific CBT protocol was developed. The definition of clinical perfectionism is similar to other definitions in determining that individuals high in perfectionism set high and often unachievable standards (Frost et al., 1990; Shafran et al., 2002). In addition to this, however, individuals high in clinical perfectionism are thought to pursue these standards despite adverse consequences, and, of fundamental importance, they are hypothesised to base their self-evaluation upon the striving for, and achievement of, those standards (Shafran

et al., 2002). Low self-esteem could be interpreted to be a part of clinical perfectionism, which is of interest because the results of the current research show that increases in self-esteem observed post-intervention were also not maintained at follow-up. One could also hypothesise that engagement with treatment generally, rather than treatment for perfectionism specifically, is what led to an increase in self-esteem, potentially explaining why self-esteem scores decreased again once engagement ceased. This might be an interesting line of enquiry for future research.

Participants in the experimental group continued to show lower levels of intolerance of uncertainty than the control group at follow-up, with a slightly smaller but comparable size of effect to that seen post-intervention. This finding supports the theory that perfectionism acts in conjunction with intolerance of uncertainty, posited by the Obsessive Compulsive Cognitions Working Group (OCBWG, 1997), and goes further to suggest that this is also the case for individuals high in perfectionism, not just those with obsessive compulsive traits. However, research investigating the nature of the relationship between perfectionism and intolerance of uncertainty is still in its infancy, and more work is required to determine whether it is a directly causal relationship, or whether it is mediated by another unknown variable.

Strengths and Limitations

This research derives many of its strengths from its design. A randomised controlled trial allows for causal inferences to be made, which means that changes in perfectionism, self-esteem and intolerance of uncertainty can be attributed (either directly or indirectly) to the guided ICBT intervention. Because participants were randomly allocated, differences between groups and potential confounding factors were minimised. This was confirmed in exploratory analysis which showed no significant differences between experimental and control groups in demographics or baseline scores of outcome variables. In addition, the randomisation schedule was

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created by a third party uninvolved with the research, reducing the likelihood of randomisation bias.

Considerable drop-out was observed, with over a quarter of participants in the experimental group completing no modules after being allocated, and fewer than 15% completing more than half the intervention. This is a limitation common to studies of online interventions. A systematic review found that drop-out for online psychological interventions ranged from 2% to 83%, and average drop-out was 35% (Melville, Casey, & Kavanagh, 2010). The review also found that the majority of individuals drop out before commencing treatment, which is in line with the current findings. It has been suggested that reminders might prompt participants to persevere (Donkin & Glozier, 2012). In the current research guides were directed to prompt participants who were inactive for a week or more. Though drop-out was still high, it was not as high as a previous RCT evaluating ICBT for perfectionism without guidance, so it is possible that the addition of guidance is effective in increasing retention (Egan, van Noort, et al., 2014). An RCT evaluating the effectiveness of the current intervention was run in Sweden, at the same time as the current RCT, and much lower drop-out rates were observed (approximately 80% retention; Rozental et al., 2017). It is likely that important procedural differences in the design of the trials might have contributed to this difference in drop-out. In particular, participants in the Swedish trial were met in person prior to commencing the intervention to confirm their intention to participate. It is likely that personally meeting with participants not only boosted retention through checking that participants still wanted to participate after being randomised, but also that a personal meeting laid a better foundation for the building of a good therapeutic relationship, which in turn may have increased motivation to participate (Shafran et al., 2017).

The use of the Rosenberg Self-Esteem Scale (RSES) might be considered a limitation of this study because it treats self-esteem as a unidimensional and stable

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trait, and many researches have argued against this understanding (Guindon, 2002; Kernis et al., 1993; Orth & Robins, 2014; Morris Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995). The use of the RSES is widespread, however, and use of it enables comparison with other research findings.

It is possible that perfectionism might in itself be an obstacle to engaging with psychological interventions, making it difficult to treat perfectionism (Egan et al., 2011). The current research provides some support for this theory. In comparison to participants who completed post-intervention measures, participants who did not were found to have significantly higher baseline scores on the FMPS sum score, and the subscales of parental expectations and parental criticism. Future research exploring how to tackle this difficulty is warranted.

The sample recruited for this study was selected due to having high levels of unhelpful perfectionism, and therefore the findings might be deemed to be relevant only to individuals or groups that are also high in perfectionism. However, participants were recruited from the general population. In addition, the Swedish RCT of this intervention that was running concurrently did not recruit based upon criteria of meeting a threshold for high perfectionism, and still similar levels of perfectionism were observed (Rozental et al., 2017). Given this, the current findings may be generalizable to the general population.

Research and Clinical Implications

The current study supports theoretical accounts and research findings indicating a relationship between high perfectionism and low self-esteem, and high perfectionism and high intolerance of uncertainty (Beck, 1976; Burns & Beck, 1978; Doron & Kyrios, 2005; Egan, Wade, Shafran, & Antony, 2014; Fennell, 1997; Guidano & Liotti, 1983; Horney, 1950; Obsessive Compulsive Cognitions Working Group, 1997; Sorotzkin, 1985). The findings suggest that these relationships differ

from each other, with self-esteem appearing to correlate with negative or maladaptive aspects of perfectionism, and intolerance of uncertainty correlating with both positive and negative aspects of perfectionism. In addition, the findings indicate the presence of a relationship between high intolerance of uncertainty and low self-esteem, a relationship that has been little investigated. It is clear that the implications of this are far reaching when considering the evidence that low self-esteem, high intolerance of uncertainty, and high levels of unhelpful perfectionism are common across a range of mental health disorders (Boelen & Reijntjes, 2009; Carleton et al., 2012; Dugas et al., 2005; Egan et al., 2011; Fennell, 1997; Gentes & Ruscio, 2011; Krabbendam et al., 2002; Mahoney & McEvoy, 2012; Mann et al., 2004; Obsessive Compulsive Cognitions Working Group, 1997; Orth et al., 2009; Sowislo & Orth, 2013b). Further research investigating how these processes relate to, or cluster across, different disorders might provide important insight into why an individual develops one disorder over another, or why some individuals present with comorbidity.

The finding that an intervention targeting perfectionism can improve self-esteem and decrease intolerance of uncertainty generates many questions and many possibilities. What is the nature of the relationship between these transdiagnostic processes, and are they directly or indirectly associated? Could one intervention lead to improvement in the symptoms of more than one mental health disorder through change in underlying transdiagnostic processes, and would this be a more efficient method of treating patients presenting with comorbid symptoms? If a particular combination of transdiagnostic processes can increase vulnerability for mental health difficulties, it might be possible to identify those at particularly high risk. In addition, interventions targeting these processes among high risk individuals might be particularly effective in preventing the development of mental health disorders.

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Conclusion

The current study provides preliminary evidence for the theory that effecting change in one transdiagnostic process can lead to change in another, at least when considering the processes of perfectionism, self-esteem, and intolerance of uncertainty. Exploring the nature of the relationships observed between these transdiagnostic processes, and how they interact within different mental health disorders, could provide new insights into how to identify those at high risk, and the best and most effective method of treating these disorders. With further understanding, it is possible that CBT and ICBT interventions focussing on a cluster of transdiagnostic processes could become integral to the treatment of mental health disorders, and perhaps also an effective early intervention strategy.

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Part III: Critical Appraisal

Introduction

The present research, reported in part two of this thesis, was conducted as part of a randomised controlled trial investigating the efficacy of a guided internet-based cognitive behavioural treatment (ICBT) for unhelpful perfectionism. The contribution of the present author was the inclusion of follow-up measures at 24 weeks, and measures assessing self-esteem and intolerance of uncertainty to: (i) investigate the relationship between the transdiagnostic processes of perfectionism, self-esteem, and intolerance of uncertainty; and (ii) investigate whether change in one transdiagnostic process, in this case perfectionism, effected a change in others, in this case self-esteem and intolerance of uncertainty. The discussion section of part two of this volume therefore focussed on these aspects of the study.

This critical appraisal discusses some of the broader challenges and implications regarding internet-based interventions in relation to the present research, specifically drop-out and barriers to uptake, the participant's perspective, and the importance of guidance. It goes on to consider evidence that perfectionism can be an obstacle to treatment of Axis I disorders, and may impact upon the treatment of perfectionism itself. The ethical implications of running a study without funding, and the impact of this on participants, is discussed. Finally, the advantages and disadvantages of being a clinician researcher are examined.

Internet-based Cognitive Behavioural Therapy (ICBT)

In comparison to face-to-face treatment, internet-based interventions are commonly associated with a number of advantages for the patient, including anonymity, flexibility to determine the time and location of treatment, and short waiting times (Andersson & Cuijpers, 2009; Cuijpers et al., 2008; Lauder et al., 2007; Musiat et al., 2014). They are also advantageous for health care providers in

that the demand for psychological treatment is greater than availability, and internet-based interventions can be helpful in bridging this gap, as well as reducing the cost of provision (Lauder et al., 2007). Given this, conducting research into the most efficient and effective methods of delivering internet-based interventions is of great value, and research in this area is growing.

Drop-out and Barriers to Uptake

Despite these advantages, drop-out can be twice as high for ICBT compared to face-to-face CBT, and is notably high prior to the start of the intervention (Waller & Gilbody, 2009). In the present trial also, drop-out was higher in the experimental group than the control group, and the majority of this drop-out occurred prior to participants starting the intervention. It is difficult in these cases to suggest that the specific intervention itself was the cause of the drop-out. One possibility is that drop-out prior to commencement is due to low participant expectations of the utility of internet-based treatment. Wootton et al. (2011) found that among patients with OCD, the majority expected small or no improvement from ICBT, and some believed that their problems were too severe or complex to be treated via the internet (Wootton, Titov, Dear, Spence, & Kemp, 2011). Participants have also reported a fear that internet-based interventions could increase isolation, and those with more severe symptoms report more negative views of ICBT (Gun, Titov, & Andrews, 2011; Hind et al., 2010). In comparison to face-to-face therapy, participants have reported that they expect internet-based interventions to be more convenient, have lower waiting times, and provide greater anonymity; however, they reportedly expected internet-based and self-help interventions to be less helpful, and provide less support and feedback, than face-to-face interventions (Musiat et al., 2014). Potential barriers against engaging with ICBT require further investigation so that strategies to overcome this can be put in place, or indeed, participants can be

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screened for suitability for ICBT if this is more appropriate. Without identifying and addressing potential barriers, the uptake of ICBT may be limited in the general population, with high drop-out being an indicator of this.

The Participant's Perspective

The high levels of patient acceptability for ICBT that have previously been reported may be an overestimation, as they are based upon the views of participants that have engaged with the interventions rather than dropping out (Musiat et al., 2014). Due to this, and the high drop-rates for ICBT discussed above, an original aim of the present research was to conduct qualitative interviews with participants who engaged with the intervention, and with those who dropped out of the intervention, both prior to and after commencement. The aims of the interviews were to be as follows: (i) To identify prior views and expectations of internet based research; (ii) to explore which aspects of the present intervention were more or less helpful, and more or less able to be understood and carried out independently, with minimal support from a guide; (iii) to identify reasons for drop-out, both prior to and after commencement of the intervention; and (iv) to explore user experience of ICBT.

As per the original proposal for the research, participants were asked for consent to be contacted after the trial for feedback via a telephone interview, and the majority gave consent. Unfortunately, the time to conduct these interviews was not available as hoped. This was, in my view, the biggest limitation of the present research. The use of qualitative methods, alongside quantitative methods, has a number of advantages, including but not limited to the gathering of information for the refinement of the intervention, to identify processes of change, to explore the variation in acceptability and effectiveness, and to gain an understanding of how the intervention was received by participants (Hill, Chui, & Baumann, 2013; Midgley,

Ansaldo, & Target, 2014). Despite this it is relatively uncommon for randomised controlled trials to have a qualitative component (Lewin, Glenton, & Oxman, 2009).

To redress the absence of qualitative interviews, a feedback questionnaire was designed by the present author to elicit participants' views (Appendix C). It included questions that could be answered on a Likert scale, and open questions that might elicit broader views of a more qualitative type. Both were provided to encourage participants who might be reluctant to provide text responses to complete the questionnaire, while also giving those participants who were keen to express their views more broadly the opportunity to do so. The data collected from this questionnaire will go some way to increase our understanding of participant experience, and it is due to be analysed and published. However, participants who dropped out of the study were less likely to complete the feedback questionnaire, particularly those who dropped out prior to commencement. The intended qualitative component of the RCT, which would have allowed researchers to attempt contact via telephone with participants who had dropped out, may have been invaluable in gathering information about why participants drop out, potentially providing information on how to increase uptake of ICBT, or how to identify participants for whom it is likely to be effective.

Guidance: An Important Part of ICBT but What about the Guides?

Personal support has been rated as the second most important factor when seeking help for a mental health disorder, after the helpfulness of an intervention, suggesting that the lack of personal support in internet-based interventions without guidance might be a barrier to uptake of ICBT (Musiat et al., 2014). A qualitative study of primary care patients found that developing a virtual relationship with the therapist, and being able to process thoughts and feelings in written form, were important parts of receiving ICBT, which suggests that a personal component might

be important for retention as well as uptake (Beattie, Shaw, Kaur, & Kessler, 2009). The importance of guidance for increasing the effectiveness of interventions, and decreasing drop-out, has also been established in numerous RCTs (Andersson & Cuijpers, 2009; Johansson & Andersson, 2012; Richards & Richardson, 2012; Spek et al., 2007).

For ICBT to retain its advantage of being a lower cost alternative to face-to-face treatment, guidance must be provided by people with less training than those who are qualified to deliver CBT face-to-face (Bennett-Levy et al., 2010). For the present RCT, guidance was primarily provided by undergraduate, masters, and PhD students who had no prior training in low or high intensity CBT. On the whole, after being trained, guides were confident in their ability to respond to participants; however, a great deal of supervision was required, particularly in the early stages. Anecdotally, my experience of this highlighted the skills I have learned through training which are often taken for granted, such as the use of Socratic questioning, and my understanding of the underlying theories behind CBT interventions. The use of surveys and behavioural experiments, for example, can be tricky and takes practice, and it was challenging for guides to support participants with complex issues through this process. It also took some time for guides to inhibit the natural urge to give advice, rather than be curious, when writing feedback to participants.

It was important, in providing supervision, to place myself in the position of the person providing guidance, so as to better develop their knowledge and skills. It was noticeable, at times, that guides were anxious about how best to respond in some situations. This, given their lack of previous experience, was not surprising or unjustified. Although providing good supervision can be time and labour intensive, there is great potential for this type of upskilling to have a wider benefit. Within the current research, guides became more confident over time and required less supervision. I was eventually able to encourage and support guides who were more

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experienced (having provided guidance for more participants), to provide some supervision to newer guides who joined the project later. If this type of upskilling is possible in mental health services, it could contribute a great deal to the development of mental health staff who are relatively less trained, but often expected to carry a large burden of demand in the NHS. My experience has led me to believe that sufficient time for supervision of guides is of particular value when providing guided ICBT in the community.

Given the demands placed upon individuals providing guidance for ICBT interventions, research into their experience of providing guidance, and the more and less helpful aspects of training and supervision might be of use. This would have been an interesting component of the current RCT, but was unfortunately not possible due to limitations in time and staffing. Research investigating the experience of giving guidance, and formalisation of the minimal level of skills and training required, is likely to be a valuable resource given the increase in ICBT interventions; therefore further research in this area is warranted.

Perfectionism as an Obstacle to Treatment

Perfectionism appears to lead to poorer treatment outcomes and/or higher drop-out in the treatment of depression, eating disorders, anxiety, obsessive compulsive disorder, and also chronic pain (Chik, Whittal, & O'Neill, 2008; Egan et al., 2011; Kempke, Luyten, Van Wambeke, Coppens, & Morlion, 2014; Mitchell, Newall, Broeren, & Hudson, 2013). Given this, it could be argued that the treatment of perfectionism, where necessary, may be a useful precursor to the treatment of other disorders. However, in the present research, the only significant difference observed between completers and non-completers at baseline was that non-completers had higher levels of unhelpful or maladaptive perfectionism, suggesting

that high perfectionism could lead to higher drop-out, even if it is the perfectionism that is being treated.

Perfectionism has been found to interfere with the therapeutic relationship, with evidence suggesting that the association between perfectionism and poor outcome in the treatment of depression can be explained by perfectionists failing to effectively develop therapeutic alliances, and having more negative perspectives of the therapeutic relationship (Zuroff et al., 2000). It is possible then, that high levels of perfectionism might impede treatment of perfectionism due to a poor therapeutic alliance.

It is difficult to know, without further research, whether a guided ICBT intervention for perfectionism might improve outcomes, by putting less pressure on the therapeutic alliance, or might lead to poorer outcomes as a result of no face-to-face contact and less opportunity for the development of a therapeutic alliance. It is interesting to note at this juncture that a similar RCT was being run, in partnership with the present research, but in Sweden (Rozental et al., 2017). This study had a much higher retention of participants, and an important difference to the current research was that participants had a face-to-face meeting with their guides prior to starting the intervention. It is possible that this aided development of the therapeutic alliance, leading to lower drop-out rates. Given this, further research investigating the impact of a face-to-face meeting, and the obstacles that perfectionists might face in developing a therapeutic alliance, might be invaluable to the development and refinement of ICBT for perfectionism, as well as for the treatment of other disorders that are associated with high levels of perfectionism.

Are Control Participants Treated Fairly?

One of the main ethical considerations in conducting an RCT is that participants allocated to a control group do not receive the intervention. In situations

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where the intervention may cause harm, it could be argued that participants in the experimental group are at greater risk (e.g. drug treatment trials). In the case of the present research, however, a previous RCT had already shown that ICBT for perfectionism without guidance was effective at reducing levels of perfectionism (Egan, van Noort, et al., 2014). Additionally, previous research has shown that providing guidance as part of ICBT can reduce drop-out and improve recovery rates in treatment of depression and anxiety (Andersson & Cuijpers, 2009; Spek et al., 2007). Given this, it was likely that by not providing participants in the control group with guided ICBT for perfectionism, we were denying them access to a helpful intervention, while still asking them to contribute a great deal in the form of completing screening measures, post-intervention measures, follow-up measures and weekly questionnaires.

The possibility of designing the study so that the control group was a wait-list control group, meaning that they would receive the intervention after completion of the initial trial, was discussed at length. Although everyone involved was clear that they would ideally like to be able to do this, it was deemed that it would not be possible. The research did not receive any direct funding. The senior researchers involved were funded by their posts or grants for other projects. The undergraduate, masters, and PhD students working as guides for the intervention were unfunded for the main part, and completed the work as part of their training or due to a desire for the experience in addition to their other work. I myself was funded through the doctorate in clinical psychology. Due to this, it was not possible to fund staff to act as guides for the extended period of time that would have been necessary to provide the intervention to the control group.

To mitigate the impact of this it was decided that participants in the control group would be given a copy of *Overcoming Perfectionism: A Self Help Guide Using Cognitive Behavioural Techniques* (Shafran, Egan, & Wade, 2010). All participants

were also given £20 worth of Amazon voucher in total as a token of thanks for the contribution of their time. Although this was, I feel, a good way of dealing with the conflict of what was ideal and what was possible, questions remain. Should we, for example, have applied for funding to enable us to provide the intervention to the control group? This may have been a good route in an ideal situation; however, writing grant applications is time consuming and we were limited as to the time available. Another option might have been to offer the pure ICBT intervention which does not require guidance. Unfortunately this was something I only thought about after completion of the trial.

One final option would have been to give everyone the intervention and only have an experimental group, meaning that the study would have been uncontrolled. Findings from this type of study could have been compared to previous research. Although this would have addressed ethical concerns regarding the control group not receiving the intervention, it would also have limited our evaluation. RCTs are the most methodologically sound way of evaluating an intervention, minimising confounding factors and allowing us to determine causality. In balancing out the utility of the research against not being able to provide control participants with the intervention, I believe the best course of action was taken.

The Role of the Clinician-Researcher

Great importance is placed on the need for clinician-researchers: individuals who provide direct services *and* conduct research. It is believed by some, for example, that a field of research is likely to progress slower if none of the researchers are directly engaged in the support and care of the relevant population, and research may not correspond as well with clinical need (Lampropoulos & Spengler, 2002; Rosenberg, 1999). Despite this, reports suggest a decline in the

number of clinical psychologists who are directly involved in research (Lampropoulos & Spengler, 2002; Rice, 1997).

There are a number of advantages to be gained from playing both roles associated with innovation, insight that cannot be gained from the literature, and coordination with research sites (Yanos & Ziedonis, 2006). In conducting the present research, the understanding of CBT that I had due to my clinical training and placement experience enabled me to create training for, and provide better supervision to, the guides working on the RCT. In addition, a real world understanding of how perfectionism presents, and the obstacles someone high in perfectionism might face in day-to-day life, provided experience and examples for me to work with when providing supervision. The advantages experienced were bidirectional. An increased understanding of perfectionism, due to the research, proved to be useful in clinical settings when trying to understand barriers to participants engaging in treatment, with specific interventions or completing homework, for example. I was also able to provide training to staff in various settings (Improving Access to Psychological Services, Intellectual Disabilities, and Oncology) on perfectionism and treatment. In addition, further understanding of low-intensity interventions, in combination with experience across a variety of placement settings, has led me to develop a number of ideas about how low intensity interventions might be more incorporated into specialist services.

There are also a number of disadvantages, or difficulties, associated with playing both roles. The conflict I experienced when it became clear that participants in the control group would not receive the intervention is an example of this, in that it was difficult to reconcile the aims of the research with the needs of the individual participants. This conflict was somewhat minimised in conducting the current research through my working with a team of people, who regularly discussed potential difficulties such as these in research meetings. Another potential

disadvantage arises when, as a clinician-researcher, you are assessing the efficacy of an intervention that you helped to develop. Researcher allegiance to an intervention can impact upon the outcomes of RCTs (Luborsky et al., 1999). In the case of the present research the perfectionism specific CBT protocol, on which the ICBT intervention was based, was designed by three senior researchers leading the project, Roz Shafran, Tracey Wade, and Sarah Egan. However, the potential effects of researcher allegiance to the intervention was somewhat mitigated by the fact that none of these researchers were involved in the day to day coordination of the study, or the treatment of any participants.

Conclusion

Through this research I have developed my understanding of the challenges associated with running a randomised controlled trial, and also of evaluating an internet-based intervention. Internet-based CBT shows promise, and the findings of the present research have contributed to the evidence base for this. The main limitation of the present research was the lack of a qualitative arm which would have allowed us to explore barriers to uptake and reasons for drop out. Given that there were no differences in the demographic characteristics between participants who did and did not drop-out of the RCT, it seems that a more exploratory and in-depth approach is needed, and this would have been possible through qualitative interviews.

The findings of the present research also contribute to the increasing evidence that ICBT is more effective with the addition of guidance. Given the increase in online interventions, and the likelihood of further increase to meet growing need, the role of the guide, and an understanding of the minimal training and skills required for guides to feel confident, warrants further research.

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Appendix A: Template of the adapted version of the quality assessment tool for observational, cohort, and cross-sectional studies.

Criteria	Yes	No	Other (CD, NR, NA)*
1. Was an objective of this paper to investigate the correlation between self-esteem and perfectionism?			
2. Was the study population clearly specified and defined?			
3. Was the participation rate of eligible persons at least 50%?			
4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study pre-specified and applied uniformly to all participants?			
5. Was a sample size justification, power description, or variance and effect estimates provided?			
6. Were all measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?			

Quality Rating (Good, Fair, or Poor) (see guidance)
Rater #1 initials:
Rater #2 initials:
Additional Comments (If POOR, please state why):

*CD, cannot determine; NA, not applicable; NR, not reported

Guidance for Assessing the Quality of Observational Cohort and Cross-Sectional Studies

The guidance document below is organized by question number from the tool for quality assessment of observational cohort and cross-sectional studies.

Question 1. Research question

Did the authors describe their goal in conducting this research? Is it easy to understand what they were looking to find? This issue is important for any scientific paper of any type. Higher quality scientific research explicitly defines a research question.

Questions 2 and 3. Study population

Did the authors describe the group of people from which the study participants were selected or recruited, using demographics, location, and time period? If you were to conduct this study again, would you know who to recruit, from where, and from what time period? Is the cohort population free of the outcomes of interest at the time they were recruited?

An example would be men over 40 years old with type 2 diabetes who began seeking medical care at Phoenix Good Samaritan Hospital between January 1, 1990 and December 31, 1994. In this example, the population is clearly described as: (1) who (men over 40 years old with type 2 diabetes); (2) where (Phoenix Good Samaritan Hospital); and (3) when (between January 1, 1990 and December 31, 1994). Another example is women ages 34 to 59 years of age in 1980 who were in the nursing profession and had no known coronary disease, stroke, cancer, hypercholesterolemia, or diabetes, and were recruited from the 11 most populous States, with contact information obtained from State nursing boards.

In cohort studies, it is crucial that the population at baseline is free of the outcome of interest. For example, the nurses' population above would be an appropriate group in which to study incident coronary disease. This information is usually found either in descriptions of population recruitment, definitions of variables, or inclusion/exclusion criteria.

You may need to look at prior papers on methods in order to make the assessment for this question. Those papers are usually in the reference list.

If fewer than 50% of eligible persons participated in the study, then there is concern that the study population does not adequately represent the target population. This increases the risk of bias.

Question 4. Groups recruited from the same population and uniform eligibility criteria

Were the inclusion and exclusion criteria developed prior to recruitment or selection of the study population? Were the same underlying criteria used for all of the subjects involved? This issue is related to the description of the study population, above, and you may find the information for both of these questions in the same section of the paper.

Most cohort studies begin with the selection of the cohort; participants in this cohort are then measured or evaluated to determine their exposure status. However, some cohort studies may recruit or select exposed participants in a different time or place than unexposed participants, especially retrospective cohort studies–which is when data are obtained from the past (retrospectively), but the analysis examines exposures prior to outcomes. For example, one research question could be whether diabetic men with clinical depression are at higher risk for cardiovascular disease than those without clinical depression. So, diabetic men with depression might be selected from a mental health clinic, while diabetic men without depression might be selected from an internal medicine or endocrinology clinic. This study recruits groups from different clinic populations, so this example would get a "no."

However, the women nurses described in the question above were selected based on the same inclusion/exclusion criteria, so that example would get a "yes."

Question 5. Sample size justification

Did the authors present their reasons for selecting or recruiting the number of people included or analyzed? Do they note or discuss the statistical power of the study? This question is about whether or not the study had enough participants to detect an association if one truly existed.

A paragraph in the methods section of the article may explain the sample size needed to detect a hypothesized difference in outcomes. You may also find a discussion of power in the discussion section (such as the study had 85 percent power to detect a 20 percent increase in the rate of an outcome of interest, with a 2-sided alpha of 0.05). Sometimes estimates of variance and/or estimates of effect size are given, instead of sample size calculations. In any of these cases, the answer would be "yes."

However, observational cohort studies often do not report anything about power or sample sizes because the analyses are exploratory in nature. In this case, the answer would be "no." This is not a "fatal flaw." It just may indicate that attention was not paid to whether the study was sufficiently sized to answer a prespecified question–i.e., it may have been an exploratory, hypothesis-generating study.

Question 6. Exposure measures and assessment

Were the exposure measures defined in detail? Were the tools or methods used to measure exposure accurate and reliable–for example, have they been validated or are they objective? This issue is important as it influences confidence in the reported exposures. When exposures are measured with less accuracy or validity, it is harder to see an association between exposure and outcome even if one exists. Also as important is whether the exposures were assessed in the same manner within groups and between groups; if not, bias may result.

For example, retrospective self-report of dietary salt intake is not as valid and reliable as prospectively using a standardized dietary log plus testing participants' urine for sodium

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content. Another example is measurement of BP, where there may be quite a difference between usual care, where clinicians measure BP however it is done in their practice setting (which can vary considerably), and use of trained BP assessors using standardized equipment (e.g., the same BP device which has been tested and calibrated) and a standardized protocol (e.g., patient is seated for 5 minutes with feet flat on the floor, BP is taken twice in each arm, and all four measurements are averaged). In each of these cases, the former would get a "no" and the latter a "yes."

Here is a final example that illustrates the point about why it is important to assess exposures consistently across all groups: If people with higher BP (exposed cohort) are seen by their providers more frequently than those without elevated BP (nonexposed group), it also increases the chances of detecting and documenting changes in health outcomes, including CVD-related events. Therefore, it may lead to the conclusion that higher BP leads to more CVD events. This may be true, but it could also be due to the fact that the subjects with higher BP were seen more often; thus, more CVD-related events were detected and documented simply because they had more encounters with the health care system. Thus, it could bias the results and lead to an erroneous conclusion.

Some general guidance for determining the overall quality rating of observational cohort and cross-sectional studies

The questions on the form are designed to help you focus on the key concepts for evaluating the internal validity of a study. They are not intended to create a list that you simply tally up to arrive at a summary judgment of quality.

Internal validity for cohort studies is the extent to which the results reported in the study can truly be attributed to the exposure being evaluated and not to flaws in the design or conduct of the study–in other words, the ability of the study to draw associative conclusions about the effects of the exposures being studied on outcomes. Any such flaws can increase the risk of bias.

Critical appraisal involves considering the risk of potential for selection bias, information bias, measurement bias, or confounding (the mixture of exposures that one cannot tease out from each other). Examples of confounding include co-interventions, differences at baseline in patient characteristics, and other issues throughout the questions above. High risk of bias translates to a rating of poor quality. Low risk of bias translates to a rating of good quality. (Thus, the greater the risk of bias, the lower the quality rating of the study.)

In addition, the more attention in the study design to issues that can help determine whether there is a causal relationship between the exposure and outcome, the higher quality the study. These include exposures occurring prior to outcomes, evaluation of a dose-response gradient, accuracy of measurement of both exposure and outcome, sufficient timeframe to see an effect, and appropriate control for confounding–all concepts reflected in the tool.

Generally, when you evaluate a study, you will not see a "fatal flaw," but you will find some risk of bias. By focusing on the concepts underlying the questions in the quality assessment tool, you should ask yourself about the potential for bias in the study you are critically appraising. For any box where you check "no" you should ask, "What is the potential risk of bias resulting from this flaw in study design or execution?" That is, does this factor cause you to doubt the results that are reported in the study or doubt the ability of the study to accurately assess an association between exposure and outcome?

The best approach is to think about the questions in the tool and how each one tells you something about the potential for bias in a study. The more you familiarize yourself with the key concepts, the more comfortable you will be with critical appraisal. Examples of studies rated good, fair, and poor are useful, but each study must be assessed on its own based on the details that are reported and consideration of the concepts for minimizing bias.

Original tool can be found at:

https://www.nhlbi.nih.gov/health-pro/guidelines/in-develop/cardiovascular-risk-reduction/tools/cohort

Appendix B: Table showing ratings of studies included in the

meta-analytic review, according to adapted rating tool.

	Allen et al. (2014)	Ashby et al. (2002)	Athulya et al. (2016)	Elion et al. (2012)	Flett et al. (1991)	Gotwals et al. (2003)	Grzegorek et al. (2004)	Hibbard et al. (2011)	Kuennen et al. (2007)	Lo & Abbott (2013)	Murray et al. (2013)	Ortega et al. (2014)	Park et al. (2015)	Pearson et al. (2006)	Preusser et al. (1994)	Rice et al. (2007)	Sherry et al. (2015)	Trumpeter et al. (2006)	Wang et al. (2007)	Wang (2010)	Wang et al. (2012)
1. Was an objective of this study to investigate the correlation between self-esteem and perfectionism?	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	N	N	N	Y	Y	N	Y
2. Was the study population clearly specified and defined?	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3. Was the participation rate of eligible persons at least 50%?	NR	NR	NR	NR	NR	NR	Y	NR	NR	NR	NR	Y	NR	Y	NR	NR	Y	NR	NR	NR	NR
4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
5. Was a sample size justification or power description provided?	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
6. Were the variables clearly defined, valid, reliable, and implemented consistently across all study participants?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Overall rating	F	F	F	F	F	F	G	F	F	F	F	G	F	G	F	F	G	F	F	F	F

1. Y = yes, N = no; 2. NR = Not relevant; 3. F = Fair; 4. G = Good

Appendix C: Questions for feedback questionnaire for participants in the experimental group.

Designed by the present author, administered and completed online.

1. Which modules in the course did you personally find helpful?
(The following should be check box answers where participants can tick more than one box)
   Module 1: Understanding perfectionism
   Module 2: Your perfectionism cycle
   Module 3: Surveys and experiments
   Module 4: New ways of thinking
   Module 5: Useful skills for managing unhelpful perfectionism
   Module 6: Self-criticism or self-compassion?
   Module 7: Re-examining the way we define our self-worth
   Module 8: Staying well: managing unhelpful perfectionism in the long term

1b. Why do you think these modules were particularly helpful?
(This should be followed by a free text box)

1c. In what way did these modules affect your thoughts, emotions and behaviour?
(This should be followed by a free text box)

1d. How did these modules affect different areas of your life (e.g. work, studying, relationships, social time, relaxing time etc.)?
(This should be followed by a free text box)

2. Which modules in the course did you find less helpful?
(The following should be check box answers where participants can tick more than one box)
   Module 1: Understanding perfectionism
   Module 2: Your perfectionism cycle
   Module 3: Surveys and experiments
   Module 4: New ways of thinking
   Module 5: Useful skills for managing unhelpful perfectionism
   Module 6: Self-criticism or self-compassion?
   Module 7: Re-examining the way we define our self-worth
   Module 8: Staying well: managing unhelpful perfectionism in the long term

2b. Why do you think you found these modules less helpful?
(This should be followed by a free text box)

2c. Is there anything you think could be done to improve these modules and make them more helpful?
(This should be followed by a free text box)

3. Were there any parts of the course that didn't make sense to you, or were difficult to understand?

   Yes [ ]   No [ ]

3a. If your answer was yes, please tell us about the parts that were difficult to understand.
(This should be followed by a free text box)

4. Did you feel supported throughout by your guide?
I felt very supported by my guide [ ]
I felt somewhat supported by my guide [ ]
I have mixed feelings about the level of support I experienced [ ]
I did not feel supported enough by my guide [ ]
I did not feel at all supported by my guide [ ]

4b. What things did your guide do that you found helpful?
(This should be followed by a free text box)

4c. What things did your guide do that you found unhelpful?
(This should be followed by a free text box)

4d. What could your guide have done differently or additionally that would have made you feel more supported?
(This should be followed by a free text box)

5. Please rate the following aspects of the course according to how easy you found them to understand:

	Very easy to understand	Fairly easy to understand	Difficult to understand
The information that you read and learned	[ ]	[ ]	[ ]
The worksheets that you were asked to complete	[ ]	[ ]	[ ]
The between session work you were asked to do	[ ]	[ ]	[ ]
The questionnaires you were asked to complete	[ ]	[ ]	[ ]

5b. What would have made the course more easy to understand?
(This should be followed by a free text box)

6. Please rate the following aspects of the course according to how easy you found them to complete:

	Very easy to complete	Fairly easy to complete	Difficult to complete
The information that you read and learned	[ ]	[ ]	[ ]
The worksheets that you were asked to complete	[ ]	[ ]	[ ]
The between session work you were asked to do	[ ]	[ ]	[ ]
The questionnaires you were asked to complete	[ ]	[ ]	[ ]

6b. If you rated any of the above as difficult to complete, please expand on why you think this is.
(This should be followed by a free text box)

7. Please rate the following aspects of the website according to how easy you found them to use:

	Very easy to use	Fairly easy to use	Difficult to use
Navigating to different pages of the website	[ ]	[ ]	[ ]
Completing worksheets	[ ]	[ ]	[ ]
Completing questionnaires	[ ]	[ ]	[ ]
Using the messaging system to communicate with your guide	[ ]	[ ]	[ ]

8. Do you have any other thoughts or comments that you would like to share?
(This should be followed by a free text box)

9. Are you happy to be contacted to discuss your feedback in greater depth?

I would rather not be contacted [   ]

I consent to being contacted on the details below [   ]

Name [   ]
Telephone number [   ]
Email Address [   ]

Appendix D: The Frost Multidimensional Perfectionism Scale

(FMPS; Frost et al., 1990)

Administered and completed online.

MPS-F

Please consider each statement and circle the corresponding number that best reflects your agreement with the statement *over the last two weeks.* **Please be sure to read each statement carefully.**

(please circle one number on each line)

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1) My parents set very high standards for me	1	2	3	4	5
2) Organisation is very important to me	1	2	3	4	5
3) As a child, I was punished for doing things less than perfect	1	2	3	4	5
4) If I do not set the highest standards for myself, I am likely to end up a second-rate person	1	2	3	4	5
5) My parents never tried to understand my mistakes	1	2	3	4	5
6) It is important to me that I be thoroughly competent in everything I do	1	2	3	4	5
7) I am a neat person	1	2	3	4	5
8) I try to be an organised person	1	2	3	4	5
9) If I fail at work/school, I am a failure as a person	1	2	3	4	5
10) I should be upset if I make a mistake	1	2	3	4	5

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
11) My parents wanted me to be the best at everything	1	2	3	4	5
12) I set higher goals than most people	1	2	3	4	5
13) If someone does a task at work/school better than me, then I feel like I failed the whole task	1	2	3	4	5
14) If I fail partly, it is as bad as being a complete failure	1	2	3	4	5
15) Only outstanding performance is good enough in my family	1	2	3	4	5
16) I am very good at focusing my efforts on attaining a goal	1	2	3	4	5
17) Even when I do something very carefully, I often feel that it is not quite right	1	2	3	4	5
18) I hate being less than the best at things	1	2	3	4	5
19) I have extremely high goals	1	2	3	4	5
20) My parents have expected excellence from me	1	2	3	4	5
21) People will probably think less of me if I make a mistake	1	2	3	4	5
22) I never felt like I could meet my parents' expectations	1	2	3	4	5

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	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
23) If I do not do as well as other people, it means I am an inferior human being	1	2	3	4	5
24) Other people seem to accept lower standards from themselves than I do	1	2	3	4	5
25) If I do not do well all the time, people will not respect me	1	2	3	4	5
26) My parents have always had higher expectations for my future than I have	1	2	3	4	5
27) I try to be a neat person	1	2	3	4	5
28) I usually have doubts about the simple everyday things I do	1	2	3	4	5
29) Neatness is very important to me	1	2	3	4	5
30) I expect higher performance in my daily tasks than most people	1	2	3	4	5
31) I am an organised person	1	2	3	4	5
32) I tend to get behind in my work because I repeat things over and over	1	2	3	4	5
33) It takes me a long time to do something "right"	1	2	3	4	5
34) The fewer mistakes I make, the more people will like me	1	2	3	4	5
35) I never felt like I could meet my parents' standards	1	2	3	4	5

Appendix E: The Clinical Perfectionism Questionnaire (CPQ; Fairburn et al., 2003)

Administered and completed online.

INSTRUCTIONS

This questionnaire is concerned with "perfectionism". **By perfectionism, we mean trying to meet really high standards whether or not you actually succeed in reaching them. In this questionnaire we are only concerned with perfectionism that affects areas of life other than your eating, weight, or appearance.**

Have you been trying to achieve high standards over the past month whether or not you have succeeded (excluding standards for your eating, weight or appearance)?
Please circle YES or NO.
YES / NO

If so, in what areas of your life (other than eating, weight or appearance) has this applied?
- for example, it might have been in your performance at work, at sport, at music, at home, etc. Please note these below:
....
....

Now, please place a 'X' in the column below which best describes you over the past month. Remember, do not count standards for your eating, weight or appearance.

	Over the past month…….	Not at all	Some of the time	Most of the time	All of the time
1	Over the past month, have you pushed yourself really hard to meet your goals?				
2	Over the past month, have you tended to focus on what you have achieved, rather than on what you have not achieved?				
3	Over the past month, have you been told that your standards are too high?				
4	Over the past month, have you felt a failure as a person because you have not succeeded in meeting your goals?				
5	Over the past month, have you been afraid that you might not reach your standards?				
6	Over the past month, have you raised your standards because you thought they were too easy?				

	Over the past month …….	Not at all	Some of the time	Most of the time	All of the time
7	Over the past month, have you judged yourself on the basis of your ability to achieve high standards?				
8	Over the past month, have you done just enough to get by?				
9	Over the past month, have you <u>repeatedly</u> checked how well you are doing at meeting your standards (for example, by comparing your performance with that of others)?				
10	Over the past month, do you think that other people would have thought of you as a "perfectionist"?				
11	Over the past month, have you kept trying to meet your standards, even if this has meant that you have missed out on things?				
12	Over the past month, have you avoided any tests of your performance (at meeting your goals) in case you failed?				

THANK YOU

Appendix F: The Rosenberg Self-esteem Scale (RSES; Rosenberg, 1965)

Administered and completed online.

Rosenberg Self-Esteem Scale (Rosenberg, 1965)

The scale is a ten item Likert scale with items answered on a four point scale - from strongly agree to strongly disagree. The original sample for which the scale was developed consisted of 5,024 High School Juniors and Seniors from 10 randomly selected schools in New York State.

Instructions: Below is a list of statements dealing with your general feelings about yourself. If you strongly agree, circle **SA**. If you agree with the statement, circle **A**. If you disagree, circle **D**. If you strongly disagree, circle **SD**.

1.	On the whole, I am satisfied with myself.	SA	A	D	SD
2.*	At times, I think I am no good at all.	SA	A	D	SD
3.	I feel that I have a number of good qualities.	SA	A	D	SD
4.	I am able to do things as well as most other people.	SA	A	D	SD
5.*	I feel I do not have much to be proud of.	SA	A	D	SD
6.*	I certainly feel useless at times.	SA	A	D	SD
7.	I feel that I'm a person of worth, at least on an equal plane with others.	SA	A	D	SD
8.*	I wish I could have more respect for myself.	SA	A	D	SD
9.*	All in all, I am inclined to feel that I am a failure.	SA	A	D	SD
10.	I take a positive attitude toward myself.	SA	A	D	SD

Scoring: SA=3, A=2, D=1, SD=0. Items with an asterisk are reverse scored, that is, SA=0, A=1, D=2, SD=3. Sum the scores for the 10 items. The higher the score, the higher the self esteem.

Appendix G: The Intolerance of Uncertainty Scale (IoU; Freeston et al., 1994)

Administered and completed online.

IUS

You will find below a series of statements which describe how people may react to the uncertainties of life. Please use the scale below to describe to what extent each item is characteristic of you. Please circle a number (1 to 5) that describes you best.

	Not at all characteristic of me		Somewhat characteristic of me		Entirely characteristic of me
1. Uncertainty stops me from having a firm opinion.	1	2	3	4	5
2. Being uncertain means that a person is disorganized.	1	2	3	4	5
3. Uncertainty makes life intolerable.	1	2	3	4	5
4. It's unfair not having any guarantees in life.	1	2	3	4	5
5. My mind can't be relaxed if I don't know what will happen tomorrow.	1	2	3	4	5
6. Uncertainty makes me uneasy, anxious, or stressed.	1	2	3	4	5
7. Unforeseen events upset me greatly.	1	2	3	4	5
8. It frustrates me not having all the information I need.	1	2	3	4	5
9. Uncertainty keeps me from living a full life.	1	2	3	4	5
10. One should always look ahead so as to avoid surprises.	1	2	3	4	5

	Not at all characteristic of me		Somewhat characteristic of me		Entirely characteristic of me
11. A small unforeseen event can spoil everything, even with the best of planning.	1	2	3	4	5
12. When it's time to act, uncertainty paralyses me.	1	2	3	4	5
13. Being uncertain means that I am not first rate.	1	2	3	4	5
14. When I am uncertain, I can't go forward.	1	2	3	4	5
15. When I am uncertain I can't function very well.	1	2	3	4	5
16. Unlike me, others always seem to know where they are going with their lives.	1	2	3	4	5
17. Uncertainty makes me vulnerable, unhappy, or sad.	1	2	3	4	5
18. I always want to know what the future has in store for me.	1	2	3	4	5
19. I can't stand being taken by surprise.	1	2	3	4	5
20. The smallest doubt can stop me from acting.	1	2	3	4	5
21. I should be able to organize everything in advance.	1	2	3	4	5
22. Being uncertain means that I lack confidence.	1	2	3	4	5

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	Not at all characteristic of me	Somewhat characteristic of me	Entirely characteristic of me

23. I think it's unfair that other people seem sure about their future. ....1...................... ....2........... ....3.......... ....4...................... ....5............

24. Uncertainty keeps me from sleeping soundly. ....1...................... ....2........... ....3.......... ....4...................... ....5............

25. I must get away from all uncertain situations. ....1...................... ....2........... ....3.......... ....4...................... ....5............

26. The ambiguities in life stress me.... ....1...................... ....2........... ....3.......... ....4...................... ....5............

27. I can't stand being undecided about my future. ....1...................... ....2........... ....3.......... ....4...................... ....5............

Appendix H: Ethical Approval from UCL Research Ethics Committee

UCL RESEARCH ETHICS COMMITTEE
ACADEMIC SERVICES

Professor Roz Shafran
Institute of Child Health
UCL

3 February 2015

Dear Professor Shafran

<u>Notification of Ethical Approval</u>
<u>Project ID 6222/001: Guided online self-help for perfectionism: a randomised controlled trial</u>

I am pleased to confirm in my capacity as Chair of the UCL Research Ethics Committee (REC) that your study has been approved by the UCL REC for the duration of the project i.e. **until February 2018.**

Approval is subject to the following conditions:

1. You must seek Chair's approval for proposed amendments to the research for which this approval has been given. Ethical approval is specific to this project and must not be treated as applicable to research of a similar nature. Each research project is reviewed separately and if there are significant changes to the research protocol you should seek confirmation of continued ethical approval by completing the 'Amendment Approval Request Form': http://ethics.grad.ucl.ac.uk/responsibilities.php

2. It is your responsibility to report to the Committee any unanticipated problems or adverse events involving risks to participants or others. Both non-serious and serious adverse events must be reported.

   Reporting Non-Serious Adverse Events
   For non-serious adverse events you will need to inform Helen Dougal, Ethics Committee Administrator (ethics@ucl.ac.uk), within ten days of an adverse incident occurring and provide a full written report that should include any amendments to the participant information sheet and study protocol. The Chair or Vice-Chair of the Ethics Committee will confirm that the incident is non-serious and report to the Committee at the next meeting. The final view of the Committee will be communicated to you.

   Reporting Serious Adverse Events
   The Ethics Committee should be notified of all serious adverse events via the Ethics Committee Administrator immediately the incident occurs. Where the adverse incident is unexpected and serious, the Chair or Vice-Chair will decide whether the study should be terminated pending the opinion of an independent expert. The adverse event will be considered at the next Committee meeting and a decision will be made on the need to change the information leaflet and/or study protocol.

On completion of the research you must submit a brief report (a maximum of two sides of A4) of your findings/concluding comments to the Committee, which includes in particular issues relating to the ethical implications of the research.

With best wishes for the research.

Yours sincerely

Professor John Foreman
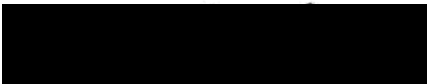**Chair of the UCL Research Ethics Committee**

Cc: Professor Catherine Law

Appendix I: Ethical approval for amendment to original

application.

Amendment Approval Request Form

1	Project ID Number: 6222-001	Name and Address of Principal Investigator: Roz Shafran

2	Project Title: Guided Online Self-help for perfectionism: A randomised controlled trial.

3	Type of Amendment/s (tick as appropriate)

☒ Research procedure/protocol (including research instruments)
☐ Participant group
☐ Sponsorship/collaborators
☐ Extension to approval needed (extensions are given for one year)
☒ Information Sheet/s
☒ Consent form/s
☐ Other recruitment documents
☐ Principal researcher/medical supervisor*
☐ Other *

*Additions to the research team other than the principal researcher, student supervisor and medical supervisor do not need to be submitted as amendments but a complete list should be available upon request.

4

Justification (give the reasons why the amendment/s are needed)
Amendment 1: Measures
We predict that an intervention targetting clinical perfectionsim may also cause change in self-esteem (Ashby & Rice, 2002), mental well-being (Kendler et al., 2013), compassion (Ferreira et al., 2013), and intolerance of uncertainty (Carleton et al., 2012) and would like to include measures of those constructs. Given the additional time it will take for participants to complete those measures, we would like to remove the diagnostic assessment (MINI) (Sheehan et al., 1998). The total time taken to complete all of the measures is approximately 30 minutes.

Amendment 1b: Follow-up
We would like to ask participants to complete all of the measures up to 12 months after completion of the intervention to assess change at follow-up.

Amendment 2: Opportunity for feedback
Given the originality of the study, would like to give participants the opportunity to provide feedback in the form of individual semi-structured interviews.

Amendment 3: Recruitment
Participants will additionally be recruited through sixth-form colleges using advertisements which will state that research is looking into treating high levels of unhelpful perfectionism.

Amendment 4: Demographics
We would like to collect demographic information about participants age, gender, ethnicity, marital status and educational attainment using categories based on those from the Office of National Statistics.

Ashby, J. S., & Rice, K. G. (2002). Perfectionism, dysfunctional attitudes, and self-esteem: A structural equations analysis. Journal of Counseling & Development, 80(2), 197-203.

Carleton, R. N., Mulvogue, M. K., Thibodeau, M. A., McCabe, R. E., Antony, M. M., & Asmundson, G. J. (2012). Increasingly certain about uncertainty: Intolerance of uncertainty across anxiety and depression. Journal of Anxiety Disorders, 26(3), 468-479.

Ferreira, C., Pinto-Gouveia, J., & Duarte, C. (2013). Self-compassion in the face of shame and body image

dissatisfaction: Implications for eating disorders.Eating behaviors, 14(2), 207-210.

Kendler, K. S., Myers, J. M., Maes, H. H., & Keyes, C. L. (2011). The relationship between the genetic and environmental influences on common internalizing psychiatric disorders and mental well-being. Behavior genetics,41(5), 641-650.

Details of Amendments (provide full details of each amendment requested, state where the changes have been made and attach all amended and new documentation)

Amendment 1
Four short, standardised, and validated, measures will be additionally included: the Fears of Compassion Scales final subscale (15 items) (Gilbert, McEwan, Matos and Rivis, 2011), the Warwick-Edinburgh mental well-being scale (Tennant, Hiller, Fishwick, Platt, Joseph, Weich, and Stewart-Brown, 2007), the Rosenberg Self-Esteem Scale (Rosenberg, 1965), and the Intolerance of Uncertainty Scale (Freeston, Rhéaume, Letarte, Dugas, and Ladouceur, 1994). To ensure that completion of these additional measures does not add a burden on participants the following steps have been taken: (i) the Mini International Neuropsychiatric Interview (Sheehan, Amorim, Janavs, Weiller, Hergueta & Baker, 1998) has now been excluded from the study; and (ii) the additional measures will only be completed prior to and post-intervention, not on a week by week basis.

Ammendment 1b
Participants will be asked to complete all assessment up to 12 months after completion of the intervention. An email will be sent to participants reminding them to do this at the time.

Amendment 2
Participants will be asked to check a box if they give consent to being invited to provide feedback in the form of an interview after the intervention. It will be made clear that not giving consent to this aspect of the study will not affect their involvement in the remainder of the study. We will ask permission for Individual, semi-structured interviews to be conducted and audio-recorded with a subset of 20 participants. The focus of interviews will be on participant experience of the intervention, primarily: (i) which aspects of the intervention participants perceived to be more or less helpful, (ii) any components of the intervention that participants experienced as difficult to understand or complete, (iii) participant experience of the level of support provided by therapists, and (iv) particular differences noted in day to day life as a result of the skills learned through the intervention. Data will be analysed using a thematic analysis approach (Braun & Clarke, 2006), and will provide valuable feedback which will be used to improve and develop the proposed intervention. The interview is attached.

Amendment 3
Post discussion with teaching representatives, we believe that students of 18 years old and above in sixth-form colleges are likely to be interested in participating in this study, and are also likely to benefit greatly from the intervention. The study will be advertised in collaboration with the school in approved locations and will state that research is looking into treating high levels of unhelpful perfectionism.

Ammendment 4
Basic demographic details will be requested. Questions are attached.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology.Qualitative research in psychology, 3(2), 77-101.

Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M. J., & Ladouceur, R. (1994). Why do people worry?. Personality and individual differences, 17(6), 791-802.

Gilbert, P., McEwan, K., Matos, M., & Rivis, A. (2011). Fears of compassion: Development of three self-report measures. Psychology and Psychotherapy: Theory, Research and Practice, 84(3), 239-255.

Rosenberg, M. (1965). Rosenberg self-esteem scale (RSE). Acceptance and commitment therapy. Measures package, 61.

Sheehan, K.H., Amorim, P., Janavs, J., Weiller, E., Hergueta, T., Baker, R., et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. Journal of Clinical Psychiatry, 59 (1998): 22-33.

Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., & Stewart-Brown, S. (2007). The Warwick-Edinburgh mental well-being scale (WEMWBS): development and UK validation. Health and Quality of life Outcomes, 5(1), 63.

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6	**Ethical Considerations** (insert details of any ethical issues raised by the proposed amendment/s) **Amendment 1** The additional measures are standardised and widely used in research. Given that they assess traits rather than psychological difficulties, we do not anticipate that completion of these additional measures will be upsetting to participants. **Amendment 1b** None predicted. If any concerns are raised about a participants well-being at follow-up they will be referred to the appropriate service for further support. **Amendment 2** Individual interviews will be investigating the participants experience of the intervention. Participants will not be approached to give an interview unless they have checked a box during consent giving permission to be contacted for this purpose. The information sheet and consent form will make it clear that declining to consent to this part of the study will not affect participation in any other part of the study. **Ammendment 3** We do not anticipate any ethical difficulties with recruiting from sixth-form colleges because of the following: (i) we will work in collaboration with sixth-forms to advertise in appropriate locations; (ii) we will make it clear that paticipants must be 18 years old or above; and (iii) we will not be approaching students directly, they will instead be approaching us if they are interested in particpating.
7	**Other Information** (provide any other information which you believe should be taken into account during ethical review of the proposed changes)

Declaration (to be signed by the Principal Researcher)

- I confirm that the information in this form is accurate to the best of my knowledge and I take full responsibility for it.
- I consider that it would be reasonable for the proposed amendments to be implemented.
- For student projects I confirm that my supervisor has approved my proposed modifications.

Signature:

Date: 30.04.15

FOR OFFICE USE ONLY:

Amendments to the proposed protocol have been ..*approved*..by the Research Ethics Committee.

Signature of the REC Chair, Professor John Foreman:

Date: ...7/5/2015.

Appendix J: Participant information sheet

Available online via the website www.overcomingperfectionism.co.uk during the trial.

Information Sheet for participants in Research Studies

You will be given a copy of this information sheet.

Title of Project: **Guided Online Self-help for perfectionism: A randomised controlled trial.**

This study has been approved by the UCL Research Ethics Committee (Project ID Number): 6222/001

Name   Roz Shafran

Work Address   UCL Institute of Child Health, 30 Guildford Street, London, WC1N 1EH

Contact Details   ich.overcomingperfectionism@ucl.ac.uk

Aims:

Perfectionism can be a problem for some people. This research aims to see if online self-help with guidance from a supporter is an effective treatment for perfectionism.

Who we are recruiting:

Any person over 18 with high levels of unhelpful perfectionism is invited to participate in this research project provided that they are not currently suicidal.

What will happen if you agree to take part

If you agree to take part, you will be sent some questionnaires to complete. These will assess your levels of perfectionism, mood, eating and other emotional difficulties you may be experiencing. If your scores indicate that you do have high levels of unhelpful perfectionism, you will be randomly assigned *either* to receive an eight module course of cognitive behaviour therapy for perfectionism with weekly email guidance from a supporter *or* asked to wait 12 weeks. After 12 weeks, everyone will be asked to complete the questionnaires again. People who are assigned to receive an eight module course of cognitive behaviour therapy with weekly guidance will be asked if they are happy to be contacted to complete a feedback interview afterwards, which will be recorded and transcripts will be anonymous. Participants will also be asked to complete the questionnaires again up to 12 months after. People who are assigned to wait 12 weeks, will be given all the materials for the course of cognitive behaviour therapy for perfectionism at that time but will not receive weekly guidance. The cognitive behaviour therapy course is all on-line and can be completed from any PC at any time that suits

you. The course will require an estimated total two-three hours per week including practice exercises.

What are the risks involved?

Some participants may find the guided-online self-help treatment for perfectionism challenging as it involves experiencing new situations. If you disclose that you are feeling suicidal, then we will need to inform your GP.

What are the benefits involved?

There are many benefits to taking part in this research. Most importantly is the reduction in symptoms of perfectionism. If participants also suffer from other disorders, for example Obsessive Compulsive Disorder (OCD), eating disorders, anxiety or depression, symptoms associated with these may also be reduced. Participants may also experience and increase in self-esteem and general well-being. In addition, on completion of follow-up measures at 12 weeks and 24 weeks each participant will receive a £10 Amazon voucher with our thanks (making a total of £20). We will offer all participants a copy of the final report evaluating the intervention.

Data Protection

All data will be collected and stored in accordance with the Data Protection Act 1998. The information you provide to us will be kept securely in a password-protected database. Your name and contact details will be kept separately from your questionnaires.

Time to decide
Please discuss the information above with others if you wish, or ask us if there is anything that is not clear or if you would like more information using the email provided at the top of this sheet.

It is up to you to decide whether to take part or not; choosing not to take part will not disadvantage you in any way. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you would rather not be contacted for a feedback interview you will be able to note this on the consent form and it will not affect your participation in the rest of the study. After signing the consent form you are still free to withdraw from the research at any time and without giving a reason.

Appendix K: Participant consent form.

Administered and completed online.

Informed Consent Form for participants in Research Studies

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Project: **Guided Online Self-help for perfectionism: A randomised controlled trial.**

This study has been approved by the UCL Research Ethics Committee (Project ID Number): 6222/001

Thank you for your interest in taking part in this research. Before you agree to take part, the person organising the research must explain the project to you.

If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you to decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

Participant's Statement

I

- have read the notes written above and the Information Sheet, and understand what the study involves.

- understand that if I decide at any time that I no longer wish to take part in this project, I can notify the researchers involved and withdraw immediately.

- consent to the processing of my personal information for the purposes of this research study.

- understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.

- agree that the research project named above has been explained to me to my satisfaction and I agree to take part in this study.

- understand that the information I have submitted will be published as a report and I will be sent a copy. Confidentiality and anonymity will be maintained and it will not be possible to identify me from any publications

Signed (or electronic check box):   Date:

Appendix L: Recruitment Poster

Placed on UCL premises.

Do you have extremely **high standards?**

Do you **judge yourself** on your ability to meet these high standards?

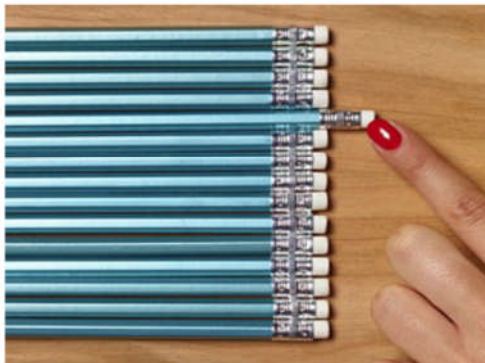# Do people call you a **perfectionist?**

If you are an adult and have perfectionism that is causing you difficulties, you may be eligible to take part in a study of a guided online self-help treatment.

To receive more information about taking part please visit:

www.overcomingperfectionism.co.uk

Or

Email: overcomingperfectionism@ich.ucl.ac.uk

Appendix M: Outline of contribution of the current researcher to the overall randomised controlled trial

The research presented in this thesis was conducted in collaboration with Professor Roz Shafran and her research team. The contribution of the current author was to include the follow-up part of the RCT at 24 weeks, and to include measures of self-esteem and intolerance of uncertainty to investigate the relationship between transdiagnostic traits. For both of these additions to the RCT a proposal was written and ethics acquired. The current author also registered the RCT on clinicaltrials.gov, and took the lead on writing and publishing the protocol for the study (Kothari, Egan, Wade, Andersson & Shafran, 2016).

With regard to design, the current author took part in, and contributed to, a number of meetings where the design and procedure of the RCT was discussed and decided. The intervention and procedure was trialled by the present author with pilot participants, and adjustments to the procedure were made in response to this. During the trial, the current author took the role of guide, administering the intervention to 13 participants, and also acted as a supervisor to the 11 other guides. The role of supervisor involved: (i) organising and providing training on CBT for perfectionism, and how to write guidance; (ii) reading through all responses to participants, and working with guides to develop their skills through working with them on their responses; (iii) allocating new participants to guides and supporting them with their case management; (iv) providing supervision in monthly supervision meetings where participants with complex difficulties were discussed.

The main findings of the RCT have been published, for which the current author contributed to preparation of the data and write-up of the paper (Shafran, Wade, Egan, Kothari, Allcott-Watson, Carlbring, Rozental, & Andersson). All analyses for the findings presented in the current thesis were conducted independently by the present author, and will be prepared for publication in due course. In addition, the present author also designed a feedback questionnaire, completed by participants in the experimental arm of the RCT, and included a measure of general well-being. The resulting data is also due to be analysed and written up for publication.