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An examination of factors that contribute to the development and maintenance of eating pathology

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Declaration

I hereby declare that this thesis has been submitted for the Doctorate in Clinical Psychology at The University of Sheffield. This thesis has not been submitted for any other degree or to any other institution.

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Literature Review

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Total

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Overall summary

Eating disorders are characterised by serious cognitive disturbances in eating attitudes and body satisfaction. They can have dangerous consequences for the patient's physical and psychological functioning, leading to high morbidity and mortality rates. Given that treatment recovery rates are currently between 45-60%, more research in the field of eating disorders is required. To contribute to our understanding of eating pathology, this project examined specific factors that are thought to be important in the maintenance and treatment of eating disorders by (a) examining the effectiveness of cognitive behavioural therapy for non-underweight eating disorders (CBT-ED) in reducing comorbid anxiety, and (b) testing the impact of reassurance-seeking on eating pathology and body satisfaction.

First, a systematic review of 14 studies assessing the effectiveness of CBT-ED in reducing comorbid anxiety was conducted. The review suggested that individual, group and computerised CBT-ED may be beneficial in reducing symptoms of anxiety in patients with non-underweight eating disorders. Self-help CBT-ED was not found to be effective in reducing anxiety. These findings have implications for the treatment of non-underweight eating disorders because clinicians have often viewed comorbidity as a reason to deviate from delivering evidence-based therapy. The results suggest that patients with a non-underweight eating disorder and comorbid anxiety may still benefit from CBT-ED. However, this review was based on a limited amount of studies, of varying quality, and should therefore be interpreted with caution. Reasons for the findings are discussed, alongside limitations of the review and the studies included. Further studies are needed, with high-quality research designs, to enable a more comprehensive review to be conducted in this area.

Second, an experimental study was conducted to test whether reassurance-seeking has an impact on eating pathology and body satisfaction. Sixty-four non-clinical participants were randomly allocated to one of three groups (body-related reassurance-seeking group, personality-related reassurance-seeking group, or the control group). Participants in the reassurance-seeking groups were given a reassurance-seeking task relating to either their body or their personality. Participants in the control group did nothing. Outcome measures were administered before and after the experimental phase. The results suggest that body-related and personality-related reassurance-seeking make eating pathology worse but in different ways. Body-related reassurance-seeking significantly increased concerns about weight and shape, and increased fear of uncontrollable weight gain. Personality-related reassurance-seeking significantly increased eating concerns. Body satisfaction was not affected by reassurance-seeking. These results suggest that reassurance-seeking should be considered in the treatment of eating disorders. Recommendations for clinical practice are made, alongside indicators for future research and limitations of the study design.

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Section 1: Literature Review

The effectiveness of cognitive behavioural therapy for non-underweight eating disorders in reducing comorbid anxiety: A systematic review

Abstract

Objectives. Patients with eating disorders often present with clinical levels of comorbid anxiety and depression. Such comorbidity can lead clinicians to deviate from the delivery of evidence-based therapy – particularly cognitive behavioural therapy (CBT). CBT for eating disorders (CBT-ED) has been found to reduce symptoms of comorbid depression, but it is unclear whether its effects extend to anxiety. This systematic review examined the effectiveness of CBT-ED for non-underweight eating disorders (NU-EDs) on reducing symptoms of anxiety.

Method: A systematic search of Web of Science, PsycINFO and Medline was conducted. Studies were included if they reported changes in anxiety after CBT-ED for patients with a NU-ED. The methodology of eligible studies was appraised, and a narrative synthesis of the data was conducted.

Results: Fourteen studies were included in this review. A review of the pre-post effect sizes for each study suggested that individual, group and computerised CBT-ED are effective in reducing anxiety. Self-help CBT-ED was not found to be effective.

Conclusions: When delivered in an individual, group or computerised format, CBT-ED seems to be beneficial in reducing anxiety in patients with a NU-ED. Reasons for this reduction and clinical implications are discussed alongside limitations of this review and the studies included. Further studies are needed, with high-quality research designs, to enable a more comprehensive review of the evidence base.

Key words: non-underweight eating disorder, eating disorder, anxiety, cognitive behavioural therapy.

Practitioner points

- The data suggests that patients with a NU-ED and comorbid anxiety may still benefit from an individual, group or computerised CBT-ED intervention.
- Clinicians should assess and monitor client's anxiety symptoms at the beginning and end of such treatments.
- If the anxiety has not reduced to a sub-clinical level post-treatment, clinicians should consider the use of a separate intervention to target the anxiety.
- Supervisors should ensure clinicians follow the recommendations above, and support clinicians to develop an awareness of when their own anxiety about patient complexity may be preventing the appropriate delivery of treatment.

Introduction

Eating disorders are responsive to cognitive behavioural therapy (CBT-ED). In particular, CBT-ED is the only evidence-based therapy recommended for non-underweight eating disorder (NU-ED) patients (National Institute for Health and Care Excellence, NICE, 2017). Nonetheless, clinicians often fail to use evidence-based therapies for patients with eating disorders (EDs), often citing complexity and comorbidity as the reason for making such exceptions (Tobin, Banker, Weisberg, & Bowers, 2007). However, even though this population often presents with clinical levels of comorbid anxiety and depression, Vall and Wade (2015) demonstrate that such comorbidity is not a substantial factor in the effectiveness of CBT-ED. Indeed, Linardon, Wade, Garcia and Brennan (2017) found that comorbid depression is substantially reduced by CBT-ED in patients with bulimia nervosa (BN). However, it is not clear whether comorbid anxiety is equally responsive to CBT-ED. This study consists of a systematic review that addresses the impact of CBT-ED for NU-EDs on comorbid anxiety, to identify if there are any clinical benefits.

The nature of eating disorders

Prevalence. An estimated 1.25 million people in the United Kingdom (UK) have an ED (BEAT, 2015). Although underdiagnosed in males, it is widely accepted that EDs are more prevalent amongst females (Sweeting et al., 2015), and most commonly begin in adolescence (Kesby, Maguire, Brownlow, & Grisham, 2017). EDs can have a profound impact on the patient's quality of life, with the condition contributing to the development of many physical complications (e.g., heart and bowel problems) and comorbid mental health difficulties (e.g., depression and anxiety). Such consequences contribute to the high mortality rates recorded in this population (NICE, 2017).

Diagnoses. Based on treatment-response evidence, adult EDs can be grouped into two categories: underweight eating disorders and non-underweight eating disorders. Anorexia nervosa (AN) is the best-recognised underweight eating disorder, characterised by a fear of weight gain, deliberate weight loss behaviours (e.g., restricting dietary intake) and a significantly low body weight in the context of the individual's age, sex and physical health (DSM-5, American Psychiatric Association; APA, 2013). NU-EDs are diagnosed in patients who engage in dysfunctional and harmful eating behaviours, but whose body weight remains in the 'normal' or 'overweight' range. Such EDs include binge eating disorder (BED), BN, and atypical eating disorders - also known as 'eating disorder not otherwise specified' (EDNOS) or 'other specified feeding and eating disorder' (OSFED). BED is characterised by recurrent episodes of binge eating and a perceived loss of control over eating with significant associated distress (DSM-5; APA, 2013). BN is also characterised by recurrent episodes of binge eating, but involves the use of compensatory behaviours aimed at controlling eating, shape or weight (e.g., laxative use, diuretics, fasting, vomiting) (DSM-5; APA, 2013). Atypical EDs refer to the presentation of symptoms that are characteristic of an eating disorder and that cause distress or impairment, but do not meet the full criteria for any of the specified EDs (e.g., symptoms that are not frequent or long-lasting enough) (DSM-5, APA, 2013).

Comorbidity with anxiety disorders.

EDs often present in conjunction with anxiety disorders. Anxiety symptoms are strongly associated with binging, vomiting, laxative abuse and restriction (Pallister & Waller, 2008), and can increase disengagement with therapy, leading to dropout (Weltzin, Bulik, McConaha, & Kaye, 1995). Pallister and Waller (2008) reviewed research investigating this overlap in women and found that EDs, in general, were associated with increased rates of generalised anxiety disorder, social phobia and agoraphobia, whereas

restrictive eating presentations were more strongly associated with obsessive-compulsive disorder (Pallister & Waller, 2008). There is a lack of prospective studies in this area, so the temporal relationship of this overlap remains unclear. However, Swinbourne and Touyz (2007) reviewed several studies reporting findings indicating that anxiety disorders tend to precede the onset of EDs (Brewerton et al., 1995; Bulik, 2003; Deep, Nagy, Weltzin, Rao, & Kaye, 1995; Godart et al., 2003; Schwalberg, Barlow, Alger, & Howard, 1992). What is clearer, is that anxiety maintains eating pathology.

The role of anxiety in maintaining eating pathology. Cognitive theory suggests that anxious individuals tend to overestimate threat due to underlying schemas that represent the world as dangerous and themselves as defenceless (Beck et al., 1985). Safety behaviours are behaviours performed by anxious individuals to prevent or reduce a perceived threat or feared catastrophe (Salkovskis, 1991). Safety behaviours may reduce anxiety in the short term, but they increase anxiety in the long term, as such avoidant behaviours prevent the individual from disconfirming their belief about the catastrophe (Salkovskis, 1991). Considering the co-occurrence of anxiety disorders and EDs, it is unsurprising that people with EDs engage in particular safety behaviours aimed at avoiding the feared catastrophe of losing control over eating, shape and/or weight (Pallister & Waller, 2008). Such eating-disorder-specific safety behaviours include: cognitive and behavioural rigidity (e.g., rigid and ritualistic eating patterns); body checking (e.g., repeated weighing and examination of one's body); reassurance-seeking about weight and shape concerns; and body avoidance (covering mirrors, wearing loose fitting clothing) (Pallister & Waller, 2008). Individuals engaging in these behaviours inadvertently reinforce their anxious thoughts or feelings around their eating or body image, leading to repeated use of the behaviour and subsequent maintenance of ED symptoms.

Implications of comorbidity with anxiety for treating eating disorders. Patients with EDs and co-occurring anxiety disorders often display more severe symptoms (Swinbourne & Touyz, 2007). This can lead clinicians to assume that these patients are more complex to treat and that their treatment requires a deviation from existing evidence-based cognitive behavioural therapy (CBT) protocols (Mountford, Tatham, Turner, & Waller, 2017). However, Mountford et al. (2017) note that complexity is inherent in EDs, regardless of co-morbidity, given the difficulties these patients present with (e.g., emotional regulation, self-esteem, interpersonal relationships, physical and cognitive consequences of starvation). Furthermore, there is research to suggest that CBT-EDs can significantly improve symptoms of anxiety amongst a range of eating disorder presentations, despite not addressing these symptoms directly (Brambilla et al., 2010; Turner, Marshall, Stopa, & Waller 2015; Wonderlich et al., 2014).

Treatment indicators for non-underweight eating disorders.

The NICE (2017) guidelines for the treatment of NU-EDs in adults recommend initially offering guided cognitive-behavioural self-help materials for EDs. After four weeks, if this treatment is unsuccessful then 20 sessions of CBT-ED is recommended. Clinical trials show that recovery rates after CBT-ED are between 40-50% for this non-underweight population, with good long-term maintenance (Fairburn et al., 2009). Given that this is a relatively successful treatment for NU-ED, it is important to establish whether CBT-ED is effective in reducing co-morbid anxiety symptoms. Such evidence might obviate the need for unnecessarily complex (and possibly ineffective) interventions for this patient group.

Aim

This review will aim to assess whether CBT-ED, in its different modalities, has an effect on reducing anxiety in patients with NU-EDs. While a meta-analytic approach was originally considered, the limited number of included studies and the wide heterogeneity within them meant that this was unlikely to yield reliable findings (Naylor, 1988). Therefore, a narrative synthesis of the data was conducted.

Method

Initially, the Cochrane Database of Systematic Reviews was checked. It was determined that a systematic review had not previously been performed on this topic.

Search strategy

A systematic literature search was conducted in the databases *Web of Science*, *PsycINFO* and *Medline* to identify eligible articles published in English. The search period was from the beginning of the databases to January 2019. Embase was not used as the University's Embase holder advised that returns would only duplicate those returned by PsycINFO and Medline.

The Boolean operators AND and OR were used to combine the 'intervention', 'population' and 'outcome' search terms (see Table 1 for specific search terms used). The author performed keyword searches and, where relevant, utilised subject heading thesauruses and 'exploded' key search terms, to include other related subject headings. Ancestry searching was also performed by reviewing the reference list of eligible papers for further eligible studies.

Table 1
Search terms used in the systematic literature search.

	Specific search terms
Intervention	"Cognitive behavioural therapy", "cognitive behavioral therapy", and "CBT*".
Population	"Bulimia Nervosa", "Bulimi*", "Binge-eating disorder", "Binge eating disorder", "BED", "Eating disorder not otherwise specified", "EDNOS", "Other specified feeding and eating disorder", "OSFED", and "atypical eating disorder*".
Outcome	"Anxiety", "Generalised Anxiety Disorder", "Generalized Anxiety Disorder", "Social Anxiety", "Social Phobia", "Panic Disorder", "Panic", "Agoraphobia", "Specific Phobia", "Phobia*", "Hypochondri*", "Health Anxiety", "Obsessive Compulsive Disorder", "OCD", "Post-traumatic stress disorder", and "PTSD".

Eligibility criteria

Table 2
Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Empirical studies examining the effectiveness of CBT for NU-EDs, assessing change in anxiety symptoms as an outcome, using a standardised self-report measure.	A sample size of less than 10 participants.
Type of CBT intervention could include individualised, self-help, computerised or group CBT.	Papers that do not report means and standard deviations on a measure of anxiety at baseline and post-intervention.
Participants aged 17-65 years	Papers not published in a peer-reviewed journal
Participants meeting criteria for a NU-ED (i.e. BN, BED, EDNOS, or OSFED).	Papers not written in English.
Studies which also sampled participants with AN, if the results for each patient group were reported separately - so that the results from only the NU-ED populations could be extracted.	

Screening

Figure 1 outlines the process and outcome of the literature search in a PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) diagram (Moher, Liberati, Tetzlaff, & Altman, 2009). A total of 410 articles were returned through database searching, and 55 articles were identified through ancestry searching. Duplicate articles were then removed (n= 90) and the remaining 375 articles were screened by their titles and abstracts for relevance. A further 274 articles were excluded due to not being relevant. The remaining 101 articles were fully assessed for eligibility using the selection criteria. Eighty-seven articles were excluded either because they did not use an adult

sample (*n*= 19), did not use a standardised measure of anxiety (*n*= 40), did not provide sufficient data for the calculation of an effect size (*n*= 11), sampled less than 10 participants (*n*= 5), or were not an empirical study (*n*= 12). Thus, 14 articles were eligible and included in this review.

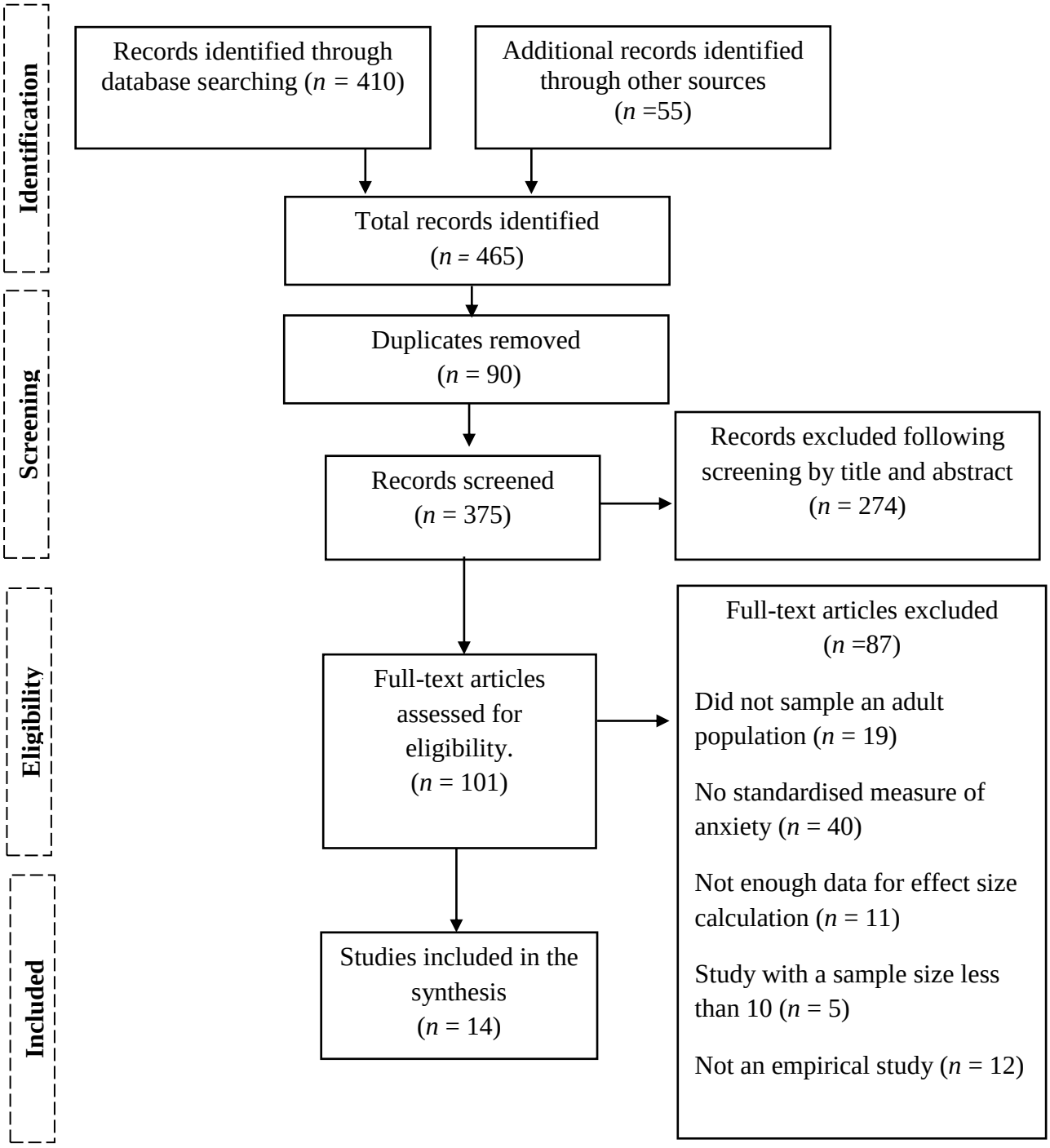

Figure 1. PRISMA diagram describing the search strategy

Data extraction

The following study characteristics were extracted from the eligible articles: authors, publication year, country of recruitment, participant characteristics (sample size, diagnosis, mean age), intervention details (type of intervention, duration, number of participants in each condition, professional delivering the intervention [CBT condition only]), control group details, specific measure of anxiety and main findings in relation to changes in anxiety. Pre-test and post-test anxiety means and standard deviations (*SD*) were extracted for all conditions. As suggested by Higgins and Green (2011), where studies reported relevant means and *SD*s at multiple time points, data from the longest follow-up point were extracted. To enable the calculation of within-subject *d* coefficients, Pearson's *r* correlation statistic was also extracted, where reported.

Effect sizes

The extracted means and *SDs* were used to calculate Cohen's *d* effect sizes for all conditions tested in each study. An online, within-subjects effect size calculator (https://memory.psych.mun.ca/models/stats/effect_size.shtml) was used. As recommended by Rosenthal (1993), a conservative Pearson's correlation coefficient (r = 0.7) was used for studies that did not report the necessary correlation between pre- and post-scores. The size of the effect was interpreted using Cohen's (1988) suggestion, where d = 0.2 is equivalent to a small effect, d = 0.5 constitutes a moderate effect, and d = 0.8 represents a large effect.

Quality assessment

To assess the methodological quality of the research articles, the strengths and weaknesses of each paper were systematically appraised. Considering the limited number of studies in this area, studies were not excluded because of their quality appraisal score.

The studies included in this review were either RCTs (n = 8) or quasi-experimental designs (n = 6). Therefore, two quality assurance tools were selected: The Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Quasi-experimental Designs (Appendix A) and The JBI Critical Appraisal Checklist for RCTs (Appendix B).

Each paper was assigned an overall quality score based on how many of the criteria they met on the relevant checklist. Two points were awarded when the paper fully met the criteria for an item, one point when it was unclear whether the paper met the criteria, and no points when the paper did not meet the criteria. A maximum score of 26 was possible for RCTs and a maximum score of 18 was possible for the quasi-experimental studies. However, item three on the quasi-experimental checklist (i.e. "Were the participants included in any comparisons receiving similar treatment/care, other than the exposure of intervention of interest?") did not apply to five out of six of the quasi-experimental studies, as these studies tested outcomes in a single group. This item was, therefore, removed for non-applicable studies, meaning that a maximum score of 16 was possible for these papers. To aid comparison between papers, a total quality percentage score was calculated for each paper by dividing the overall quality score by its maximum possible score and multiplying by 100. Since the JBI has not published a categorisation system for its checklists, the author created an arbitrary categorisation system and categorised papers as either: 'Poor' (<59%), 'Fair' (60-69%), 'Good' (70-79%) or 'Excellent' (>80%) quality.

To assess interrater reliability, a peer researcher randomly selected 40% of the eligible papers (n= 5) and conducted an independent assessment of quality using the respective checklists. The second rater was blind to the first rater's scoring. Discrepancies in ratings were discussed and resolved.

Results

Fourteen studies, with a total of 1086 participants were eligible for inclusion in this systematic literature review. A summary of study characteristics can be found in Table 3, where studies are grouped by research design and listed in chronological order. The quality of the studies, their characteristics and an overview of the main findings in relation to changes in anxiety are presented below.

Quality appraisal

The results of the quality appraisal are presented in Appendix C. The calculation of the intraclass correlation co-efficient (ICC) indicated that there was good interrater reliability (ICC = 0.81, 95% CI [0.66, 0.89], F (50,50) = 5.4, $p < 0.01$) (Koo & Li, 2016). The majority of studies (n = 12) were considered by the author to be of fair to good quality, with ratings falling between 69% and 77%. Two studies were rated to be of poor quality, receiving a quality score of 50% (Cooper & Steere, 1995) and 54% (Munsch et al., 2006).

Randomised Controlled Trials. Of the RCTs (n = 8), seven used a true randomisation procedure to assign participants to group and four used an appropriate allocation concealment strategy. Treatment groups were similar at baseline in four of the RCTs. The process of blinding both participants and those delivering treatment to the treatment condition is difficult in RCTs that evaluate psychological interventions, for practical reasons. Therefore, none of the studies reported blinding participants or the person delivering the intervention to the treatment condition. However, the outcome assessors were blind to the participant's assigned condition in five of the studies; two studies did not provide enough detail around this, and one study stated that blinding was not possible but omitted reasons (Munsch et al., 2006). All studies treated their intervention groups identically (other than the intervention of interest) by ensuring the

number and duration of sessions were the same in each treatment group. Most studies (*n* = 5) did not adequately describe the reasons for loss to follow up and/or conduct an analysis to estimate the impact of loss to follow up on the results. Seven studies (Cooper & Steere, 1995) conducted and reported an intention-to-treat analysis. Outcomes were measured in the same way across groups in six of the studies. However, only two studies (Sanchez-Ortiz et al., 2011; Wonderlich et al., 2014) provided clear information about the reliability of the measurement, with most studies omitting details about the training of the outcome assessors and any reliability checks that took place. Five of the studies were adequately powered according to their sample size calculation and employed appropriate statistical analyses. The author considered all trial designs appropriate for the research question.

Quasi-experimental studies. All the quasi-experimental studies (*n* = 6) demonstrated adequate cause and effect. Fernandez-Aranda et al. (2015) was the only study to compare CBT with another intervention - there were no significant differences between groups at baseline, and both conditions were treated equally apart from the intervention of interest. None of the studies utilised a control group. All studies used multiple measurements of the outcome variables before and after intervention. Only half of the studies (*n* = 3) adequately described the loss to follow up and conducted impact analyses. The remaining studies lacked details about loss to follow up, including reasons for drop-out and/or an analysis of the patterns of drop-out and impact of the attrition on the results. All studies used the same questionnaires and procedure to measure outcomes pre-intervention and post-intervention. However, none of the studies provided clear information about the reliability of the measurement performed in the study (e.g., the training of the raters, inter- or intra-rater reliability). Only one study (Openshaw, Waller, & Sperlinger, 2004) conducted and reported a power analysis.

Study characteristics

Five studies were conducted in the UK, two in Australia, two in Spain, one in Switzerland, one in Canada, one in Italy, one in Israel and one in the United States of America. Eight of the studies were RCTs, and the remaining six were quasi-experimental designs.

Participants. Altogether, the 14 studies sampled a total of 1086 participants, 50 of whom were male. Sample sizes ranged from 22 to 272 participants. All studies recruited a clinical sample, with participants meeting the diagnostic criteria for BN (*n* = 672), BED (*n* = 134), EDNOS (*n* = 263), or OSFED (*n* =17). Studies sampled patients who had been referred to either specialist ED clinics (*n* = 6), who attended a hospital's psychiatry department (*n* = 1), or who were receiving inpatient treatment at an EDs unit (*n* = 1). Other studies sampled volunteers who responded to a study advertisement placed in the community (*n* = 5) or in the military (*n* = 1), with two of these studies also including participants who were put forward by health care professionals. All studies recruited separate participants and there were no overlapping data.

CBT Interventions. Sixteen CBT interventions were tested across the 14 studies, including individual CBT (*n* = 6), self-help CBT (*n* = 3) (four conditions)[1], group CBT (*n* = 4) and computerised CBT (*n* = 1) (two conditions)[2]. Studies varied in both treatment length and the professional delivering the intervention. Across studies testing individual CBT (*n* = 6) the number of intervention sessions ranged from 10 to 21, and treatments were delivered by either a clinical psychologist (*n* = 2), a clinical assistant (*n* = 1), the researcher (*n* = 1), a psychologist (*n* = 1), or members of a multidisciplinary team (*n* = 1). Studies testing a self-help format (*n* = 3) ranged from 6-17 weeks in treatment length and were either delivered by a postgraduate psychology student, a GP, or were unguided self-

[1] Steele & Wade (2008) compared two CBT self-help interventions (self-help for BN vs self-help for perfectionism).
[2] Sanchez-Ortiz et al. (2011) compared two computerised CBT interventions (immediate vs delayed)

help. Two of the studies evaluating group CBT were similar in treatment length (16 sessions) but a psychologist and co-therapist delivered one intervention and a clinical psychologist and clinical dietitian delivered the other. The third group CBT interventions consisted of both 12 group sessions and 4 individual sessions, delivered by a psychologist and dietitian. The fourth group CBT intervention was delivered by a therapist and co-therapist and consisted of 16 weekly sessions and 6 monthly follow-up sessions. Finally, the computerised CBT interventions lasted three months and patients received support from a therapist via email.

Other interventions. Seven studies (six of which were RCTs) compared CBT with another psychological intervention. None of the studies evaluated a pharmacotherapy intervention. Comparator interventions included: 22 sessions of behavioural weight loss treatment (n = 1); 8 weeks of non-specific unguided self-help for self-assertion skills (n = 1); 18 weeks of exposure and response prevention therapy (n = 1); 6 weeks of mindfulness-based techniques (n = 1); 19 weeks of integrative cognitive affective therapy (n = 1); 16 weeks of group CBT with 10-12 video game sessions aimed at increasing self-control (n = 1), and 6 sessions of cue exposure therapy based on virtual reality, on top of a first level CBT treatment (n = 1). Although the latter two interventions involved CBT, the treatment was combined with an additional therapy, so effect sizes for these interventions were grouped amongst the 'other interventions' group.

Inactive control groups. Two studies used passive control groups as comparators. Banasiak et al. (2005) utilised a delayed treatment control and Carter, Olmsted, Kaplan, McCabe, Mills, and Aime (2003) utilised a waiting list control group.

Measures and follow-up. All studies measured anxiety as an outcome using a standardised self-report measure. On all measures, higher scores equated to higher levels of anxiety. Therefore, a decrease in scores at time two was interpreted as a reduction in

anxiety. The measures included: the State-Trait Anxiety Inventory (*n* = 5) (STAI; Spielberger, Gorsuch, & Lushene, 1983); the Beck Anxiety Inventory (*n* = 4) (BAI; Beck, Epstein, Brown, & Steer, 1988); the Cognition Checklist, Anxiety Scale (*n* = 1) (CCAS; Beck, Brown, Steer, & Eidelson, 1987); the Generalised Anxiety Disorder Questionnaire (*n* = 1) (GADQ; Spitzer, Kroenke, Williams, & Lowe, 2006); the Brief Symptom Inventory (anxiety subscale) (*n* = 1) (BSI; Derogatis, 1993); the Depression Anxiety Stress Scale (anxiety subscale) (*n* = 1) (DASS; Lovibond & Lovibond, 1995); and The Hospital Anxiety and Depression Scale, anxiety subscale (*n* = 1) (HADS; Zigmond & Snaith, 1983). The STAI was the only self-report tool to measure both state and trait anxiety; the other questionnaires just measured state anxiety. In the interest of consistency, and to aid comparison, the author extracted only the state scores from the STAI.

The longest follow-up time-point for anxiety symptoms differed across studies and included the last treatment day (*n* = 6), 1 week post-treatment (*n* = 1), 6-months post-treatment (*n* = 3), 4-months post-treatment (*n* = 1), 3-months post-treatment (*n* = 1); and 12 months post-treatment (*n* = 2).

Table 3
Characteristics and effect sizes of the reviewed studies

Authors (year)	Country	Participant characteristics	CBT intervention details (Professional delivering intervention)	Comparator intervention details	Inactive control group details	Main findings in relation to anxiety measure	Anxiety measure (Longest follow-up point)	Quality (%)	Effect size(s) *d*
RANDOMISED CONTROLLED TRIAL									
Banasiak, Paxton, & Hay (2005)	AUS	109 female participants with BN diagnosis. CBT group *M*age = 29.5 (8.72) Control group *M*age = 28.3 (8.22)	CBT Guided Self-Help (GSH) (*n* = 54) 17 weeks (GP)	-	Delayed treatment control (*n* = 55)	Participants in the GSH group showed significantly greater improvements in anxiety than the control group.	The Brief Symptom Inventory, Anxiety subscale (1-week FU)	73%	CBT = 0.58 Control = 0.02
Carter, Olmsted, Kaplan, McCabe, Mills, & Aime (2003)	CAN	85 female participants with BN diagnosis. *M*age = 27.0 (8.0)	CBT unguided Self-Help manual. (*n* = 28) 2 months (Unguided)	Non-specific unguided Self-Help (focus on self-assertion skills) (*n* = 28) 2 months	Waiting list control (*n* = 29)	No statistically significant changes in anxiety for any group.	Beck Anxiety Inventory (End of therapy FU)	69%	CBT = -0.12 Non-specific = 0.19 Control = 0.23
Cooper & Steere (1995)	UK	27 female participants with BN diagnosis. *M*age = 27.0 Age range= 18-33years	Individual CBT (*n* = 13) 18 weeks, 19 sessions	Exposure and Response Prevention (*n* = 14) 18 weeks,	-	Participants in both groups showed significant improvement in anxiety.	State-Trait Anxiety Inventory (12- month FU)	50%	CBT = 1.57 ERP = 0.11

			(Therapist- the researcher)	19 sessions					
Ferrer-García et al. (2017)	SP	64 participants with BN (*n* = 35) or BED (*n* = 29) diagnoses. CBT group (8 male, 24 female) *M*age = 34.56 (9.08) Comparator group (11 male, 21 female) *M*age = 34.75 (10.04)	Individual CBT (*n* = 32) 6 additional 30-minute sessions to first level CBT (amount not stated) (Clinical Psychologist)	Cue exposure therapy based on virtual reality (VR-CET) (*n* = 32) 6 additional 30 minute sessions to first level CBT (amount not stated)	-	CBT group did not show a significant decrease in anxiety. VR-CET group showed a significant decrease in anxiety.	State-Trait Anxiety Inventory (End of therapy FU)	69%	CBT = 0.26 VR-CET = 0.21
Munsch et al. (2006)	SZ	80 participants (9 male) with BED CBT group (4 male, 40 female) *M*age = 44.4 (11.5) Comparator group (5 male, 31 female) *M*age = 47.8 (11.8)	Group CBT for BED Active phase: 16 sessions 16 weeks Follow-up treatment: 6 monthly sessions (*n* = 44) (Therapist and co-therapist)	Group Behavioural Weight Loss (BWL) Treatment Active phase: 16 sessions 16 weeks Follow-up treatment: 6 monthly sessions (*n* = 36)	-	Neither group showed a significant decrease in anxiety.	Beck Anxiety Inventory (12- month FU)	54%	CBT = 0.81 BWL = -0.03
Sanchez-Ortiz et al. (2011)	UK	76 participants (1 male) with BN (*n* = 39) or EDNOS (*n* = 37) diagnosis. CBT group *M*age = 22.7 (3.1)	(1) Immediate computerised CBT (*n* = 38) 8 sessions	-	-	Both groups showed a significant reduction in anxiety symptoms, with immediate CBT	The Hospital Anxiety and Depression Scale	77%	Immediate = 1.54 Delayed = 1.21

		Control group *M*age = 25.0 (7.7)	3 months Began treatment immediately after randomisation. (2) Delayed computerised CBT (*n* = 38) 8 sessions 3 months Began treatment after a 3 month wait (Both groups: therapist email support)			showing the greatest reduction.	Anxiety subscale (6- month FU)		
Steele & Wade (2008)	AUS	47 participants (1 male) with BN diagnosis. CBT group *M*age = 25.73 (5.64) Comparator group *M*age = 24.65 (5.51) Placebo group *M*age = 27.75 (6.36)	(1) CBT guided self-help for BN (CBT-BN) (*n* = 15) 8 individual sessions 6 weeks (2) CBT guided self-help for perfectionism (CBT-P)	Placebo group consisting of mindfulness techniques (*n* = 16) 8 individual sessions 6 weeks	-	No significant changes in symptoms of anxiety for any group.	The Depression Anxiety Stress Scale Anxiety subscale (6-month FU)	73%	CBT-BN = -0.22 CBT-P = 0.30 Mindful-ness = 0.31

			(*n* = 17) 8 individual sessions 6 weeks (Postgraduate psychology student therapists)						
Wonderlich et al. (2014)	USA	80 participants (8 male) with BN diagnosis. CBT group (4 male, 36 female) *M*age = 28.8 (10.8) Comparator group (4 male, 36 female) *M*age = 25.8 (8.2)	Individual CBT-E (*n* = 40) 21 sessions 19 weeks (PhD Psychologist)	Integrative Cognitive-Affective Therapy (n=40) 21 sessions 19 weeks	-	Both treatments showed significant improvements in state anxiety.	State-Trait Anxiety Inventory (4-month FU)	73%	CBT = 0.83 ICAT = 1.05
QUASI-EXPERIMENTAL DESIGNS									
Fernandez-Aranda et al. (2015)	SP	38 female participants with BN diagnosis Total *M*age = 29.5 (9.9)	Group CBT (n=18) 16 sessions 16 weeks (Psychologist and co-therapist)	Group CBT 16 sessions 16 weeks + 1 Serious Video Game (SVG) session (aimed at increasing self-control) a week for 10-12 weeks (n=20)	-	The CBT + SVG group showed more improvement in anxiety symptoms. CBT alone did not improve state anxiety	State-Trait Anxiety Inventory (3-month FU)	72%	CBT = -0.32 CBT+ SVG = 0.34

Brambilla et al. (2010)	IT	22 female participants with BN diagnosis *M*age = 30.0 (8.0)	Individual CBT-E 20 weeks 13 inpatient therapy 7 weeks of residential day-hospital (Psychiatrist, psychologist, physicians, dieticians and nurses)	-	-	Significant improvement in anxiety after CBT-E.	State-Trait Anxiety Inventory (End of therapy FU)	69%	CBT-E = 0.61
Carter et al. (2016)	IS	64 female soldiers with BN (*n* = 36) or EDNOS (*n* = 28) diagnosis. *M*age = 19.7 (0.6)	Group CBT 16 sessions 16 weeks 1 month follow up session (Clinical Psychologist and Clinical Dietician)	-	-	Anxiety scores significantly improved from baseline to end of treatment.	Cognition Checklist Anxiety Scale (End of therapy FU)	69%	CBT = 0.78
Knott, Woodward, Hoefkens, & Limbert (2015)	UK	272 participants (8 male) with BN (*n* = 74) or EDNOS (*n* = 198) diagnosis *M*age = 28.74 (8.49)	Individual CBT- E Mean and median number of sessions = 20 Range = 6 - 40 sessions	-	-	Significant improvement found on anxiety measure post-treatment.	Beck Anxiety Inventory (End of therapy FU)	75%	CBT = 1.16

			(Clinical Psychologist)						
Openshaw, Waller, & Sperlinger (2004)	UK	29 participants (1 male) with a BN diagnosis *M*age = 28.3 (7.0)	Group CBT 12 group sessions 4 individual sessions 12 weeks in total (Psychologist dietician)	-	-	Anxiety scores did not make clinically significant change	Beck Anxiety Inventory (6-month FU)	75%	CBT = 0.62
Waller et al., (2018)	UK	93 participants (3 male) with either a diagnosis of BN (*n* = 51), BED (*n* = 25) or OSFED (*n* = 17). *M*age = 27.4 (8.66)	Individual CBT-T 10 sessions weekly (Clinical assistants)	-	-	Anxiety scores fell below the clinical cut-off post-treatment	Generalised Anxiety Disorder Questionnaire (GAD-7) (End of therapy FU)	69%	CBT = 0.42

Note. AUS = Australia; CAN= Canada; FR= France; IS= Israel; IT= Italy; SP= Spain; SZ = Switzerland; UK= United Kingdom; USA= United States of America; BN= Bulimia Nervosa; BED= Binge Eating Disorder; EDNOS= Eating Disorder Not Otherwise Specified; CBT= Cognitive Behavioural Therapy; CBT-E= Cognitive Behavioural Therapy for Eating Disorders; CBT-T= brief version of CBT-E; OSFED= Other Specified Feeding and Eating Disorder; FU = Follow up.

Changes in anxiety during CBT for NU-EDs.

Table 4 presents mean anxiety scores (pre- and post-intervention), as well as the calculated effect sizes, for each study's CBT intervention. Where studies used a comparator intervention and/or control group, the effect sizes for these conditions are also presented.

Individual CBT. Of the six studies testing the effect of individual CBT, five found a significant improvement in anxiety scores from baseline to post-intervention, with effect sizes ranging from 0.42 – 1.57. One of these studies was considered to be of poor quality (Cooper & Steere, 1995), whereas the others were considered to be of fair to good quality (Brambilla et al. 2010; Knott, Woodward, Hoefkens, & Limbert, 2015; Waller et al., 2018; Wonderlich et al. 2014). Although the remaining study did not find a significant reduction in anxiety, there was a decrease in anxiety over time, which had a small effect (d= 0.26; Ferrer-García et al. 2017). This study was of fair quality.

Self-help CBT. Of the four self-help CBT conditions, only one was found to significantly reduce anxiety from baseline to post-intervention (Banasiak et al., 2005). This study reported a moderate effect size (d= 0.58) and was of good quality. The remaining studies found no significant changes in anxiety symptoms and were of fair (Carter et al., 2003) and good quality (Steele & Wade, 2008). One condition found a reduction in anxiety scores, with a small effect size, whilst the remaining two conditions showed an increase in anxiety scores (d= -0.12 and d= -0.22).

Group CBT. Of the four studies testing group CBT, only one found a significant improvement in anxiety scores from baseline to end of treatment (Carter et al., 2016). This study was of good quality and the effect size was large (d = 0.78). Munsch et al. (2006) reported an equally large effect size (d = 0.78) but found no significant improvement in

anxiety, though this study was of poor quality. Openshaw et al. (2004) conducted a good quality study but did not find clinically significant change on a measure of anxiety, though the intervention was found to be moderately effective in reducing anxiety (d= 0.62). In contrast, Fernandez-Aranda et al. (2015) reported an increase in anxiety scores (d = -0.32), in a study considered to be of good quality.

Computerised CBT. One study, of good methodological quality, tested the difference between two computerised CBT interventions (Sanchez-Ortiz et al., 2011). Participants in both interventions showed a significant reduction in anxiety after group CBT, with immediate CBT showing significantly greater improvements than delayed CBT. Effect sizes for both groups were found to be large: d = 1.54 and d = 1.21 respectively.

Comparator interventions. Significant reductions in anxiety were found after exposure response prevention (Cooper & Steere, 1995), cue exposure therapy based on virtual reality (Ferrer-García et al., 2017), and integrative cognitive-affective therapy (Wonderlich et al., 2014). Effect sizes were d = 0.11, d = 0.21 and d = 1.05 respectively, and studies were rated as poor (Cooper & Steere, 1995), fair (Ferrer-García et al., 2017) and good (Wonderlich et al., 2014). Although mindfulness (Steele & Wade, 2008) and non-specific unguided self-help (Carter et al., 2003) did not significantly reduce anxiety, they did reduce anxiety over time. Both studies reported a small effect size and were considered to be of fair (Carter et al., 2003) and good quality (Steele & Wade, 2008). In contrast, a poor quality study testing a group behavioural weight loss treatment reported a slight increase in anxiety scores (d = -0.03). Fernandez-Aranda et al. (2015) tested the effect of CBT plus a video game intervention, aimed at increasing self-control. They did not report whether the intervention was significant in relation to reducing anxiety, but mean scores show a reduction in anxiety, with a small effect size (d = 0.34).

Passive controls. Two studies compared CBT with a control group. Banasiak et al. (2005) conducted a good quality study and found that individual CBT showed significantly greater reductions in anxiety than a delayed treatment control. In comparison, Carter et al. (2003) reported no significant changes in anxiety for all conditions, but a reduction in overall anxiety scores was noted in the control group with a small effect size (d = 0.23).

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Table 4

Mean anxiety scores and calculated effect sizes for each treatment within each study.

Study number	Type of CBT intervention	Anxiety Measure	CBT Intervention			Other treatment condition			Inactive Control Group		
			Pre- M (SD)	Post- M (SD)	Effect size(d)	Pre- M (SD)	Post- M (SD)	Effect size(d)	Pre- M (SD)	Post- M (SD)	Effect size(d)
RANDOMISED CONTROLLED TRIALS											
1	Self-help CBT	BSI	0.96 (0.69)	0.67 (0.57)	0.58	-	-	-	1.00 (0.78)	1.01 (0.82)	0.02
2	Self-help CBT	BAI	24.40 (12.00)	25.40 (12.30)	-0.12	23.40 (12.80)	21.50 (12.80)	0.19	21.50 (9.60)	19.60 (10.90)	0.23
3	Individual CBT	STAI-S	54.20 (8.40)	41.80 (11.0)	1.57	43.10 (13.00)	42.00 (12.70)	0.11	-	-	-
4	Individual CBT	STAI-S	31.00 (18.50)	26.00 (12.50)	0.26	29.50 (29.75)	24.00 (7.50)	0.21	-	-	-
5	Group CBT	BAI	13.79 (12.95)	6.30 (10.10)	0.81	10.74 (9.43)	11.00 (12.17)	- 0.03			
6	Computerised CBT	HADS	11.10 (3.60)	6.20 (4.40)	1.54	-	-	-	-	-	-
			11.80 (3.50)	8.10 (4.20)	1.21	-	-	-	-	-	-
7	Self-help CBT	DASS	11.42 (7.05)	13.04 (10.82)	-0.22	12.10 (6.40)	10.02 (9.28)	0.31	-	-	-
			11.41 (5.96)	9.61 (8.55)	0.30	-	-	-	-	-	-
8	Individual CBT	STAI-S	45.10 (12.50)	37.50 (10.80)	0.83	46.90 (13.30)	35.90 (13.70)	1.05	-	-	-
QUASI-EXPERIMENTAL DESIGNS											
9	Group CBT	STAI-S	30.12 (11.95)	33.91 (16.61)	-0.32	28.11 (12.48)	25.00 (10.82)	0.34	-	-	-
10	Individual CBT	STAI-S	52.50 (15.90)	45.60 (10.70)	0.61	-	-	-	-	-	-
11	Group CBT	CC	26.20 (9.10)	20.90 (8.50)	0.78	-	-	-	-	-	-
12	Individual CBT	BAI	22.11 (12.09)	10.11 (10.33)	1.16	-	-	-	-	-	-
13	Group CBT	BAI	23.00 (11.60)	17.30 (12.20)	0.62	-	-	-	-	-	-
14	Individual CBT	GAD-7	12.20 (4.92)	7.92 (12.90)	0.42	-	-	-	-	-	-

*Note.*1= Banasiak et al. (2005); 2= Carter, Olmsted, Kaplan, McCabe, Mills, & Aime (2003); 3= Cooper & Steere (1995); 4= Ferrer-García et al. (2017); 5= Munsch et al. (2006) 6= Sanchez-Ortiz et al. (2011); 7= Steele & Wade (2008); 8= Wonderlich et al. (2014); 9= Fernandez-Aranda et al. (2015); 10= Brambilla et al. (2010); 11= Carter et al. (2016); 12= Knott, Woodward, Hoefkens, & Limbert (2015); 13= Openshaw, Waller, & Sperlinger (2004); 14= Waller et al. (2018). BSI= The Brief Symptom Inventory [Anxiety subscale]; BAI= Beck Anxiety Inventory; STAI-S= State-Trait Anxiety Inventory -State score only; HAM-A= The Hamilton Anxiety Rating Scale; HADS= The Hospital Anxiety and Depression Scale [Anxiety subscale]; DASS= The Depression Anxiety Stress Scale [Anxiety subscale]; CC= Cognition Checklist Anxiety Scale]; GAD-7= Generalised Anxiety Disorder Scale. r = 0.7 was used for all studies except Ferrer- García et al., (2017) and Knott, Woodward, Hoefkens, & Limbert (2015) as they reported Pearson's r.

Discussion

Despite CBT-ED being an empirically supported treatment for NU-EDs, clinicians often consider this therapy unsuitable for clients with comorbid psychiatric symptoms (Tobin et al., 2007). A recent meta-analytic review (based on a larger number of studies) has shown that CBT-ED is successful in reducing comorbid depression (Linardon et al., 2017). However, CBT-ED's effect on anxiety is less clear and the literature is not as advanced. Therefore, the aim of this review was to examine whether cognitive behavioural therapy for NU-EDs is effective in reducing comorbid anxiety.

This discussion summarises the main findings and their relevance to existing literature and theory. Limitations of the review and the studies included within this review are considered, as well as implications for future research and clinical practice.

Summary of the main findings.

Fourteen studies of varying quality were included in this review. Eight of these studies found a significant reduction in anxiety after CBT-ED. A review of the pre-post effect sizes for each study suggests that individual, group and computerised CBT-ED are effective in reducing anxiety. Self-help CBT-ED was not found to be effective in reducing anxiety. Therefore, this review suggests that CBT-ED, when delivered in an individual, group and computerised format, seems to be beneficial in reducing anxiety in patients with a NU-ED. These findings, however, must be interpreted with caution as only a limited number of studies were available to draw conclusions from and the quality of these studies vary from fair to good.

Comparison with the literature.

Previous research demonstrates that the effects of CBT-ED also extend to specific

comorbid psychological symptoms. For instance, Linardon et al. (2017) reviewed CBT for BN and found it to be efficacious in reducing depressive symptoms at post-treatment. Research has also found that the effects of CBT-ED extend to personality pathology (Agüera et al., 2012; Anderson, Joyce, Carter, McIntosh, & Bulik, 2002; Dalle Grave et al., 2007). For example, Turner et al. (2015) tested the effectiveness of CBT-ED in patients with a diagnosis of either AN, BN or EDNOS and found that scores on a measure of personality disorder cognitions significantly improved after treatment. Although relatively less researched, there is also evidence for the efficacy of CBT-ED in reducing comorbid substance use disorders (Karacic et al., 2011). Lastly, Linardon and Brennan (2017) reviewed the effect of CBT-ED on subjective- and health-related quality of life (QoL) and found increased QoL ratings in participants. The present review has the potential to add to this evidence base as it reports promising findings that CBT-ED (delivered in an individual, group or computerised format) may also reduce comorbid anxiety symptoms, in patients with NU-EDs.

Relevance to existing literature and theory: How can a reduction in anxiety symptoms after CBT-ED be explained?

The hot cross bun model. The hot cross bun model (Padesky & Mooney, 1990) is a parsimonious model outlining how cognitive, emotional, behavioural and biological factors interact to develop and maintain any symptom or disorder. Padesky and Mooney (1990) argue that if you change an aspect of a person's behaviour, this will subsequently modify related cognitions, emotions and biology. This theory underpins CBT-ED and, as a result, CBT-ED is designed to be a 'doing' therapy - not a 'talking' therapy. This is particularly important, as this population's ability to challenge cognitions and emotions is limited due to the biological effects of restrictive behaviours and starvation, even at a normal weight (Mountford et al., 2017). For example, CBT-ED focuses on the here-and-now, promoting

dietary-related behavioural changes such as keeping food diaries, eating 'forbidden' foods, and establishing a pattern of regular and balanced eating (Murphy, Straebler, Cooper, & Fairburn, 2010). Reversing starvation effects and increasing carbohydrate intake enhances serotonin levels and has been found to improve mood stability and cognitive flexibility (Bruce et al., 2009; Mountford et al., 2017). This biological benefit may partially explain why a reduction in anxiety may follow after individual, group or computerised CBT-ED.

Other behavioural interventions used in CBT-ED include those aimed at challenging the use of safety behaviours. Safety behaviours (e.g., body checking and body avoidance) are driven by anxiety and are performed in an attempt to prevent the feared catastrophe of losing control over eating, shape and/or weight (Pallister & Waller, 2008). CBT-ED involves psychoeducation on how safety behaviours maintain eating pathology through the interaction between biological, cognitive, behavioural and emotional factors. Behavioural interventions designed to challenge the usefulness of safety behaviours include exposure-based techniques (e.g., mirror work). Such techniques involve practising sitting with the anxiety for long enough (30 – 40 minutes) that it naturally subsides, without performing the associated safety behaviour (Waller & Butler, 2010). These techniques test beliefs regarding the usefulness of safety behaviours in averting feared catastrophes and develop the patient's skills in tolerating and managing anxiety. Thus, these techniques may also explain why a patient's anxiety might reduce after individual, group or computerised CBT-ED.

Critique and suggestions for future research.

A small number of studies were eligible for inclusion within this review. None of the studies were of 'excellent' quality, with most studies rated as either 'fair' or 'good' quality. The inconsistencies between studies (sample size, CBT modality, length of treatment,

professional delivering the treatment, and follow-up length) make it difficult to reliably synthesise the effects of CBT-ED.

Only two studies utilised a control group, demonstrating the need for more robust research designs in this field. Data were available from only seven comparator interventions, and none of the studies compared the effects of CBT-ED with a pharmacotherapy intervention, highlighting a gap in the literature. All studies sampled a clinical population, but the underrepresentation of male participants (n = 50) and participants with BED (n = 134), limits the generalisability of the review's findings to these populations. Future studies in this area should aim to recruit more males with NU-EDs and patients with BED to establish the validity of the review's findings.

All studies utilised standardised and well-validated measures of anxiety. However, these measures rely on self-report data, which increases the risk of social desirability bias. Studies in this area mostly measured state anxiety. Future research could look at the effect of CBT-ED in reducing symptoms of trait anxiety or specific comorbid anxiety disorders (e.g., generalised anxiety disorder, social phobia) in NU-ED populations.

A total of 11 studies were excluded from the review as they did not report enough data for the effect size calculation. Future research should aim to report means, standard deviations and Pearson's r for all conditions. This would improve reporting standards and decrease selective reporting bias, and also allow for comprehensive reviews of the evidence base.

A meta-analysis was not conducted due to the heterogeneity in the included studies' clinical populations, types of interventions, measures and follow-up time points. In such cases, subgroup analyses are recommended as a means of investigating heterogeneous results

(Higgins & Green, 2011). However, the limited number of high-quality studies included in this review, coupled with the need for multiple subgroup analyses, meant that a meta-analysis would have lacked sufficient power to confidently interpret subgroup analyses (Borenstein, Hedges, & Rothstein, 2009). When the limitations of the current evidence base have been addressed, and the studies have improved in quantity, future reviews would benefit from the inclusion of a meta-analysis. This would help to quantify the effect of CBT-ED on reducing anxiety by examining potential moderating variables e.g. different patient groups, treatment modalities and measures.

Effect sizes were extracted and calculated by one researcher. Future research would benefit from the involvement of one or more researchers in this process (as well as the search process) to decrease the likelihood of researcher bias (Sampson, McGowan, Cogo, Grimshaw, Moher, & Lefebvre, 2009).

This review benefited from a highly comprehensive, systematic search of three major databases with the addition of ancestry searching. However, studies published in a language other than English were not included in the review, which means that the findings may only be generalizable to countries whose academics routinely publish in English. Furthermore, the inclusion of only studies published in peer-review journals can over-inflate estimates of effect, since significant results are more likely to be published in both peer-reviewed and English-language journals (Pazez, 2017).

The addition of a second rater to assess the quality of the research improves the reliability of the quality appraisal, reducing the risk of researcher bias. In the absence of published cut-off scores, the author created an arbitrary categorisation system to determine overall study quality. This was helpful in interpreting and contextualising the review's

findings. However, deriving a total quality score, which gives equal weight to all items in the tool, is a contested issue and limits the utility of this study's quality appraisal.

Finally, this review did not consider the extent to which changes in symptoms were clinically meaningful. This review examined whether changes in anxiety scores were statistically significant and how large the size of the effect was. Therefore, this review cannot draw conclusions about whether CBT-ED, in its different modalities, is effective at reducing anxiety to sub-clinical levels. Examining whether clinically significant change was achieved in each study would have provided useful information regarding the intervention's transferability to clinical practice.

Clinical Implications

This review reports promising findings indicating that CBT-ED is effective in reducing anxiety in patients with NU-EDs, when delivered in an individual, group or computerised format. Self-help CBT-ED was not found to be effective in reducing anxiety. Although these findings should be considered in light of the limited evidence-base, the results suggest that patients with a NU-ED and comorbid anxiety may benefit from a CBT-ED intervention. Therefore, clinicians should continue to gather information regarding comorbid anxiety symptoms at assessment, and create a shared understanding with the patient about how these symptoms relate to their eating disorder. Individual, group or computerised CBT-ED should continue to be offered for these patients, ensuring that comorbid anxiety symptoms are measured before and after treatment. If the anxiety has not reduced to a sub-clinical level at the end of treatment, clinicians could consider the use of a separate intervention to target the anxiety.

Research shows that the decision to deviate from evidence-based therapy is often a product of clinician anxiety (Waller, Stringer, & Meyer, 2012). The role of clinical

supervision is therefore important in addressing therapist drift (Waller, 2009). Supervisors should support clinicians to follow the review's recommendations, where appropriate, and develop clinician's awareness of when their own anxiety about patient complexity may be preventing the appropriate delivery of treatment.

Conclusion

This is the first review to systematically identify and synthesise research examining the effectiveness of CBT-ED for NU-ED on reducing comorbid anxiety. The findings suggest that individual, group and computerised CBT-ED is beneficial in reducing anxiety in patients with a NU-ED. These results have the potential to contribute to the current evidence base, which suggest that the benefits of CBT-ED extend to a range of comorbid psychological symptoms. The review suggests that clinicians should not deviate from delivering CBT-ED, with patients with comorbid anxiety. However, more high-quality research trials, addressing the limitations identified by this review, are needed in order to confirm these findings.

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Appendix A- JBI Critical Appraisal Checklist for Quasi-Experimental Studies

Reviewer _____ Date _____

Author _____ Year _____ Record Number

		Yes	No	Unclear	Not applicable
1.	Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	☐	☐	☐	☐
2.	Were the participants included in any comparisons similar?	☐	☐	☐	☐
3.	Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	☐	☐	☐	☐
4.	Was there a control group?	☐	☐	☐	☐
5.	Were there multiple measurements of the outcome both pre and post the intervention/exposure?	☐	☐	☐	☐
6.	Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	☐	☐	☐	☐
7.	Were the outcomes of participants included in any comparisons measured in the same way?	☐	☐	☐	☐
8.	Were outcomes measured in a reliable way?	☐	☐	☐	☐
9.	Was appropriate statistical analysis used?	☐	☐	☐	☐

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

_____

Appendix B- JBI Critical Appraisal Checklist for Randomized Controlled Trials

Reviewer _____ Date _____

Author _____ Year _____ Record Number _____

	Yes	No	Unclear	NA
10. Was true randomization used for assignment of participants to treatment groups?	☐	☐	☐	☐
11. Was allocation to treatment groups concealed?	☐	☐	☐	☐
12. Were treatment groups similar at the baseline?	☐	☐	☐	☐
13. Were participants blind to treatment assignment?	☐	☐	☐	☐
14. Were those delivering treatment blind to treatment assignment?	☐	☐	☐	☐
15. Were outcomes assessors blind to treatment assignment?	☐	☐	☐	☐
16. Were treatment groups treated identically other than the intervention of interest?	☐	☐	☐	☐
17. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	☐	☐	☐	☐
18. Were participants analyzed in the groups to which they were randomized?	☐	☐	☐	☐
19. Were outcomes measured in the same way for treatment groups?	☐	☐	☐	☐
20. Were outcomes measured in a reliable way?	☐	☐	☐	☐
21. Was appropriate statistical analysis used?	☐	☐	☐	☐
22. Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?	☐	☐	☐	☐

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

_____

_____

Appendix C – Quality appraisal table.

Outcomes for the JBI Critical Appraisal Checklist for RCTs.

Study	Item number 1	2	3	4	5	6	7	8	9	10	11	12	13	Quality rating %	Critical Review
Banasiak, Paxton & Hay (2005)	√	√	√	X	X	√	√	√	√	X	?	√	√	73%	**Strengths:** A computer-generated biased coin randomisation approach was used. No statistical difference on baseline demographics and clinical measures between groups. Randomisation was completed by a statistician outside of the study, so the outcome assessors remained blind to treatment assignment. Groups were treated identically apart from the intervention of interest. Authors provided description of loss to follow up and analysed the impact of the loss to follow up between the group, and concluded there were no significant differences between those who completed the trial and those who dropped out on demographic variables or clinical measures at baseline. Intention to Treat (ITT) analysis was conducted and reported. Reports calculation of a power analysis. **Weaknesses:** Outcomes were not measured in the same way; authors indicate that the reassessment of participants after the intervention was either administered face to face, over the telephone or via questionnaire. It is not clear how many participants did what. Measures were taken at 1 week, 3 months and 6 months for the CBT group, but only at one time point for the control group (1 week after end of intervention). No details provided on the assessors training in administering the outcome measures or diagnosing.
Carter, Olmsted, Kaplan, McCabe, Mills, & Aime (2003)	√	√	?	X	X	√	√	?	√	√	?	?	√	69%	**Strengths:** A restricted randomisation procedure employing random permuted blocks of 3 people was used. Allocation to groups was concealed; groups were assigned after the initial assessments by opening the envelope. Outcome assessors were blind to treatment assignment. Treatment groups were treated identically other than the intervention of interest. Absolute numbers reported for loss to follow up in each group, analysis to assess the impact of the loss to follow up on the results was conducted – no statistical differences between groups with regards to attrition. Participants were analysed in their respective groups and ITT was reported. Outcomes were measured in the same way for treatment groups. **Weaknesses:** Groups were similar at baseline except the waiting list control group had a significantly higher baseline purging frequency. There is no detail

															about the reasons for loss to follow-up/ drop out. No detail regarding the reliability of the measurements (e.g. number of raters, training of raters etc). No power calculation reported.
Cooper & Steere (1995)	?	?	?	X	X	√	√	X	X	√	?	?	√	50%	**Strengths:** Independent assessor who was blind to treatment condition conducted the outcome assessments. Treatment groups were treated identically in terms of number of sessions and duration of each session. Outcomes were measured in the same way for both groups. **Weaknesses:** No details regarding the randomisation procedure, who was in charge or what kind of procedure was used. Therefore unsure about allocation concealment. The researchers conducted the therapy, treating patients in both conditions – possible unconscious bias. The groups were not assessed at baseline to check for similarities. They were checked at mid-treatment. Some details are given of loss to follow up, but authors omit the reason for two of the dropouts and there was no analysis of the impact of the loss to follow up on the results. There is no ITT analysis. No details given about the training of the assessor in administering the measures and whether there was a second rater for intra-rater reliability. No power calculation reported.
Ferrer-García et al.(2017)	√	√	√	X	X	?	√	?	√	?	?	√	√	69%	**Strengths:** Randomised using biased coin randomisation. Allocation concealment. Groups were found to be similar at baseline. Treatment groups treated identically in terms of duration and session number. No missing data. No drop out. Participants analysed in the groups to which they were randomised. Appropriate statistical analysis. Power calculation reported. **Weaknesses:** States that outcome assessments were undertaken by assessors not involved in treatment delivery, but does not specify whether this person was blind to treatment allocation. The VR group received additional outcome measures targeted at VR-CET, which the other group did not receive. No details given about the training of the assessor in administering the measures and whether there was a second rater for intra-rater reliability. The follow up phase of this study is yet to be conducted.
Munsch et al. (2006)	√	?	?	X	X	X	√	√	√	√	X	X	√	54%	**Strengths:** Randomised using a permuted block design. Treatment groups were treated identically other than the intervention of interest. Good detail provided about the participants who were lost to follow up. Authors checked and there were no significant differences between groups with regards to loss to follow up. Participants were analysed in the groups to which they were randomised and ITT analysis was conducted. Outcomes were measured in the same way across groups.

															Weaknesses: Unclear whether allocation was concealed. Unclear whether there were any significant differences between groups at baseline. Outcome assessors were not blind to treatment allocation. Authors report that it was not possible to assess the interrater reliability of the interviews. No power calculation conducted or reported.
Sanchez-Ortiz et al.(2011)	√	√	√	**X**	**X**	√	√	X	√	√	√	√	√	**77%**	**Strengths:** Use of an independent statistician to randomise participants using computer randomisation. Treatment allocation was concealed until all groups were assigned. Outcome assessments were conducted by assessor blind to treatment allocation. No imbalances between groups on any of the sociodemographic or clinical characteristics. Treatment groups were treated identically apart from immediate or delayed time frame. ITT analysis was conducted and participants were analysed in the groups they were assigned. Outcomes were measured at the same time (baseline, 3 and 6 months) and in the same way (telephone interview plus online questionnaire) for both groups. Power calculation conducted, study adequately powered, appropriate statistical tests and adjustments used. **Weaknesses:** Reliability blinding check revealed that 69% of the blind assessors guessed the treatment group of the participants, indicating that blinding was not completely successful. Follow up was not complete, no description of loss to follow up was given, except the numbers, there was no analysis of the impact of the loss to follow up on the results.
Steele & Wade (2008)	√	**?**	**?**	**X**	**X**	√	√	√	√	√	**?**	√	√	**73%**	**Strengths:** Used block randomisation, a computer-generated random number sequence. Primary researcher responsible for this. All EDE assessments were delivered by trained interviewers blind to allocation. Independent research assistant conducted post-treatment and 6-month follow up assessment via telephone. Treatment groups were treated identically (duration, length) apart from content. Details given with regard to loss to follow up, and an analysis of the impact of the loss to follow up on the results was conducted. This revealed no significant differences between participants who withdrew and those who completed. Used a linear mixed model analysis which retained all participants in the analyses regardless of missing data (ITT approach). Outcomes measured in the same way for each group. Power analysis reported and appropriate statistical analysis used. **Weaknesses:** No details given regarding allocation concealment. Some differences between groups despite randomisation; placebo group had a significantly higher BMI than perfectionism group. Some detail given about inter-rater reliability of assessment sessions but unclear whether this was done

															for both pre and post EDE assessment and for other assessments.
Wonderlich et al. (2014)	√	√	√	**X**	**X**	**?**	√	**X**	√	√	√	√	√	**73%**	**Strengths:** Participants were randomised by an independent statistician using blocks of four participants stratified by site, diagnosis and therapist. Allocation was concealed to researchers when recruiting. No significant differences between groups at baseline. Treatment groups treated identically apart from intervention content. ITT analysis conducted, participants analysed in their respective groups and missing data was accounted for. Outcomes measured in the same way for both treatment groups. Use and details of inter-rater reliability for EDE. Power analysis reported and appropriate statistical tests used. **Weaknesses:** Trained masters and doctoral level assessors conducted the interviews and assessed for bulimic symptoms; they were blind to participant group. However, no detail on who collected outcome measures. Some detail provided regarding loss to follow up, but reasons were omitted and no evidence of an analysis of the impact of loss to follow up on the results.

KEY:
√ = Yes = 2 points **?** = Can't tell = 1 point **X** = No = 0 points

Outcomes for the Joanna Briggs Institute critical appraisal checklist for quasi-experimental designs.

	Item number										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	Quality rating (%)	
Fernandez-Aranda et al. (2015)	√	√	√	**X**	√	√	√	**?**	X	**72%**	**Strengths:** The cause and effect is clear. No significant differences between participants at baseline. Participants treated identically in both groups aside from the intervention of interest. Multiple measurements of the outcome pre and post intervention/exposure. Follow up was not complete but there was an analysis of the impact of the loss to follow up on the results. Outcomes included in comparisons were measured at the same time point and same measurements

											across each group. **Weaknesses:** No control group. No detail given as to why participants dropped out. No information about the reliability of the measurements – including whether there were any raters, the training of the assessors, intra-rater reliability. Power analysis not reported, but discussion section states the statistical power of the study was poor due to the small sample size.
Brambilla et al. (2010)	√	√	n/a	**X**	√	**?**	√	**?**	**?**	**69%**	**Strengths:** The cause and effect is clear; the intervention occurs in the time before the explored 'effect'. Multiple measurements of the outcome were taken both pre and post intervention. **Weaknesses:** No control group. Unclear whether follow up was complete, no details given about drop outs or number of participants who completed all measures. No details of who administered the measures, their training and whether intra-rater reliability took place. No power analysis reported, unclear whether study is appropriately powered for the statistics used.
Carter et al.(2016)	√	√	n/a	**X**	√	**?**	√	**?**	**?**	**69%**	**Strengths:** Clear what the 'cause' and the 'effect' is. Outcome data was collected for participants who dropped out and an t-test analysis between treatment completers and non-completers was conducted and reported. Intra-rater reliability reported for the baseline diagnostic measure. **Weaknesses:** No control group. Incomplete information given on participants that dropped out of treatment-only general reference to reasons for dropping out being 'mostly related to military-related circumstances'. Reference to the use of standardised procedures to collect outcome questionnaires, but no detail given about what this involves. No power analysis was reported and relatively small sample size obtained; unclear therefore whether the study was adequately powered.
Knott, Woodward, Hoefkens, & Limbert (2014)	√	√	n/a	**X**	√	√	√	**?**	**?**	**75%**	**Strengths:** Clear cause and effect. Multiple measures used (Eating pathology, depression, anxiety). Good detail given to the reasons for loss to follow up and differences between completers and non completers adequately described. Intent-to-treat analysis conducted. Pre to post treatment comparisons measured in the same way. **Weaknesses:** No control group. No details given about the reliability of the measurements (e.g. the training of the raters, who administered the measures, intra-rater reliability). No power calculation conducted

Openshaw, Waller, & Sperlinger (2004)	√	√	n/a	**X**	√	**?**	√	**?**	√	**75%**	**Strengths:** Clear cause and effect. Multiple measurements of outcome. Good description of loss to follow up, details about number of participants and specific reasons for loss to follow up. Pre to post treatment comparisons measured in the same way. Power analysis conducted and reported, sample size yields a medium to large effect size. **Weaknesses:** No control group. No analysis of the impact of the loss to follow up on the results. No details given about the reliability of the measurements (e.g. the training of the raters, who administered or scored the measures, intra-rater reliability)
Waller et al. (2018)	√	√	n/a	**X**	?	√	√	**?**	**?**	**69%**	**Strengths:** Clear cause and effect. Multiple measures administered - almost all measures taken at baseline (session 1), session 4, post-treatment (session 10) and at three-month follow-up. Good description of loss to follow up in terms of numbers and proportions and analysis of 'predictors of attrition'. Outcomes were measured pre and post intervention using the same tools. Appropriate statistical analysis conducted to answer the research question. **Weaknesses:** Measures of depression and anxiety were not collected at three-month follow up. No analyses of the impact of loss to follow up on results. No details given about the reliability of the measurements (e.g. the training of the raters, who administered or scored the measures, intra-rater reliability). No report of statistical power analysis.

KEY:

√ = Yes = 2 points **?** = Can't tell = 1 point **X** = No = 0 points

Section 2: Research Report

A non-clinical randomised controlled trial to assess the impact of reassurance-seeking on eating pathology and body satisfaction.

Abstract

Objective: This research aimed to determine whether reassurance-seeking has an impact on eating pathology and body satisfaction.

Method: This non-clinical study used a pre-post, randomised controlled design. Sixty-four participants were randomly allocated to one of three groups (body-related reassurance-seeking, personality-related reassurance-seeking or the control group). Participants in the reassurance-seeking groups were given a reassurance-seeking task relating to either their body or their personality. Participants in the control group simply completed the measures at the same time points. Outcome measures were administered before and after the experimental phase.

Results: Planned comparisons revealed that body-related and personality-related reassurance-seeking made eating pathology worse, but in different ways. Body-related reassurance-seeking significantly increased concerns about weight and shape, and increased fear of uncontrollable weight gain. Personality-related reassurance-seeking significantly increased eating concerns. Body-related reassurance-seeking did not make eating pathology significantly worse than personality-related reassurance seeking. Body satisfaction was not found to be affected by reassurance-seeking.

Conclusion: This study suggests that reassurance-seeking has a causal effect on eating pathology in a non-clinical population. The results suggest that different forms of reassurance-seeking demonstrating different effects. Future research is required to establish whether these finding extend to clinical samples. The results are discussed in light of the current literature. The strengths and limitations of the study are outlined alongside suggestions for future research and clinical implications.

Key words: eating disorder, eating pathology, body satisfaction, reassurance-seeking

Practitioner points

- Reassurance-seeking appears to negatively impacts eating pathology.
- During the assessment phase, clinicians should identify whether or not the patient engages in problematic reassurance-seeking. A formulation should be developed to help the patient understand how this safety behaviour maintains eating pathology.
- Interventions to target reassurance-seeking could include behavioural experiments, exposure-based techniques, and survey-based techniques.
- Eating disorder prevention programmes could target non-clinical populations who are considered 'at risk' of developing an eating disorder, by providing psychoeducation on the link between reassurance-seeking and eating pathology.

Introduction

Eating disorders are characterised by serious cognitive disturbances in eating attitudes and body image (National Institute for Health and Care Excellence, NICE, 2017). They are most prevalent in adolescent girls and young women but are typically detected and treated in early adulthood (Kesby, Maguire, Brownlow, & Grisham, 2017; Thompson, Wonderlich, Crosby, & Mitchell, 2001). The most commonly considered eating disorders are anorexia nervosa and bulimia nervosa. Both disorders are characterised by a fear of weight gain and maladaptive behaviours intended to change body shape, size and weight (Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006). Anorexia nervosa is diagnosed in individuals with significantly low body mass resulting from the persistent restriction of food intake. A diagnosis of bulimia nervosa captures patients who engage in recurrent episodes of binge eating and compensatory purging behaviours (e.g., laxative use) (American Psychiatric Association, 2013). However, it is important to remember that the most common eating disorders are those atypical presentations that do not meet full criteria for either of these diagnoses (Fairburn & Harrison, 2003).

Eating disorders have dangerous consequences for the patient's physical and psychological functioning, leading to high morbidity and mortality rates (NICE, 2017). Cardiovascular, neurological, gastrointestinal and fertility problems are amongst the physical complications experienced by patients. Co-morbid psychological difficulties include depression and suicidal behaviour, anxiety, obsessive-compulsive disorder (OCD) and substance abuse (Simon, Schmidt, & Pilling, 2005). The annual total treatment costs to the United Kingdom's (UK) National Health Service are as high as £4.6 billion, with a yearly loss of around 2,700 quality-adjusted life years (BEAT, 2015).

Prevalence and aetiology

It is estimated that there are 1.25 million people in the UK with an eating disorder, approximately 11% of whom are male (BEAT, 2017). However, research into the prevalence of body satisfaction and eating pathology amongst non-clinical samples has found high proportions of body weight and shape concerns (Favaro, Ferrara, & Santonastaso, 2003) and disordered eating behaviours, such as vomiting, binge-eating, and laxative use (Croll, Neumark-Sztainer, Story, & Ireland, 2002). Individuals presenting with these attitudes and behaviours are considered vulnerable to developing clinical levels of eating pathology (Fairburn, Cooper, & Shafran, 2003; Levine & Smolak, 2006).

Research has linked the emergence of eating pathology to a range of factors, including: repeated media exposure to a 'thin ideal' (Harper & Tiggemann, 2008); perfectionism (Levinson et al., 2013); and interpersonal problems (e.g. social comparison, non-assertiveness, fear of judgement) (Carey, Donaghue, & Broderick, 2014; Levinson & Rodebaugh, 2012). However, the fact that the history appears to differ across individuals makes it difficult to detect one single factor that is necessary or sufficient for eating pathology to develop (Bailey & Waller, 2017; Connan, Campbell, Katzman, Lightman, & Treasure, 2003). In contrast, there is clearer evidence about the safety behaviours that maintain existing eating pathology and body dissatisfaction (Bailey & Waller, 2017; Pallister & Waller, 2008), which can be addressed in treating eating disorders. Consequently, this focus on addressing maintenance factors characterises evidence-based treatments, such as eating-disorder-focused cognitive behavioural therapy (CBT-ED), the Maudsley Anorexia Nervosa Treatment for Adults (MANTRA), and Family-Based Treatment (NICE, 2017). Therefore, it is important to understand the role of safety behaviours.

Safety behaviours

Anxiety and depression are key components of eating disorders (Lavender et al., 2016; Pallister & Waller, 2008). Individuals with eating disorders often engage in a range of safety behaviours to regulate these negative emotions, including restriction, purging, and binge-eating. Body avoidance, body comparison and body checking are three safety behaviours that have received good empirical support in the eating disorders literature (Heinberg & Thompson, 1992; Reas, Whisenhunt, Netemeyer, & Williamson, 2002; Rosen, 1997; Rosen, Srebnik, Saltzberg, & Wendt, 1991). These safety behaviours reduce unwanted thoughts and feelings in the short term but maintain eating pathology in the longer term (Pallister & Waller, 2008; Thompson, 1992). For example, body avoidance behaviours (e.g., avoiding mirrors) prevent the individual from being exposed to evidence that could disconfirm their unhelpful body-related beliefs (Fairburn et al., 2003). In contrast, body checking (e.g., ritualistic weighing) exaggerates perceived, body imperfections. Body comparison (e.g., comparing one's body to attractive media icons) magnifies the difference between one's actual and desired body (Fairburn et al., 2003; Hamel, Zaitsoff, Taylor, Menna, & Grange, 2012). Such behaviours are also likely to block therapeutic attempts to modify unhelpful thoughts and behaviours related to eating, serving to maintain the cognitions and emotional states (Waller & Marcoulides, 2013).

Treatment

NICE (2017) guidelines recommend that adults with anorexia nervosa should be offered either individual CBT-ED, MANTRA or Specialist Supportive Clinical Management. For adults with bulimia nervosa, NICE recommends bulimia-nervosa-focused guided self-help or individual CBT-ED. Overall, cognitive behavioural therapy

(CBT) has the largest evidence base for the treatment of adults with eating disorders (Hay, 2013). The model underpinning CBT-ED places substantial emphasis on addressing body-related safety behaviours. However, the treatment outcomes for people with eating disorders are moderate, with only 45-60% of patients recovering (Fairburn et al., 2009; Steinhausen & Weber, 2009). This gap in the recovery rate indicates the need for further research into understanding the factors that maintain eating disorders and that could be targeted to treat such patients. Such research needs to include the identification of further safety behaviours that could be key in treating and preventing eating pathology. A safety behaviour that has received little attention in relation to eating disorders but is better known in the anxiety literature is reassurance-seeking, which will be the target of this study.

Reassurance-seeking

Reassurance-seeking involves the pursuit of threat-relieving information from other people. It has the aim of increasing one's sense of security via verbal interactions with others or non-verbal interactions (e.g., obtaining information from the internet or checking behaviours) (Halldorsson & Salkovskis, 2017). Like other safety behaviours, this behaviour is performed to reduce distress in the short term but can cause difficulties in the longer term. For example, reassurance-seeking can create interpersonal conflict and hinder the development of healthy social relationships (Mason et al., 2016), driving others away or resulting in unhealthy patterns of interaction. The interpersonal aspect of reassurance-seeking is therefore particularly important to understand.

Reassurance-seeking is a common, maladaptive coping strategy, which is observed in a range of disorders. As a result, reassurance-seeking is understood to be a transdiagnostic psychological construct, contributing to the development and

maintenance of psychopathology in individuals with anxiety disorders (OCD; Salkovskis, 1986; generalised anxiety disorder [GAD]; Woody & Rachman, 1994; social phobia; Heerey & Kring, 2007; panic disorder; Onur, Alkin, & Tural, 2007) and depression (Burns, Brown, Plant, Sachs-Ericsson & Joiner, 2006; Joiner & Metalsky, 2001). The type of reassurance sought can vary as a function of the disorder. For example, individuals with depression tend to request reassurance that one is lovable and worthy (Starr & Davila, 2008), whereas individuals with health anxiety might request reassurance about their physical symptoms (Anderson, Saulsman, & Nathan, 2011).

The existing research on reassurance-seeking in the eating disorders is limited and mainly correlational. However, it shows that this behaviour is worthy of further consideration as a potential factor in understanding eating disorders. Findings to date are based on relatively disparate research designs, limiting the overall conclusions that can be drawn. For example, Howard, Heron, MacIntyre, Myers, and Everhart (2017) found that higher levels of reassurance-seeking (as measured by the extent to which participants value and access Facebook as a medium of feedback and validation on their appearance), were associated with greater body dissatisfaction and eating pathology. Mason et al. (2016) found that reassurance-seeking about one's worth and lovability strengthened the association between social avoidance, eating pathology and depressive symptoms in patients with bulimia nervosa. Kwan, Minnich, Douglas, Gordon and Castro (2017) used the same measurement of reassurance-seeking and found that reassurance-seeking strengthened the relationship between bulimic symptoms and interpersonal stress in an undergraduate sample. Finally, in a longitudinal study of female college students, Cooley, Toray, Valdez and Tee (2007) found that higher baseline levels of reassurance-seeking (about one's worth and lovability), depression and stressful life events were associated with greater eating pathology symptoms at 20

months. However, the use of correlational designs means that conclusions cannot be drawn about cause and effect, making the relationship between reassurance-seeking and eating pathology/body satisfaction unclear. Therefore, there is a need for experimental designs, to allow for causal inferences to be drawn about the role of reassurance-seeking.

The extant literature has found that reassurance-seeking in relation to one's appearance (Howard et al., 2017) and one's worth (Cooley et al., 2007; Kwan et al., 2017; Mason et al., 2016), is associated with increased eating pathology/body satisfaction. However, research to date has not investigated whether there is a difference in impact between types of reassurance-seeking. Therefore, this study will test the impact of both body-related and personality-related reassurance-seeking. It is hypothesised that both types of reassurance-seeking will impact eating pathology/body satisfaction, but that body-related reassurance-seeking will have a greater impact, given the well-recognised link between body image and eating pathology.

Aims of this study

This research aims to establish causality in the relationship between reassurance-seeking and eating pathology/body satisfaction, in a non-clinical sample. Experimental methodologies have been used to infer cause and effect in previous research on safety behaviours and eating pathology (Bailey & Waller, 2017; Shafran, Lee, Payne, & Fairburn, 2007). These studies have helped to inform our understanding of what to target clinically. However, there is a lack of experimental research investigating the impact of different types of reassurance-seeking on eating pathology and body satisfaction. Therefore, the current research will use a similar experimental design to Bailey and Waller (2017), who used a randomised controlled trial (RCT) in a

naturalistic setting. This method will be used to assess the impact of personality-related and body-related reassurance-seeking on eating pathology/body satisfaction. The aims of the study are as follows:

Aim 1:

To determine whether reassurance-seeking has an impact on eating pathology.

Hypothesis 1:

a) There will be a significant difference in eating pathology scores over time between the three groups (personality-related reassurance-seeking, body-related reassurance-seeking and no reassurance-seeking; control group).
b) Body-related and personality-related reassurance-seeking will significantly increase eating pathology scores. There will be no significant change in eating pathology scores in the control group.
c) Body-related reassurance seeking will make eating pathology significantly worse than personality-related reassurance-seeking.

Aim 2:

To determine whether reassurance-seeking has an impact on body satisfaction.

Hypothesis 2:

a) There will be a significant difference in body satisfaction scores over time between the three groups (personality-related reassurance-seeking, body-related reassurance-seeking and no reassurance-seeking; control group).
b) Body-related and personality-related reassurance-seeking will make body

satisfaction significantly worse. There will be no significant change in body satisfaction scores in the control group.

c) Body-related reassurance-seeking will make body satisfaction significantly worse than personality-related reassurance-seeking.

Aim 3:

To determine whether the impact of reassurance-seeking is related to state anxiety, state depression or trait reassurance-seeking.

Hypothesis 3:

State depression, state anxiety and trait reassurance-seeking will be associated with the impact of reassurance-seeking on eating pathology and body satisfaction.

Method

Ethics

The University of Sheffield's Department of Psychology Research Ethics Committee granted ethical approval to this study (Appendix A).

Design

This non-clinical study used a pre-post, randomised controlled design in a naturalistic setting. Reassurance-seeking type was the between-subjects factor, with three levels: body-related, personality-related, and no reassurance-seeking (control). The within-subject factor was time, with two levels (pre and post). The dependent variables were body satisfaction and eating pathology.

Participants

Sample size calculation. *A priori* sample size analysis was calculated using Cohen's tables to determine the adequate sample size to investigate the main hypothesis that reassurance-seeking will make eating pathology and body satisfaction worse (Appendix B; Cohen, 1992). Effect size assumptions were based on a previous study with a similar design (Bailey & Waller, 2017) which found a large effect size (*partial eta-squared* = .129), equating to d = .76. Therefore, the present study assumed a large effect size (d = .80). To detect a large effect size, with an alpha = .05, using three groups, a total sample size of 63 is necessary to yield a significant effect with 80% power (Cohen, 1992). This equates to 21 participants per group. Based on the findings from the previous research (Bailey & Waller, 2017), a conservative attrition rate of 20% was assumed. Therefore, to allow for attrition, this study aimed to recruit 75 participants, allocating 25 participants to each group (see Procedure section for more details on the pseudo-random allocation process).

Inclusion and exclusion criteria. This study recruited females aged 18-65 years from a non-clinical population. A non-clinical female population was selected as this is a new area of research and females are at a greater risk of developing an eating disorder. The age range was chosen as it reflects the age at which most eating disorders are detected and treated. Participants who did not complete the full set of questionnaires at time one or time two were excluded. The following participants were excluded at the screening stage, as they were considered vulnerable to the possible harmful effects of the research: participants with a current or previous history of an eating disorder; participants with a learning disability; and participants receiving ongoing treatment for anxiety or depression. Participants who scored very highly on a measure of depression, anxiety, eating pathology and/or body satisfaction at time one were also excluded for

ethical reasons (see Table 1 for cut-off scores). Participants did not receive an incentive for taking part.

Table 1
Cut-off scores for exclusion

Variable (measurement)	Cut-off score
Depression (PHQ-9)	≥ 15
Anxiety (GAD-7)	≥ 15
Eating pathology (ED-15)	≥ 4.71
Body satisfaction (BSS)	≥ 77

Note. PHQ-9 = patient health questionnaire-9; GAD-7 = generalised anxiety disorder-7 questionnaire; BSS = body satisfaction scale.

Procedure

Recruitment. This study used convenience sampling to recruit participants from the researcher's social media website (n = 48) and the University of Sheffield's Volunteers list (n = 42). A total of 64 participants completed measures at time one and time two, and were included in the analysis. Students and staff on the University of Sheffield's volunteers list received an email, outlining the nature of the study and requesting their participation (Appendix C). Interested participants retrieved the link in the email and completed a screening questionnaire to address demographic factors (age, eating disorder history, learning disability diagnosis and treatment for depression and/or anxiety) (Appendix D). Non-eligible participants were excluded and presented with information explaining why they were unable to participate (Appendix E). Eligible participants were redirected to an information sheet (Appendix F) and consent form (Appendix G). Access to the battery of questionnaires (see Measures section) was granted once the participant selected the option titled: 'I give consent to take part in the above study'. Participants were required to enter their email address to enable the

researcher to contact the participants about the experiment and to match their data at time one and time two. Email addresses were then removed from all files.

A research advertisement (Appendix H) was also placed on the researcher's social media website. Upon retrieving the web-link, participants followed the same process as the participants from the volunteers list.

Group allocation. Figure 1 provides a visual representation of the recruitment and randomisation process. Of the 90 participants who completed the measures at time one, 12 were excluded due to exceeding the cut-off scores (see Table 1) on a measure of depression, anxiety, eating pathology and/or body satisfaction. Alternation (a quasi-randomisation procedure) was used. The researcher assigned 78 eligible participants to one of three conditions based on the order in which they entered the study (e.g. every third person was allocated to the control group). Allocation concealment was therefore not possible. Participants were assigned to either the body-related reassurance-seeking group (n = 26), the personality-related reassurance-seeking group (n = 26), or the control group (n = 26). Participants were not blind to their condition, but they were unaware that there were two types of reassurance-seeking conditions.

Experimental groups. The researcher emailed participants in the experimental groups to confirm their participation and arrange a suitable day to complete a reassurance-seeking task. On the evening before their scheduled experimental day, participants received an email containing standardised instructions for either the body-related reassurance-seeking task (Appendix I) or the personality-related reassurance-seeking task (Appendix J). The instructions for both experimental groups stated that, for a continuous eight-hour period (starting from when the participant wakes up), participants must ask one person for reassurance once every hour. Participants were

informed that if they missed a time point, they should continue as normal from the next time point. Participants were instructed to wait a minimum of two hours, after the eight-hour period, before completing the second online survey (see Measures section). An automated email was sent to participants at the end of the day, reminding them to complete the online survey.

Control group. Participants in the control group also received an email confirming their participation and were informed that they would receive a second online survey two weeks from their time one survey.

Debrief. All participants were presented with the same debrief sheet (Appendix K), which appeared once they completed the second online survey.

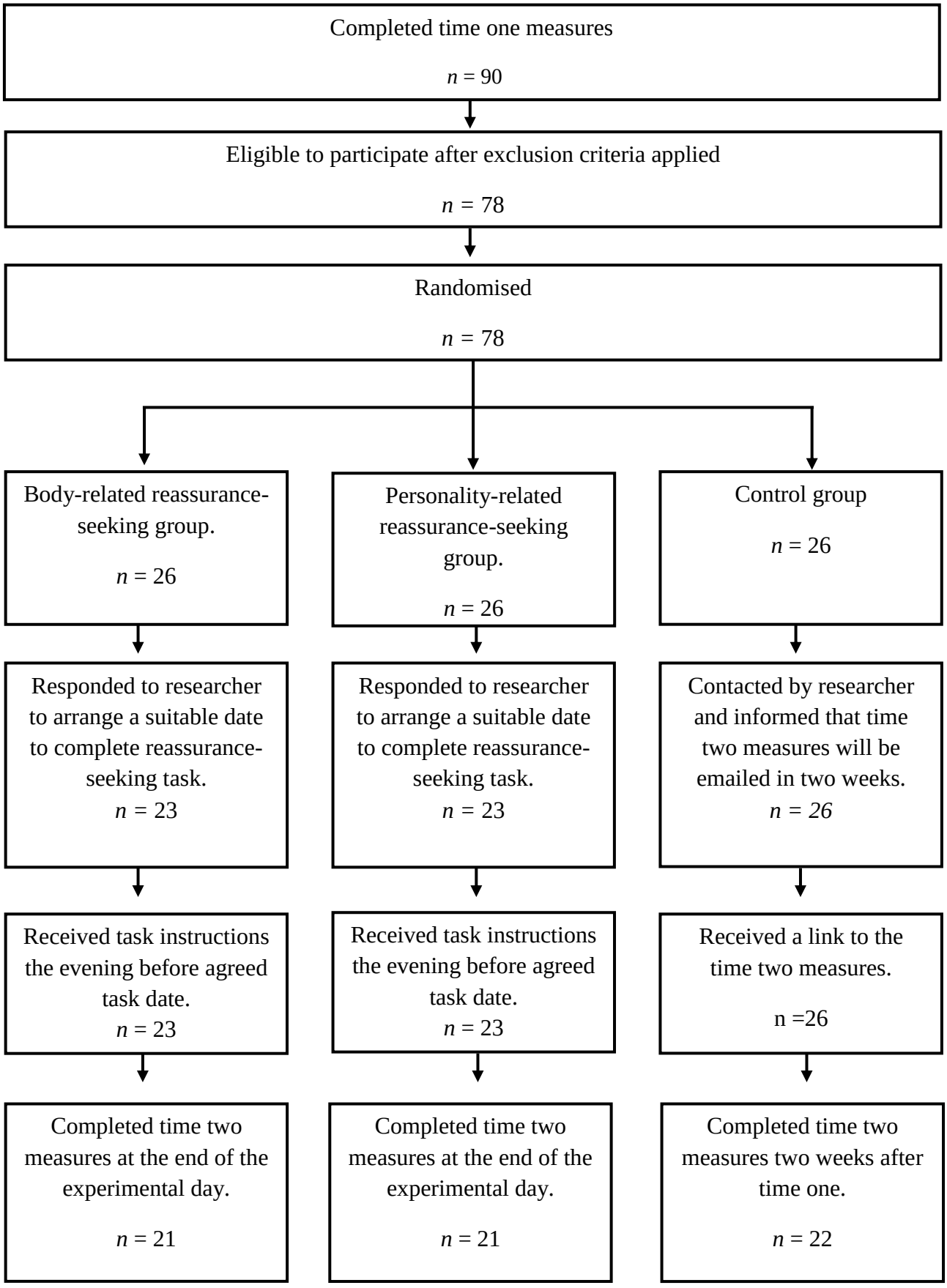


Figure 1. Flow chart of recruitment and randomisation procedure

Measures

All data were collected via online surveys, hosted by Qualtrics. All participants completed two online surveys. The first online survey consisted of the following measures:

Depressive and Obsessive Reassurance Seeking Scale (DORSS; Radomsky, Parrish, & Dugas, 2009). The DORSS is a 30-item measure of trait reassurance-seeking (Appendix L). The respondent is required to rate the extent to which each statement is true of them (e.g. "I sometimes make self-derogatory statements with the hope that someone will object to them"). Ratings are made on a five-point Likert scale (0 = Not at all, 4 = Very much). Scores were calculated for three subscales: overt obsessive-compulsive reassurance-seeking (10 items), covert obsessive-compulsive reassurance-seeking (10 items) and depressive reassurance-seeking (10 items). Total scores for each subscale range from 0-40, with higher scores indicating a greater tendency to seek reassurance. This measure was validated in a university student sample and has excellent inter-item reliability ($\alpha = 0.93$) (Radomsky et al., 2009).

Body Satisfaction Scale (BSS; Slade, Dewey, Newton, Brodie, & Kiemle, 1990). The BSS is a 16-item measure of body satisfaction (Appendix M). The respondent is asked to indicate the degree to which they are satisfied with each of the 16 body-parts listed (e.g. neck, arms). A seven-point Likert scale (1 = very satisfied, 7 = very unsatisfied) was used for rating. Scores were calculated for two subscales: head satisfaction and body satisfaction. An overall, 'general dissatisfaction' score was calculated by combining scores for all 16 items. Total general dissatisfaction scores range from 16-112, with higher scores indicating greater body dissatisfaction. This measure was validated in a college student sample ($\bar{x} = 47.94$, SD = 14.60), and has acceptable test-retest reliability and internal consistency ($\alpha = 0.87$) (Slade et al., 1990).

Participants scoring two or more standard deviations above the mean (≥ 77) were excluded from participating, as these participants were considered vulnerable to any possible harmful effects of the research.

ED-15 (Tatham et al., 2015). The ED-15 is a brief 11-item measure of core eating pathology (Appendix N). Respondents are asked to indicate how often they have experienced certain cognitions (e.g. "preoccupied with thoughts of food and eating") and engaged in behaviours (e.g. "followed strict rules about my eating") over the past week. Each response is rated on a seven-point Likert scale (0 = Not at all, 6 = All the time). Scores were calculated for two subscales: weight/shape concerns (e.g. "felt distressed about my body weight") and eating concerns (e.g. "been preoccupied with thoughts of food and eating"). An overall attitudinal score (ranging from 0-6) was calculated by averaging the scores for 10 items, with higher scores indicating more disordered eating attitudes. The remaining item, "I worry that whatever I eat, I will gain lots of weight" is a standalone item which measures respondents' fear of uncontrollable weight gain. This measure was validated in non-clinical females ($\bar{x}$ = 2.05, SD = 1.33) and has high internal consistency and test-retest reliability (Tatham et al., 2015). Participants scoring two or more standard deviations above the mean (≥ 4.71) were excluded from participating, as these participants were considered vulnerable to any possible harmful effects of the research.

Patient Health Questionnaire – 9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001). The PHQ-9 is a nine-item measure of state depression (Appendix O) used to determine the characteristics of the population. Respondents are asked to rate how often they have experienced a range of symptoms (e.g. "feeling down, depressed or hopeless") over the past two weeks. Each response is rated on a four-point Likert scale (0 = not at all, 3 = nearly every *day).* Total scores range from 0-27, with scores of ≥ 5, ≥

10, ≥ 15 and ≥ 20 representing mild, moderate, moderately severe and severe depression, respectively. This scale has well-established reliability and validity in non-clinical populations (Kroenke et al., 2001). Participants with scores indicating moderately severe and severe depression (≥15) were excluded from participating, as these participants were considered vulnerable to any possible harmful effects of the research.

Generalised Anxiety Disorder – 7 (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006). The GAD-7 is a seven-item measure of state anxiety (Appendix P) used to determine the characteristics of the population. Respondents are asked to rate how often they have experienced a range of symptoms (e.g. trouble relaxing) over the past two weeks. Each response is rated on a four-point Likert scale (0 = not at all, 3 = nearly every day). Total scores range from 0-21, with scores of ≥ 5, ≥ 10 and ≥ 15 reflecting mild, moderate and severe anxiety levels respectively. The scale has high internal consistency (α = 0.92) and high test-retest reliability (r= 0.83) (Spitzer et al., 2006). Participants with scores indicating severe anxiety levels (≥15) were excluded from participating, as these participants were considered vulnerable to any possible harmful effects of the research.

Second online survey. The second online survey consisted of only the BSS and the ED-15. Participants in the experimental groups were asked to indicate how many times they sought reassurance over the course of the experimental period (Appendix Q). This item was devised by the researcher to verify the participants' engagement with the task. All participants indicated that they had sought reassurance between seven and eight times during the experimental period, indicating good compliance.

Data analysis

Preparation. The raw data were downloaded from Qualtrics into a Microsoft Excel spreadsheet before being transferred to SPSS (Version 25) for data analysis. The categorical variable, "Group", was created to label the condition participants were assigned to (1 = body-related reassurance-seeking; 2 = personality-related reassurance-seeking; 3 = control). The raw scores for eating pathology (ED-15 scores), body satisfaction (BSS scores), anxiety (GAD-7 scores), depression (PHQ-9 scores) and reassurance-seeking (DORSS scores) were converted into total scores. Subscale scores were also calculated for the ED-15 (i.e., weight/shape concerns, and eating concerns), the BSS (i.e., head satisfaction and body satisfaction), and the DORSS (i.e., overt, covert, and depressive reassurance-seeking). On all measures, an increase in scores indicated greater difficulties. To compare differences between body-related and personality-related scores (hypotheses 1c and 2c), change scores were calculated for each participant's BSS and ED-15 (and subscale) scores by subtracting time two scores from time one scores.

Descriptive statistics. To determine the characteristics of the sample, means and standard deviations were obtained for all baseline data. Cronbach's alphas were calculated as a measure of scale internal consistency. There were no outliers in the data, as assessed by inspection of boxplots. Histograms, Normal Q-Q Plots and the Shapiro-Wilk's test ($p > .05$) indicated that the majority of the data were normally distributed, with the exception of the control group's ED-15 scores at time two, and the personality-related reassurance-seeking group's ED-15 scores at time one. ANOVAs were conducted, as they are considered robust to violations of normality (Kirk, 2014). Parametric tests were used throughout the analysis due to their greater statistical power, which reduces the risk of Type 2 errors (Mumby, 2002).

Inferential statistics. Firstly, a series of one-way ANOVAs were conducted to identify any significant differences between groups at baseline. To address hypotheses 1a and 2a, two 3x2 mixed ANOVAs were conducted to detect whether any change in BSS and ED-15 scores resulted from the interaction between group allocation (the between-subjects factor) and time (the within-subjects factor). The data for both BSS and ED-15 scores met the assumptions of the 3x2 mixed ANOVA as there were no outliers (as assessed by boxplot), the data were normally distributed (as assessed by Shapiro-Wilk's test, $p > .05$), and there was homogeneity of variance ($p > .05$) and covariances ($p = .006$), as assessed by Levene's test of homogeneity of variances and Box's test of covariance matrices, respectively. Sphericity was assumed, given that the within-subjects factor had fewer than three categories (Leard, 2015). The significance level was set at 0.05.

Kirk (2014) emphasises the importance of extracting all relevant information contained in the data, regardless of an insignificant ANOVA result, through the judicious use of *a priori* 'planned comparison' tests. Therefore, to examine any significant pre-post change within each group (hypotheses 1b and 2b), a series of one-tailed paired samples t-tests were conducted. Cohen's *d* effect sizes were calculated for all significant findings (Cohen, 1988). To test whether body-related reassurance-seeking made eating pathology and body satisfaction significantly worse than personality-related reassurance-seeking (hypotheses 1c and 2c), a series of independent samples t-tests were conducted. A minimum significance level of $p < .05$ was used for all t-tests. Multiplicity adjustments were not considered appropriate, given that these tests were planned (Anderson, 2014; Rutherford, 2011).

Finally, a series of Pearson's correlations were conducted to examine whether the impacts of each form of reassurance-seeking on eating pathology and body

satisfaction were associated with state depression, state anxiety, or trait reassurance-seeking (hypothesis 3). To reduce the risk of a Type 1 error with these exploratory tests, the significance level was set to .01.

Results

Sample characteristics

Sixty-four eligible female participants were randomised to either the body-related reassurance-seeking group (n = 21), the personality-related reassurance-seeking group (n = 21), or the control group (n = 22). The baseline characteristics for all groups are presented in Table 2, alongside results from a series of one-way ANOVAs to check for any significant difference between groups. The ANOVAs revealed that there were no significant differences between groups at baseline, meaning that the groups were balanced.

Table 3 displays the Cronbach's alpha coefficients for all the measures and their subscales at time 1. All questionnaires and their corresponding subscales have high internal consistencies, showing that a strong relationship exists between the items on these measures, and suggesting that each forms a cohesive construct. The table also shows the mean baseline score for the overall sample. These mean scores are comparable to those reported for non-clinical samples by the authors of the scales.

Table 2
Mean baseline scores and SDs for participants across the conditions, with one-way ANOVA statistics reported.

	Group			ANOVA	
	RS-Body (n = 21)	RS-Personality (n = 21)	Control (n = 22)	F	p
	M (SD)	M (SD)	M (SD)		
BSS-Total	45.43 (13.00)	45.67 (14.13)	47.41 (14.87)	0.129	0.880
BSS- Head	21.95 (6.76)	20.29 (6.62)	20.55 (6.63)	0.381	0.685
BSS- Body	23.48 (8.66)	25.95 (8.58)	26.86 (9.51)	0.821	0.445
PHQ-9	4.48 (2.80)	3.95 (3.22)	3.45 (3.38)	0.567	0.570
GAD-7	3.33 (3.72)	2.81 (3.31)	3.50 (3.69)	0.216	0.806
DORSS- Total	32.95 (19.04)	22.57 (14.95)	24.59 (23.96)	1.638	0.203
DORSS- Overt	12.86 (9.84)	8.52 (7.33)	8.14 (9.26)	1.848	0.166
DORSS- Covert	11.71 (6.92)	7.38 (4.34)	8.00 (7.58)	2.771	0.071
DORSS- Depressive	8.38 (6.95)	6.48 (5.30)	8.45 (9.03)	0.502	0.608
ED-15- Total	1.60 (1.14)	1.39 (1.05)	1.80 (1.38)	0.627	0.538
ED-15- WSC	1.50 (1.38)	1.39 (1.05)	1.85 (1.49)	0.707	0.497
ED15- EC	1.76 (1.34)	1.40 (1.18)	1.72 (1.32)	0.486	0.618

Note. M = Mean; SD = Standard Deviation; RS = reassurance seeking BSS = body satisfaction scale, ED-15 = eating attitudes measures; WSC = weight and shape concern; EC = eating concern; PHQ-9 = depressive symptoms scale, GAD-7 = anxiety symptoms scale;

Table 3

Descriptive statistics and Cronbach's alphas for measures at time 1.

	Total (n= 64) M (SD)	Cronbach's alpha α
BSS- Total	46.19 (13.83)	.864
BSS- Head	21.03 (7.22)	.833
BSS- Body	24.89 (8.87)	.860
PHQ-9	3.95 (3.12)	.766
GAD-7	3.22 (3.53)	.866
DORSS- Total	26.67 (19.94)	.939
DORSS- Overt	9.81 (9.00)	.917
DORSS- Covert	9.02 (6.65)	.802
DORSS- Depressive	7.78 (7.23)	.893
ED-15- Total	1.60 (1.19)	.919
ED-15- WSC	1.58 (1.36)	.847
ED15- EC	1.63 (1.27)	.815

Note. M = Mean; SD = Standard Deviation; BSS = body satisfaction scale, ED-15 = eating attitudes measures; WSC = weight and shape concern; EC = eating concern; PHQ-9 = depressive symptoms scale, GAD-7 = anxiety symptoms scale; DORSS = measure of reassurance seeking.

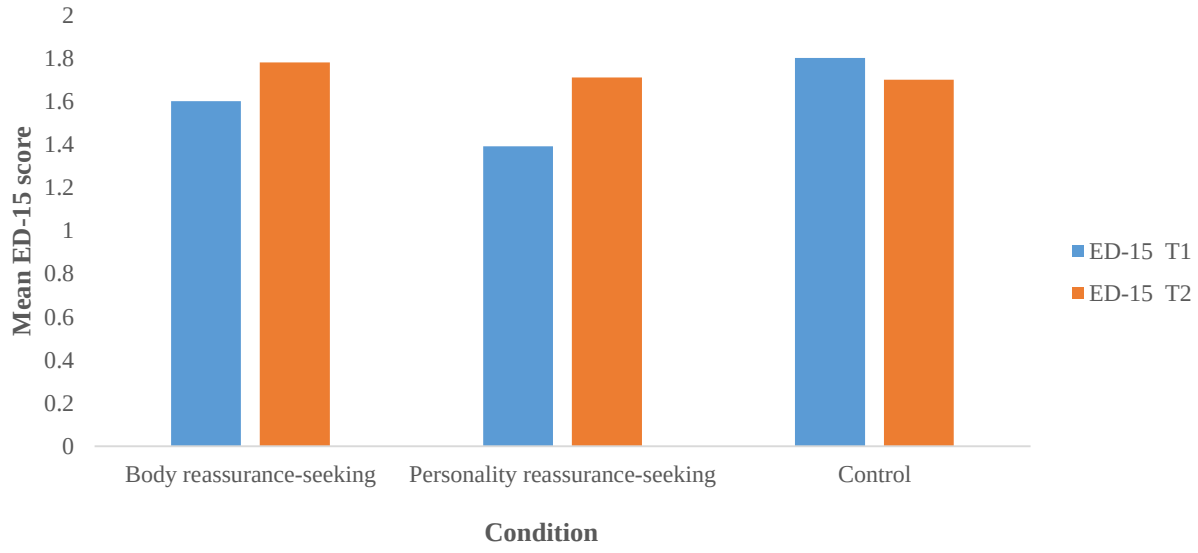
The impact of reassurance-seeking on eating pathology

Hypothesis 1a: *There will be a significant difference in eating pathology scores over time between the three groups (personality-related reassurance-seeking, body-related reassurance-seeking and no reassurance-seeking; control group).*

Figure 2 shows the ED-15 scores of the three groups before and after the intervention. ED-15 scores increased over time under both experimental conditions, whereas the control group's scores remained relatively stable (see Table 4 for details of mean scores). Thus, it appears that reassurance-seeking made eating pathology worse.

To determine whether there was a significant difference between eating pathology scores across the conditions, a 3 (group) x 2 (time) ANOVA was performed. There was no main effect of time ($F(1, 61) = 2.203$, $p = .143$, partial $\eta^2 = .035$) or of group ($F(2, 61) = .175$, $p = .839$, partial $\eta 2 = .006$), nor was there a significant interaction between group allocation and time on eating pathology scores (F (2, 61) = 1.733, $p = .185$, partial $\eta^2 = .054$). Hypothesis 1a was therefore not supported.

Figure 2. Mean ED-15 scores at time 1 and time 2 across conditions.



Hypothesis 1b: *Body-related and personality-related reassurance-seeking will significantly increase eating pathology scores. There will be no significant change in eating pathology scores in the control group.*

The planned comparisons in Table 4 demonstrate support for hypothesis 1b as body-related reassurance-seeking and personality-related reassurance-seeking were found to significantly increase participants' overall eating pathology, but in different ways. Body-related reassurance-seeking increased participants' weight and shape concerns and their fear of uncontrollable weight gain. In contrast, personality-related reassurance-seeking significantly increased participants' eating concerns. All of these significant effects were moderate in strength (Cohen, 1988). There was no such change over time in the control group.

Hypothesis 1c: *Body-related reassurance seeking will make eating pathology significantly worse than personality-related reassurance-seeking.*

A series of independent samples t-tests were conducted to test whether body-related reassurance-seeking made eating pathology significantly worse than personality-related reassurance-seeking, by comparing the difference between change scores for each variable between groups. The findings showed that there was no statistical difference between the groups in regards to their overall eating pathology (M = 0.14 , 95% CI [-0.51, 0.22], $t(40)$ = .797, p = 0.22), weight and shape concerns (M = 0.16, 95% CI [-0.38, 0.41], $t(40)$ = 0.82 , p = 0.47), eating concerns (M = 0.38, 95% CI [-0.89, 0.13], $t(40)$ = -1.525, p = 0.07) or fear of uncontrollable weight gain (M = 0.19 , 95% CI [-0.66, 1.04], $t(40)$ = 0.454, p = 0.33).

Table 4

Results from the t-test calculation, comparing pre and post eating pathology and body satisfaction scores within each condition.

	Body-related reassurance-seeking					**Personality-related reassurance-seeking**					**Control group**				
	Pre	Post	t	*p*	d	Pre	Post	t	*p*	d	Pre	Post	t	*p*	d
	M (SD)	*M* (SD)				*M* (SD)	*M* (SD)				*M* (SD)	*M* (SD)			
ED-15- Total	1.60 (1.14)	1.78 (1.17)	**2.11**	**.024**	**0.46**	1.39 (1.05)	1.71 (1.28)	**2.06**	**.027**	**0.47**	1.80 (1.39)	1.70 (1.18)	0.44	*ns*	-
ED-15- WSC	1.49 (1.38)	1.75 (1.32)	**1.90**	**.036**	**0.43**	1.37 (1.21)	1.61 (1.44)	1.70	*ns*	-	1.85 (1.49)	1.72 (1.24)	0.65	*ns*	-
ED15- EC	1.76 (1.33)	1.83 (1.31)	0.51	*ns*	-	1.40 (1.18)	1.86 (1.24)	**2.18**	**.021**	**0.49**	1.72 (1.32)	1.69 (1.18)	0.14	*ns*	-
FUWG	1.24 (1.81)	1.76 (1.70)	**1.92**	**.035**	**0.42**	1.38 (1.24)	1.71 (1.77)	1.05	*ns*	-	1.68 (1.73)	1.64 (1.65)	0.17	*ns*	-
BSS-Total	45.43 (12.99)	46.76 (16.16)	0.73	*ns*	-	45.67 (14.13)	43.10 (13.77)	1.39	*ns*	-	47.41 (14.87)	47.82 (13.37)	0.16	*ns*	-
BSS- Head	21.95 (6.76)	22.29 (8.06)	0.36	*ns*	-	20.29 (6.62)	19.24 (6.71)	0.96	*ns*	-	20.55 (6.63)	21.55 (6.52)	0.82	*ns*	-
BSS- Body	23.48 (8.66)	24.48 (9.45)	0.74	*ns*	-	25.95 (8.58)	23.86 (9.40)	1.58	*ns*	-	28.86 (9.51)	26.27 (7.98)	0.39	*ns*	-

Note. ED-15 = eating attitudes measures; WSC = weight and shape concern; EC = eating concern; FUWG = fear of uncontrollable weight gain; BSS = body satisfaction scale. *ns* = non-significant. Significance level set at $p < .05$.

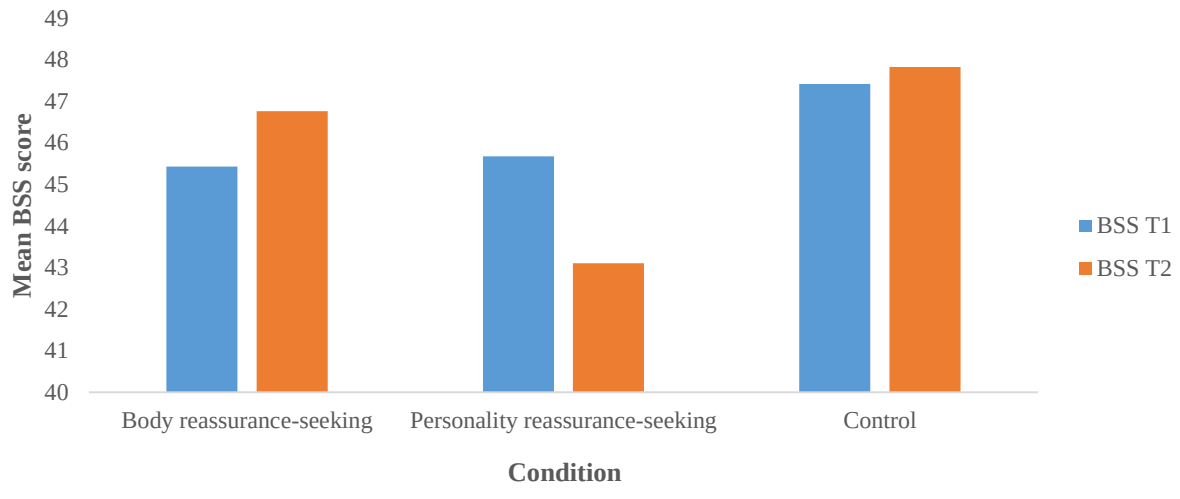
The impact of reassurance-seeking on body satisfaction

Hypothesis 2a: *There will be a significant difference in body satisfaction scores over time between the three groups (personality-related reassurance-seeking, body-related reassurance-seeking and no reassurance-seeking; control group).*

Figure 3 shows the total BSS scores of the three groups before and after the intervention. BSS scores rose following the body-related reassurance-seeking condition, indicating that this intervention results in greater body dissatisfaction. In contrast, after the personality-related reassurance condition, BSS scores fell over time, indicating greater satisfaction. There was little change in the control condition (see Table 4 for mean scores).

To determine whether there was a significant difference between body satisfaction scores across the conditions, a 3 (group) x 2 (time) ANOVA was performed. There was no main effect of time ($F(1, 61) = .049$, $p = .825$, partial $\eta^2 = .001$) or of group ($F(2, 61) = .315$, $p = .731$, partial $\eta 2 = .010$), nor was there a significant interaction between group allocation and time on body satisfaction levels ($F(2, 61) = .888$, $p = .417$, partial $\eta^2 = .028$). Hypothesis 2a was therefore not supported.

Figure 3. Mean Body Satisfaction Scale (BSS) scores at time 1 and time 2 across conditions.



Hypothesis 2b: *Body-related and personality-related reassurance-seeking will make body satisfaction significantly worse. There will be no significant change in body satisfaction scores in the control group.*

The planned comparisons in Table 4 show that none of the three conditions were associated with a change in body satisfaction. Therefore, this hypothesis was not supported.

Hypothesis 2c: *Body-related reassurance-seeking will make body satisfaction significantly worse than personality-related reassurance-seeking.*

A series of independent samples t-tests were conducted to test whether body-related reassurance-seeking made body satisfaction significantly worse than personality-related reassurance-seeking, by comparing the difference between change scores for each variable between groups. The findings showed that there was no statistical difference between the groups in regards to their overall body satisfaction (M = 3.90, 95% CI [-1.38, 9.19], $t(40)$ = 1.494, p = 0.07), head satisfaction (M = 1.38, 95% CI [-1.50, 4.26], $t(40)$ = .969, p = 0.69) or body satisfaction (subscale) (M = 3.10, 95% CI [-0.73, 6.91], $t(40)$ = 1.637, p = 0.06). Hypothesis 2c was therefore not supported.

Factors associated with the impact of reassurance seeking

Hypothesis 3: *State depression, state anxiety and trait reassurance-seeking will be associated with the impact of reassurance-seeking on eating pathology and body satisfaction.*

A series of Pearson's correlations were conducted for each condition to examine whether the impact of reassurance-seeking on eating pathology (Table 5) and body satisfaction (Table 6) was associated with state depression, state anxiety or trait reassurance-seeking. The significance level was set to .01 to reduce the risk of a Type 1 error. The results showed that there were no significant associations between participants' individual baseline characteristics and the impact of any reassurance-seeking task (p >. 01 in all cases).

Table 5

Pearson's correlations between participants' levels of eating pathology and their level of state depression, state anxiety and trait reassurance

	Body-related reassurance-seeking				**Personality-related reassurance-seeking**				**Control**			
	ED-15 Total	WSC	EC	FUWG	ED-15 Total	WSC	EC	FUWG	ED-15 Total	WSC	EC	FUWG
PHQ-9	.317	.222	1.69	-.118	.242	.095	.363	.238	-.332	-.350	-.277	-.524
GAD-7	.193	.104	.147	-.233	.282	.247	.287	.210	-.282	-.268	-.270	-.469
DORSS- Total	.330	.161	.278	.199	.287	.121	.422	.369	-.249	-.219	-.259	-.418
DORSS- Overt	.453	.229	.368	.088	.222	.009	.411	.380	-.242	-.218	-.247	-.365
DORSS- Covert	.230	.288	-.060	.400	.173	.159	.169	.088	-.156	-.125	-.178	-.356
DORSS- Depressive	.036	-.171	.301	.022	.402	.240	.521	.476	-.281	-.253	-.286	-.436

Note. PHQ-9 = depressive symptoms scale, GAD-7 = anxiety symptoms scale, DORSS = measure of reassurance seeking, ED-15 = eating attitudes measures; WSC = weight and shape concern; EC = eating concern; FUWG = fear of uncontrollable weight gain. Significance level set at $p < .01$.

sseeking, across the three conditions.

Table 6

Pearson's correlations between participants' levels of body satisfaction (including head and body) and level of state depression, state anxiety and trait reassurance-seeking, across the three conditions.

	Body-related reassurance-Seeking			**Personality-related reassurance-seeking**			**Control**		
	BSS Total	BSS Head	BSS Body	BSS Total	BSS Head	BSS Body	BSS Total	BSS Head	BSS Body
PHQ- 9	.370	.455	.193	-.111	-.162	.007	-.139	-.049	-.202
GAD-7	.437	.343	.361	-.061	-.028	.021	-.203	-.063	-.301
DORSS- Total	.221	.394	.032	.054	-.155	.200	.082	.168	.005
DORSS Overt	.258	.361	.105	.036	-.047	.110	.117	.207	.035
DORSS Covert	.123	.267	-.015	.253	-.111	.387	.101	.160	.045
DORSS Depressive	.118	.302	-.045	-.111	-.236	.121	.012	.098	-.060

Note. PHQ-9 = depressive symptoms scale, GAD-7 = anxiety symptoms scale, DORSS = measure of reassurance seeking, BSS= body satisfaction scale. Significance level set at $p < .01$.

Summary of main findings

Reassurance-seeking appears to have a negative impact on eating pathology. Both body-related reassurance-seeking and personality-related reassurance-seeking were found to increase eating pathology, but in different ways. However, reassurance-seeking did not have an impact on body satisfaction. State levels of depression and anxiety and trait reassurance-seeking were not associated with the impact of reassurance-seeking, suggesting that these effects are robust, despite individual characteristics.

Discussion

This experimental study utilised an RCT to determine the impact of reassurance-seeking on eating pathology and body satisfaction, using a non-clinical sample in a naturalistic setting. Specifically, this study tested the impact of two types of reassurance-seeking (i.e., body-related and personality-related), and whether the impact was related to existing levels of trait reassurance-seeking, state anxiety and state depression. This discussion will outline the study's findings and their relevance to the current evidence base and theory. Consideration will also be given to the study's limitations and implications for future research and clinical practice.

Summary of findings

Contrary to hypothesis 1a, this study found that there was no significant difference in eating pathology scores over time between the three conditions. However, planned comparisons revealed that body-related and personality-related reassurance-seeking increased eating pathology scores, in line with hypothesis 1b. Hypothesis 1c was rejected as body-related reassurance-seeking did not make eating pathology significantly worse than personality-related reassurance seeking. Instead, the results suggest that both body-related

and personality-related reassurance-seeking increase eating pathology, but in different ways. Body-related reassurance-seeking was found to significantly increase concerns about weight and shape, and to increase fear of uncontrollable weight gain. In contrast, personality-related reassurance-seeking significantly increased eating concerns.

This study did not support hypothesis 2a, as there was no significant difference in body satisfaction scores over time between the three conditions. Hypothesis 2b and 2c were also rejected as body-related and personality-related reassurance-seeking did not make body satisfaction significantly worse. Nor did body-related reassurance-seeking make body satisfaction significantly worse than personality-related reassurance-seeking.

Finally, hypothesis 3 predicted that state depression, state anxiety and trait reassurance-seeking would be associated with the impact of reassurance-seeking on eating pathology and body satisfaction. This hypothesis was rejected, as the results showed no significant associations between the participants' individual baseline characteristics and the impact of the reassurance-seeking task. This finding implies that the effect of reassurance-seeking on eating pathology apply to everyone equally.

The findings in the context of the current evidence base

This is the first study to use an experimental design to examine the impact of two types of reassurance-seeking on eating pathology and body satisfaction. Previous research in this area is limited by its reliance on correlational designs (Cooley et al., 2007; Howard et al., 2017; Kwan et al., 2017; Mason et al., 2016). The current findings are consistent with results reported by Cooley et al. (2007), who found that high levels of reassurance-seeking at time one predicted greater levels of eating pathology at time two. The present study also builds upon research findings by Mason et al. (2016) and Kwan et al. (2017), who found that reassurance-seeking strengthened the associations between social avoidance and eating

pathology (Mason et al., 2016) and between bulimic symptoms and interpersonal stress (Kwan et al., 2017). The findings are also consistent with research into reassurance-seeking in the anxiety disorders, which suggests that reassurance-seeking may enhance negative feelings, increase the need to ask again, and strengthen negative cognitions over a limited time period (Salkovskis, 1986).

In contrast, the current study found that reassurance-seeking did not impact body satisfaction. This finding is inconsistent with the results reported by Howard et al. (2017), who found that reassurance-seeking was associated with greater body dissatisfaction. However, Howard et al. (2017) conducted a cross-sectional, correlational study, meaning that the interpretation of their findings is limited as they cannot infer causality. Furthermore, Howard et al. (2017) looked specifically at the effects of reassurance-seeking via social media sites, whereas the current research investigated the effect of face-to-face reassurance-seeking. Posting an image of oneself on social media enables the user to receive appearance-related feedback from a number of people in quick succession whilst comparing their appearance with the images of others. Therefore, it is possible that body satisfaction levels would decrease if the intensity and duration of the intervention was increased in the current study. Different forms of reassurance-seeking (e.g., face-to-face, texting, social media) might elicit different effects on body satisfaction and eating pathology. Future research should consider testing and comparing the effects of different contexts on the link between reassurance-seeking and body satisfaction and eating pathology. Finally, Howard et al. (2017) used a different body satisfaction measure (Body Shape Questionnaire; Evans & Dolan, 1993) to the current study, which may have been more sensitive to changes in body satisfaction. Future research should consider using different measures of body satisfaction to detect differences.

How can the findings be explained by existing theory?

Why did reassurance-seeking make eating pathology worse?

Behavioural learning theory can be used to explain the finding that both personality-related and body-related reassurance-seeking significantly increased eating pathology. Safety behaviours reduce unwanted feelings in the short term but maintain negative affect in the long term (Gillet & Mazza, 2018). According to behavioural learning theory, a behaviour is more likely to be repeated if it removes something negative (Skinner, 1971). In the case of reassurance-seeking, the behaviour is negatively reinforced by the temporary reduction of distress that follows receiving reassurance. This reduction makes it more likely that the individual will seek reassurance again when the unresolved feeling or thought resurfaces (Gillet & Mazza, 2018). The cycle is maintained by the fact that the individual does not learn how to tolerate, master or overcome the emotional experience without the reassurance of another (Parrish & Radomsky, 2010). Indeed, reassurance-seeking is a safety behaviour that is thought to be instrumental in the development and maintenance of a range of anxiety disorders (e.g., OCD; Salkovskis, 1986; GAD; Woody & Rachman, 1994; social phobia; Heerey & Kring, 2007). In this study, it appears that the same is true of eating pathology.

Given that the reassurance-seeking task in this study consisted of questions that were personal and sensitive in nature (e.g. “Do you think I’ve put on weight”; “Do I ever annoy you?”), it is likely that the task elicited uncomfortable cognitions and feelings in relation to body image and self-worth. Such feelings may have been temporarily relieved by receiving reassurance, but the results suggest that by repeatedly performing this safety behaviour, negative feelings relating to eating pathology were increased by the end of the experimental day. Therefore, reassurance-seeking appears to be an unhelpful safety behaviour. It is worthy of further empirical attention, in relation to the development and maintenance of eating

disorders.

Why did body-related reassurance-seeking have a particular effect on weight and shape concerns?

Cognitive-behavioural-theory will be used to explain the finding that body-related reassurance-seeking significantly increased participant weight and shape concerns, and fear of uncontrollable weight gain. Cognitive-behavioural-theory posits that everyone possesses body-image schemas, comprised of rules and beliefs about appearance (Levine & Smolak, 2006). Such schemas can be positive or negative in nature and are shaped by our experiences and interaction with our environment. The promotion of unrealistic beauty standards (i.e., the 'thin-ideal') by the media in Western society places great value on women achieving and maintaining a thin body type (Hargreaves & Tiggemann, 2003). Pressure to conform to this beauty standard is achieved through repeated social reinforcement (Pearson, Wonderlich, & Smith, 2015), and has led to the creation of negative body-image schemas in many women, dictating how they should look and feel (e.g., "If I am not thin, I am unattractive") (Levine & Smolak, 2006). Given that this is an unattainable standard for most women (Williamson, 1998), the discrepancy between one's 'actual' weight and one's 'ideal' weight causes disturbances in body image and eating attitudes (Higgins, 1987; Thompson & Stice, 2001). Receiving appearance-related feedback from others can trigger body-related schemas, with negative schemas eliciting negative thoughts and feelings in relation to one's body (Cash, 2011). Beck (2002) suggests that when the reassurance provided is incongruent with the schema held, the individual will dismiss the information, deeming the reassurance redundant.

Given that this study was conducted in a Western country, it is likely that participants will have experienced repeated exposure to media portrayals of the 'thin-ideal' throughout their life. It is possible, therefore, that the body-related reassurance-seeking questions (e.g.,

"Do you think I'd look better if I lost some weight?") may have activated negative body-image schemas, triggering uncomfortable thoughts and feelings about participants' bodies. This would explain the finding that participants' weight and shape concerns and fear of uncontrollable weight gain increased after a body-related reassurance-seeking task. The BSS, however, did not detect any changes in body satisfaction. This may be because the BSS is not as sensitive as the ED-15 in detecting immediate state change. The BSS requires participants to provide ratings of how satisfied they are with a range of body parts. It is possible that the activation of negative body-image schemas could have increased concerns with only one or two specific body parts (e.g. the stomach or legs), which would not have increased their overall score by much. The ED-15, however, focuses on the distress caused by the dissatisfaction with the specific body parts (e.g. "I feel distressed about my body shape"), so is therefore more sensitive to changes in overall weight and shape concerns.

Why did personality-related reassurance-seeking have a particular effect on eating concerns?

Fairburn, Cooper and Shafran's (2003) model of eating disorders can be used to explain why this study found that personality-related reassurance-seeking significantly increased eating concerns. This model posits that specific cognitive processes contribute to the maintenance of eating pathology. Such processes include clinical perfectionism and low self-esteem (Fairburn et al., 2003). Fairburn et al. suggest that a pervasively negative perception of oneself can result in a drive to pursue achievement in a valued domain. Furthermore, individuals with traits of clinical perfectionism tend to judge their self-worth primarily on the basis of their ability to strive and meet the demanding standards they place on themselves. This pattern suggests that people who place great value on the 'thin ideal', and who have low self-esteem and high clinical perfectionism, are likely to apply perfectionist standards to their ability to control their eating. It is possible, therefore, that the

personality-related reassurance-seeking task could have decreased self-esteem and increased perfectionism amongst a group of westernised women who are likely to place value on the 'thin ideal'. Future research could test this hypothesis by administering measures of self-esteem and perfectionism at time one and time two.

Limitations and considerations for future research

It is important to note that since the ANOVA result was non-significant, the findings from this study should be interpreted with caution. Multiplicity adjustments were not applied to the t-test calculations as the t-tests were planned and hypothesis-driven, and such adjustments are therefore widely considered as unnecessary (Anderson, 2014; Rutherford, 2011). However, the absence of a correction for multiple comparisons might have increased the possibility of a Type 1 error (Frane, 2015).

Methodological limitations of this study should be considered when interpreting the findings and conducting future research in this area. This study used convenience sampling to recruit participants who were conveniently accessible (registered on the volunteers list) or known to the researcher (contacts on social media website). However, this sampling technique may have resulted in response bias, as people with a particular interest in their body image may have been more inclined to participate. Such participants could bias the results, weakening the external validity of the findings.

This study used a quasi-randomisation procedure (alternation), whereby participants were allocated to a group based on the order in which they entered the study (every third person was allocated to the control group). Typically, this technique poses an increased risk of selection bias, given that the researcher is aware of which group the next participant will be allocated to (Kahan, Rehal, & Cro, 2015). However, this bias is most prevalent when the researcher has the power to selectively recruit participants into a trial, which was not the case

in the current study. Moreover, the groups were found to be balanced, maximising the probability that the effects noted were related to the reassurance-seeking task (Akobeng, 2005). Future research aiming to replicate this study should utilise randomisation methods that reduce the risk of selection bias, such as simple randomisation (Kahan et al., 2015).

Furthermore, this study recruited females aged 18-65 years. The results, therefore, cannot be generalised to males or females outside of this age-range, as it cannot be assumed that reassurance-seeking would have the same effect. Future research should consider testing and comparing the effects of reassurance-seeking between males and females across different age groups. Due to the absence of experimental studies in this area, this research chose to recruit a non-clinical sample, meaning that the findings cannot be generalised to a clinical population. Future research should replicate the current study's methodology using a clinical sample (individuals with an eating disorder diagnosis) to establish the utility of the findings in a clinical setting.

The absence of an active control group in this study limits the interpretation of the findings. It is possible that the effects found in the experimental groups may have been caused by factors other than the intervention. For example, simply knowing that they were part of the experimental group may have meant that these participants had different expectations to the control group regarding how they would feel after the task. Therefore, without evenly distributing cofounding variables between the experimental group and the control group using an active control task, we cannot confidently attribute the effects found in this study to the nature of the experimental task alone.

White women are thought to experience greater body dissatisfaction and disordered eating than Black women (Botta, 2000). However, research shows that repeated exposure to the Western 'thin ideal' can negatively affect Black women's body image and lead to the

development of eating pathology (Williamson, 1998). This study would have benefitted from collecting data on participants' ethnicity, to establish whether the effect of reassurance-seeking is comparable amongst different ethnic groups. Another limitation of this study is that data was that it did not collect data on the specific age of participants. Future research should collect data on participant age, to examine whether age moderates the effect of reassurance-seeking. Such detail on age and ethnicity would help to increase understanding of who is most at risk of the effects of reassurance-seeking.

The baseline characteristics that this study measured were not associated with the impact of reassurance-seeking. Although this finding indicates that the effect of reassurance-seeking was rigorous enough to apply to everyone equally, it may be that there are other relevant characteristics that this study should have been measured. Rosewall, Gleaves and Latner (2018) report that high levels of socially prescribed and self-oriented perfectionism, perceived pressure from the media, and low levels of self-esteem moderate the association between body image and eating pathology. Future research should aim to incorporate validated measures of self-esteem, perfectionism, and media pressure, in order to establish whether the effect of reassurance-seeking on eating pathology is influenced by other characteristics.

The use of self-report measures increases the risk of social-desirability-bias (van de Mortel, 2008). This bias may be particularly prominent in those participants who knew the researcher personally, and should be taken into account when considering the validity of the findings. However, participants completed the self-report measures in an anonymous online survey, and online surveys can increase the truthful reporting of sensitive information, in comparison to other methods of data collection (Kreuter, Presser, & Tourangeau, 2008). To ensure full compliance, this research would have had to be conducted in a controlled, artificial setting, which would have limited the study's ecological validity.

The researcher created a list of body-related and personality-related reassurance-seeking questions, using the expertise of an experienced clinician in this field. However, with hindsight, it is evident that one of the personality-related questions (i.e., "Do you care about me?") relates less to personality and more to one's insecurity in their relationship with the person in question. The authenticity of both body-related and personality-related questions could have been improved by obtaining, and acting upon, feedback from service-users with current or historical eating disorder diagnoses. Future research should incorporate focus groups with members of this clinical population to establish personality-related and body-related reassurance-seeking questions, as well as other common types of reassurance-seeking in this population (e.g., performance-related reassurance seeking). This development might enhance the validity of the findings, and facilitate the development of new knowledge on the effects of different kinds of reassurance-seeking on eating pathology.

In order to detect the task's long-term effect, participants were asked to complete the second online survey a minimum of two hours after the eight-hour period. However, this was not based on existing literature or theory, and it is possible that choosing a different time point (e.g., the following morning) would have affected the findings. As previously mentioned, it is possible that the reassurance-seeking task altered body satisfaction, but that this effect was not present during the time point tested. Furthermore, it was not possible to control exactly what time the participants took the second online survey. It would have been helpful if participants had been asked to state the time when they last sought reassurance, and the time they completed the second online survey. This additional information would have ensured greater experimental control, as participants outside of the required time frame could have been excluded from the analyses, thereby increasing the reliability of the findings. Future research could test how long the effect was maintained by increasing the frequency of the time points (e.g., 24 hours later).

This study also lacked control over the content of the reassurance provided to participants. Research suggests that the content and nature of the reassurance received can influence further reassurance-seeking behaviour (Parrish & Radomsky, 2011). Future research could investigate the effect of different types of reassurance (e.g., positive vs ambiguous) on eating pathology and body satisfaction.

Clinical implications

The findings of this research indicate that reassurance-seeking negatively impacts upon eating pathology and should, therefore, be considered during treatment in eating disorder services. During assessments, clinicians should identify whether the patient engages in reassurance-seeking, using clinical questions or a measure such as the DORSS (Radomsky et al., 2009). They could also ask the patient to keep a diary for a week, logging how often they have sought reassurance per day. If reassurance-seeking is indicated as problematic, a formulation could be developed to help the patient understand why they engage in this behaviour (i.e., to relieve unwanted feelings) and how it maintains problems by increasing unwanted feelings in the longer term.

If reassurance-seeking is understood to be a perpetuating factor, this would support a therapeutic intervention to target the behaviour. Such interventions could include behavioural experiments, exposure-based techniques, and survey-based techniques. Behavioural experiments designed to test pre-existing beliefs about the usefulness of reassurance-seeking could include asking the patient to complete a day of reassurance-seeking followed by a day of no reassurance-seeking and compare the way they felt at the end of each day. Exposure-based techniques could involve supporting the patient to practice sitting with unwanted emotion without distracting or diverting, for long enough that the emotion reduces naturally over time, rather than using the safety behaviour of reassurance-seeking. Survey-based

techniques aimed at disconfirming beliefs about the positive effects of reassurance-seeking could include distributing a questionnaire (to individuals unknown to the patient) aimed at understanding how others experience being asked for reassurance.

Clinicians should proceed with caution when devising such interventions, as more research is required in clinical samples in order to support these clinical implications. All interventions should be monitored for effectiveness using the BSS (Slade et al., 1990) and the ED-15 (Tatham et al., 2015).

These findings are also important for eating disorder prevention programmes. Such programmes could target non-clinical populations who are considered vulnerable to developing eating pathology (e.g., athletes, dancers, adolescent girls and young women). The programmes could provide psychoeducation on the link between reassurance-seeking and eating pathology, as well as promoting awareness of reassurance-seeking behaviour so that it is identified early and avoided (e.g., using habit reversal training). Such interventions have the potential to prevent these 'at risk' groups from developing an eating disorder in the future.

Conclusion

This study suggests that reassurance-seeking has a causal effect on eating pathology in a non-clinical population. It also suggests that different forms of reassurance-seeking have different effects, which has implications for our understanding of the pathology of eating problems. Whilst future research is needed to establish the utility of the findings in a clinical setting, it appears that personality- and body-related reassurance-seeking should be addressed clinically.

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Appendix A - Ethical approval letter

Downloaded: 14/02/2018
Approved: 14/02/2018

Grace Brennan
Registration number: 160124396
Psychology
Programme: Doctorate of Clinical Psychology (DClinPsy)

Dear Grace

PROJECT TITLE: A non-clinical randomised controlled trial to assess the impact of reassurance seeking on eating pathology and body satisfaction
APPLICATION: Reference Number 017153

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 14/02/2018 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 017153 (dated 14/12/2017).
- Participant information sheet 1038296 version 1 (14/12/2017).
- Participant consent form 1038297 version 1 (14/12/2017).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Yours sincerely

Thomas Webb
Ethics Administrator
Psychology

Appendix B – Cohen's table

Table 2
N for Small, Medium, and Large ES at Power = .80 for α = .01, .05, and .10

	α								
	.01			.05			.10		
Test	Sm	Med	Lg	Sm	Med	Lg	Sm	Med	Lg
1. Mean dif	586	95	38	393	64	26	310	50	20
2. Sig *r*	1,163	125	41	783	85	28	617	68	22
3. *r* dif	2,339	263	96	1,573	177	66	1,240	140	52
4. *P* = .5	1,165	127	44	783	85	30	616	67	23
5. *P* dif	584	93	36	392	63	25	309	49	19
6. χ^2									
1*df*	1,168	130	38	785	87	26	618	69	25
2*df*	1,388	154	56	964	107	39	771	86	31
3*df*	1,546	172	62	1,090	121	44	880	98	35
4*df*	1,675	186	67	1,194	133	48	968	108	39
5*df*	1,787	199	71	1,293	143	51	1,045	116	42
6*df*	1,887	210	75	1,362	151	54	1,113	124	45
7. ANOVA									
2*g*[a]	586	95	38	393	64	26	310	50	20
3*g*[a]	464	76	30	322	52	21	258	41	17
4*g*[a]	388	63	25	274	45	18	221	36	15
5*g*[a]	336	55	22	240	39	16	193	32	13
6*g*[a]	299	49	20	215	35	14	174	28	12
7*g*[a]	271	44	18	195	32	13	159	26	11
8. Mult *R*									
2*k*[b]	698	97	45	481	67	30			
3*k*[b]	780	108	50	547	76	34			
4*k*[b]	841	118	55	599	84	38			
5*k*[b]	901	126	59	645	91	42			
6*k*[b]	953	134	63	686	97	45			
7*k*[b]	998	141	66	726	102	48			
8*k*[b]	1,039	147	69	757	107	50			

Note. ES = population effect size, Sm = small, Med = medium, Lg = large, diff = difference, ANOVA = analysis of variance. Tests numbered as in Table 1.
[a] Number of groups. [b] Number of independent variables.

Appendix C- Study advertisement (Volunteers list)

Dear Volunteer,

Would you like to take part in a study of eating attitudes and body image?

This study is looking for females, aged 18-65 years, to complete two questionnaires on separate days. In-between completing these questionnaires, some participants will be asked to spend one day asking others for reassurance at regular intervals.

The research will take place online and within your everyday environment. It does not require you to attend the Psychology department.

This work has been approved by the University of Sheffield, Department of Psychology Ethics Committee, and is in accordance with the British Psychological Society code of human research ethics.

Your responses will remain confidential, and you can withdraw from the study at any point. All information recorded will remain anonymous throughout.

There is no obligation to participate in this, or any other study. If you do not want to take part, there is no need to reply to this e-mail. However, if you are interested in taking part, please click on the link below:

This project is supervised by Professor Glenn Waller, University of Sheffield.

Kind Regards,

Grace Brennan

Trainee Clinical Psychologist.

Appendix D- Screening questionnaire

Please answer the following questions by placing a X in the relevant box:

Are you aged 18-65 years?	Yes☐	No☐
Are you Male or Female?	Male☐	Female ☐
Do you have an eating disorder?	Yes☐	No☐
Have you had an eating disorder in the past?	Yes☐	No☐
Have you been diagnosed with a learning disability?	Yes☐	No☐

(Please note: this does not include learning difficulties e.g. dyslexia, dyspraxia).

Are you currently receiving ongoing treatment for anxiety?	Yes☐	No☐
Are you currently receiving ongoing treatment for depression?	Yes☐	No☐

Appendix E- Information for excluded participants

Unfortunately, you are not eligible to participate in this research. Your responses to the screening questionnaire may have indicated that you either:

- Have a current or previous history of an eating disorder.
- Have a learning disability diagnosis.
- Are receiving ongoing treatment for anxiety or depression.

Due to ethical reasons, we are unable to accept participants who have indicated any the above. There is a chance that participating in the current study could adversely affect your mental health.

Alternatively, you may have indicated that you are outside the age bracket required to participate, or that you are a male. This study only requires participation from females aged 18-65 years.

Thank you for your interest.

Please contact gbrennan1@sheffield.ac.uk if you require more information about this.

Appendix F- Information Sheet

The University Of Sheffield.

Department of Psychology.
Clinical Psychology Unit.

Doctor of Clinical Psychology (DClin Psy) Programme
Clinical supervision training and NHS research training & consultancy.

Clinical Psychology Unit
Department of Psychology
University of Sheffield
Cathedral Court
1 Vicar Lane
Sheffield S1 2LT UK

Telephone:

Email: gbrennan1@sheffield.ac.uk

PARTICIPANT INFORMATION SHEET

Please click on the response box at the bottom of this page to indicate that you have read the information sheet

What is the purpose of the study?
This study aims to test the impact of reassurance seeking on eating attitudes and body image.

Why have I been invited?
You have been invited to take part in this study because you are a woman, aged between 18-65 years, who responded to this study advertisement. You have been deemed eligible to participate because you indicated that you are not receiving ongoing treatment for anxiety or depression, nor do you have a learning disability diagnosis, or a current (or previous) eating disorder.

Do I have to take part?
There is no obligation to take part in this research.

What will happen if I take part?
First you will be asked to complete an on-line questionnaire. Following this, you will be sent an email to notify you of the research group that you have been randomly allocated to. You might be assigned to either the:

Experimental group
This group will spend one day (of their choosing) asking others for reassurance about their appearance or about themselves more generally. These participants will be asked to do this once an hour, for eight hours. They will then be asked to complete an on-line questionnaire at the end of the day.

Control group
Participants in this group will be asked to select a date to complete an on-line questionnaire.

What are the benefits of taking part?
No one has previously tested the impact of reassurance seeking on eating attitudes and body image. We are hoping that the findings from this study will help inform future treatment for individuals with eating disorders.

Will I receive any reimbursement of expenses for taking part in this research?
No, you will not be reimbursed for taking part in this study. This study and all related communications will be made entirely online via e-mail and within your everyday environment, requiring no travel to the Psychology department.

Will all the information be kept confidential?
Only the research team will have access to your responses. Before you begin the experiment, you will be required to state your email address. We will use this email address to contact you and to match your responses to both questionnaires. All data will be stored securely. Once you have completed the study, we will match your responses and delete your email address. We will then anonymise your data so that your responses cannot be traced back to you.

Can I withdraw at any time?
Your participation in this study is voluntary and you have the right to stop participating at any time. You can withdraw your data at any time up to one week after completing the second set of questionnaires. If you wish to do this, please contact the researchers. You can also withdraw before submitting your responses by closing your Internet browser.

What will happen to the results of the study?
The results of the study will be written up and submitted as a doctoral thesis. Additionally, the study will be submitted for publication in a scientific journal. Information regarding individual participants will not be included and you will not be identifiable from any reports or publications of the study. The anonymised data will not be destroyed and it is possible it will be made available to other researchers (e.g. via the Open Science Framework or alongside any peer-reviewed papers that arise as a result of the research).

What if I become distressed as a result of taking part?
If you feel distressed about any of the topics raised in this study and feel you need to speak to someone, please contact the University of Sheffield's Counselling Service on (0114) 222 4134.

What if I wish to complain about the way the study has been carried out?
If you wish to make a complaint about the way the study has been carried out, or you encounter a problem, please email the research supervisor, Professor Glenn Waller (g.waller@sheffield.ac.uk). If you feel that your complaint has not been handled to your satisfaction following this, you can contact the University's Registrar and Secretary Dr Andrew West, Email: registrar@sheffield.ac.uk and Tel (0114) 222 1051

Contact Information
This research is being conducted by Grace Brennan, Trainee Clinical Psychologist. This research will be used to write a thesis which fulfils part of Grace's doctoral training. If you have any questions about the research, you can leave a telephone message with the Research Support Officer on: 0114 222 6650 and he will ask Grace Brennan to contact you.

☐ I have read the information sheet.

Appendix G - Consent form

Department of Psychology.
Clinical Psychology Unit.

Doctor of Clinical Psychology (DClin Psy) Programme
Clinical supervision training and NHS research training & consultancy.

Clinical Psychology Unit
Department of Psychology
University of Sheffield
Cathedral Court
1 Vicar Lane
Sheffield S1 2LT UK

Telephone:

Email: gbrennan1@sheffield.ac.uk

I confirm that I have read and understand the information sheet for this study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	☐
I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences.	☐
I understand that my responses will be kept confidential and that I will not be identified or identifiable in the report that results from the research.	☐
I agree for the data collected from me to be stored anonymously and potentially used in future research.	☐
I would like to receive a copy of the study results, once available.	☐
I give consent to take part in the above study.	☐
Please state your email address below so that the researcher can contact you with the study instructions.	
Email address:	

Appendix H – Study advertisement (Social media)

Would you like to take part in a research project on eating attitudes and body image?

We are looking for females, aged 18-65 years, to complete two questionnaires on separate days.

In-between completing these questionnaires, some participants will be asked to spend one day asking others for reassurance at regular intervals.

For more information, or to take part in the study, please click on the link below:

In the interest of keeping your participation anonymous, we ask everyone to refrain from liking, commenting on, or sharing this post. If you have any questions, please feel free to contact me directly.

Thank you

Appendix I –Body-related reassurance-seeking task

Starting from whatever time you wake up tomorrow, we would like you to ask **one** person for reassurance **once every hour**, for eight hours. The person you ask can be different each time, but the study requires that you ask these questions **in person** (not via text, social media or telephone)

If you miss a time point, you should continue as normal from the next time point. Please ask the following questions at the corresponding time point:

Time point	**Question**
1st hour	Do I look fat in this?
2nd hour	Do you think I've put on weight?
3rd hour	Are my thighs too big?
4th hour	Do my arms look fat to you?
5th hour	Do I have a double chin?
6th hour	Do you think I'd look better if I lost some weight?
7th hour	Are my cheeks too chubby?
8th hour	Do you think my shoulders are too big?

Please wait a minimum of **two hours**, after the eight-hour period, before completing the second online survey (see link below). You will receive an email reminder this evening to remind you to complete this questionnaire.

Appendix J – Personality-related reassurance-seeking task

Starting from whatever time you wake up tomorrow, we would like you to ask **one** person for reassurance **once every hour**, for eight hours. The person you ask can be different each time, but the study requires that you ask these questions **in person,** (not via text, social media or telephone).

If you miss a time point, you should continue as normal from the next time point. Please ask the following questions at the corresponding time point:

Time point	**Question**
1st hour	Do you care about me?
2nd hour	Do you think I'm clever?
3rd hour	Do you think I am a good person?
4th hour	Do you think I make stupid decisions?
5th hour	Do you think I'm funny?
6th hour	Do I ever annoy you?
7th hour	Do you find me boring?
8th hour	Do you think I'm kind?

Please wait a minimum of **two hours**, after the eight-hour period, before completing the second online survey (see link below). You will receive an email reminder this evening to remind you to complete this questionnaire.

Appendix K – Debrief sheet

Does reassurance-seeking influence eating attitudes and body image?
Disturbances in body image and eating attitudes are characteristics associated with eating disorders. Individuals with eating disorders also report high levels of anxiety and depression. Reassurance seeking is a behaviour performed to reduce feelings of anxiety and depression in the short term but has been shown to create further difficulties in the longer term. Correlational studies have found that individuals with higher levels of negative eating attitudes and body dissatisfaction report higher levels of reassurance seeking behaviour. To date, there hasn't been any research to determine a whether a causal link between reassurance-seeking and negative eating attitudes/body image.

This research aimed to define the role of reassurance seeking by investigating whether reassurance seeking worsens eating attitudes and body satisfaction. We also wanted to test whether this influence was greater when the reassurance sought was body-related as opposed to personality-related. To test this, we asked you to complete an initial on-line questionnaire measuring your levels of body satisfaction and eating attitudes. You were then randomised into one of three groups:

Body-related reassurance-seeking
Participants in this group were asked to seek reassurance about their body (e.g. "Do I look fat in this?")

Personality-related reassurance-seeking
Participants in this group were asked to seek reassurance relating to their personality (e.g. "Do you think I'm funny?")

No reassurance seeking
Participants in this group were not asked to seek any reassurance.

We then asked you to complete a second questionnaire, which measured your levels of body satisfaction and eating attitudes again, so that we could compare your scores before and after the study.

We also wanted to see whether your pre-existing level of anxiety, depression and reassurance-seeking were associated with this effect. This is why you completed a measure of reassurance-seeking, depression and anxiety at the beginning of the study.

If you feel distressed about any of the topics raised in this study and feel you need to speak to someone, please contact the University of Sheffield's Counselling Service on (0114) 222 4134.

If you have any further questions and/or would like to request the research findings, please don't hesitate to contact Grace Brennan, Trainee Clinical Psychologist, (gbrennan1@sheffield.ac.uk) or Glenn Waller, Research Supervisor, (g.waller@sheffield.ac.uk).

Thank you again for your participation. In order to retain a copy of this debrief sheet, please select the option below to save and/or print.

Appendix L- Depressive and Obsessive Reassurance Seeking Scale

How much are each of the following statements true of you?

Please answer every item, without spending too much time on any particular item.

	Not at all	A little	Some	Much	Very Much
1. I often try to find out if others care about me without asking them directly	0	1	2	3	4
2. I often make a statement about something that I've done to get information from others about how well I've done it	0	1	2	3	4
3. I often ask my partner / family members / roommate to reassure me that I remembered to lock the door, turn off the stove, unplug the clothes iron, etc.	0	1	2	3	4
4. I have trouble accepting responsibility for something important without asking for reassurance that everything will be OK	0	1	2	3	4
5. I sometimes make self-derogatory statements with the hope that someone will object to them	0	1	2	3	4
6. If I am unable to check something I am anxious about, I will ask others to reassure me that it is OK	0	1	2	3	4
7. I spend an excessive amount of time looking for signs of approval from others	0	1	2	3	4
8. If I am uncertain about the cleanliness of an object, I will wait until somebody else touches it before I do	0	1	2	3	4
9. In order to feel worthwhile, I need other people to continually show me that I am valued through their actions and gestures towards me	0	1	2	3	4
10. I always 'test the waters' before engaging in any activity that makes me anxious	0	1	2	3	4
11. I often ask others to tell me if I have made the 'wrong' decision	0	1	2	3	4
12. I become so anxious when I am uncertain about something that I need to ask my friends or family for reassurance over and over again	0	1	2	3	4
13. I am always 'testing' my friends and family to see if they really care about me	0	1	2	3	4
14. I sometimes check the safety of an object or situation by looking to see how other people react to it	0	1	2	3	4

15. I sometimes ask others to reassure me again and again that I have done all that I can to make things safe	0	1	2	3	4
16. I look to other people's moods when they are around me to determine whether they like me	0	1	2	3	4
17. If I am really worried about something, it rarely seems good enough to have others reassure me about it only once	0	1	2	3	4
18. I spend far more time than most people looking to others for signs that things will be OK	0	1	2	3	4
19. I sometimes threaten to end a friendship in order to see if my friends really care about me	0	1	2	3	4
20. If I am unsure about the safety of my food, I will wait until someone else has tried some before I do	0	1	2	3	4
21. When faced with an important decision, I need to ask others for reassurance before I can make my final choice	0	1	2	3	4
22. I would rather risk annoying other people with repeated requests for reassurance than to continue to feel anxious about something	0	1	2	3	4
23. I annoy people with repeated requests for reassurance about their feelings for me and this causes problems in my relationships	0	1	2	3	4
24. If other people do not tell me otherwise, I can assume that I've got things under control	0	1	2	3	4
25. If I have checked something repeatedly and still feel unsure, I ask others to reassure me that things are safe	0	1	2	3	4
26. When I am anxious about doing something, I often start and if nobody around me warns me to stop, I assume it is OK to continue	0	1	2	3	4
27. I have often been told that I seem "insecure" because I constantly seek affirmation or approval from others	0	1	2	3	4
28. In social situations, I try to 'read' other people's body language to determine whether they like me	0	1	2	3	4
29. If others do not object to my engaging in an activity, then it must be 'safe'	0	1	2	3	4
30. I often try to find out if an object or situation is "safe" without asking anybody directly	0	1	2	3	4

Appendix M - Body Satisfaction Scale

Please note how satisfied you are with each of the following parts of your body, by circling the appropriate number.

		Very Satisfied	Moderately Satisfied	Slightly Satisfied	Undecided	Slightly Unsatisfied	Moderately Unsatisfied	Very Unsatisfied
1.	Head	1	2	3	4	5	6	7
2.	Face	1	2	3	4	5	6	7
3.	Jaw	1	2	3	4	5	6	7
4.	Teeth	1	2	3	4	5	6	7
5.	Nose	1	2	3	4	5	6	7
6.	Mouth	1	2	3	4	5	6	7
7.	Eyes	1	2	3	4	5	6	7
8.	Ears	1	2	3	4	5	6	7
9.	Shoulders	1	2	3	4	5	6	7
10.	Neck	1	2	3	4	5	6	7
11.	Chest	1	2	3	4	5	6	7
12.	Tummy	1	2	3	4	5	6	7
13.	Arms	1	2	3	4	5	6	7
14.	Hands	1	2	3	4	5	6	7
15	Legs	1	2	3	4	5	6	7
16	Feet	1	2	3	4	5	6	7

Appendix N- ED-15 questionnaire

Please note how much each of the following statements apply to you.

	Over the past week, how often have I:	Not at all	Rarely	Occasionally	Sometimes	Fairly often	Nearly all the time	All the time
1	I worry about losing control over my eating							
2	I avoid activities or people because of the way I look							
3	I feel preoccupied with thoughts of food and eating							
4	I compare my body negatively with others'							
5	I worry that whatever I eat, I will gain lots of weight							
6	I avoid looking at my body (e.g., in mirrors; wearing baggy clothes) because of the way it makes me feel							
7	I feel distressed about my weight							
8	I check my body to reassure myself about my appearance (e.g., weighing myself; using mirrors)							
9	I follow strict rules about my eating							
10	I feel distressed about my body shape							
11	I worry that other people are judging me as a person because of my weight and appearance.							

Appendix O- Patient Health Questionnaire – 9

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

Appendix P - Generalised Anxiety Disorder – 7 Questionnaire

Over the last 2 weeks, have you felt bothered by any of these things?	**Not at all**	**Several Days**	**More than half the days**	**Nearly Every day**
1. Feeling nervous, anxious, or on edge?	0	1	2	3
2. Not being able to stop or control worrying?	0	1	2	3
3. Worrying too much about different things?	0	1	2	3
4. Trouble relaxing?	0	1	2	3
5. Being so restless that it is hard to sit still?	0	1	2	3
6. Becoming easily annoyed or irritable?	0	1	2	3
7. Feeling afraid as if something awful might happen?	0	1	2	3

Appendix Q- Task engagement question

You were asked to seek reassurance every hour, for eight hours. How many times did you do this?

	0	1	2	3	4	5	6	7	8	9
Number of hours	○	○	○	○	○	○	○	○	○	○