UNIVERSITY OF SOUTHAMPTON

Faculty of Environmental and Life Sciences

School of Psychology

The Impact of Weight Loss Surgery on Disordered Eating and Body Image

By

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Thesis for the Degree of Doctor of Clinical Psychology

May 2019

Word count: 19,736

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Abstract

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The first part of this thesis is a review of the literature investigating the impact of targeted psychological interventions on disordered eating and the subsequent impact on weight loss in individuals who have undergone weight loss surgery. Twelve studies were selected for inclusion within the review and their methodological quality was assessed. The findings were contradictory. Although some studies suggested that targeted psychological interventions can ameliorate disordered eating behaviours and support weight loss post-operatively, others reported no improvements. The discussion highlights a number of methodological limitations and consequently, the results must be interpreted with caution. This body of literature is in its infancy and as such, it is crucial that future research focuses on the rigorous evaluation of such interventions in order to inform clinically responsive and effective services.

The empirical part of this thesis explored the psychological characteristics of a post-weight loss surgery population. The research also explored the predictors of body image dissatisfaction and disordered eating behaviour, including the extent to which self-ideal discrepancies were predictive of these variables. The study also explored the impact of a brief self-compassion letter writing intervention on levels of self-compassion and affect. The overall pattern of results highlighted the presence of elevated levels of

psychological distress, body image dissatisfaction and disordered eating behaviour and low levels of self-esteem in the weight loss surgery population. Participants held unrealistic weight loss expectations following surgery and substantial discrepancies existed between individuals' current and ideal body shapes, which were predictive of body image dissatisfaction and disordered eating behaviour. Trait self-esteem and shape concern significantly predicted body image dissatisfaction, whereas weight phobia and negative affect predicted disordered eating behaviour. Engagement in the brief self-compassion letter writing task led to improvements in both affect and self-compassion. Clinical implications, limitations of the current study and directions for future research directions are considered within the discussion.

List of Tables

List of Figures

Declaration of Authorship

I, Charlotte Jayne Clark, declare that this thesis and the work presented in it is my own and has been generated by me as the result of my own original research.

The Impact of Weight Loss Surgery on Disordered Eating and Body Image

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;

2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;

3. Where I have consulted the published work of others, this is always clearly attributed;

4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;

5. I have acknowledged all main sources of help;

6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;

7. Either none of this work has been published before submission, or parts of this work have been published as: [please list references below]:

Signed:

Date:

Acknowledgements

First and foremost, I would like to thank everyone from the weight loss surgery community who took time out of their busy lives to participate in the study. Without your support and participation in the study, this thesis would not have been possible. You are all truly inspirational people and I hope I have done justice to your experiences.

I would like to express my sincerest gratitude to my supervisors Professor Lusia Stopa and Dr Hannah Turner for their continued support and patience. Thank you for having such a positive influence on me in the pursuit of this thesis and for supporting me to complete research on a topic I am so passionate about.

I would like to extend my greatest appreciation to my friends, family and cohort. I feel so incredibly lucky to have such a supportive network - thank you for the unwavering love, support and encouragement you have given me. Gen, thank you for your loyal companionship during our countless latte-fuelled weekends spent at the library. Helen, for your unrelenting belief in me even when I had none in myself.

My parents, I cannot ever thank you enough for supporting me throughout this journey and for always encouraging me to follow my dreams. My biggest inspiration has been and will always be my mother. I will never stop trying to make you proud.

List of Abbreviations

%EWL	Percentage of Excess Weight Loss
%TWL	Percentage of Total Weight Loss
ACT	Acceptance and Commitment Therapy
ANOVA	Analysis of variance
Band	Adjustable Gastric Banding
BES	Binge Eating Scale
BMI	Body Mass Index
BUT	Body Uneasiness Test
Bypass	Gastric Bypass
CBT	Cognitive Behavioural Therapy
DBT	Dialectical Behaviour Therapy
DIET	The Dietary-Adherence Intake and Eating Test
EAT-26	The Eating Attitudes Test
EDDS	The Eating Disorder Diagnostic Scale
EDE-Q	The Eating Disorder Examination – Questionnaire
EES	Emotional Eating Scale
EI	Eating Inventory
EOQ	Emotional Overeating Questionnaire
EPHPP	Effective Public Health Practice Project
GAD-7	The Generalised Anxiety Disorder-7
GRWQ	Goals and Relative Weights Questionnaire
Kg	Kilograms
NHS	National Health Service
NICE	National Institute for Health and Care Excellence

PANAS	Positive and Negative Affect Scale
PHQ-9	The Patient Health Questionnaire-9
RCT	Randomised Controlled Trial
RSES	Rosenberg Self-Esteem Scale
SBEQ	The Subjective Binge Eating Questionnaire for Bariatric Surgery Patients
SCCS	Self-Concept Clarity Scale
SCS	Self-Compassion Scale
SD	Standard Deviation
SFRS	Stunkard Figure Rating Scale
Sleeve	Gastric Sleeve or Sleeve Gastrectomy
SSES	State Self-Esteem Scale
TFEQ-R18	The Three Factor Eating Questionnaire Revised-18
UK	United Kingdom
USA	United States of America
VIF	Variance Inflation Factor
WHO	World Health Organisation
WLS	Weight Loss Surgery

Chapter 1: Systematic Review

The Impact of Targeted Psychological Interventions on Disordered Eating Following Weight Loss Surgery

1.1 Introduction

Weight Loss Surgery is the most effective treatment to maximise long-term weight loss in patients with severe obesity (Chang et al, 2014). However, a number of patients experience suboptimal weight loss and weight re-gain over time (Courcoulas et al 2013). A number of factors affect adherence to post-operative guidelines; one important factor is disordered eating behaviours, which are common in weight loss surgery populations (Mitchell et al., 2012). Psychological interventions that target disordered eating behaviours may improve weight loss outcomes in this group and the objective of the current systematic review is to investigate the effects of these targeted psychological interventions on disordered eating and the subsequent impact on weight loss following weight loss surgery.

Obesity is the medical term used to describe an individual who has a Body Mass Index (BMI) exceeding 30kg/$m^{2,}$ (WHO, 2000). Obesity is a major health problem worldwide and prevalence rates have burgeoned in both developed and developing countries over the last two decades (Chang et al, 2014). More than half of the adult population in the U.K. is said to be overweight or obese (NICE, 2006), with nine in ten adults projected to be overweight or obese by 2050 if this trend continues (Department of Health, 2009). Obesity has been identified as the main cause of physical health conditions and premature mortality in the U.K. (Lavie, Milani, & Ventura, 2009) and it is estimated that this will cost the NHS approximately £1.9-2 billion per year by 2030 (Wang, McPherson, Gortmaker & Brown, 2011). There is growing evidence for weight loss surgery being the most effective way to improve health status and prevent an

untimely death for people with severe obesity (Chang et al, 2014; Picot et al, 2012). Commensurate with the growing epidemic of obesity, the past decade has seen a significant increase in the frequency of weight loss surgery around the world (Madura & DiBlaise, 2012).

Weight loss surgery defines a group of surgical procedures designed to facilitate weight loss. There are several types of weight loss surgery, which fall into three broad categories. First, procedures that are 'malabsorptive', which involve bypassing some of the small intestine, thus limiting absorption of calories. Second, procedures that are 'restrictive', which involve reducing the size of the upper gastrointestinal tract, thus limiting food intake. Third, 'combination procedures', which combine intestinal bypass with restriction of the upper food pathway (Dent et al., 2010). Roux-en-Y gastric bypass, adjustable gastric banding and sleeve gastrectomy are the most commonly performed procedures in the UK (Buchwald & Oien, 2013). Compared to non-surgical procedures, weight loss surgery provides the best probability of achieving sustained weight loss (Padwal et al., 2011), with the range of excess weight lost estimated between 40-71% (Buchwald et al., 2004; Garb, Welch, Zagarins, Kuhn & Romanelli, 2009). Moreover, weight loss surgery enhances health related quality of life (Helmio et al., 2014) and mitigates comorbid medical problems (Kaly et al., 2008; Munoz et al., 2007), such as diabetes, sleep apnoea and cardiovascular problems (Chang et al., 2010).

Although many weight loss surgery candidates succeed in achieving and sustaining clinically significant weight loss post-surgery, there are a significant number of patients who do not (Kaly et al., 2008). Evidence from longitudinal studies suggests that the majority of patients begin to regain weight two years after surgery, with some experiencing weight gain from six months post-operatively (Courcoulas et al 2013). Such weight regain can compromise the health benefits following surgery, such as

increases in diabetes and hypertension (Courcoulas et al., 2013). Along with surgical and physical complications, non-surgical and psychological factors, such as disordered eating behaviours, have been highlighted as important factors related to insufficient weight loss and to weight regain following weight loss surgery (Sarwer, Dilks & West-Smith, 2011).

Amongst researchers and clinicians, there is no single agreed definition as to what constitutes disordered eating behaviour. However, Baechle and colleagues have defined disordered eating behaviour as "a wide range of eating disorder pathologies including dieting for weight control, binge eating and purging behaviours, to subthreshold and full syndrome eating disorders" (Baechle et al., 2014, p. 342). Similar rates of disordered eating behaviour exist in both pre-operative and post-operative patients; however, it is likely that such behaviours may present differently post-operatively due to the physical changes created by the surgery. As post-operative but not pre-operative eating behaviours are the strongest predictors of long term weight loss outcomes (Burgmer et al., 2005; Conceição et al., 2017), this systematic review will focus on the impact of psychological interventions that are delivered post-operatively. For the purposes of this review, the term 'disordered eating', rather than maladaptive eating or abnormal eating behaviour, has been employed as this was considered to be the least value-laden descriptor.

Compared to the general population, prevalence rates of disordered eating behaviour appear to be higher in weight loss surgery populations (Mitchell et al., 2012). It is argued that the reinforcing effects of weight loss after surgery, the systematic reminders to control the amount of food eaten and continued efforts to maintain weight loss, which are crucial for treatment success, may reinforce disordered eating patterns post-surgery (Conceição et al., 2015; Deitel, 2002). Disordered eating behaviours that

are commonly documented in the literature include: binge eating that occurs in 4-49% of patients (Niego, Kofman, Weiss & Geliebter, 2007), loss of control eating (whereby an individual experiences the sense of being unable to stop or control their eating) occurring in 13-39% of patients (Colles et al., 2008; Conceição et al., 2014; White et al., 2010), grazing (the repetitive eating of small amounts of food in an unplanned manner, Conceição et al., 2014) occurring in 26-46% of patients (Colles et al., 2008; Kofman, Lent & Swencionis, 2010) night eating syndrome (a time-delayed pattern of food intake outside the natural circadian rhythm) present in 2-31% of patients (Allison et al., 2006; Colles, Dixon & O'Brien, 2008) and emotional eating in 38% of patients (Miller-Matero et al., 2014). Research into the risk factors associated with disordered eating behaviour in weight loss surgery populations is scarce; however, the role of shame in eating psychopathology has increasingly been examined in both clinical and non-clinical populations (Goss & Alan, 2009; Keith, Gillanders & Simpson, 2009).

Shame has been defined as a 'self-conscious emotion' arising in response to negative self-reflection and a feeling of inadequacy or failure (Burney & Irwin, 2000). Goss & Gilbert (2002) hypothesised that disordered eating behaviours are used to distract the self from the intolerable feelings of shame and other negative affect in the short-term but contribute to the perpetuation of shame (Gilbert, 2005; Goss & Allan, 2000). High levels of shame may therefore undermine the self-regulation of eating behaviour (Duarte et al., 2017) and may lead to difficulties in maintaining weight or weight gain. This pattern has been noted amongst individuals who are classified as obese, with those experiencing greater levels of shame also showing increases in weight (Wardle & Beinart, 1981).

One notable source of shame has been identified as the pervasive weight stigma that exists throughout Western culture (Phul & Heuer, 2010). Shure and Weinsotck

(2009) highlighted the presence of culturally-induced shame through the emphasis on thinness as the most desirable state (Bemporad, 1996) and through cultural myths such as, “thin is good and fat is bad” (Shure & Weinstock, 2009, p. 165). Weight-related stereotypes indicating that obese individuals are less competent, lack self-discipline, and are emotionally unstable appear to become internalised (Wang, Brownell & Wadden, 2004) and create feelings of shame and inadequacy in relation to others (Ferreira, Pinto-Gouveia & Duarte, 2013). Evidence suggests that weight loss surgery patients may be especially prone to such internalized weight biases and body shame (Burmeister, Hinman, Koball, Hoffmann & Carels, 2013). Moreover, evidence suggests that these appear to remain intact even after individuals have lost weight and are no longer classified as ‘obese’. (Annis, Cash, Hrabosky, 2004). It is therefore likely that such shame and internalised weight biases may continue to exist during and after weight loss surgery and undermine self-regulation of eating behaviour post-operatively.

Although weight loss surgery is effective at reducing weight and improving weight-related comorbidities through mechanical restrictions and hormonal changes (Mechanick et al., 2013), surgery alone does not directly address the underlying social, emotional, behavioural and cognitive factors that contribute to disordered eating behaviour (Cassin et al., 2016). As long-term weight outcomes are contingent upon post-operative eating behaviour (Conceição et al., 2017; Devlin et al., 2016), which can be adversely affected by disordered eating, psychological interventions that aim to ameliorate disordered eating behaviours, such as improving a person’s ability to regulate emotions and tolerate negative affect, may be critical for successful long-term treatment outcomes.

In the U.K. post-operative psychological interventions are not routinely offered to weight loss surgery patients in either private or public health settings. Evidence from

existing systematic reviews (Beck, Johannsen, Stoving, Mehlsen & Zachariae, 2012; Rudolph & Hilbert, 2013; Stewart & Avenell, 2015) suggests that psychotherapeutic and behavioural interventions have the potential to facilitate optimal weight loss outcomes following weight loss surgery. However, the interventions included in this review comprised support groups and lifestyle interventions that were delivered in a non-manualised format with no standardised protocol. They also varied greatly in content and many did not include psychological support. Moreover, these interventions focused primarily on dietary intake and exercise regimes, and largely ignored disordered eating behaviours as an outcome, despite the treatment of post-operative eating disturbances being indispensable for an optimal post-operative outcome (Heinberg, 2012).

1.1.1 Aim of the Review

The overall aim of this systematic review is to examine the effectiveness of targeted psychological interventions on disordered eating behaviour following weight loss surgery. The specific objectives of the present review were to identify which psychological interventions are currently provided to patients following weight loss surgery and the format and length of such interventions. The review also aims to examine how effective the interventions are at ameliorating disordered eating and whether such interventions have an impact on weight loss outcomes.

1.2 Method

1.2.1 Identification Process

Searches of the following internet databases: CINAHL Plus with Full Text (1937-2018); Medline (1946-2018) and PsycINFO (1806-2018) were conducted in November 2018. Search terms and filters were generated that were specific to the questions being asked of the literature and limited to peer-reviewed articles in English. Search terms included 'bariatric surgery', 'weight loss surgery', 'gastric band', 'gastric bypass', 'gastric sleeve', 'Roux-en-Y', 'eating behaviour', 'maladaptive eating', 'disordered eating', 'psychological intervention', 'psychological treatment' and 'group therapy'. There were no exclusions placed on the sampling timeframe for studies, given the paucity of research found in the search and because this is a relatively new and under-researched area.

As highlighted by the Cochrane Collaboration (Higgins & Green, 2008), systematic reviews are often subject to publication bias, which occurs when the outcome of a study influences the decision whether to publish it, which can then subsequently result in a review that highlights positive results and neglects negative ones. Primary researchers in the field were contacted to obtain any other relevant research papers or unpublished data. To assess for any additional papers that were not retrieved in the literature searches, reference lists were screened. No new studies were identified as a result of these additional searches.

The screening of titles and abstracts revealed 52 potentially eligible papers. All duplicates were removed and the 40 results from this search were then screened to determine if they were suitable for inclusion within this systematic review and their

reference lists searched. A further 28 were excluded after applying the inclusion and exclusion criteria. A diagram of this process is illustrated in Figure 1.

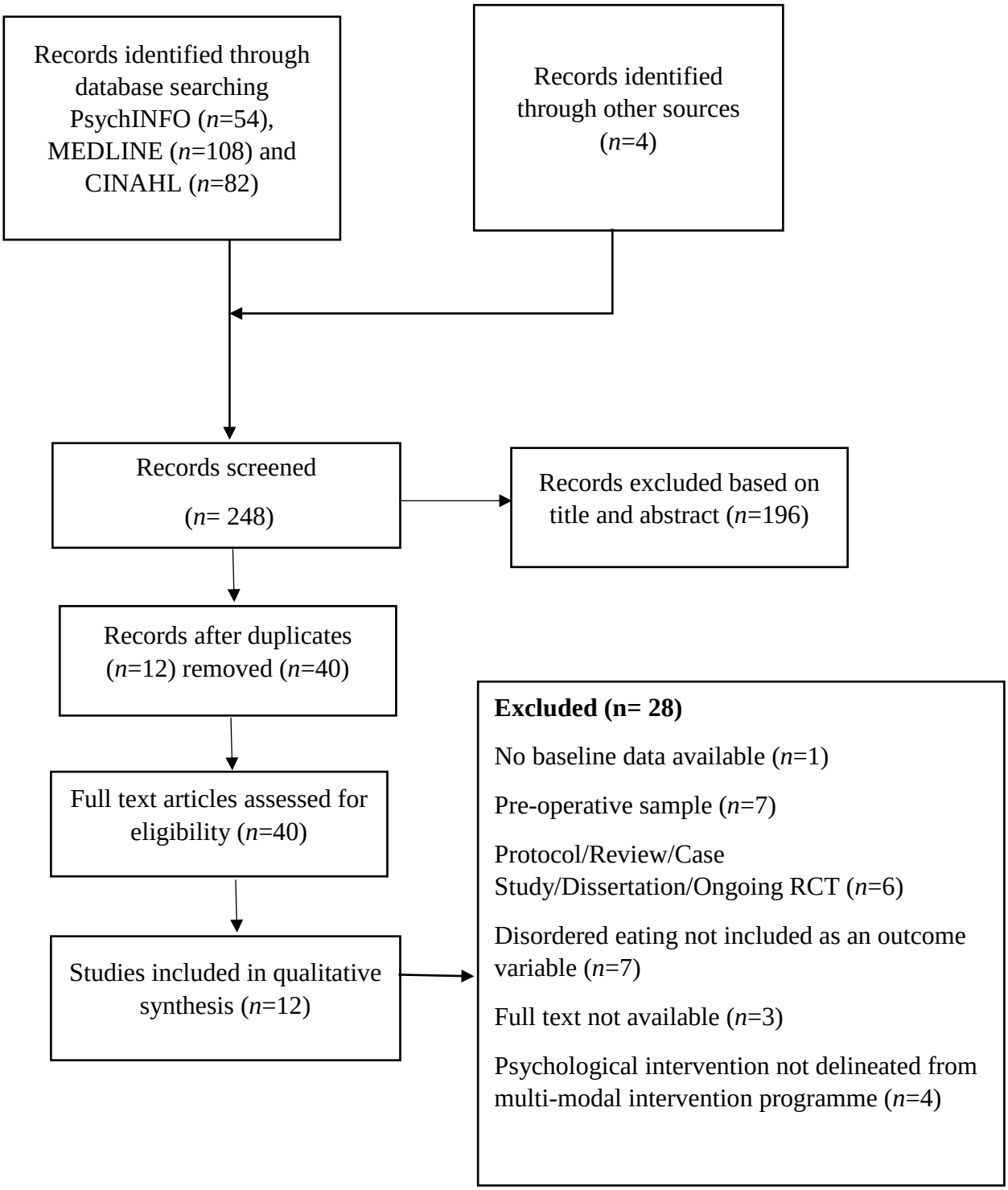
1.2.2 Inclusion and Exclusion Criteria

Papers were deemed to meet the inclusion criteria if they were peer-reviewed quantitative publications, reported on adults (>18 years of age) who had undergone weight loss surgery prior to receiving a targeted psychological intervention, had utilised at least one specific and valid questionnaire or structured interview examining disordered eating, and had collected data at least at both baseline and post-intervention time points. The targeted intervention must have used a specific protocol with the explicit aim of changing eating behaviour, but may have been delivered in a variety of different formats (e.g. individual, group, self-help and remotely delivered interventions). Multi-modal intervention programmes were only included if the psychological intervention was clearly operationalised and outcome measures for the psychological intervention were clearly delineated from the rest of the programme.

Discussion papers, conference papers, reviews, comments, case reports and academic dissertations were excluded. Studies that had not clearly measured disordered eating behaviour were also omitted, as were studies that included participants who had lost weight through non-surgical procedures. A total of 12 papers were deemed eligible and were included in the review.

Figure 1.

Study Selection Process Flow Chart



1.2.3 Data Extraction and Quality Appraisal

One of the few tools available for use in systematic reviews that include items on intervention integrity is the Effective Public Health Practice Project (EPHPP) Quality Assessment Tool for Quantitative Studies. The EPHPP tool, which is recommended by The Cochrane Public Health Review Group (Higgins & Green, 2008), was used to appraise the methodological characteristics and the quality of papers deemed eligible for this review. The EPHPP tool allows reviewers to derive a global rating of quality from six domains: selection bias, study design, confounders, blinding, data collection method and withdrawals/drop-out. The inter-rater reliability of the final grade assigned to each paper by the EPHPP tool has been found to be 'excellent' (Armijo-Olivo, Stiles, Hagen, Biondo & Cummings, 2012). To address reliability and validity, a second researcher independently coded all research papers. There were few discrepancies that were resolved through discussion to achieve consensus. There was total agreement between both researchers regarding the papers included within the review. Key features of each paper were extracted and summarised in Table 1.

Table 1.

Characteristics of Included Studies

Intervention Type	Author (year)	Country	Study Type	Sample Size (*n*)	Surgery Type	Data Collection Points	Mean Time Since Surgery (months)	Length and Format of Intervention	Measure of Disordered Eating Behaviour	Weight Loss Measurement	Participant Characteristics	
											Mean Age (years)	Female (%)
ACT	Weineland, Arvidsson, Kakoulidis & Dahl (2012)	Sweden	RCT	39	Bypass or Sleeve	Pre and post only	15.6	6 week internet-based Intervention	EDE-Q and SBEQ	No weight loss outcome included.	43.1	89.7%
ACT	Weineland, Hayes & Dahl (2012)	Sweden	RCT	39	Bypass or Sleeve	Pre, post- and six month follow-up	15.5	6 week internet-based Intervention	EDE-Q and SBEQ	No weight loss outcome included.	23	89.7%
ACT	Bradley et al (2016)	USA	Cohort	11	Bypass, Sleeve or Band	Pre and post only	43.3	10 week acceptance based behavioural group intervention	EDE-Q, EES, EI and own grazing questionnaire	% of (Total) Weight Loss and Change in Absolute Weight.	53.4	63.6%

ACT	Bradley et al (2017)	USA	Cohort	20	Bypass, Sleeve or Band	Pre, mid treatment (session 5), post-treatment and three month follow-up	61.2	10 week online ACT based intervention.	EDE-Q, EES, EI and own grazing measure	% of (Total) Weight Loss and Change in Absolute Weight.	54.3	85%
CBT	Beaulac & Sandre (2015)	Canada	Cohort	17	Not specified	Pre, post and three month follow-up	Not specified (minimum of 6 weeks)	8 week group intervention.	EOQ	No weight loss outcome included.	48	88.2%
CBT	Himes et al (2015)	USA	Cohort	28	Bypass	Pre and post only	48	10 week group intervention	EDE-Q, EDDS and food records.	% of (Total) Weight Loss, Total Mean Weight Loss and Change in BMI.	53	93%

CBT	Leahey, Crowther & Irvin (2008)	USA	Cohort	7 (excluding *n*=2 pre-operative patients)	Bypass or Band	Pre and post only	5.7	10 week Cognitive Behavioural Mindfulness Group Therapy Intervention.	EES, EDE-Q and BES	Deviation from expected weight loss.	54	85.7%
CBT	Robinson, Adler, Darcy, Osipoy & Safer (2016)	USA	Cohort	13	Not specified	Pre and post only	Not specified	12 week skills based intervention	DIET	% of Excess Weight Loss	42.9	76.9%
CBT	Sockalingam et al (2017)	USA	Cohort	14	Bypass	Pre and post only	6	6 session telephone based intervention	EES and BES	% of (Total) Weight Loss	46.2	86%

Mindfulness Based	Chacko, Yeh, Davis & Wee (2016)	USA	RCT	18	Bypass, sleeve or Band.	Pre, 3 months and six months	30	10 week mindfulness based group intervention	TFEQ-R18 and BES	Change in Absolute Weight, Change in BMI and Waist Circumference	54	83.3%
Mindfulness-Based	Wnuk et al (2018)	Canada	Cohort	28	Bypass or Sleeve	Pre post and four month follow-up	36.4	8 week Mindfulness Based eating awareness group intervention.	EES and BES	Change in BMI	55.4	100%
Motivational Interviewing	David, Sockalingam, Wnuk & Cassin (2016)	Canada	RCT	51	Not specified	Pre and twelve week follow up	24	Single session adapted motivational interviewing intervention.	BES	Outcome not included.	49.2	87%

Note. BES – Binge Eating Scale; DIET – The Dietary-Adherence Intake and Eating Test; EDDS – The Eating Disorder Diagnostic Scale; EDEQ – Eating Disorder Examination Questionnaire; EES – Emotional Eating Scale; EI – Eating Inventory; EOQ- Emotional

Overeating Scale; SBEQ – The Binge Eating Questionnaire for Bariatric Surgery Patients; TFEQ-R17 – Three Factor Eating Questionnaire Revised-18.

1.3 Results

1.3.1 Description of Included Studies

Participant Characteristics

The selected studies incorporated data from 285 participants, with an average sample size of 23.8 participants within each study. The majority of participants (87.7%) were female, with a mean age of 48 years. Across the seven studies that calculated BMI, BMI ranged from 27 to 45.4. All of the studies utilised participants from community/outpatient samples. There was information on ethnicity in seven studies; all of which had 60% or more Caucasian participants. Four studies gave information about educational level of participants, with 70.6-92.3% of participants attending college level education.

Nine out of the twelve studies featured exclusion criteria based on participants' mental health status. One study did not feature exclusion criteria based on participants' mental health status and reported that 76.9% of their sample had received at least one psychiatric diagnosis (Robinson et al., 2016). Two studies did not report on their exclusion criteria.

Type of Surgery

There are various types of weight loss surgery procedures currently available, each with differing weight loss outcomes and side effects (Mitchell & de Zwaan, 2012). For example, the Roux-en-Y gastric bypass procedure tends to lead to greater overall weight loss compared to Gastric Banding, which tends to produce smaller weight losses. Moreover, the various types of procedures also contribute to differences in problematic eating behaviours, such as "dumping syndrome", when food moves from the stomach to the small bowel too quickly, and malnutrition, which is more often seen in patients who have undergone the Roux-en-Y gastric bypass procedure (Mitchell &

de Zwaan, 2012). Due to these variations, it is important to take type of surgery into account when considering differences in study outcome.

Among the twelve studies, six recruited participants who had received a combination of weight loss surgeries, including Roux-en-Y gastric bypass, laparoscopic gastric banding and vertical sleeve gastrectomy, whereas two studies focussed on Roux-en-Y gastric bypass procedures only. Three studies did not specify the type of weight loss surgery that the full sample had received.

Time since Surgery

The rate of weight loss is often rapid in the initial six months post-surgery but then tends to slow down and continue more gradually until a plateau is reached around two years post-surgery (O'Brien, Dixon & Brown, 2004). All weight loss surgery procedures require patients to implement some level of liquid diet before gradually including soft, and then progressively more solid foods into their diets (Conceição, Vaz, Bastos, Ramos & Machado, 2013). Although there is no agreed consensus about the most effective time-point at which to deliver psychological interventions to weight loss surgery patients, it is important to consider time since surgery when comparing the effectiveness of interventions due to the differences in eating patterns necessitated by weight loss surgery sequela. The mean time since surgery of participants within the selected studies was 28.6 months, with two studies not reporting on the duration of time since participants had received surgery.

Measurement of Disordered Eating Behaviour

All of the studies utilised self-report measures to assess disordered eating behaviour. The majority of studies (*n*=9) used one of three standardised measures of disordered eating; the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994), the Emotional Eating Scale (EES; Amow, Kenardy & Agras, 1995)

and the Binge Eating Scale (BES; Gormally, Black, Daston & Rardin, 1982). Two studies utilised a measure for specific use within weight loss surgery populations that had not been previously psychometrically evaluated. Three studies developed their own specific measure of grazing behaviour due to the absence of a validated measure. One study adapted the standardised measures to better suit a weight loss surgery population, including the addition of an extra question on the EDE-Q to assess purging behaviour for 'unplugging' purposes, to provide relief from food that has become stuck in the lower oesophagus, rather than weight control.

Outcome measure descriptions varied in quality. Three papers described the measures in detail including psychometric properties such as internal consistency and test re-test reliability (Leahey et al., 2008; Robinson et al 2016; Weineland et al., 2012b;). Five studies referred to the psychometric properties of the measures without providing any data (Beaulac & Sandre, 2015; Bradley et al., 2016; Bradley et al., 2017; Chacko et al., 2016; Weineland et al., 2012a;). Four studies offered brief descriptions of the measures (Himes et al., 2015; David et al., 2016; Sockalingam et al., 2017; Wnuk et al., 2018)

Measurement of Weight Loss

There is no agreed consensus regarding the methods used for measuring weight loss within the field of weight loss surgery research. 'Obesity Surgery', one of the main academic journals in the field recommended that researchers use Percentage of Excess Weight Loss (%EWL) or Change in BMI as a measurement of weight loss. However, some researchers have advised that %EWL should not be used when comparing studies as this produces variation and can confound results (van de Larr, de Caluwé & Dillemans, 2011). For example, Van de Laar and colleagues (2011) demonstrated that when using %EWL, patients with lower initial weights will appear to have a more

successful weight loss outcome than those who had higher initial starting weights but have attained higher levels of weight loss. Differences in methods of measuring weight loss can cause some difficulties with making comparisons between studies. Nevertheless, weight loss measurement is an important factor to consider when comparing effectiveness of interventions.

Out of the twelve included studies, eight studies made attempts to analyse the outcome of weight loss. The method of measuring weight loss varied across studies, with four studies employing Percentage (or Total) Weight Loss (%TWL), and the remaining studies utilising other methods for measuring weight loss such as Percentage Excess Weight Loss (%EWL), change in Body Mass Index (BMI), change in absolute weight, deviation from expected weight loss and waist circumference measurements.

1.3.2 Psychological Interventions

Among the selected studies, the psychological interventions were delivered using a variety of methods such as face to face, internet and telephone and videoconference calling and included both group (50%) and individual interventions (50%). Eleven trials utilised allied health professionals or students, such as psychologists or masters level psychology students, to facilitate the treatment modalities. In one study it was unclear which profession delivered the interventions being investigated.

The detail and quality of information describing the interventions varied greatly across trials. There was a highly variable range of frequency and duration of contact with participants across the trials. The interventions in four studies were based on principles from Acceptance and Commitment Therapy (ACT), five studies were based on principles from Cognitive Behavioural Therapy (CBT), two studies primarily used mindfulness-based approaches and one study utilised a motivational interviewing

approach. The duration of the interventions across the studies ranged from a single session intervention to a twelve-week programme. The key findings of each paper are summarised in Table 2.

Table 2.

Disordered Eating Behaviour and Weight Loss Outcomes

Author (year)	Study Type	Intervention Type	Data Collection Points	Impact on Disordered Eating Behaviour	Impact on Weight Loss Outcome (Measurement)
Weineland, Arvidsson, Kakoulidis & Dahl (2012)	RCT	ACT	Pre and post only	Reductions in eating disorder symptomology, shape concerns and subjective binge eating (p<0.05).	No weight loss outcome reported.
Weineland, Hayes & Dahl (2012)	RCT	ACT	Pre, post- and six month follow up	Improvements in eating psychopathology were found when compared to treatment as usual at pre-, post- and follow up (p<0.05). Reductions in weight and shape concerns were found from pre to post-intervention (p<0.05) but no differences were found at pre-intervention to follow up (*ns*).	No weight loss outcome reported.
Bradley et al (2016)	Cohort	ACT	Pre and post only	Reductions in responsivity to internal cues (p<0.05) and increases in cognitive restraint (p=0.05).	Significant changes (A & B).
Bradley et al (2017)	Cohort	ACT	Pre, mid treatment (session 5), post-treatment and three month follow up	Reductions in disinhibition (p<0.05) and eating in response to anxiety (p<0.05), as well as increases in cognitive restraint (p<0.01).	Significant changes (A & B).

Beaulac & Sandre (2015)	Cohort	CBT	Pre, post and three month follow up	No significant changes in emotional overeating.	No weight loss outcome reported.
Himes et al (2015)	Cohort	CBT	Pre and post only.	Reductions in subjective binge episodes (p<0.05) and grazing behaviour patterns (p<0.05).	Significant changes (C & E).
Leahey, Crowther & Irvin (2008)	Cohort	CBT	Pre and post only	No inferential statistics reported.	No inferential statistics reported (D).
Robinson, Adler, Darcy, Osipov & Safer (2017)	Cohort	CBT	Pre and post only	No significant changes in emotional eating, mindless eating or grazing behaviour.	No significant changes (F).
Sockalingam et al (2017)	Cohort	CBT	Pre and post only	Reductions in binge eating, emotional eating and eating in response to anxiety and anger (p<0.05).	No significant changes (B).
Wnuk et al (2018)	Cohort	Mindfulness-Based	Pre post and four month follow up	No significant reductions in emotional eating or binge eating.	No significant changes (C).
Chacko, Yeh, Davis & Wee (2016)	RCT	Mindfulness-Based	Pre, 3 months and six months	Reductions in emotional eating were found at six month follow up, as compared to a standard intervention control group (p<0.05).	No significant changes (A, C & G).
David, Sockalingam, Wnuk & Cassin (2016)	RCT	Motivational Interviewing	Pre and twelve week follow up	Reductions in binge eating were found for the treatment group from pre-intervention to follow up (p<0.001), as compared to a wait-list control group. No significant differences were found at follow up.	Not reported.

Note. A = Change in Absolute Weight (kg); B = % of (Total) Weight Loss; C = Changes in BMI; D = Deviation from expected weight loss (%); E = Total Mean Weight Loss (kg); F = % of Excess Weight Loss (%EWL); G = Waist Circumference (cm).

1.3.2.1 Interventions Based on Acceptance and Commitment Therapy

Two papers evaluated ACT-based interventions using a randomised controlled design. Both Weineland, Arvidsson & Kakoulidis (2012) and Weineland, Hayes & Dahl (2012) compared a six-week internet-based ACT intervention with treatment as usual. The intervention condition included two face-to-face sessions and weekly telephone support calls, alongside weekly online modules. The face-to-face sessions focused on individual functional behavioural analysis of experiential avoidance whereas each of the online modules focussed on the ACT core processes: values, defusion, self as context, acceptance, committed action and contact with the present moment. Participants in the control condition received individualised sessions from the weight loss surgery support team as needed, which could include dietary advice and food diary registrations.

The remaining two studies evaluated the effectiveness of an ACT-based intervention using a cohort design. Bradley and colleagues (2016) evaluated a ten-week manualised group intervention to support adherence to the restrictive postoperative diet. Each 75-min group session focused on fostering the core ACT processes and standard behavioural techniques such as self-monitoring, stimulus control and psychoeducation. Bradley and colleagues (2017) evaluated a ten- week internet ACT-based intervention, which focused on strategies to increase willingness to experience less pleasurable and aversive experiences (e.g. hunger, food cravings, and negative emotions) through the core ACT processes. The online modules included sections on behavioural application of the skills and a fortnightly phone call from a member of the study team to check understanding and ensure application of the skills being learned.

Impact of Interventions Based on Acceptance and Commitment Therapy on Disordered Eating

Overall, interventions utilising an ACT approach appeared to have a positive impact upon a number of disordered earing variables. Both RCT studies explored the impact of the ACT-based psychological intervention on overall eating disorder symptomatology using the EDE-Q (Fairburn & Beglin, 1994). Both studies found significant reductions in eating disorder symptomatology at post-intervention when compared to a treatment-as-usual control group (Weineland, Arvidsson, Kakoulidis & Dahl, 2012; Weineland, Hayes & Dahl, 2012). Moreover, Weineland, Hayes & Dahl (2012) found that these improvements were maintained at six-month follow-up.

Significant reductions in binge eating behaviours were found post-intervention (Weineland, Arvidsson, Kakoulidis & Dahl, 2012). However, there were no significant differences in binge eating ratings between intervention and control conditions at long-term follow up. It should be noted that the instruments used to measure binge eating within these studies were adapted for weight loss populations and have not been psychometrically evaluated. There were no significant changes in restraint (Weineland, Arvidsson, Kakoulidis & Dahl, 2012; Weineland, Hayes & Dahl, 2012), as measured by the EDE-Q.

Both RCT studies reported no significant changes in eating concerns following completion of the six week ACT interventions, as compared to treatment as usual (Weineland, Arvidsson, Kakoulidis & Dahl, 2012; Weineland, Hayes & Dahl, 2012), whilst significant reductions were found in weight and shape concerns (Weineland, Arvidsson, Kakoulidis & Dahl, 2012; Weineland, Hayes & Dahl, 2012). However, these reductions were not sustained at a six-month follow up (Weineland, Hayes & Dahl, 2012).

Whilst no significant changes were found in emotional eating following completion of the group-based intervention (Bradley et al., 2016), significant reductions in eating in response to anxiety were found following completion of the internet-based intervention (Bradley et al., 2017). There were no significant reductions in grazing behaviour across both cohort studies (Bradley et al., 2016; Bradley et al., 2017). However, as there were no validated measures of grazing behaviour, both studies developed their own measure of grazing behaviour for use within their studies.

Both cohort studies reported statistically significant increases in restraint following completion of treatment (Bradley et al 2016; Bradley et al 2017), with medium (d=0.67) and large effect sizes (d=1.84) respectively (Cohen, 1988). Both of these studies employed the Cognitive Restraint subscale of The Eating Inventory (Stunkard & Messick, 1998). Stunkard & Messick (1998) defined cognitive restraint as an individual's ability to intentionally limit food intake, typically to prevent weight gain. High levels of cognitive restraint have been associated with greater responsiveness to obesity treatments (Stunkard & Messick, 1988) and larger amounts of weight loss in weight loss surgery populations (Sarwer et al., 2008).

Both cohort studies explored whether the interventions based on ACT had an impact on participants' reactivity to internal cues of satiety (such as thought processes and emotional responses within the individual) and external cues of satiety (such as environmental factors) using the Eating Inventory (Stunkard & Messick, 1998). Both studies found that following completion of the intervention, there were significant reductions in reactivity to internal cues but not in reactivity to external cues (Bradley et al., 2016; Bradley et al., 2017). Moreover, Bradley and colleagues (2017) found significant reductions in disinhibition using the Eating Inventory (Stunkard & Messick, 1998), following completion of an online ACT intervention.

Impact of Interventions Based on Acceptance and Commitment Therapy on Weight Loss

Although both studies using an RCT design did not measure weight loss outcomes (Weineland, Arvidsson, Kakoulidis & Dahl, 2012; Weineland, Hayes & Dahl, 2012), both cohort studies reported statistically significant weight loss post-intervention (Bradley et al., 2016; Bradley et al., 2017), as measured by changes in absolute weight and total mean weight loss

1.3.2.2 Interventions based on Cognitive Behavioural Approaches

Three trials utilised a cohort design to investigate the effectiveness of group interventions based on cognitive-behavioural approaches. Beaulac & Sandre (2015) evaluated an 8-week CBT based group intervention, which aimed to improve post-surgical outcomes by addressing psychosocial issues that can contribute to poor post-operative adjustment and associated weight regain. Alongside weekly homework tasks, participants attended group sessions that each focussed on a specific theme, including stress and coping, emotional eating, changing negative thinking, body image and self-esteem.

Leahey, Crowther & Irvin (2008) investigated the implementation of a 10-week cognitive-behavioural mindfulness-based group intervention designed to reduce binge eating and associated emotional eating, and enhance well-being and post-surgical adjustment. Each session, lasting up to 75 minutes, focused on slowing participants' food consumption, increasing self-acceptance, increasing awareness of internal cues, addressing dysfunctional cognitions regarding food and eating and developing alternative coping strategies to assist with adherence to post-surgical guidelines. Finally, Himes and colleagues (2015) examined the effectiveness of a six-week group intervention informed by CBT and DBT. Each session, which lasted for 60 minutes,

aimed to address behavioural non-adherence to dietary guidelines, management of life stressors, and skill development in preventing unhealthy eating patterns.

The remaining two trials utilised a cohort design to examine the effectiveness of cognitive behavioural interventions delivered through a variety of treatment modalities, such as videoconferencing and telephone communication. Robinson and colleagues (2016) investigated the impact of a 12-week early post-operative intervention using a cohort design. The intervention was designed to address psychological skill deficits that underlie poor dietary adherence and disordered eating behaviours associated with suboptimal weight loss outcomes. In addition to a 15-20 minute pre-treatment appointment, the intervention involved two 90-min sessions and ten 30-min sessions. The intervention was delivered face to face, either in person, through videoconferencing or through a combination of both methods. Finally, Sockalingam and colleagues (2017) explored the impact of a six-session cognitive behavioural intervention, delivered via the telephone. Each session lasted up to 55 minutes and largely focussed on improving eating pathology and psychosocial functioning.

Impact of Interventions Based on Cognitive Behavioural Approaches on Disordered Eating

Overall, the results from studies reporting the impact of CBT-based interventions on disordered eating variables were contradictory. Three studies reported significant reductions in binge eating at post-intervention, however none of these outcomes were assessed at follow-up. As such, the sustainability of these changes cannot be ascertained (Himes et al., 2016; Leahey et al., 2008; Sockalingam et al., 2017).

Two studies reported no significant changes in ratings of emotional eating following completion of group interventions (Beaulac & Sandre, 2015; Robinson et al., 2017), However, Sockalingam and colleagues reported significant reductions in eating in response to emotions and eating in response to anger and anxiety (Sockalingam et al., 2017) following the completion of their telephone delivered intervention. Moreover, Leahey and colleagues (2008) reported large effect sizes for reductions in guilt associated with eating and urges to eat in response to emotions.

Whilst Himes and colleagues (2015) reported significant reductions in grazing behaviour patterns post-intervention, which included significant reductions in number of snacks and number of eating episodes per day (Himes et al., 2015), Robinson and colleagues (2017) found no significant reductions in grazing behaviour at post-intervention (Robinson et al., 2017). However, it should be noted that there is no validated measure of grazing behaviour and both studies had developed their own measure of grazing behaviour.

Himes and collegues (2015) reported no significant changes in restraint scores at post-intervention (Himes et al., 2015), as measured by the EDE-Q. Moreover, Leahey and colleagues reported that restraint scores only increased slightly and found that 42.9% of participants experienced a decrease in restraint over the treatment period (Leahey, Crowther & Irvin, 2008). Moreover, Robinson and colleagues (2017) explored the impact of their intervention on mindless eating, as assessed using the DIET (Darcy, Adler, Miner & Lock, 2014) and found no significant changes in mindless eating.

Large effect sizes for reduction in eating concerns (d=0.82), weight concerns (d=1.20) and shape concerns (d=0.78) following completion of a ten-week group intervention (Leahey et al., 2008).

Impact of Interventions Based on Cognitive Behavioural Approaches on Weight Loss

The impact of CBT-based post-operative psychological interventions on weight loss were mixed. Himes and colleagues (2015) reported significant changes in weight loss at post-intervention, as measured by total mean weight loss and changes in BMI. Robinson and colleagues reported no significant changes in weight loss, as measured by Excess Weight Loss (%EWL). Although no inferential statistics were reported, Leahey and colleagues (2008) reported that participants' average deviation from expected weight loss reduced from 12.29 to 6.43 pounds post-intervention. Beaulac and Sandre (2015) did not measure weight loss outcomes.

1.3.2.3 Interventions Based on Mindfulness Approaches

Chacko and colleagues (2016) compared the effectiveness of a mindfulness-based group intervention to a standard control condition. Participants in the intervention condition received a 10-week mindfulness based group intervention that was designed to prevent weight regain and improve coping skills to support long-term weight maintenance. Each 90-min group session focused on integrating attitudes of mindfulness, such as patience, acceptance and self-compassion to help mitigate life stressors, with adapted versions of behavioural strategies for obesity, including goal setting, problem-solving, stimulus control. Participants in the control condition received a singular 60-min individualised counselling session with a registered dietician, which included guidance on nutrition, exercise and life-style strategies.

Wnuk and colleagues (2018) evaluated the effectiveness of an 8-week mindfulness-based eating awareness training group intervention using a cohort design. The aim of the intervention was to reduce problematic eating and prevent weight regain.

Participants received weekly 2-hr group sessions, alongside assigned weekly homework tasks.

Impact of Interventions Based on Mindfulness Approaches on Disordered Eating

When compared to a control condition, Chacko and colleagues (2016) demonstrated significant reductions in emotional eating at six-month follow up. However, these changes were not sustained at a twelve-month follow-up. Conversely, Wnuk and colleagues reported no significant changes in ratings of emotional eating within their cohort study (Wnuk et al., 2018).

There were no significant changes in restraint, as measured by the TFEQ (Chacko et al, 2016).

Impact of Interventions Based on Mindfulness Approaches on Weight Loss

Both studies reported no significant changes in weight loss following completion of an intervention based on mindfulness approaches (Chacko et al., 2016; Wnuk et al., 2018) as measured by changes in BMI, changes in absolute weight and waist circumference (cm).

1.3.2.4 Interventions based on Motivational Interviewing Approaches

David and colleagues (2016) compared the effectiveness of an adapted motivational interviewing intervention with a wait-list control condition. Participants received a single adapted motivational interviewing session, which was designed to increase participants' readiness for change, confidence in their ability to change and adherence to dietary guidelines. The mean session length was 107.9 min (*SD*= 26.3) and was tailored to each participant according to the dietary guidelines that each participant was having the greatest difficult adhering to.

Impact of Interventions based on Motivational Interviewing Approaches on Disordered Eating

Results indicated that there were significant reductions in binge eating behaviours following completion of the single-session intervention. Although David and colleagues (2016) demonstrated significant reductions in binge eating from baseline to twelve-week follow up, there were no differences in ratings of binge eating between the intervention group and a wait-list control group at follow up.

Impact of Interventions based on Motivational Interviewing Approaches on Weight Loss

Weight loss outcomes were not reported by David and colleagues (2016).

1.3.3 Quality of Included Studies

Following the evaluation of each paper using the quality assessment tool, all twelve papers were rated as having an overall quality rating of 'poor'. Quality Ratings of the included studies were summarised in Table 3. Among the twelve selected studies, four were randomised controlled trials (66.7%), whereas eight studies utilised a cohort design. Only six studies completed follow-up assessments (50%), which ranged from three to six months in duration. Only one of the studies that utilised an RCT design gave an adequate description of the randomisation process. There was no concealment of allocation utilised in any of the included studies. Seven studies took place in the USA (58.3%); three were in Canada (25%) and two were in Sweden (16.7%).

Out of the twelve studies included, ten studies utilised media advertising to recruit participants whereas two studies recruited through referrals from medical professionals. The sample size of the studies ranged from 7 to 51 participants. Power calculations were not reported for any of the included studies. Intention to treat analysis

was only employed in five studies, whereas effect sizes were reported in ten out of the twelve studies.

Treatment Fidelity

Treatment fidelity refers to the strategies used to monitor and enhance the reliability and validity of clinical interventions in order to ensure that the full benefits of the interventions can be realised (Bellg et al., 2004). Out of the twelve studies, only two studies made explicit reference to monitoring treatment fidelity. David and colleagues (2016) audio-recorded 28% of sessions, which were then independently rated using a standardised treatment adherence and competence scale. All audio-recorded sessions exceeded the pre-determined threshold for demonstrating treatment adherence, with a mean adherence rating of 5.8 out of 7. Robinson and colleagues (2016) utilised audio-recordings of sessions and group consultation to ensure treatment fidelity.

Treatment Acceptability

Although there is no universally agreed definition of what constitutes treatment acceptability, Kazdin (1980) described treatment acceptability as the degree to which an individual perceives a treatment procedure to be fair, reasonable, appropriate and un-intrusive. Factors that influence participants' perceived acceptability include the intervention's **"**appropriateness in addressing the clinical problem, suitability to individual life style, convenience and effectiveness in managing the clinical problem" (Sidani, Epstein, Bootzin, Moritz & Miranda, 2009, p.421). Consequently, if an intervention is considered acceptable, participants may be more likely to adhere and potentially benefit from improved clinical outcomes.

Ten studies assessed acceptability using various objective measures of behaviour as indicators of acceptability, such as withdrawal and retention rates

(Beaulac & Sandre, 2015; Bradley et al., 2016; Bradley et al., 2017; Chacko et al., 2016; David et al., 2016; Himes et al., 2015; Robinson et al., 2016; Sockalingam et al., 2017; Weineland et al., 2012a; Wnuk et al., 2018). Nine of the studies reported that they assessed acceptability using self-report measures, which included satisfaction measures and reports of participants' experiences of the intervention (Beaulac & Sandre, 2015; Bradley et al., 2016; Bradley et al., 2017; Chacko et al., 2016; Himes et al., 2015; Leahey et al., 2008; Robinson et al., 2016; Weineland et al., 2012b; Wnuk et al., 2018). None of the studies specified a threshold criterion, i.e., the number of participants that needed to withdraw /discontinue treatment, for the intervention to be considered unacceptable.

Table 3.

Quality Ratings of Included Studies Using the EPHPP Quality Assessment Tool

	Selection Bias	Study Design	Confounders	Blinding	Data Collection Methods	Withdrawals / Drop-Outs	Global Rating
1.Weineland, Arvidsson, Kakoulidis (2012)							
2.Weineland, Hayes & Dahl (2012)							
3.Beaulac & Sandre (2015)							
4.Bradley et al (2017)							
5.Wnuk et al (2018)							
6.Leahey, Crowther & Irvin (2008)							
7.Himes et al (2015)							
8.Robinson, Adler, Darcy, Osipov & Safer (2017)							
9.Sockalingam et al (2017)							
10.Bradley et al (2016)							
11.Chacko, Yeh, Davis & Wee (2016)							
12.David, Sockalingam, Wnuk & Cassin (2016)							

Rating	
Strong	
Moderate	
Weak	

1.4 Discussion

The purpose of the present systematic review was to critically examine the effectiveness of targeted psychological interventions on disordered eating behaviour following weight loss surgery. The targeted post-operative psychological interventions employed within this review were heterogeneous in terms of mode of treatment delivery, point of delivery and duration of contact with participants. The treatment modalities that were evaluated included interventions based on cognitive behavioural therapy, acceptance and commitment therapy, mindfulness and motivational interviewing approaches. At present, there is no standardised guidance for the provision of psychological support following weight loss surgery (NICE, 2014) and post-operative interventions are not routinely offered to weight loss surgery patients in the U.K.

Findings were contradictory, with some studies suggesting that targeted post-operative psychological interventions ameliorated disordered eating behaviours, whereas others reported no improvements. Each of the four trials that utilised approaches from ACT appeared to have a positive impact upon a selected number of disordered eating variables such as reductions in levels of disinhibition, reductions in weight and shape concerns, reduced amounts of eating in response to anxiety and reductions in eating in response to internal states. Moreover, one study found reductions in overall eating disorder symptomatology were maintained at a six-month follow-up period.

The main mechanism of therapeutic change within the ACT-based interventions appeared to be acceptance (Hayes, Strosahl & Wilson, 1999). Emphasis was placed upon teaching strategies to increase individuals' capacity for acceptance of previously

avoided internal states, in order for individuals to engage in value-driven behaviours. It is possible that engagement in disordered eating behaviour may serve as a means of avoiding negative affect, such as guilt or shame. Although avoidance results in short-term relief, the consequences of such behaviour include interference with post-surgical guidelines, sub-optimal weight outcomes and poorer psychosocial adjustment following surgery. Given the promising results for acceptance-based interventions, future research should investigate the mediating effects of acceptance on disordered eating in the post-operative treatment of weight loss surgery patients.

Moreover, interventions that utilised an ACT approach appeared to demonstrate good participant acceptability, with all four trials attaining an impressive retention rate of over 70% across both face-to-face and remotely delivered formats. It is of note, however, that there were no long-term assessment of these outcomes and the sample sizes were small. As such, uncertainty remains about whether these interventions are able to facilitate sustainable changes in disordered eating behaviours over time. It is therefore essential that the impact of using acceptance-based approaches using a well-controlled trial with long-term follow up is examined through further research. Moreover, given the cost implications of using remotely delivered interventions (Ritterband, 2009), future research should seek to compare the effectiveness of such interventions with face-to-face treatments.

With regards to trials that evaluated weight loss as an outcome, findings are equivocal. Although some studies reported significant reductions in weight, others reported no significant changes. It should be noted that the studies that reported significant weight loss outcomes featured participants who had all experienced weight regain prior to engaging with the intervention. There are a number of factors that may

account for this finding. For example, individuals who experience weight re-gain post-surgery are more likely to have a history of weight cycling (Ball et al., 1999). As such, it is possible that this finding may reflect the cyclical nature of the weight status of these participants rather than a beneficial effect of the intervention. Moreover, many of the studies featured samples with a relatively low mean BMI at pre-intervention. It is possible that these participants may be less motivated to lose weight compared to samples of individuals with higher BMIs at pre-intervention.

Moreover, the lack of control conditions and long-term follow ups, and the variability in measurements of weight loss, mean that any conclusions related to sustained weight loss must be interpreted with caution. No mode of treatment delivery, whether individual, group, face-to-face or remotely delivered, appeared to produce more favourable weight loss outcomes.

1.4.1 Strengths and Limitations of Included Studies

A strength among many of the included studies was the attempt to collect longer-term outcome data and to not solely focus on the earlier stages of post-surgery, where outcome measurements appear more positive. However, the variability in time points at which the interventions were delivered varied greatly across studies, ranging from a mean time of 5.7 months to 61.2 months post-surgery.

As discussed previously, differences in eating patterns and rates of weight loss, necessitated by the weight loss surgery sequelae, are likely to have an impact on response outcomes to interventions. It is of note that the trials within the present review, which included samples of participants with a mean of 40 months or more post-surgery, appeared to have more positive outcomes. Such differences in point of delivery can cause difficulties in making comparisons across the trials. As such, there is still

uncertainty regarding whether there is an optimal time to deliver psychological interventions post-surgery. It is therefore prudent for future research to investigate the point at which delivery of interventions is most effective on outcomes, in a way that demonstrates methodological rigour.

Another limitation of the studies under review relates to the use of 'opt-in' recruitment strategies, which raises the question of whether these samples are representative of the wider post-weight loss surgery population. It is possible that individuals who volunteered to participate experienced more successful post-surgery outcomes or are more motivated to engage with the interventions. This could be reflected in the relatively low mean pre-intervention BMI reported by a number of the studies.

Furthermore, the majority of studies included participants who did not exhibit disordered eating behaviour that met clinical thresholds. Several problems are caused when using such samples, one being that they do not provide reliable information about the effectiveness of the intervention for individuals with more severe eating pathology. Moreover, nine out of ten studies that reported their exclusion criteria made exclusions based on participants' mental health status. This further limits the extent to which findings can be generalised to the wider post-surgery population, where high rates of psychiatric co-morbidity are reported (Kalarchian et al., 2007). It is therefore essential that exclusion criteria, as well as recruitment strategy, are carefully considered in future research to ensure maximum generalisability of findings.

Questions remain regarding the adequacy and appropriateness of the assessment tools used within some of the included studies. The majority of the measures used were global and general, and lacked normative data specific to weight loss surgery

populations. Moreover, some studies implemented questionnaires that had been specifically developed for the purposes of their study. The use of non-standardised measures causes problems with regard to cross study comparison and replication of results. Moreover, the lack of psychometric testing of these measures raises concerns regarding quality of data. As such, only standardised measures, which have been demonstrated as valid and reliable within a weight loss surgery population, should be utilised in future research.

There were no UK based studies. This may reflect the more recent emergence of weight loss surgery in the UK or the absence of psychological interventions routinely provided to weight loss surgery patients in the U.K. The majority of studies were conducted in countries where medical costs are typically covered by private health care and medical insurance. This may limit the extent to which findings can be generalised to UK settings where the majority of healthcare is public state-funded. Although none of the studies detailed the source of funding for participants' healthcare costs, it is possible that the approach taken by the participants towards the procedure and intervention will differ depending on funding source. As such, it is important for future research to detail the source of funding in order to examine its potential impact upon post-surgical outcomes.

Evidence not published in peer-reviewed publications, can provide an important forum for disseminating studies with negative results that may not otherwise be disseminated. The present systematic review only included peer-reviewed publications, which may increase the likelihood of publication bias and provide a skewed picture of the available evidence. Future research may wish to consider a diverse format of

research evidence when reviewing the literature in order to increase the comprehensiveness of the review.

1.4.2 Overall Conclusions of the Review

This review adopted a systematic and replicable approach, which included supplementation of the results of the electronic search with hand searching, searching of reference lists and quality ratings that were cross checked by an independent rater. Such an approach ensures confidence that all relevant research was included in the review and that conclusions arising from this review are based on all the evidence currently available.

A number of limitations of this systematic review need to be acknowledged. This review included a relatively small number of papers and the heterogeneous nature of the studies caused difficulties when conducting comparisons between the trials. The methodology and standard of research conducted is crucial when interpreting the results of the included papers; all of which were rated as 'poor' quality. All of the papers lacked a number of important elements of methodological rigour, such as blinding, active attention control conditions, inadequacy of assessment tools, small sample sizes and short follow up time points. As such, the true effect of targeted post-operative psychological interventions on disordered eating behaviour, and subsequent weight loss outcomes, remains difficult to determine. Although the selected studies provided data that were relevant to the aims of the present review, they did not present with quality evidence to fulfil the aims of the review.

Another limitation of the review is that some of the papers included within this review did not identify ameliorating disordered eating behaviours as a primary aim for their intervention. Instead, many of the interventions primarily focused on weight loss

outcomes, such as maintenance or regain. However, information pertaining to the impact on disordered eating behaviours could still be extrapolated from the reported results. It could be argued that the aims of the papers were not wholly compatible with the aims of the present review. However, given the paucity of research within this area, such papers were deemed to meet the inclusion criteria for the review.

Nonetheless, it is becoming clear that weight loss surgery is not solely a surgical issue. In order for successful long-term outcomes to be realised, the underlying social, emotional, behavioural and cognitive factors that are associated with disordered eating behaviour post-operatively, must be addressed. Despite the promising nature of these initial findings (Beck, Johannsen, Stoving, Mehlsen & Zachariae, 2012; Rudoph & Hilbert, 2013; Stewart & Avenell, 2015), uncertainty regarding the mechanisms of therapeutic change, as well as the length, timing and format of treatment delivery remains.

Although many weight loss surgery candidates succeed in achieving and sustaining clinically significant weight loss post-surgery, a significant number of individuals do not and continue to suffer. There is lack of current information into the most effective ways in which services should support individuals undergoing such a life changing procedure. It is therefore of the utmost importance that future research focuses on the rigorous evaluation of such interventions in order to inform and guide clinically responsive and effective services.

Chapter 2: Empirical Paper

The Impact of Weight Loss Surgery: An Investigation into the Predictors of Body Image Dissatisfaction and Disordered Eating Behaviour Post-Surgery

2.1 Introduction

2.1.1 Clinical Context

Obesity, defined as a Body Mass Index of over 30kg/m^2, is a major health problem worldwide, with a range of adverse physical, social, psychological and economic consequences for both the individual and society (Throsby, 2007; WHO, 2015). Obesity has reached epidemic proportions globally, with the incidence of obesity having nearly doubled since 1980 (WHO, 2015). The prevalence rates of obesity in the U.K. are the highest in Europe and it has been predicted that half of the U.K. population will be obese by 2050 (WHO, 2015).

Obesity has been attributed as the main cause for more than 2.8 million deaths annually due to the increased prevalence of obesity-related morbidities, such as diabetes, hypertension, heart disease and certain types of cancers (The International Association for the Study of Obesity, 2002). It is estimated that by 2030, obesity-related morbidity will cost the NHS approximately £1.9-2 billion per year (Wang, McPherson, Gortmaker & Brown, 2011), with wider costs to society estimated to reach £49.9 billion per year (Public Health England, 2017). Although treatments for obesity are unlikely to affect the increasing prevalence rates, evidence suggests they can reduce rates of obesity-related morbidity and mortality (e.g. Sjöström, 2013). An increasing amount of research evidence suggests that weight loss surgery is the most efficacious treatment available for severe obesity (Chang et al, 2014, Colquitt et al, 2014; Picot et al, 2012).

2.1.2 Weight Loss Surgery

Weight Loss Surgery defines a group of surgical procedures that are performed to facilitate weight loss through reducing the capacity of the stomach (restrictive methods), by decreasing the absorption of nutrients (malabsorption methods) or through a combination of both methods. The three main types of weight loss surgery procedures that are commonly performed in the U.K. are the gastric bypass (such as the Roux-en-Y gastric bypass), gastric sleeve and gastric banding procedures (Buchwald & Oien, 2013). These procedures are usually performed laparoscopically, with 95.4% of weight loss surgeries in the U.K. using laparoscopic procedures (Welbourn et al., 2014). Each surgical procedure has varied gastro-intestinal outcomes, with regards to physical capacity of the stomach, absorption, digestion and hormonal balance, all of which have an impact upon the processing of food and storage of energy (Meel, Lewis, Reimann, Gribble & Park, 2016).

A gastric bypass procedure involves the creation of a small pouch from the top half of the stomach that is then connected to a shorter length of the small intestine. The procedure restricts the food that can be digested as the stomach pouch is only able to hold a small amount of food (restrictive), whereas malabsorption occurs as a result of bypassing the proximal small bowel. The gastric bypass procedure is the most common procedure performed in the UK (Welbourn et al., 2014) and has often been viewed as the 'gold standard' treatment for morbid obesity (BMI of 40kg/m^2 or more; Fobi, Lee, Holness & DeGaulle, 1998).

The gastric sleeve procedure, also referred to as a sleeve gastrectomy, involves the removal of 75% of the stomach in order to create a restrictive effect, leaving a 'sleeve' shaped organ. The mechanisms of gastric sleeve are not fully understood, but

the procedure is thought to inhibit appetite through suppression of ghrelin, a hormone responsible for hunger (Ali, El Chaar, Ghiassi & Rogers, 2012).

The gastric banding procedure consists of an adjustable silicone band being placed around the top part of the stomach, restricting the intake of food. The restriction caused by the band can be adjusted according to individual patient requirements, through injecting saline via a port which is inserted at the time of surgery. Unlike, the gastric bypass and sleeve gastrectomy procedures, the digestive system remains fully intact in the gastric banding procedure. There is no clear consensus as to which surgical procedure produces superior outcomes; however, percentage of excess weight loss tends to be significantly less for patients who have undergone gastric banding than other weight loss procedures (Welbourn et al., 2014).

Commensurate with the growing epidemic of obesity, there has been a substantial increase in the number of weight loss surgery procedures being performed over the past decade (Madura & DiBlaise, 2012). According to a recent Cochrane Review, weight loss surgery provides the best probability of achieving sustained weight loss and produces greater improvements in health-related quality of life compared to non-surgical approaches (Colquitt, Pickett, Loveman & Frampton, 2014). It is estimated that between 40-71% of excess weight loss is achieved through weight loss surgery (Buchwald et al., 2004; Garb, Welch, Zagarins, Kuhn & Romanelli, 2009), with patients on average no longer meeting the criteria for morbid obesity at two years post-surgery (Pories & MacDonald, 1993). Moreover, findings from a longitudinal study that reported a mean excess weight loss of 28.4% seven years post-surgery (Courcoulas, King & Belle, 2018), suggests that weight loss surgery can contribute to long-term weight loss outcomes.

Although many weight loss surgery candidates succeed in achieving and sustaining clinically significant weight loss post-surgery, 20-30% of patients fail to maintain their weight loss (Buchwald et al., 2004; Sarwer, Wadden & Fabricatore, 2005). It is estimated that between 20% and 50% of patients will regain the weight they had lost as a result of their surgery (Benotti & Forse, 1995; Budak & Thomas, 2009). Such weight regain can compromise the health benefits gained following surgery, such as increases in diabetes and hypertension (Courcoulas et al., 2013). Several factors have been proposed as being associated with sub-optimal weight loss following surgery, which appear to encompass both surgically-related and psychological factors (Petry, Barry, Pietrzak & Wagner, 2008; Sarwer, Dilks & West-Smith, 2011). However, identification of factors that are of direct relevance to weight loss failure has been of limited success. In particular, there is a lack of consensus surrounding the psychological profile of the weight loss surgery population, such as anxiety, mood, and self-esteem. One key potential psychological variable that has gathered emerging evidence as having important implications post-surgery is body image dissatisfaction.

2.1.3 Body Image Dissatisfaction

Body image dissatisfaction is defined as the negative perceptions and feelings one has about one's body (Peat, Peyerl & Muehlenkamp, 2008). According to Self-Discrepancy Theory (Higgins, 1987), body image dissatisfaction is caused when there is disparity between an individual's current body shape, their 'actual self' and their ideal body shape, the 'ideal self', creating a 'self-ideal discrepancy' (Higgins, 1987; Williamson, Gleaves, Watkins & Schlundt, 1993). Body image dissatisfaction is a common source of distress among weight loss surgery candidates (Dixon, Dixon, &

O'Brien, 2002), with poor body image being a primary motivator for individuals to have surgery (Libeton, Dixon, Laurie, & O'Brien, 2004).

Research findings have suggested that a self-ideal body shape discrepancy exists throughout the weight loss surgery trajectory; as individuals' own body shape decreases, so does their ideal body shape (Munoz et al., 2010). The degree to which self-concept is stable and consistent over time is associated with better self-perception and psychological functioning (Donahue, Robins, Roberts & John, 1993). This is captured by the construct self-concept clarity (Campbell et al., 1996), which is often harder for individuals to sustain following weight loss surgery as the dramatic changes in weight often trigger feelings of uncertainty about their sense of self in relation to their new body (Faccio, Nardin & Cipolletta, 2016). Consequently, individuals may be more vulnerable to turn to external sources, such as idealising socially desirable thin bodies, as a means of defining themselves (Vartanian & Dey, 2013).

Munoz and colleagues (2010) suggest that surgery may impact upon an individual's ability to gauge a realistic ideal body shape, with patients often reporting 'unrealistic' and 'unattainable' weight loss expectations (Kaly et al., 2008). It is possible that once individuals experience the rapid weight loss, commonly experienced with surgery, they will then view surgery as a mechanism to achieve their idealised thin body shape (Munoz et al., 2010). This may then serve to progressively elevate patients' expectations as to what 'realistic' ideal body shape can be attained and endorse thinner ideal body sizes, thus maintaining the self-ideal discrepancy.

Higgins (1987) proposed that discrepancies between the actual-self and the ideal-self make individuals more vulnerable to the experience of dejection-related emotions such as increased feelings of shame towards one's body when one's

expectations of their ideal body shape are not met. Moreover, research has shown that the hanging folds of tissue and loose skin that often occur as a consequence of dramatic weight loss can be further sources of distress for individuals post-surgery (Aly, Cram & Heddens, 2004). This appears to be reflected in the finding that weight loss surgery patients often become increasingly dissatisfied with their body image with increasing weight loss (Aly et al., 2004; Kinzl, Traweger, Trefalt & Biebl, 2003). These negative emotional experiences may then lead patients to adopt compensatory strategies in an attempt to minimise the discrepancy between their current and ideal body shape (Deitel & Shikora, 2002; Vartanian, 2012), which may include disordered eating behaviour.

2.1.4 Disordered Eating Behaviour

Disordered eating behaviour has been defined as "a wide range of eating disorder pathologies including dieting for weight control, binge eating and purging behaviours, to subthreshold and full syndrome eating disorders" (Baechle et al., 2014, p. 342). Compared to the general population, prevalence rates of disordered eating behaviour appear to be higher in weight loss surgery populations (Mitchell et al., 2012). Research suggests that 11-50% of weight loss surgery candidates will exhibit disordered eating behaviour (Niego, Kofman, Weiss & Geliebter, 2007; Sallet et al., 2007). Conceição and colleagues (2015) suggest that accelerated weight loss and the systematic reminders to control the amount of food eaten that are often associated with treatment success, increase patients' risk of developing or exacerbating pre-existing disordered eating behaviour following surgery (Marino et al., 2012; Segal, Kussunoki & Larino, 2004; Stunkard & Allison, 2003).

Disordered eating behaviours that are commonly described in the literature include emotional eating (Miller-Matero et al., 2014), loss of control eating (whereby

an individual experiences the sense of being unable to stop or control one's eating; Colles, Dixon & O'Brien, 2008), binge eating (Kofman, Weiss & Geliebter, 2007; Niego et al., 2007), night eating syndrome (a time-delayed pattern of food intake outside the natural circadian rhythm; Allison et al., 2006; Colles et al., 2008), grazing (the repetitive eating of small amounts of food in an unplanned manner; Conceição et al., 2014), self-induced vomiting, laxative abuse and dietary restraint (Rusch & Andris, 2007; White, Kalarchian, Masheb, Marcus & Grilo, 2010).

However, the identification of disordered eating symptomatology within weight loss surgery populations is further complicated by the difficulties in distinguishing between routine eating behaviour that is necessitated by the surgery and disordered eating behaviour. For example, patients are instructed to develop patterns of eating behaviour that could be considered as 'ritualistic', such as chewing food extensively (de Zwaan et al., 2010). Moreover, a limited food intake, decreased appetite, nutritional deficits, highly specialised diets and an intense focus on weight management and body image may mimic symptoms that are often associated with disordered eating behaviour. As such, the weight loss surgery sequelae may mask the side effects of disordered eating, making the distinction between routine post-surgical behaviour and disordered eating behaviour unclear.

Nonetheless, psychological interventions utilised for eating disorder populations may also be beneficial for weight loss surgery patients. Growing evidence has demonstrated the importance of self-compassion to effectively target elements of eating disorder presentations, such as shame and self-criticism (Pinto-Gouveia et al., 2012; Braun, Park, & Gorin, 2016), both of which have been identified as important vulnerability and maintenance factors in eating disorder pathology (Braun, Park &

Gorin, 2016; Goss & Allan, 2010; Kelly & Carter, 2012; Kelly Vimalakanthan & Miller, 2014).

Shame has been conceptualised as a self-conscious emotion that often arises in response to negative self-evaluation and a feeling of inadequacy or failure (Burney & Irwin, 2000). Goss and Gilbert (2002) proposed that symptoms such as restrictive eating, bingeing, and purging could be viewed as attempts to regulate underlying feelings of shame. Although these symptoms tend to be effective at reducing shame in the short-term, they tend to prolong and intensify these feelings and contribute to the maintenance of distress (Gilbert, 2005; Goss & Allan, 2009). Research suggests that individuals who are clinically obese disclose high levels of shame (Webb, 2000), that are of similar magnitude to other eating disordered populations (Franks, 2011).

2.1.5 The Role of Self-Compassion

Self-compassion has been suggested as an antidote to shame and self-criticism (Neff, 2003a) and can be protective against disordered eating behaviour (e.g. Pinto-Gouveia et al., 2012). According to Neff (2003a), self-compassion is defined as the process of being open to and moved by one's own suffering, experiencing feelings of caring and kindness towards oneself, taking an understanding, non-judgmental attitude toward one's inadequacies and failures, and recognising that one's experience is part of the common human experience' (Neff, 2003a, p. 224). Higher levels of self-compassion are associated with fewer thinness related pressures (Tylka, Russell & Neal, 2015), more adaptive eating attitudes (Adams & Leary, 2007), reduced body image avoidance (Stapleton & Nikalje, 2013), reduced obligatory exercise (Magnus et al., 2010) and more intuitive eating (Stapleton & Nikalje, 2013). Moreover, evidence has suggested that psychological interventions that aim to induce self-compassion can

reduce distress associated with body dissatisfaction (Albertson, Neff & Dill-Shackleford, 2014; Braun et al., 2016) and lower levels of eating disorder symptomology (Gale, Gilbert, Read & Goss, 2014).

Given these findings, it is reasonable to extend the same principles of self-compassion treatment approaches to weight loss surgery patients who are especially prone to body shame and negative self-evaluation (Burmeister, Hinman & Koball, 2013). It is possible that a brief self-compassion intervention may have a positive impact on some of the psychological risk factors associated with body dissatisfaction and disordered eating in a weight loss surgery population. To the authors' knowledge, no research has yet been undertaken to evaluate the effectiveness of a brief self-compassion intervention within a weight loss surgery population.

2.1.6 Aims of the Present Study

The aims of this research will be:

i) To explore the psychological characteristics of a post-weight loss surgery population, including anxiety, depression, self-esteem, self-concept clarity, disordered eating and body image satisfaction levels.

ii) To explore the relationship of the self-ideal discrepancy on individuals' eating behaviour and body image following weight loss surgery.

iii) To explore the predictors of body image dissatisfaction and disordered eating behaviour post-surgery

iv) To investigate the impact of a brief self-compassion letter writing intervention within a post-weight loss surgery population.

2.1.6 Hypotheses

The specific hypotheses of this research are:

i) The ‘self-ideal discrepancy’, the discrepancy that exists between an individuals’ current and ideal body shape, will be predictive of the level of body dissatisfaction and disordered eating behaviour experienced by patients.

ii) Individuals with a greater self-ideal discrepancy, will experience greater levels of body dissatisfaction and disordered eating behaviour.

iii) Participants who complete the self-compassion letter writing task will experience positive changes in their levels of self-compassion and affect.

2.2 Method

Ethical approval for this study was obtained from the University of Southampton Ethical and Research Governance committee (see Appendix B).

2.2.1 Design

The current study utilised a cross-sectional web-based survey design to explore the sample characteristics, to determine the relationship between self-ideal discrepancies on body dissatisfaction and disordered eating and to examine the predictors of body dissatisfaction and disordered eating within a post-operative weight loss surgery sample. A repeated measures design was also employed to explore the impact of a single experimental self-compassion manipulation task in a sample of post-weight loss surgery patients.

2.2.2 Participants

A priori power calculations were conducted using G*Power. Given the paucity of literature within the field, a medium effect size was deemed as appropriate. Power calculations indicated that a sample size of 74 was required to conduct a multiple regression, with an alpha level of 0.05 based on 14 predictors.

All participants resided within the United Kingdom and had undergone their weight loss surgery at least six months prior to the commencement of the study. Participants were also eligible to participate if they were over eighteen years of age and were fluent in the English language.

A total of 90 participants completed the study. Twenty-five participants (27.8%) declined to participate in the brief self-compassion manipulation task, leaving 65 participants who took part in all aspects of the study (72.2%). To assess for potential

sample bias, differences between participants who completed the brief manipulation task and those who did not were explored using t-tests for continuous variables. There were no significant group differences in the age of participants, $t(88) = 0.80$, $p=0.43$, and type of weight loss surgery procedure $t(88) = -0.62$, $p=0.54$ between the two groups. Pearson's Chi Square tests could not be used to explore group differences in categorical variables due to violation in statistical assumptions.

2.2.3 Measures

As well as the measures outlined below, participants also completed a questionnaire designed for the purposes of this study in order to obtain background information (see Appendix C). This included basic demographic questions (including age, ethnic origin and gender), current and pre-surgery body weight, height, and current and previous physical and mental health status. Participants answered brief questions about their experiences of having weight loss surgery, including details relating to their procedure, their primary motivation for having surgery and any regrets or concerns following surgery (see Appendix D).

Weight and Weight Loss

Participants' weight was expressed through body weight in kilograms and by calculating the BMI of each participant. Weight loss was measured by calculating weight loss in kilograms and total percentage weight loss (%TWL). %TWL was calculated using the equation (Amount of weight lost in kg /Pre-Surgery Weight in kg) x 100.

Disordered Eating

The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 2008)

Participants provided a self-report measure of eating disorder symptomology using the EDE-Q version 6 (see Appendix E). The EDE-Q is a 28-item self-report questionnaire adapted from the Eating Disorder Examination Interview (Fairburn, Cooper & O'Connor, 1993). The EDE-Q is comprised of four subscales: dietary restraint, shape concern, weight concern, eating concern, as well as yielding a global score. Participants rated on how many days in the last month they had experienced a number of eating disorder symptoms (e.g. self-induced vomiting, laxative misuse) using a 5-point Likert scale. The EDE-Q has adequate reliability and validity in community samples (Passi, Bryson & Lock, 2003). A series of Cronbach alpha calculations indicated good to excellent reliability for the EDE-Q in this sample: Restraint α=0.83; Eating Concern α=0.79, Shape Concern α=0.87, Weight Concern α=0.78 and Global Score α=0.93.

The Eating Attitudes Test (EAT-26; Garner, Olmstead, Bohr & Garfinkel, 1982)

The EAT-26 is a 26-item self-report questionnaire that measures disordered eating using three subscales: oral control, dieting and bulimia and food pre-occupation (see Appendix F). Respondents answer statements such as "Am terrified about being overweight" and "Am preoccupied with a desire to be thinner" using a 6-point Likert scale (3 always, 2 usually, 1 often, 0 sometimes, 0 rarely, 0 never). Higher scores indicate greater concerns about body weight, body shape and eating. The EAT-26 is a highly reliable and valid measure for use within both clinical and non-clinical settings (Garner, Olmstead, Bohr & Garfinkel, 1982; Mintz & O'Halloran, 2000). The

Cronbach's alpha calculation for this sample showed EAT-26 questionnaire scores to be acceptable in terms of internal consistency (α=0.72).

Body Dissatisfaction

The Body Uneasiness Test (BUT; Cuzzolara, Vetrone, Marano & Garfinkel, 2006)

The BUT is a 71-item self-report measure that provides assessment of body image attitudes in clinical and non-clinical populations (see Appendix G). The BUT-A scale (34 items) was used in the current study to measure body dissatisfaction. The BUT-A is comprised of five subscales: weight phobia, body-image related avoidance behaviour, body image concerns, compulsive self-monitoring and detachment and estrangement feelings towards one's own body (depersonalisation). Participants respond to each of the statements using a 6-point Likert scale (0 never, 5 always). Respondents rate how dissatisfied they are with each aspect of their bodies using a 6-point Likert scale (0 never, 5 always). The BUT has good psychometric properties, satisfactory internal consistency and significant test-retest reliability (Cuzzolara et al., 2006). A Cronbach's alpha calculation showed the BUT-A to be excellent in terms of internal consistency within the current study (α=0.96).

Self-ideal Body Shape Discrepancy and Weight Loss Expectations

Due to the absence of an existing tool to measure self-ideal body shape discrepancies and weight loss expectations, the present study utilised a combination of two instruments to evaluate these constructs in line with previous research on weight loss surgery populations (Price, Gregory & Twells, 2014).

Stunkard Figure Rating Scale (SFRS, Stunkard, Sorensen, & Schulsinger, 1983)

The SFRS is used to quantitatively assess body shape expectation and the degree and direction of self-ideal body shape discrepancy (see Appendix H). The scale consists of a series of nine gendered silhouettes, ranging in degree from very thin to very overweight (labelled 1-9, with lower numbers reflected smaller silhouettes). Respondents are required to select the silhouette that best indicates both their current body shape and their desired body shape. To measure the degree of participants' self-ideal body shape discrepancy, a discrepancy score was calculated by subtracting their desired shape from their current body shape. The SFRS has been used to evaluate body image in populations of individuals with obesity and individuals who have undergone weight loss surgery (e.g. Munoz et al., 2010; Price, Gregory & Twells, 2014). Despite methodological concerns relating to the use of silhouettes to measure body image (Gardner, Friedman & Jackson, 1998), the SFRS has been psychometrically validated and has good test-retest reliability (Thompson & Altabe, 1991).

Goals and Relative Weights Questionnaire (GRWQ; Foster, Wadden, Vogt & Brewer, 1997)

Participants' post-operative body weight expectations were assessed using the GRWQ (see Appendix I). The GRWQ is a two-part self-report questionnaire. Part I assesses factors such as health, appearance, and social norms that influence selection of a target weight. Part II of the GRWQ requires respondents to numerically define their "dream" weight ("A weight you would choose if you could weigh whatever you wish"), "happy" weight ("A weight that is not as ideal as the first one; it is a weight, however, that you would be happy to achieve"), acceptable weight ('A weight you would not be particularly happy with, but one that you could accept, since it is less than your starting

weight') and disappointed weight ('A weight that is less than your starting weight, but one that you could not view as successful in any way; you would be disappointed if this were your final weight after surgery"). Simple modifications were made to the GRWQ category definitions to place them into the context of weight loss surgery, according to similar studies in the literature (Price, Gregory & Twells, 2014). For the present study, participants were given only part II of the GRWQ.

Self-Compassion

The Self-Compassion Scale (SCS; Neff, 2003b)

The SCS is a 26-item measure that assesses trait levels of self-compassion (see Appendix J). The SCS assesses how often participants respond to feelings of inadequacy or suffering with: self-judgement, self-kindness, common humanity, isolation, over-identification and mindfulness. Respondents respond to statements such as, "I'm kind to myself when I'm experiencing suffering"" using a 5-point Likert scale (1 almost never, 5 almost always*).* The SCS is a theoretically valid measurement of self-compassion and has good psychometric properties (Neff, 2003b). The SCS had good internal consistency in previous trials (Albertson et al., 2015). The Cronbach's alpha calculation for this study showed SCS questionnaire scores to be poor in terms of internal consistency (α=0.5). It was not possible to increase internal consistency for the SCS through item deletion in the present study.

Self-Compassion Analogue Scales

Two visual analogue scales were designed for the purpose of the current study to assess state self-compassion directly before and after completion of the brief manipulation task (see Appendix K). Participants were asked to indicate the extent to which they endorsed the statements "I feel kindness and warmth towards myself right now" and "I feel self-critical and judgemental towards myself right now" using an 11-point scale (0 not at all, 10 extremely).

Affect

The Positive and Negative Affect Scale (PANAS; Watson, Clark, and Tellegen, 1988)

The PANAS is a 20-item scale used to measure both positive and negative affect (see Appendix L). Participants rate the extent to which they feel positive and negative affect (e.g. excited, irritable, nervous etc.) using a 5-point likert scale (1 not at all, 5 very much). Scores are calculated separately for the positive and negative subscales and in each case range from 10-50. The PANAS has been used widely in research with clinical populations and has good psychometric properties, with high reliability and validity (Watson, et al., 1988; Kitsantas, Gilligan & Kamata, 2003). Both scales have good internal consistency (Crawford & Henry, 2000). A Cronbach's alpha calculation showed the PANAS to be excellent in terms of internal consistency for both the Positive (α=0.91) and Negative (α=0.93) scales within the present study.

The Generalised Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams & Lowe, 2006)

The GAD-7 is a 7-item brief self-report outcome measure that provides a valid and efficient tool for screening for generalised anxiety disorder (Löwe et al., 2008; see

Appendix M). Using a 4-point Likert scale (0 not at all, 3 nearly every day), respondents indicate how much they have experienced each symptom over the previous two weeks. The total score can range from 0-21, with higher scores indicating more severe anxiety. A Cronbach's alpha calculation showed the GAD-7 to be excellent in terms of internal consistency within the present study (α=0.91).

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

The PHQ-9 is a nine item brief self-report questionnaire that provides a valid and efficient tool for detecting symptoms of current depression (see Appendix N). Using a 4-point Likert scale (0 not at all, 3 nearly every day), respondents indicate how much they have experienced each symptom over the previous two weeks. The total score can range from 0-27 and cut off scores of 5, 10, 15 and 20 are used to indicate mild, moderate, moderately severe and severe depression respectively. The PHQ-9 is a valid and reliable measure of depression severity (Kroenke et al., 2001). The Cronbach's alpha calculation for this sample showed the PHQ-9 to be good in terms of internal consistency (α=0.88).

Self-Concept Clarity

Self-Concept Clarity Scale (SCCS; Campbell et al., 1996)

The SCCS is a self-report 12-item scale evaluating the temporal stability, consistency and clarity of self-beliefs (see Appendix O). Participants respond to each of the statements (e.g. "In general, I have a clear sense of who I am and what I am") using a 5-point Likert (1 strongly agree, 5 strongly disagree). The State-SCCS has a good internal consistency (α=0.86) and test-retest reliability (*r*=0.79) (Campbell, Assanand, & Paula, 2003). Items 1, 4, 8 and 9 were used from the original trait SCCS

to measure state self-concept clarity, in line with previous research (Nezlek & Plesko, 2001). Cronbach's alpha was computed for the scale in the current research, which showed good internal consistency (α=0.82).

Self-Esteem

The Rosenberg Self-Esteem Scale (RSES; Rosenberg 1965)

The widely used ten-item RSES was used to measure trait self-esteem (see Appendix P). Participants respond to positively worded items, such as "I take a positive attitude toward myself" and negatively worded items which are reversed scored such as "At times I think I am no good at all" using a 4-point Likert scale (strongly disagree to strongly agree). Total scores range from 0-30, with higher total scores indicating higher trait self-esteem. A Cronbach's alpha calculation showed RSES questionnaire scores to be excellent in terms of internal consistency (α=0.95) in the present study.

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

The 20-item SSES questionnaire was used to measure state self-esteem (see Appendix Q). The SSES is comprised of three subscales: performance self-esteem, social self-esteem and appearance self-esteem. Using a 5-point Likert scale (1 not at all, 5 extremely), respondents indicate how much each item represents their current feelings about themselves. Higher scores indicate strong feelings of confidence regarding skills in each of the subscales, whereas lower scores indicate feelings of deficiency (Heatherton & Polivy, 1991). The SSES has excellent reliability and validity (Heatherton & Polivy, 1991). The Cronbach's alpha calculation for this study showed SSES scores to be excellent in terms of internal consistency (α=0.95).

2.2.4 Self-Compassion Letter Writing Task

The letter writing task utilised instructions based on previous studies of self-compassion from Neff (2011) and Shapira and Mongrain (2010).The first written prompt invited participants to think of a recent experience when they felt distressed, ashamed or disgusted by a certain aspect of their appearance. To promote a compassionate mindset, participants were then invited to write a letter to themselves from the perspective of an unconditionally loving friend. Accompanying instructions were provided in order to assist participants in generating statements of self-kindness and common humanity as well as incorporating aspects of mindfulness. Participants were encouraged to spend up to 10 minutes on the task.

2.2.5 Procedure

Participants were notified about the study through featured posts on a number of online weight loss surgery support platforms (Appendix R). Interested volunteers then followed a link to an online portal that provided detailed information about the study in written form (Appendix S). All participants were provided with the direct contact details of the research team should they have had any further queries regarding their involvement with the study. Participants were reminded that they could withdraw from the study at any time without any given reason. In order to facilitate this, participants were asked to generate an individualised participant code. Following this, participants gave informed consent to take part in the study (Appendix T).

Eligibility was determined by a series of screening questions. Those who were not eligible to participate were re-directed to the debriefing statement and were not prompted to complete any further questionnaires. Participants who met the eligibility criteria were then directed to complete the full battery of questionnaires.

After completing the questionnaires, participants were invited to complete a brief self-compassion letter writing task (Appendix U). Immediately after completing the task, ratings of self-compassion, using the visual analogue scales, and affect were re-assessed. Participants were then directed to the debriefing statement (see Appendix V) and provided with the opportunity to enter a free prize draw.

In order to assist participants to manage any distress that they may have experienced through taking part in the study, participants were provided with details to make telephone contact with a member of the research team. Participants were also provided with the contact details of further sources of support if they wished to discuss any reactions or concerns they had about the impact of the study.

Table 4.

Participant Characteristics (n=90)

	Mean (*SD*) or Count (%)
Age (years)	40 (11.2)
Gender Identity	
Female	85 (94.4%)
Male	5 (5.6%)
Ethnic Origin	
White or White British	83 (92.2%)
Black or Black British	2 (2.2%)
Asian or Asian British	1 (1.1%)
Mixed Background	3 (3.3%)

Other Ethnic Background	1 (1.1%)
Type of Weight Loss Surgery Procedure	
Roux-en-Y Gastric Bypass	51 (56.7%)
Sleeve Gastrectomy	24 (26.7%)
Gastric banding	10 (11.1%)
Mini Gastric Bypass	4 (4.4%)
Duodenal Switch	1 (1.1%)
Time Since Surgery	
6-12 months	26 (28.9%)
12-18 months	15 (16.7%)
18-24 months	6 (6.7%)
2-3 years	11 (12.2%)
3-4 years	12 (13.3%)
4-5 years	5 (5.6%)
More than 5 years	15 (16.7%)
Current Weight (kg)	89.5 (19.6)
Current BMI (kg/m^2)	32.4 (6.2)
Pre-Surgical Weight (kg)	136.8 (24.5)
Pre-Surgical BMI (kg/m^2)	49.6 (7.95)
Percentage Weight Loss (%TWL)	33.9 (12.6)

2.3 Results

2.3.1 Data Analysis

Statistical analyses were conducted using SPSS version 25.0. The background information questionnaire was summarised using descriptive statistics. Univariate regression analyses were conducted to test the association between the self-ideal discrepancy and disordered eating and body dissatisfaction. Correlational analyses were conducted to test the association between the post-operative variables and measures of disordered eating and body dissatisfaction to determine which measures would be entered in the multivariate analyses. Multiple regression analyses were conducted to determine the predictive ability of post-operative variables on body dissatisfaction and disordered eating. The standardized beta coefficients are reported to compare the strength of the effect of each individual independent variable to the dependent variable and to compare the relative importance of each variable in the regression model.

One way repeated measures analyses of variance (ANOVA) were performed to assess differences in ratings of self- compassion and affect before and after completion of a brief self-compassion manipulation task. The independent variable of time had two levels (pre- and post-manipulation task). The dependent variables were self-compassion and affect.

2.3.2 Characteristics of a Post-Operative Weight Loss Surgery Sample

Demographic Information

The majority of participants were female (*n*=85, 94.4%), with an average age of 40 years (*SD* =11.2 years). Key demographic information including weight and BMI history of all participants are summarised in Table 4.

Surgery Related Factors

The majority of participants had undergone the Roux-en-Y Gastric Bypass procedure (*n*=51; 56.7%), on average, 6-12 months prior to study commencement. The mean length of time between participants deciding to have weight loss surgery and undergoing the surgical procedure was 17.8 months (*SD* =17.3).

Fifty-two (57.8%) participants self-funded their weight loss surgery procedure, whereas 38 (42.2%) participants had their procedure funded by the NHS. Eighty four participants (93.3%) had their surgery in the United Kingdom, whereas six participants had their procedure undertaken in various locations around Europe, including Czech Republic, Lithuania, Belgium and Poland (6.7%). The majority of the sample had only undergone one WLS procedure (*n*=85, 94.4%). Twenty seven participants experienced complications during surgery (30%). Eleven participants reported having undergone reconstructive surgery since having WLS (12.2%), and a further 51 participants indicated that they would consider having reconstructive surgery in the near future (56.7%).

The majority of participants (*n*=56) cited physical health issues as their primary motivation for undergoing weight loss surgery (62.2%), followed by psychological health (7.8%) and to increase life expectancy (7.8%). Nine participants had fallen pregnant since their weight loss surgery (10%). No participants were pregnant at the time of study commencement. Since having weight loss surgery, sixty participants (66.6%) reported their surgery as having an impact on at least one area of functioning. These most commonly reported were changes in spending habits, relationships and employment.

Physical Health

The majority of participants (*n*=63, 70%) reported suffering from at least one physical health condition prior to having weight loss surgery. These most commonly reported were difficulties in walking, musculoskeletal problems and polycystic ovaries syndrome.

Weight and Weight Loss

Mean pre-operative weight and BMI, post-operative weight and BMI and percentage weight loss (%TWL) are shown in Table 4. Participants mean weight in kilograms pre-operatively compared to post-operatively, resulted in a mean weight loss of 47.3 kilograms (*SD* =22). This equates to participants losing, on average 33.9% of their body weight following surgery (*M*= 33.9, *SD* =12.6). BMI data indicated that 13 participants were now a healthy weight (BMI 18.5-24.9), 16 were overweight (BMI 25-29.9), 30 were in obesity category I (BMI 30-34.9), 23 were in obesity category II (BMI 35-39.9) and eight were still in obesity category III (BMI ≥40). All participants had a lower weight and BMI compared to their pre-surgical weight.

There was a significant difference in the amount of weight lost (in kg) across the different types of weight loss procedures as determined by one-way ANOVA ($F(3, 86) = 5.12$, $p=.003$). A Tukey post hoc revealed that weight loss (in kg) was significantly lower for the gastric banding procedure (23.62 ± 11.98 kg) compared to the gastric sleeve (47.88 ± 16.48kg) and roux-en-y gastric bypass procedure (51.29 ± 23.13kg). There was no significant difference between the gastric sleeve and roux-en-y gastric bypass procedures ($p=.908$). Within the current sample, individuals who had their surgery funded by the NHS lost significantly more weight (in kg) (52.64 ± 23kg)

compared to individuals who self-funded their surgery (40.53 ± 18.4kg), $t(37) = -2.65$, $p=.009$.

2.3.3 Psychological *Functioning*

Overview

Descriptive statistics for participants' psychological characteristics are shown in Table 5. Out of the full sample, 88 participants elected to answer optional questions surrounding their mental health status (97.8%). Thirty-seven participants (41.1%) reported themselves as having experienced psychological difficulties that had been diagnosed by a doctor prior to having surgery, whereas 18 participants (20%) reported having experienced psychological difficulties diagnosed by a doctor since having surgery. Only 48.9% of these participants reported themselves as having any formal support for these psychological difficulties. The main forms of support were described as talking therapies and psychotropic medication. Thirty-seven participants (41.1%) reported having contact with a psychologist during their weight loss surgery journey, which was mainly in the capacity of undertaking a pre-surgical assessment.

Table 5.

Mean and Standard Deviation Scores for Participant Psychological Characteristics (n=90)

	Mean (*SD*)
BUT-A	
Global Severity Index	3.32 (0.99)
Weight Phobia	4.00 (1.04)
Body Image Concern	3.89 (1.30)
Avoidance	2.71 (1.22)
Compulsive Self-Monitoring	2.61 (0.96)
Depersonalisation	2.69 (1.18)
EAT-26	
Total Score	19.39 (9.39)
Bulimia and Food Preoccupation	4.06 (3.59)
Dieting	11.6 (5.53)
Oral Control	3.72 (3.15)
Rosenberg Self-Esteem Scale	13.99 (7.13)
State Self Esteem Scale	54.41 (17.89)
Self-Compassion Scale	68.17 (11.08)
Self-Concept Clarity Scale	14.01 (4.44)
PANAS	
Positive Affect	21.79 (7.79)
Negative Affect	23.23 (10.39)
GAD-7	11.1 (5.96)
PHQ-9	12.03 (6.68)

Anxiety and Depression

Out of the total sample (*n*=90), 56 participants met the criteria for clinically significant symptoms of depression (62.2%; Kroenke et al., 2001) and 49 met the criteria for clinically significant symptoms of anxiety (54.4%; Spitzer et al., 2006).

Disordered Eating

Forty-five participants scored above the cut off of 20 on the EAT-26 (50%) to indicate a high level of concern about dieting, body weight or problematic eating behaviours**.** On the subscale scores of the EDE-Q subscale scores, the clinical cut-off is indicated by a score of ≥ 4 (Luce, Crowther & Pole, 2008). Fifty-three participants (58.8%) scored in the clinical range on any one of the EDE-Q subscales. In the current sample, the mean scores on the Global, Eating Concern, Shape Concern and Weight Concern were greater than one standard deviation of the normal population (Fairburn and Beglin, 1994; see Table 6), which suggests that the current sample generally expressed more disordered eating compared to the general population.

Table 6.

Mean scores on EDE-Q subscales in the current sample compared to Fairburn and Beglin's (1994) community norms

EDE-Q Subscale	Mean (*SD*) current sample (*n*=90)	Mean (*SD*) Fairburn & Beglin (1994) norms (*n*=243)
Global	3.03 (1.36)	1.55 (1.21)
Restraint	2.15 (1.78)	1.25 (1.32)
Eating Concern	1.97 (1.57)	0.62 (0.86)
Shape Concern	4.17 (1.54)	2.15 (1.60)
Weight Concern	3.85 (1.56)	1.59 (1.37)

Self- Ideal Discrepancy

The current sample perceived their mean current body shape as 6.1 ± 1.66 silhouettes, whereas their mean ideal body size was rated as 3.73 ± 1.26 silhouettes**.** On average, participants had a self-ideal body shape discrepancy of 2.34 ± 1.3 silhouettes, indicating discrepancy between their self-perceived current body image and the image of their ideal body.

Weight Loss Expectations

Participants reported a mean expected weight loss of 55.21kg (*SD*=20.52) as a result of their weight loss surgery. On average participants reported their "dream weight" (67.4± 9.56kg) as being just under half of their pre-operative weight (136.8 ± 24.5kg). Participants reported their "happy weight" as 75.2 ± 11.34kg, their "acceptable weight" as 80.5 ± 13.92kg and their "disappointed weight" as 92.8 ± 18.95kg.

2.3.4 Exploring the Relationship of the Self-Ideal Discrepancy and Body Dissatisfaction

Preliminary Analysis

The scatterplot of standardised predicted values verses standardised residuals, showed that the data met the assumptions of homogeneity of variance and the residuals were approximately normally distributed. The scatterplot of the Centred Leverage Values and the standardised residuals, showed that there were three observations with standardised residuals outside ±1.96 but there were no extreme outliers with standardised residuals outside ±3. Data indicated that two observations had large overall leverage, whereas two observations had large Cook's D scores. As such, these data points were removed to ensure that these outliers did not influence the regression (Tbachnick, Fidell & Osterlind, 2001).

Univariate Regression Analysis: Exploring the Relationship of the Self-Ideal Discrepancy and Body Dissatisfaction

The scatterplot showed that there was a positive linear relationship between the two variables, which was confirmed with a Pearson's correlation coefficient of 0.22 (p<.001). A univariate regression analysis explored the relationship between self-ideal discrepancy scores and body dissatisfaction (see Table 7.). The model showed that the relationship between the self-ideal discrepancy and body dissatisfaction was significant (p=.049). The slope coefficient was 0.18 so as self-ideal discrepancy scores increase by one, the model predicts that body dissatisfaction scores will increase by 0.18. The R^2 value was 0.45 so 45% of the variation in body dissatisfaction can be explained by the model containing only the self-ideal discrepancy.

Table 7.

Univariate Regression Analysis for Self-Ideal Discrepancy and Body Dissatisfaction

	B	*SE* B	*β*	*t*	*p*
Constant	2.90	0.23		12.63	.001
Self-Ideal Discrepancy	0.18	0.09	0.21	2.00	.049

2.3.5 Exploring the Relationship of the Self-Ideal Discrepancy and Disordered Eating

Preliminary Analysis

The scatterplot of standardised predicted values verses standardised residuals, showed that the data met the assumptions of homogeneity of variance and the residuals were approximately normally distributed. The scatterplot of the Centred Leverage Values and the standardised residuals, showed that there were four observations with standardised residuals outside ±1.96 but there are no extreme outliers with standardised residuals outside ±3. Data indicated that two observations had large overall leverage, whereas three observations had large Cook's D scores. As such, these data points were excluded from the model to ensure that these outliers did not influence the regression (Tbachnick, Fidell & Osterlind, 2001).

Univariate Regression Analysis: Exploring the Relationship of the Self-Ideal Discrepancy and Disordered Eating

The scatterplot showed that there was a positive linear relationship between the two variables, which was confirmed with a Pearson's correlation coefficient of 0.34

(p<.001). A univariate regression analysis explored the relationship between self-ideal discrepancy scores and disordered eating (see Table 8.). The model showed that the relationship between the self-ideal discrepancy and disordered eating was significant (p<.001). The slope coefficient was 0.47 so as self-ideal discrepancy scores increase by one, the model predicts that disordered eating scores will increase by 0.47. The R^2 value was 0.17 so 17% of the variation in disordered eating can be explained by the model containing only the self-ideal discrepancy.

Table 8.

Univariate Regression Analysis for Self-Ideal Discrepancy and Disordered Eating

	B	*SE* B	*β*	*t*	*p*
Constant	1.89	0.29		6.50	.001
Self-Ideal Discrepancy	0.47	0.11	0.41	4.11	.001

Table 9.

Pearson Correlation Matrix of the Post-Operative Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. EDEQ: Global		**.81****	**.89****	**.92****	**.67****	**.57****	**.60****	**.32****	**.66****	**.67****	**.55****	**.51****	**.62****	**-.67****	**-.53****	.18	**.63****	**.61****	**-.46****	**.68****	.01	**.34****	**.72****	**-.32****	**-.22***
2. EDEQ: Eating Concern			**0.68****	**.68****	**.60****	**.48****	**.66****	.19	**.55****	**.53****	**.50****	**.41****	**.62****	**-.60***	**-.45***	.14	**.59****	**.59****	**-.42****	**.60****	.24	.08	**.62****	**-.24***	-.19
3. EDEQ: Shape Concern				**.86****	**.49****	**.42****	**.45****	**.21***	**.68****	**.73****	**.60****	**.48****	**.59****	**.69****	**.54****	**.23***	**.62****	**.60****	**.44****	**.64****	.11	**.38****	**.75****	.17	.17
4. EDEQ: Weight Concern					**.56****	**.50****	**.53****	.19	**.66****	**.66****	**.52****	**.50****	**.57****	**.64****	**.48****	.12	**.54****	**.57****	**.44****	**.62****	.13	**.42****	**.70****	**.33****	**.31****
5. EAT-26: Total Score						**.89****	**.69****	**.64****	**.44****	**.47****	**.45****	**.35****	**.55****	**-.52****	**-.40****	**.24***	**.57****	**.43****	**-.34****	**.56****	.03	**.21***	**.53****	**-.28****	-.20
6. EAT-26: Dieting							**.43****	**.41***	**.36****	**.39****	**.31****	**.28****	**.41****	**-.45****	**-.33****	.16	**.48****	**.32****	**-.28****	**.45****	.05	**.26***	**.42****	**-.21***	-.00
7. EAT-26: Bulimia								.16	**.39****	**.42****	**.45****	**.35****	**.57****	**-.45****	**-.32****	.13	**.42****	**.43****	**-.34****	**.48****	.04	.09	**.51****	-.16	.19
8. EAT-26: Oral Control									**.22****	**.24***	**.27****	.14	**.28***	**-.25***	**-.24***	**.29****	**.36****	**.23***	-.13	**.32****	.04	.07	**.28****	**-.26***	.16
9. BUT: Weight Phobia										**.78****	**.62****	**.64****	**.56****	**-.69****	**-.55****	**.43****	**.59****	**.60****	**.48****	**.58****	.03	**.23***	**.86****	**.41****	-.16
10. BUT: Body Image Concern											**.80****	**.48****	**.68****	**-.80****	**-.67****	**.28****	**.59****	**.65****	**.55****	**.63****	.16	**.32****	**.92****	**.63****	-.19
11. BUT: Avoidance												**.48****	**.75****	**-.73****	**-.66****	**.28****	**.63****	**.67****	**.51****	**.64****	.09	.15	**.87****	**.63****	-.10
12. BUT: Compulsive Self-Monitoring													**.65****	**-.54****	**-.49****	**.47****	**-.49****	**.50****	**.35****	**.53****	.09	.00	**.71****	**.21***	-.08
13. BUT: Depersonalisation														**-.68****	**-.56****	**.35****	**-.56****	**.62****	**.48****	**.67****	.05	**.10**	**.84****	**.40****	-.18
14. State Self-Esteem															**.89****	**.36****	**-.74****	**-.71****	**.74****	**.71****	-.17	.20	**-.83****	**.63****	.17
15. Trait Self-Esteem																**.41****	**-.69***	**-.69****	**.73****	**.65****	**.21***	.19	**-.70****	**.66****	.04

16. Self- Concept Clarity	**.38****	**.27***	**.26***	**.26***	.13	.02	**.40****	**.21***	.11
17. Anxiety		**.81****	**-.54****	**.81****	.05	.14	**.72****	**-.41****	-.07
18. Depression			**-.61****	**.74****	.13	.16	**.72****	**-.42****	-.14
19. PANAS: Positive Affect				**-.43****	.12	-.14	**-.55****	**.50****	-.13
20. PANAS: Negative Affect					.06	-.18	**.63****	**-.46****	-.14
21. Weight Loss Expectation						**.35****	.58	.16	.13
22. Self-Ideal Discrepancy							**.22***	.11	**-.23***
23. BUT Global Severity								**-.57****	-.18
24. Self-Compassion									-.05
25. %TWL									

**p* < .05

***p*<.001

2.3.6 Multiple Regression: Analytic Strategy

Method of Multiple Regression

The appropriateness of each method of multiple regression were considered. As there was no theoretical basis for which order the predictors should be entered into the model, all predictors were entered simultaneously using the standard forced entry method. In forced entry regressions, each predictor variable is evaluated based on its own unique contribution (Tabachnick & Fidell, 2007).

Selecting the Predictor Variables

There was no previous published research reporting predictors of body dissatisfaction or disordered eating that could have been used to inform the decision for the analyses carried out in this study. However, Tabachnick & Fidell (2007) recommends selecting the fewest predictor variables necessary where each should predict a substantial and independent portion of the outcome.

Pearson correlation co-efficient analyses were conducted in order to establish which variables significantly correlated with body dissatisfaction as measured by the BUT Global Score and disordered eating as measured by the EDE-Q Global Score (see Table 9.). Predictors that were at least moderately correlated (r>0.5) with the dependent variables were considered for inclusion within the model.

The predictor variables that met inclusion for the multiple regression analysis exploring Body Dissatisfaction were Eating Disorder Symptomology, Eating Concern, Shape Concern, Weight Concern, Bulimia, Eating Disorder Concerns, Trait Self-Esteem, State Self-Esteem, Depression, Anxiety and Negative Affect. The predictor variables that met inclusion for the multiple regression analysis exploring Disordered

Eating were Body Dissatisfaction, Weight Phobia, Body Image Concern, Avoidance, Compulsive Self-Monitoring, Depersonalisation, State Self-Esteem, Trait Self-Esteem, Anxiety, Depression and Negative Affect.

Preliminary Analysis

The standardised residuals for both body dissatisfaction and disordered eating scores showed that the assumptions of homoscedasticity and linearity were met. The distribution of the standardised residuals were approximately normally distributed. The Durbin-Watson statistic showed that the assumption of independent errors was met and that adjacent residuals were unrelated (Field, 2009).

Multi-collinearity was examined between potential predictors using Pearson correlation coefficient analyses. According to Field (2013), elimination of independent variables with a correlation co-efficient of 0.8 and above should be considered. Anxiety, State Self-Esteem, Eating Disorder Symptomology, Weight Concern were therefore excluded from the analysis exploring Body Dissatisfaction. Anxiety, Body Dissatisfaction and State Self Esteem were therefore excluded from the analysis exploring Disordered Eating.

The Variance Inflation Factor (VIF) and tolerance statistics can provide further assessment of the presence of multi-collinearity. It has been suggested that VIF statistics greater than 10 (Bowerman, & O'Connell, 1990; Menard, 1995) and tolerance statistics below 0.2, are indicative of multi-collinearity. Although all of the VIF statistics were smaller than 10, tolerance statistics >0.2 for predictor variables within the current dataset indicated that the assumption of multi-collinearity was violated. The presence of multi-collinearity has serious implications on findings; the effects between variables cannot be separated and extrapolation beyond the current sample is likely to

be seriously erroneous due to the likelihood of change in collinearity patterns (Meloun, Mulitký, Hill & Brereton, 2002). The presence of multi-collinearity will therefore be considered in the discussion.

2.3.7 Multiple Regression Analysis Exploring the Predictors of Body Dissatisfaction

The results for the multiple regression analysis are summarised in Table 10. The model accounted for 75% (R^2 = .75) of the variance in body dissatisfaction. This was a significant contribution to the variance (F=28.1 p <.0001). The only variables in the model which significantly predicted variance in body dissatisfaction were Trait Self Esteem (t=-3.1, p = .002) and Shape Concern (t=2.6, p = .01).

Table 10.

Summary of Multiple Regression Analysis Exploring the Relationship between Predictor Variables and Body Dissatisfaction.

	B	*SE* B	*β*	*t*	*p*
Negative Affect	2.07	0.36	0.11	1.07	0.29
Trait Self-Esteem	-0.04	0.01	-0.26	-3.14	0.00**
Depression	0.03	0.02	0.18	1.87	0.07
Bulimia	0.03	0.02	0.11	1.26	0.21
EAT-26 Total Score	0.00	0.01	0.04	0.50	0.65
Eating Concern	-0.02	0.06	-0.03	-0.27	0.80
Shape Concern	0.21	0.08	0.32	2.64	0.01*
Weight Concern	0.04	0.08	0.06	0.48	0.64
Trait Self Esteem	0.02	0.03	0.09	0.64	0.52

*p<0.05

**p<0.001

As Trait Self-Esteem and Shape Concern were the only significant and independent predictors of body dissatisfaction, a further regression analysis was conducted, using the forced entry method, to explore the contribution Trait Self Esteem and Shape Concern in predicting body dissatisfaction. The model predicts that an increase in 1 unit of Trait Self Esteem, would result in a decrease in body dissatisfaction scores of -0.06. For Shape Concern, an increase in 1 unit would result in an increase in body dissatisfaction scores by 0.33. The R2 value was 0.68 so 68% of the variation in disordered n can be explained by the model which was statistically significant $F(2, 89) = 92.8$, $p<.0001$. See Table 11.

Table 11.

Multiple Regression Analysis for Trait Self Esteem, Shape Concern and Body Dissatisfaction

	B	*SE* B	*β*	*t*	*p*
Constant	2.74	0.30		0.08	.000
Trait Self-Esteem	-0.06	0.01	-0.42	-5.84	.000
Shape Concern	0.33	0.05	0.52	7.18	.000

2.3.8 Multiple Regression Analysis Exploring the Predictors of Disordered Eating

The results for the multiple regression analysis, using the forced entry method, are summarised in Table 12. The model accounted for 61.1% (R2 = .61) of the variance in Disordered Eating. This was a significant contribution to the variance (F= 13.97 p <.0001). The only variables in the model which significantly predicted variance in

disordered eating were Negative Affect (t = 2.7, p = .01) and Weight Phobia (t = 1.96, p = .05).

Table 12.

Summary of Multiple Regression Analysis Exploring the Relationship between Predictor Variables and Disordered Eating

	B	*SE* B	*β*	*t*	*p*
Negative Affect	0.04	0.02	0.33	2.7	0.01*
Weight Phobia	0.34	0.18	0.26	1.96	0.05*
Body Image Concerns	0.25	0.16	0.24	1.55	0.12
Avoidance	-0.23	0.15	-0.21	-1.5	0.14
Compulsive Self-Monitoring	-0.04	0.16	-0.03	-0.24	0.81
Depersonalisation	0.26	0.15	0.23	1.71	0.09
Positive Affect	-0.01	0.02	-0.08	-0.72	0.47
Depression	0.02	0.03	0.08	0.61	0.54
Trait Self Esteem	0.02	0.03	0.09	0.64	0.52

*p<0.05

As Negative Affect and Weight Phobia were the only significant and independent predictors of disordered eating, a further regression analysis was conducted, using the forced entry method, to explore the contribution Negative Affect and Weight Phobia in predicting disordered eating. The model predicts that an increase in 1 unit of Negative Affect, would result in an additional increase in 0.06 in disordered earing scores. For Weight Phobia, an increase in 1 unit would result in an increase in disordered eating scores by 0.53. The R^2 value was 0.56 so 56.6% of the variation in disordered eating can be explained by the model which was statistically significant F (2, 89) = 56.83, p<.0001. See Table 13.

Table 13.

Multiple Regression Analysis for Negative Affect, Weight Phobia and Disordered Eating

	B	*SE* B	*β*	*t*	*p*
Constant	-.430	0.38		-1.13	.263
Negative Affect	0.06	0.01	0.44	5.10	.001**
Weight Phobia	0.53	0.11	0.41	4.68	.001**

**p<0.001

2.3.9 Examining the Impact of a Self-Compassion Letter Writing Task

Preliminary Analysis

All data were assessed for outliers and normality through observations of boxplots, histograms and calculating *Z* scores for skewness and kurtosis. Upon visual examination of the boxplots and histograms, data for Time 2 Negative Affect were considered to violate the assumption of normality and was considered to be positively skewed. Moreover, a Kolmogorov-Smirnov test confirmed that the assumption of normality was violated $D(64) = .13$, p=.01. Potential outliers were identified and examined on an individual basis. Tabachnick & Fidell (2007) recommend that cases with standardised scores in excess of 3.29 should be treated as potential outliers. As the standardised *Z* score of these data points did not exceed the value of 3.29, data were not deemed as potential outliers and it was not deemed necessary to transform the data (Taachnick & Fidell, 2007).

One Way Repeated Measures Analysis of Variance (ANOVA): Examining the Impact of a Brief Self-Compassion Manipulation on Self-Compassion and Affect

One way repeated measures ANOVAs were performed to assess whether ratings of self-compassion and affect differed significantly before and after completing a brief self-compassion manipulation task. The means and standard deviations for participants' self-compassion and affect ratings for both time 1 and time 2 are presented in Table 14.

There were significant differences between participants' levels of kindness and warmth (self-compassion) $F(1, 63) = 14.53$, $p < .0001$, $\eta 2 = .19$ and participants' level of self-criticism and judgement (self-compassion) between the two time points $F(1, 63) = 32$, $p < .0001$, $\eta 2 = .34$. There were significant differences in participant ratings of positive affect $F(1, 63) = .52.3$, $p < .0001$, $\eta 2 = .45$ and negative affect $F(1, 63) = 19.19$, $p = .672$, $p < .0001$, $\eta 2 = .23$ between the two time points.

The mean and standard deviation scores displayed in Table 14. illustrate that participants' ratings of kindness and warmth towards themselves (self-compassion) and positive affect increased from time 1 to time 2, whereas participants' ratings of self-criticism and judgement (self-compassion) towards themselves and negative affect decreased from time 1 to time 2.

Table 14.

Mean and Standard Deviation Scores for the Participant Ratings of Self-Compassion and Affect

Measure	Time 1 Mean (*SD*)	Time 2 Mean (*SD*)
Self-Compassion: "I feel kindness and warmth towards myself right now" (0-10)	4.74 (3.12)	5.6 (2.8)
Self-Compassion: "I feel self-critical and judgemental towards myself right now" (0-10)	7.33 (3.01)	6 (2.8)
PANAS: Positive Affect	21.79 (7.79)	25.78 (9.12)
PANAS: Negative Affect	23.23 (10.39)	21.4 (9.93)

2.4 Discussion

2.4.1 Overview

The current study aimed to explore the psychological characteristics of a U.K. sample of patients who had undergone weight loss surgery, since there is a lack of consensus surrounding the psychological profile of the post-weight loss surgery population. The study also explored the predictors of body image dissatisfaction and disordered eating behaviour post-surgery and examined to what extent self-ideal discrepancies were predictive of these variables. The study also investigated the impact of a brief letter-writing intervention on levels of self-compassion and affect.

2.4.2 Sample Characteristics

The sample in the current study was predominantly female (94.4%), white British (92.2%) with a mean age of 40 years (*SD*= 11.2) who had undergone weight loss surgery at six to twelve months ago (28.9%). Demographic characteristics of the current sample, as well as pre-surgical BMI data, was largely consistent from that obtained from a wider U.K. weight loss surgery population (Douglas et al., 2015). As such, it could be argued that the results obtained from the current sample may be representative of individuals undergoing weight loss surgery nationally. However, type of surgical procedure was largely inconsistent, with a greater percentage of gastric bypass procedures and fewer gastric band procedures within the current study.

Participants who underwent gastric bypass and gastric sleeve procedures lost significantly more weight than those who had gastric band procedures. Individuals who had their weight loss surgery funded by the NHS lost significantly more weight than those who self-funded. However, this may simply be reflective of the fact that 70% of

these procedures funded by the NHS were gastric bypass which necessitates quicker weight loss compared with other procedures. The majority of participants within the sample cited concerns about physical health as their primary motivation for undergoing weight loss surgery, which is in line with previous research conducted by Libeton, Dixon, Laurie & O'Brien (2004). However, unlike Libeton and colleagues (2004) who found that 32% of their sample cited physical appearance as their main motivation for surgical treatment, only 3% of participants did so in the current sample.

2.4.3 Psychological Functioning

Weight loss surgery is an effective intervention in the morbidly obese, helping them to achieve marked weight loss and improve physical comorbidities, yet the evidence regarding the post-operative psychological outcomes remains inconclusive. There was a high prevalence of psychological difficulties within the current sample. In nearly two-thirds of the sample there was evidence of a probable depressive disorder and over half of the participants met the threshold for having a probable anxiety disorder. Overall, the respondents reported higher levels of anxiety and depression than the general population (Kocalevent, Hinz & Brähler, 2013; Löwe et al., 2008) and other post-operative weight loss surgery populations (De Zwaan et al., 2014). Moreover, participants experienced low levels of self-esteem, which appeared to be lower than those reported in other weight loss surgery samples (Dymek, Le Grange, Neven, Alverdy, 2012). However, as this latter clinical sample comprised of solely individuals who received the gastric bypass procedure, this comparison is offered more tentatively.

It is possible that patients hold pre-operative expectations that weight loss surgery will undoubtedly improve their life, which may have a negative impact upon psychological functioning if these expectations are not met (Bocchieri, Meana & Fisher,

2002). Moreover, given the self-selecting nature of participants within the current sample, their elevated levels of psychological distress may be more reflective of an enduring psychological vulnerability that may have contributed to their weight management difficulties.

The reflections on psychological distress are constrained by the current study design which did not seek to make pre- and post-operative comparisons. The potential impact of weight loss surgery on psychological functioning could only be achieved by a longitudinal study design in which surgery could be investigated as the potential mediating factor. However, given that over 40% of the sample reported themselves as having psychological difficulties prior to surgery, it seems likely that for many participants, these difficulties pre-existed their surgery. Although pre-operative anxiety and depression can predict distress two to three years post-operatively (de Zwaan et al., 2011), it is not possible to comment on whether the severity of these difficulties in the current sample had reduced or worsened post-operatively.

2.4.4 Weight Loss and Weight Loss Expectations

In the current study, participants lost 47.3 kg on average, which equated to approximately a third of their body weight. Van de Laar and Acherman (2015) recommend that a 25% loss in initial body weight is considered a successful WLS outcome. In the current study, the sample exceeded this criterion, achieving an average of 33.9% loss in initial body weight. However, due to the cross-sectional design of the study, it is not possible to determine the long-term impact of the surgery upon weight loss outcomes.

Patients expected to lose as much as 55.21 kg on average (49.6%TWL of weight) as a result of their weight loss surgery and would be disappointed if they had only achieved a weight loss of 43.74kg (31.3%TWL). On average participants reported

their “dream weight” as being just under half of their pre-operative weight. The findings in the current study are consistent with previous research that highlights the unrealistic expectations of weight loss held by patients following weight loss surgery (e.g. Kaly et al., 2008; Wee et al., 2006).

2.4.5 Self-Ideal Discrepancy

On average, participants had a self-ideal body shape discrepancy of 2.34 ± 1.3 silhouettes, indicating discrepancy between their self-perceived current body image and the image of their ideal body. Compared to community samples, participants within the current study reported a greater self-ideal body discrepancy (1.2 ± 1.4 silhouettes; Fitzgibbon, Blackman & Avellone, 2000). As hypothesised, as self-ideal discrepancies increased, so did levels of body dissatisfaction and disordered eating behaviour. The self-ideal discrepancy observed in the current study was similar to those reported post-operatively by Munoz and colleagues (2010). Moreover, the self-ideal discrepancy was a significant predictor of both body dissatisfaction and disordered eating in the current study. This finding is consistent with research conducted by Williamson and colleagues who found an association between greater self-ideal body shape discrepancies and increased body image dissatisfaction (Williamson, Gleaves, Watkins & Schlundt, 1993).

The emphasis on thinness as the most desirable state within Western culture (Bemporad, 1996), along with surgically-induced rapid weight loss experienced by patients, may lead individuals to idealize and endorse increasingly thinner body shape expectations. It is possible that individuals may experience increased feelings of dissatisfaction towards their body when their expectations of ideal body shape are not met (Higgins, 1987). Subsequently, individuals may adopt disordered eating behaviour as a compensatory strategy to minimise the discrepancy between their current and ideal

body shapes (Deitel & Shikora, 2002; Vartanian, 2012). This finding holds important implications for post-operative outcomes since discrepancies may have a negative impact upon adherence to post-surgical dietary guidelines and subsequent weight outcomes.

2.4.6 Body Image Dissatisfaction

Participants reported high levels of body image dissatisfaction in the current study. Mean scores were higher compared to non-clinical populations, and were comparative to those found in eating disorder populations (Cuzzolara, Vetrone, Manaro & Garfinkel, 2006). Although weight loss surgery is commonly associated with improvements to body image, much of the literature appears to neglect a significant and potentially detrimental post-surgical outcome - the presence of excessive skin (Sarwer et al., 2008). It has been suggested that the 'curious omission' (Smith & Farrants, 2012) of the experience of excess skin in the literature may be due the tendency for research into weight loss surgery to ignore negative outcomes (Boccheieri et al., 2002).

Body image dissatisfaction due to increased flaccid soft tissue, such as abdominal skin overhang and pendulous breasts, has been reported in up to 70% of patients following surgery (Kinzl, Traweger, Trefait & Biebl, 2003). Excess skin may not only limit physical and social activities, create hygiene problems, potentiate skin infections, adversely affect self-esteem, mood and body image (Kinzl et al., 2003), but also compromise intimate relationships (Highton, Ekwobi & Rose, 2012). As such, the presence of excess soft tissue following surgery may undermine the benefits of surgery, such as body image satisfaction in the months and years post-surgery (Hafner, Watts & Rogers, 1991; Kinzl et al., 2003). This appears to be reflected in the finding that shape concern, rather than weight concern, was a significant predictor of body image dissatisfaction, which may be caused by residual skin difficulties. Interestingly, 69% of

the current sample either had reconstructive surgery or were planning to undergo surgery in the near future, which may further support this explanation.

Trait self-esteem was also a significant predictor of body image dissatisfaction within the current sample. Drawing on Higgins (1987) self-discrepancy theory, it is possible that a discrepancy between an individuals' actual body shape and a socially idealised body shape underpins negative emotions such as guilt and shame, and lower self-esteem (Higgins, 1987). Individuals who perceive their bodies as discrepant from the socially desired thin ideals experience increased body-related shame ("I am a bad person because I am obese"), which appears to have a negative impact upon self-esteem (Pila et al., 2015) and body image satisfaction. Evidence suggests that weight stigma and culturally-induced shame (Shure & Weinstock, 2009) remain internalised even after individuals have lost weight and are no longer classified as 'obese'. (Annis, Cash, Hrabosky, 2004). Thus, people may continue to experience negative self-esteem and body image dissatisfaction regardless of their weight status. Moreover, the presence of excess skin may mean that individuals continue to perceive themselves as discrepant from societal ideals, which may further perpetuate individuals' distress. To date, the role of shame has not been systematically examined in post-weight loss surgery populations. Although the current study did not investigate the role of shame due to the lack of a validated measure, it would be prudent for future research to investigate the mediating role of shame in self-esteem and body image dissatisfaction in this clinical group.

2.4.7 Disordered Eating Behaviour

Participants reported high levels of disordered eating behaviour in the current study. Mean scores were greater than one standard deviation of non-clinical populations (Fairburn and Beglin; 1994) but within one standard deviation of an eating disordered

population (Aardoom, Dingemans, Op't Landt & Van Further, 2012). However, 50% of the current sample exhibited symptomatology that placed them "at risk" of having an eating disorder (Garner, Olmstead, Bohr & Garfinkel, 1982). Explanations for these findings may be drawn from the literature, which suggests that rapid weight loss and dietary restraint experienced following weight loss surgery may trigger, or lead to the development of disordered eating (Conceição et al., 2013; Conceição et al., 2015). However, distinguishing between thoughts and behaviours related to disordered eating, and changes in eating patterns that are a consequence of the surgery is complex. Significantly reduced portion sizes, the weighing out of food, strict control over calorie intake and an intense focus on weight management may be necessary adjustments to post-surgical life but may mimic or mask disordered eating behaviour. Weight loss, if viewed in isolation of disordered eating behaviour, may be interpreted as being highly successful by healthcare professionals. Consequently, there is a risk that disordered eating behaviours may be inadvertently overlooked and reinforced within this population.

Negative affect and weight phobia were significant predictors of disordered eating within the current sample. Since weight is meticulously monitored by professionals at regular intervals and is used as a key outcome measure of surgery, Atchinson and colleagues (1998) assert that it is unsurprising that individuals with a psychological vulnerability may become preoccupied with concerns surrounding weight (Atchison et al., 1998). Moreover, fear of gaining weight is probably quite realistic in this population, who are likely to have a history of dieting and weight loss, characterised by multiple experiences of losing large amounts of weight and then regaining it (Conceição et al., 2015).

Due to the absence of pre-operative data within the current study, it is not possible to comment upon the impact of surgery on disordered eating behaviour. However, such behaviour is commonly observed both before and after weight loss surgery (Mitchell et al., 2015). Dahl and colleagues (2010) suggest that approximately 32.5% of individuals seeking weight loss surgery present with an eating disorder. However, it is unclear whether these behaviours had abated or worsened following surgery. Further research that utilises a longitudinal design is needed to investigate the impact of surgery on eating behaviour throughout the weight loss surgery trajectory.

2.4.8 The Impact of a Brief Self-Compassion Letter Writing Task

As hypothesised, the results from the current study suggests that engaging in a brief self-compassion letter writing exercise has a positive impact on self-compassion and affect in a post-weight loss surgery population. Engagement in the task was associated with an increase in positive affect, as well as a decrease in negative affect. This finding may be particularly pertinent, given the elevated levels of psychological distress and low levels of self-compassion documented within the current sample.

The letter-writing intervention did not explicitly prompt people to change the content of their thoughts relating to their bodies, rather it focused on the way people related to these thoughts (Leary, Tate, Adams, Batts Allen & Hancock., 2007). Participants were prompted to extend kindness towards themselves, as if they were a loving friend, which aimed to help participants elicit a warm understanding and acceptance towards their distress. Further prompts encouraged participants to adopt a mindful perspective, which may have helped participants to approach their bodies in a non-judgemental and balanced approach, so that perceived flaws were neither suppressed nor exaggerated. Finally, the sense of common humanity in self-compassion

may have helped to remind participants of the imperfect nature of the human condition, which may have provided participants with a safe context for to consider the less positive aspects of the self (Breines & Chen, 2012).

Although self-compassion is unlikely to get rid of self-critical thoughts, by having a positive impact upon levels of self-compassion and affect, self-compassion may lessen the negative impact of these thoughts. It may have been useful to directly assess the impact of the intervention on body dissatisfaction through the use of a state measure of body dissatisfaction. However, in the context of the current study this could have been excessive, given that participants had already completed the BUT as a trait measure, as part of an extensive battery of questionnaires. Moreover, there are no measures of state body dissatisfaction that have been validated on a weight loss surgery population.

It should be noted that 27.8% of participants declined to participate in the self-compassion letter-writing exercise, which places the acceptability of this type of intervention into question. Qualitative feedback from those who declined to engage, suggests that these participants may have experienced difficulties generating alternatives to their self-critical thoughts particularly after completing measures that direct participants to focus on their relationship to their bodies and eating behaviours. Examples include “I have no positive thoughts about myself…my own self beliefs/doubts are so ingrained that there is nothing anyone could say to alter my perception of self” and “I'm not sure I can say anything positive right now. This questionnaire has highlighted my failings and I'm unable to pretend I'm a caring understanding friend to myself in this moment.”. Given the self-selecting nature of the sample, it is possible that a self-selection bias may have significantly impacted the findings. It is possible that participants who did not complete the intervention may have

significantly differed on a number of psychological variables, such as disordered eating, body image dissatisfaction, self-esteem and affect, compared to individuals who completed the intervention. However, such group differences were not analysed within the current study.

Compassion can give rise to avoidance or even fear reactions in some individuals (Gilbert, 2010) and fears, blocks and resistance to compassion are a common barrier in clinical practice, especially for people with high shame and self-criticism (Lee, 2005). Within face to face delivered compassion-focused interventions, the compassion of the therapist and compassion-focused exercises can help to support the client to overcome such barriers to compassion (Gilbert & Irons, 2005). Future consideration should be placed on how to provide guidance through online compassion-focused interventions, such as the use of video excerpts to guide participants through the exercise.

Given the potential benefits of self-compassion cited within the literature, it is particularly promising that a relatively brief and accessible intervention can demonstrate clear benefits on outcomes of self-compassion and affect. There has been no research to date that has examined the effectiveness of a self-compassion intervention within a weight loss surgery population. It is therefore prudent for future research to further investigate the use of such interventions within this population using methodological rigour, such as through the use of an active control group and long-term follow up.

2.4.9 Limitations of the Study

Caution must be exercised when generalising the results of this study to other populations due to the presence of multi-collinearity within the data set. The presence of multi-collinearity has serious implications on findings; the effects between variables cannot be separated and extrapolation beyond the current sample is likely to be seriously erroneous due to the likelihood of change in collinearity patterns (Meloun et al. 2002).

The study obtained data from post-operative weight loss surgery patients exclusively. Although beyond the scope of this research, the use of a longitudinal design may lead to a more comprehensive understanding of the impact of weight loss surgery on psychological variables and how these change throughout the surgery sequelae. It would also be worthwhile for future research to compare the experiences of those who have body image dissatisfaction and disordered eating behaviours against those who have not, in order to assist in the identification of protective factors.

Measures used within the current study were self-report and were not diagnostic instruments and therefore, the prevalence of psychological problems post-surgery cannot be estimated. The self-report nature of this research may have led to vulnerability for socially desirable responses or the over reporting of symptoms from participants (Luppino et al., 2010). Although attempts to minimise this risk were made by emphasising participants' anonymity in the study, this may still have impacted on the validity of the findings. Moreover, research has suggested that individuals often underestimate their weight when self-reporting (Engstrom, Paterson, Dohert, Trabulsi & Speer, 2003). As such, weight loss expectations and the discrepancy between ideal and current body shapes documented in the current study may be even more disparate than originally thought.

Although the silhouette scales are a useful instrument to investigate the presence of self-ideal discrepancies following weight loss surgery, there has been documented concerns regarding the reliability of using silhouette scales within obese populations. The BMIs of individuals who are obese can often surpass the maximum estimated BMI of the last figure of the SFRS, which can undermine the reliability of such results for this population (Bertoletti, Aparicio, Bordignon & Trentini, 2018). Given the lack of psychometric evaluation of measures for post-weight loss surgery populations, the validity of the measures used within this study should be brought into question. For example, findings from Parker, Mitchell, O'Brien & Brennan (2015) suggests that the EDE-Q may have limited validity for use within a post-weight loss surgery population. Moreover, caution should be exercised when interpreting findings due to the possible conceptual overlap between the constructs measured, such as the EDE-Q Weight Concern subscale and BUT Weight Phobia subscale. Future research should seek to disentangle the extent to which conceptual overlap exists between the measures employed in this study. More importantly, future research is desperately needed in order develop new and robust assessment tools in order to accurately identify and manage the psychological needs of this population.

The current study failed to take into account whether or not participants had engaged in previous therapy, which may have impacted upon participants' ability to engage in the self-compassion letter writing task. Moreover, participants completed the letter writing task at their own pace. This is problematic as some participants may have spent more time engaged in this task than others. Although there is potential to improve this aspect of the research by specifying the amount of time that participants can spend, it is possible that this would compromise the authenticity of the intervention and would not be reflective of how this intervention would be used in clinical practice. Moreover,

by asking respondents to complete the questionnaires immediately after completing the letter writing task, only the immediate effects of the intervention were captured. Participants in the current study were clearly aware that they were doing something positive for themselves and as such, may have responded in accordance with this. As such, it is possible that the observed effect is due to an expectancy bias.

2.4.10 Clinical Implications

The present study has enhanced research in this area through the use of a relatively large U.K. sample to help identify a psychological profile of weight loss surgery patients, including the predictors of body image dissatisfaction and disordered eating in order to inform effective psychological interventions and improve post-operative outcomes. It has also highlighted the use of self-compassion as a relatively quick and easy means of increasing self-compassion within this sample, which may have potential protective benefits from body image dissatisfaction and disordered eating behaviour. It is hoped that this research will be the first in a series of studies investigating the effectiveness of self-compassion interventions within weight loss surgery populations. At present, post-operative psychological interventions are not routinely offered to weight loss surgery patients in the U.K. However, the current study highlights a number of important psychological factors that need to be addressed through psychologically informed interventions in order to improve outcomes following weight loss surgery.

This study highlights the need for diligence from professionals when identifying and assessing disordered eating behaviours post-surgery, which can be masked by eating behaviours necessitated by surgery. It is argued that if weight loss is viewed in isolation of disordered eating behaviour, there is potential for professionals to reinforce disordered eating patterns. Moreover, it is of utmost importance that weight loss and

body shape expectations are assessed and monitored throughout the weight loss surgery trajectory, given the importance of these factors in maintaining the self-ideal discrepancy and predicting levels of body image dissatisfaction and disordered eating behaviour. By increasing patients' awareness of the unintended consequences of upholding such high expectations and increasing understanding surrounding the residual difficulties that may exist post-surgery, such as excess skin, patient satisfaction and outcomes may well improve.

2.4.11 Conclusions

Whilst acknowledging the limitations of this research, the present study has highlighted the presence of elevated levels of psychological distress, body image dissatisfaction and disordered eating behaviour and low levels of self-esteem in the weight loss surgery population, especially compared with the general population. Participants held unrealistic weight loss expectations following surgery and substantial discrepancies existed between individuals' current and ideal body shapes, which were predictive of body image dissatisfaction and disordered eating behaviour. Trait self-esteem and shape concern were found to significantly predict body image dissatisfaction, whereas weight phobia and negative affect were predictive of disordered eating behaviour. The present study found that a brief self-compassion letter writing task led to improvements in affect and self-compassion. As such, future research should seek to investigate the protective effect of self-compassion against body dissatisfaction and disordered eating behaviour within this sample. Moreover, future research is also needed to develop robust assessment tools in order to help develop a more comprehensive psychological profile of weight loss surgery patients in order to inform and guide effective psychological interventions.

Appendix A: Measures Used in Studies Included in the Literature Review

Title of Measure	Abbreviation	Description	Reference
Binge Eating Scale	BES	The BES is a 16-item self-report measure designed specifically for use with individuals with obesity that assesses binge eating behaviours (such as objective amount of food consumed) and associated cognitions and emotions (such as shame and guilt).	Gormally, Black, Daston & Rardin (1982)
The Dietary-Adherence Intake and Eating Test	DIET	The DIET is a 13-item self-report measure that assesses both dietary adherence and related maladaptive eating patterns found to be associated with suboptimal weight loss outcomes such as grazing, mindless eating, emotional eating and eating till plate is clean.	Darcy, Adler, Miner & Lock (2014)
The Eating Disorder Diagnostic Scale	EDDS	The EDDS is a 22 item self-report questionnaire that assesses the presence of three eating disorders; anorexia nervosa, bulimia nervosa and binge eating disorder according to DSM-IV criteria.	Stice, Telch & Rizvi (2000)
Eating Disorder Examination - Questionnaire	EDE-Q	The EDE-Q is a 28-item self-report measure of eating disorder symptomology adapted from the Eating Disorder Examination Interview. Participants report on the frequency of weight concerns, shape concerns, eating concerns and dietary restraint over the past month.	Fairburn & Beglin (1994)

Emotional Eating Scale	EES	The EES is a 25-item self-report measure that assesses the tendency to cope with painful emotions by eating. The EES is comprised of three subscales: eating in response to anger, anxiety, and depression.	Arnow, Kenardy & Agras (1995)
Eating Inventory (also known as the Three-Factor Eating Questionnaire)	EI	The EI is a 51-item self-report questionnaire that assesses dimensions of human eating behavior, such as cognitive restraint, disinhibition and reactivity to internal and external cues.	Stunkard & Messick (1985)
Emotional Overeating Questionnaire	EOQ	The EOQ a 9-item self-report measure scale that assesses the tendency to overeat over the past month in response to nine different emotions (e.g. anxiety, happiness, sadness).	Masheb & Grilo (2006)
The Binge Eating Questionnaire for Bariatric Surgery Patients	SBEQ	The SBEQ is a self-report measure used to assess subjective binge eating for the prior 28 days in weight loss surgery patients. The SBEQ features a specific focus on grazing and loss of control eating.	Ghaderi & Weineland (2010)
The Three Factor Eating Questionnaire Revised-18	TFEQ-R18	The TFEQ-R18 is an 18-item self-report measure of eating behaviours that is comprised of three subscales: cognitive restraint, uncontrolled eating and emotional eating.	Karlsson, Persson, Sjöström, & Sullivan (2000)

Appendix B: Ethical Approval

Appendix C: Demographics Questionnaire

1. How old are you?

…… years

2. To which gender identity do you most identify with? (please tick)

☐ Male

☐ Female

☐ Transgender Male

☐ Transgender Female

☐ Gender Variant/ Non-conforming

☐ Not listed. Please specify:

☐ Prefer not to say

3. Which of these options describes your ethnic origin? (please tick)

☐ White (British/Irish/Any other White background)

☐ Asian or Asian British (Indian/Pakistan/Bangladeshi/Any other Asian background)

☐ Black or Black British (Caribbean/African/Any other Black background)

☐ Mixed (White and Asian/White and Caribbean/White and Black African/Any other mixed background)

☐ Other ethnic group (Chinese/Any other ethnic group)

☐ Prefer not to say

Appendix D: Experiences of Weight Loss Surgery Questionnaire

4. What type of weight loss surgery did you have? (please tick)

☐ Roux-en-Y gastric bypass

☐ Sleeve gastrectomy

☐ Gastric banding

☐ Gastric balloon

☐ Other: (please state):

…….....

5. Have you undergone more than one weight loss surgery procedure in the past? (please tick)

☐ Yes

☐ No

If no, please provide details of previous procedures:

……...

6. How was your weight loss procedure funded? (please tick)

☐ Self-funded

☐ NHS funded

☐ Other: Please state:……...

7. Which country was your weight loss surgery procedure completed in? (please tick)

☐ United Kingdom

☐ Other: (please state):…….

8. When did you have your weight loss surgery? (please tick)

☐ 0-6 months

☐ 6-12 months ago

☐ 12-18 months ago

☐ 18-24 months ago

☐ 2-3 years ago

☐ 3-4 years

☐ 4-5 years ago

☐ More than five years ago

9. What was your approximate weight on the day you had your weight loss surgery?

10. What is your current weight?

11. How much weight did you expect to lose as a result of having weight loss surgery? (please specify kg or stones)

12. Since having your weight loss surgery, how often do you weigh yourself on average? (please tick)

- ☐ More than once a day
- ☐ Once a day
- ☐ Once a week
- ☐ Every fortnight
- ☐ Once a month
- ☐ Less often than once a month

13. Are all of your family members/friends/significant others aware that you have had weight loss surgery?

- ☐ Yes
- ☐ No

If no, please describe why you have chosen not to tell all of your family and friends about your surgery:

……...

14. Did you suffer from any of the medical conditions before your weight loss surgery? (please tick all that apply)

- ☐ Difficulties breathing
- ☐ Difficulties walking or running
- ☐ Musculoskeletal problems (i.e. pains in the knees or back)
- ☐ Cardiovascular disease (i.e. heart problems)
- ☐ Diabetes
- ☐ Osteoarthritis
- ☐ Stroke

☐ High cholesterol

☐ High blood pressure

☐ Gallstones

☐ Polycystic Ovaries Syndrome

☐ Skin problems

15. Did you experience any complications during or after your weight loss surgery? (please tick)

☐ No

☐ Yes

If yes, please describe your difficulties:

……...

16. What was your primary motivation for having weight loss surgery?

17. Since having your weight loss surgery, have you had any reconstructive surgery completed (i.e. tummy tuck) (please tick)

☐ No - I have no plans to have any reconstructive surgery in the near future.

☐ No - I am seeking to have reconstructive surgery in the near future.

☐ Yes

If yes, which procedures have you had completed?

.....

18. Since having weight loss surgery, have you fallen pregnant? (please tick)

☐ No

☐ Yes

19. Are you currently pregnant? (please tick)

☐ No

☐ Yes

If yes, how many weeks pregnant are you?

.....

20. What was the length of time between deciding to have weight loss surgery and undergoing the surgery?

21. Have you had any contact with a psychologist during your weight loss surgery journey?

☐ No

☐ Yes

If yes, please describe the nature of this contact and whether this was pre- or post-weight loss surgery:

……..

22. Please indicate whether you have experienced any changes related to the following since having weight loss surgery?

	Yes	No
Work	☐	☐
Spending habits	☐	☐
Relationships with partner, family or children	☐	☐
School/College/University	☐	☐
Legal problems	☐	☐
Alcohol use	☐	☐
Substance use	☐	☐

Please describe in a sentence any items you responded yes:

……

Follow up Questions

Please note that the following questions are optional. Please click to skip if you do not wish to answer.

1. **Have you ever experienced any psychological difficulties that have been diagnosed by a doctor prior to having weight loss surgery?**

☐ No

☐ Yes

If yes, please state the nature of your difficulties:……

2. Have you experienced any psychological difficulties that have been diagnosed by a doctor after having weight loss surgery?

☐ No

☐ Yes

If yes, please state the nature of your difficulties:……

3. Have you had any contact with mental health services within the past 5 years?

☐ N/A

☐ No

☐ Yes

If yes, please state the nature of the contact:……

4. Have you received any formal support for your psychological condition?

☐ N/A

☐ No

☐ Yes

If yes, what types of support have you received (i.e. GP, antidepressant medication, counselling, talking therapies):…….

Appendix E: The Eating Examination Questionnaire (EDE-Q)

Instructions: The following questions are concerned with the past four weeks (28 days) only. Please read each question carefully. Please answer all of the questions. Please only choose one answer for each question. Thank you.

Questions 1 to 12: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days) only.

	On how many of the past 28 days	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
1	Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
2	Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?	0	1	2	3	4	5	6
3	Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
4	Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
5	Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?	0	1	2	3	4	5	6
6	Have you had a definite desire to have a totally flat stomach?	0	1	2	3	4	5	6
7	Has thinking about food, eating or calories made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
8	Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
9	Have you had a definite fear of losing control over eating?	0	1	2	3	4	5	6
10	Have you had a definite fear that you might gain weight?	0	1	2	3	4	5	6
11	Have you felt fat?	0	1	2	3	4	5	6
12	Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

Questions 13-18: Please fill in the appropriate number in the boxes on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past four weeks (28 days).....

13	Over the past 28 days, how many times have you eaten what other people would regard as an unusually large amount of food (given the circumstances)?	.....
14	....On how many of these times did you have a sense of having lost control over your eating (at the time that you were eating)?	.....
15	Over the past 28 days, on how many **DAYS** have such episodes of overeating occurred (i.e. you have eaten an unusually large amount of food and have had a sense of loss of control at the time)?	.....
16	Over the past 28 days, how many times have you made yourself sick (vomit) as a means of controlling your shape or weight?	.....
17	Over the past 28 days, how many times have you taken laxatives as a means of controlling your shape or weight?	.....
18	Over the past 28 days, how many times have you exercised in a "driven" or "compulsive" way as a means of controlling your weight, shape or amount of fat or to burn off calories?	.....

Questions 19-21: Please circle the appropriate number. Please note that for these questions the term "binge eating" means eating what others would regard as an unusually large amount of food for the circumstances, accompanied by a sense of having lost control over eating.

19	Over the past 28 days, on how many days have you eaten in secret (ie, furtively)?.....Do not count episodes of binge eating	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
		0	1	2	3	4	5	6
20	On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effect on your shape or weight? .....Do not count episodes of binge eating	None of the times	A few of the times	Less than half	Half of the times	More than half	Most of the time	Every time
		0	1	2	3	4	5	6
21	Over the past 28 days, how concerned have you been about other people seeing you eat? .....Do not count episodes of binge eating	Not at all		Slightly	Moderately			Markedly
		0	1	2	3	4	5	6

Questions 22-28: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days)

	On how many of the past 28 days	Not at all		Slightly		Moderately		Markedly
22	Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
23	Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
24	How much would it have upset you if you had been asked to weigh yourself once a week (no more, or less, often) for the next four weeks?	0	1	2	3	4	5	6
25	How dissatisfied have you been with your weight?	0	1	2	3	4	5	6
26	How dissatisfied have you been with your shape?	0	1	2	3	4	5	6
27	How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?	0	1	2	3	4	5	6
28	How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?	0	1	2	3	4	5	6

Appendix F: The Eating Attitudes Test (EAT-26)

Check a response for each of the following statements.

		Always	Usually	Often	Some times	Rarely	Never
1.	Am terrified about being overweight.	□	□	□	□	□	□
2.	Avoid eating when I am hungry.	□	□	□	□	□	□
3.	Find myself preoccupied with food.	□	□	□	□	□	□
4.	Have gone on eating binges where I feel that I may not be able to stop.	□	□	□	□	□	□
5.	Cut my food into small pieces.	□	□	□	□	□	□
6.	Aware of the calorie content of foods that I eat.	□	□	□	□	□	□
7.	Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)	□	□	□	□	□	□
8.	Feel that others would prefer if I ate more.	□	□	□	□	□	□
9.	Vomit after I have eaten.	□	□	□	□	□	□
10.	Feel extremely guilty after eating.	□	□	□	□	□	□
11.	Am preoccupied with a desire to be thinner.	□	□	□	□	□	□
12.	Think about burning up calories when I exercise.	□	□	□	□	□	□
13.	Other people think that I am too thin.	□	□	□	□	□	□
14.	Am preoccupied with the thought of having fat on my body.	□	□	□	□	□	□
15.	Take longer than others to eat my meals.	□	□	□	□	□	□
16.	Avoid foods with sugar in them.	□	□	□	□	□	□
17.	Eat diet foods.	□	□	□	□	□	□
18.	Feel that food controls my life.	□	□	□	□	□	□
19.	Display self-control around food.	□	□	□	□	□	□
20.	Feel that others pressure me to eat.	□	□	□	□	□	□
21.	Give too much time and thought to food.	□	□	□	□	□	□
22.	Feel uncomfortable after eating sweets.	□	□	□	□	□	□
23.	Engage in dieting behavior.	□	□	□	□	□	□
24.	Like my stomach to be empty.	□	□	□	□	□	□
25.	Have the impulse to vomit after meals.	□	□	□	□	□	□
26.	Enjoy trying new rich foods.	□	□	□	□	□	□

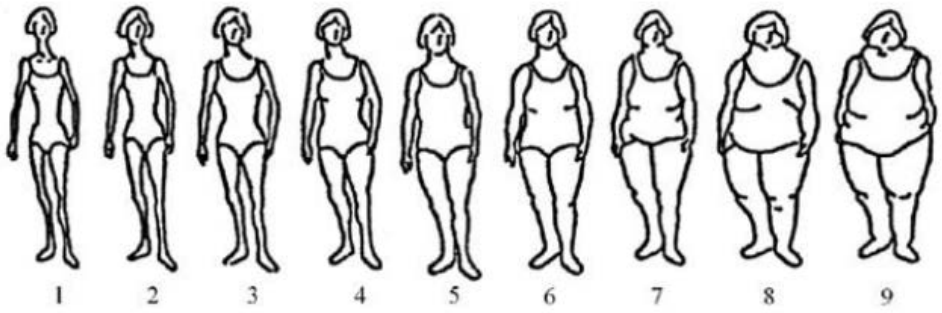
Appendix G: Body Uneasiness Test (BUT)

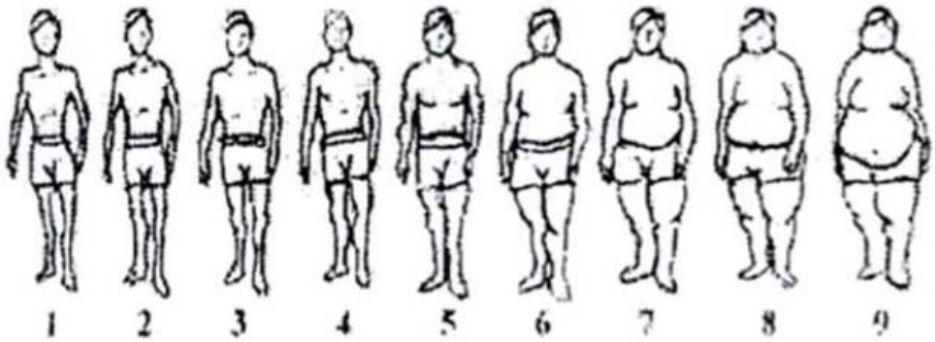
BUT•A

Mark with an X the answer which best expresses your experience at the moment

	never	seldom	sometimes	often	very often	always
1 I spend a lot of time in front of the mirror	0	1	2	3	4	5
2 I don't trust my appearance: I'm afraid it will change suddenly	0	1	2	3	4	5
3 I like those clothes which hide my body	0	1	2	3	4	5
4 I spend a lot of time thinking about some defects of my physical appearance	0	1	2	3	4	5
5 When I undress, I avoid looking at myself	0	1	2	3	4	5
6 I think my life would change significantly if I could correct some of my aesthetic defects	0	1	2	3	4	5
7 Eating with others causes me anxiety	0	1	2	3	4	5
8 The thought of some defects of my body torments me so much that it prevents me being with others	0	1	2	3	4	5
9 I'm terrified of putting on weight	0	1	2	3	4	5
10 I make detailed comparisons between my appearance and that of others	0	1	2	3	4	5
11 If I begin to look at myself, I find it difficult to stop	0	1	2	3	4	5
12 I would do anything to change some parts of my body	0	1	2	3	4	5
13 I stay at home and avoid others seeing me	0	1	2	3	4	5
14 I am ashamed of the physical needs of my body	0	1	2	3	4	5
15 I feel I am laughed at because of my appearance	0	1	2	3	4	5
16 The thought of some defects of my body torments me so much that it prevents me studying or working	0	1	2	3	4	5
17 I look in the mirror for an image of myself which satisfies me and I continue to search until I am sure I have found it	0	1	2	3	4	5
18 I feel I am fatter than others tell me	0	1	2	3	4	5
19 I avoid mirrors	0	1	2	3	4	5
20 I have the impression that my image is always different	0	1	2	3	4	5
21 I would like to have a thin and bony body	0	1	2	3	4	5
22 I am dissatisfied with my appearance	0	1	2	3	4	5
23 My physical appearance is dissappointing compared to my ideal image	0	1	2	3	4	5
24 I would like to undergo plastic surgery	0	1	2	3	4	5
25 I can't stand the idea of living with the appearance I have	0	1	2	3	4	5
26 I look at myself in the mirror and have a sensation of uneasiness and strangeness	0	1	2	3	4	5
27 I am afraid that my body will change against my will, in a way I don't like	0	1	2	3	4	5
28 I feel detached from my body	0	1	2	3	4	5
29 I have the sensation that my body does not belong to me	0	1	2	3	4	5
30 The thought of some defects of my body torments me so much that it prevents me having a sexual life	0	1	2	3	4	5
31 I observe myself in what I do and ask myself how I seem to others	0	1	2	3	4	5
32 I would like to decide what appearance to have	0	1	2	3	4	5
33 I feel different to how others see me	0	1	2	3	4	5
34 I am ashamed of my body	0	1	2	3	4	5

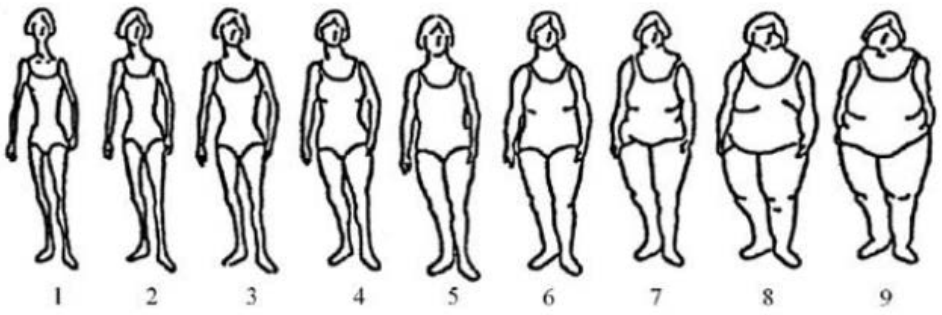
Appendix H: Stunkard Figure Rating Scale (SFRS)

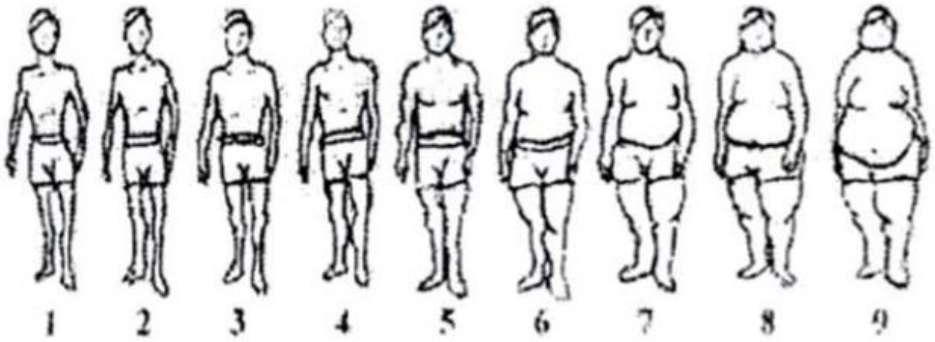




Step 1: Look at the pictures above and try to choose the picture that most closely resembles **your body shape right now.**

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10





Step 2: Look at the pictures above and try to choose the picture that most closely resembles your **ideal** body shape.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

Appendix I: Goals and Relative Weights Questionnaire (GRWQ)

Please indicate what your **acceptable** weight would be (a weight you would not be particularly happy with, but one that you could accept, since it is less than your starting weight)?

KG

Stones and pounds

Please indicate what your **disappointing** weight would be (a weight that is less than your starting weight, but one that you could not view as successful in any way; you would be disappointed if this were your final weight after surgery)?

KG

Stones and pounds

Please indicate what your **dream** weight would be (a weight you would choose if you could weigh whatever you wish)?

KG

Stones and pounds

Please indicate what your **happy** weight would be (a weight that is not as ideal as the first one; it is a weight, however, that you would be happy to achieve)?

KG

Stones and pounds

Appendix J: Self-Compassion Scale (SCS)

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never				Almost always
1	2	3	4	5

_____ 1. I'm disapproving and judgmental about my own flaws and inadequacies.

_____ 2. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

_____ 3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.

_____ 4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.

_____ 5. I try to be loving towards myself when I'm feeling emotional pain.

_____ 6. When I fail at something important to me I become consumed by feelings of inadequacy.

_____ 7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.

_____ 8. When times are really difficult, I tend to be tough on myself.

_____ 9. When something upsets me I try to keep my emotions in balance.

_____ 10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

_____ 11. I'm intolerant and impatient towards those aspects of my personality I don't like.

_____ 12. When I'm going through a very hard time, I give myself the caring and tenderness I need.

_____ 13. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

_____ 14. When something painful happens I try to take a balanced view of the situation.

_____ 15. I try to see my failings as part of the human condition.

_____ 16. When I see aspects of myself that I don't like, I get down on myself.

_____ 17. When I fail at something important to me I try to keep things in perspective.

_____ 18. When I'm really struggling, I tend to feel like other people must be having an easier time of it.

_____ 19. I'm kind to myself when I'm experiencing suffering.

_____ 20. When something upsets me I get carried away with my feelings.

_____ 21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.

_____ 22. When I'm feeling down I try to approach my feelings with curiosity and openness.

_____ 23. I'm tolerant of my own flaws and inadequacies.

_____ 24. When something painful happens I tend to blow the incident out of proportion.

_____ 25. When I fail at something that's important to me, I tend to feel alone in my failure.

_____ 26. I try to be understanding and patient towards those aspects of my personality I don't like.

Appendix K: Self-Compassion Analogue Scales

Please read each statement and indicate to what extent you feel this way RIGHT NOW using the rating scale below.

0 = Not at all

10 = Extremely

I feel kindness and warmth towards myself right now.

0
1
2
3
4
5
6
7
8
9
10

I feel self-critical and judgemental towards myself right now.

0

1

2

3

4

5

6

7

8

9

10

Appendix L: Positive and Negative Affect Scale (PANAS)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate number next to that word. Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale provided to record your answers.

1 = very slightly or not at all
2 = a little
3 = moderately
4 = quite a bit
5 = extremely

1. Interested	1	2	3	4	5
2. Disinterested	1	2	3	4	5
3. Excited	1	2	3	4	5
4. Upset	1	2	3	4	5
5. Strong	1	2	3	4	5
6. Guilty	1	2	3	4	5
7. Scared	1	2	3	4	5
8. Hostile	1	2	3	4	5
9. Enthusiastic	1	2	3	4	5
10. Proud	1	2	3	4	5
11. Irritable	1	2	3	4	5
12. Alert	1	2	3	4	5
13. Ashamed	1	2	3	4	5
14. Inspired	1	2	3	4	5
15. Nervous	1	2	3	4	5
16. Determined	1	2	3	4	5
17. Attentive	1	2	3	4	5
18. Jittery	1	2	3	4	5
19. Active	1	2	3	4	5
20. Afraid	1	2	3	4	5

Appendix M: The Generalised Anxiety Disorder-7 (GAD-7)

Over the last 2 weeks, how often have you been bothered by the following problems? *(Use "✔" to indicate your answer"*	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 N: The Patient Health Questionnaire-9 (PHQ-9)

	Not at all	Several days	More than half the days	Nearly every day
1. Over the *last 2 weeks*, how often have you been bothered by any of the following problems?				
a. Little interest or pleasure in doing things	☐	☐	☐	☐
b. Feeling down, depressed, or hopeless	☐	☐	☐	☐
c. Trouble falling/staying asleep, sleeping too much	☐	☐	☐	☐
d. Feeling tired or having little energy	☐	☐	☐	☐
e. Poor appetite or overeating	☐	☐	☐	☐
f. Feeling bad about yourself or that you are a failure or have let yourself or your family down	☐	☐	☐	☐
g. Trouble concentrating on things, such as reading the newspaper or watching television.	☐	☐	☐	☐
h. 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.	☐	☐	☐	☐
i. Thoughts that you would be better off dead or of hurting yourself in some way.	☐	☐	☐	☐

Appendix O: Self Concept Clarity Scale (SCCS)

For each of the following statements, please indicate the extent to which the statement applied to you RIGHT NOW. Use the scale provided.

1. **My beliefs about myself often conflict with one another.**

1----------2----------3----------4----------5
Strongly Disagree — Strongly Agree

2. **My beliefs about myself seem to change very frequently.**

1----------2----------3----------4----------5
Strongly Disagree — Strongly Agree

3. **If I were asked to describe my personality, my description might end up being different from one day to another day.**

1----------2----------3----------4----------5
Strongly Disagree — Strongly Agree

4. **Sometimes I feel that I am not really the person that I appear to be.**

1----------2----------3----------4----------5
Strongly Disagree — Strongly Agree

Appendix P: Rosenberg Self Esteem Scale (RSES)

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

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

Appendix Q: State Self Esteem Scale (SSES)

This is a questionnaire designed to measure what you are thinking at this moment. There is of course, no right answer for any statement. The best answer is what you feel is true of yourself at the moment. Be sure to answer all of the items, even if you are not certain of the best answer.

Again, answer these questions as they are true for you **RIGHT NOW.**

1. I feel confident about my abilities.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

2. I am worried about whether I am regarded as a success or failure.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

3. I feel satisfied with the way my body looks right now.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

4. I feel frustrated or rattled about my performance.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

5. I feel that I am having trouble understanding things that I read.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

6. I feel that others respect and admire me.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

7. I am dissatisfied with my weight.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

8. I feel self-conscious.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

9. I feel as smart as others.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

10. I feel displeased with myself.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

11. I feel good about myself.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

12. I am pleased with my appearance right now.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

13. I am worried about what other people think of me.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

14. I feel confident that I understand things.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

15. I feel inferior to others at this moment.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

16. I feel unattractive.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

17. I feel concerned about the impression I am making.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

18. I feel that I have less scholastic ability right now than others.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

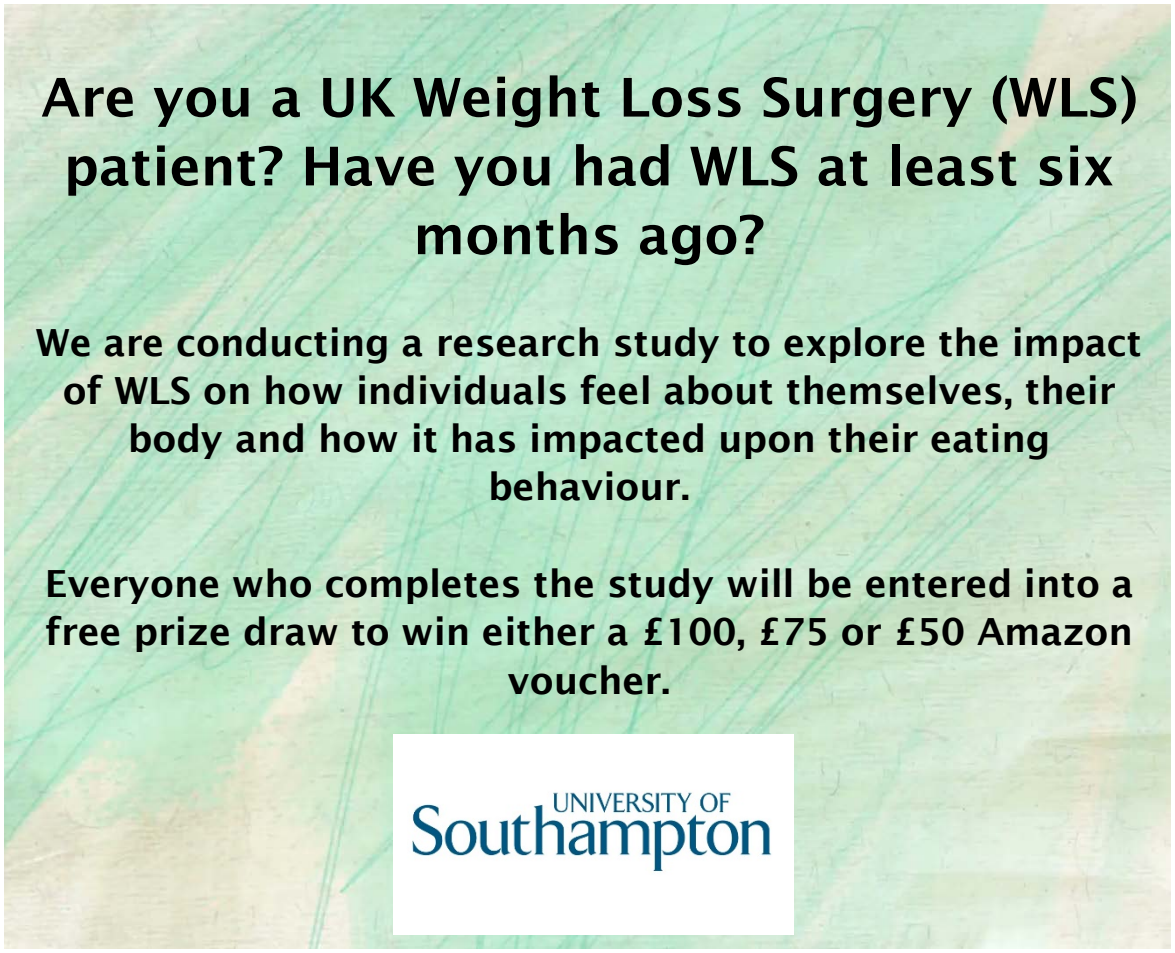
19. I feel like I'm not doing well.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

20. I am worried about looking foolish.

1	2	3	4	5
Not At All	A Little Bit	Somewhat	Very Much	Extremely

Appendix R: Study Advert



Volunteers needed for a research study exploring the impact of weight loss surgery (WLS) on how you feel about yourself, your body and how it has impacted upon your eating behaviour

If you have had weight loss surgery at least six months ago, are from the UK and are over 18 years of age, we'd be very grateful if you could complete the study which should take no more than 30-45 minutes to complete.

If you are interested in finding out more about the study and what it involves, please click the link below.

https://sotonpsychology.eu.qualtrics.com/jfe/form/SV_2t72vZw8s2vJIMt

ERGO number ref: 32188

Appendix S: Participant Information Sheet

Participant Information Sheet

Study Title: **The Impact of Weight Loss Surgery in a Post-Weight Loss Surgery Population**

Researchers: Charlotte Clark, Professor Lusia Stopa & Dr Hannah Turner

ERGO number: 32188

You are being invited to take part in the above research study. To help you decide whether you would like to take part or not, it is important that you understand why the research is being done and what it will involve. Please read the information below carefully and ask questions if anything is not clear or you would like more information before you decide to take part in this research. If you are happy to participate you will be asked to complete a consent form.

What is the research about?

You have been invited to take part in a research study that has been designed to explore the impact of weight loss surgery on how individuals feel about themselves and their body and how it impacts upon their eating behaviours. The study also aims to explore whether a self-compassion exercise can have an impact on the way in which people who have undergone weight loss surgery view themselves and their body. If you agree to take part in the study, you will be asked to complete a number of questionnaires that will ask you to think about how you feel about yourself and your body, your eating behaviour and mood. You will also be asked to complete a short letter writing exercise, which will be accompanied with instructions to guide you through this.

Why have I been asked to participate?

You have been invited to participate in this study as you are from the United Kingdom and have undergone weight loss surgery more than six months ago.

What will happen to me if I take part?

Once you have familiarised yourself with the participant information sheet and have agreed to take part, you will be asked to complete a set of questionnaires which should take no longer than 10 minutes to complete. You will then be invited to complete a short letter-writing exercise which should take no longer than 15 minutes to complete. Finally, you will be asked to complete a second set of questionnaires, which should take no more than 10 minutes to complete. You are asked to complete all aspects of the study in one sitting as discontinuing half way through will result in all of your responses being deleted.

Are there any benefits in my taking part?

There has been very little research conducted into the impact of weight loss surgery and the effects it can have on individuals' lives after surgery. Research in this area is important as we want to help promote and improve the wellbeing of individuals' post-weight loss surgery. It is hoped that your participation in this study will help to further our understanding of the issues and difficulties that may arise post-surgery and help to develop and improve the psychological support for people following weight loss surgery.

Will I be compensated for taking part?

There is no payment for taking part in the study. However, everyone who completes the study will be entered into a free prize draw to win either a £100, £75 or £50 Amazon Voucher. Entry into the prize draw is optional and participants will be asked to provide their email address at the end of the study if they wish to enter. Your email address will be kept separate from your responses in the study

Are there any risks involved?

You will be asked to complete a set of questionnaires that will ask you to think about how you feel about yourself and your body, eating behaviour and mood, which some individuals may find distressing. If you feel you need some time to talk about any of the issues raised during the study, please contact a researcher on the contact details below, who will advise you of who you can contact if you feel that you need further support. Alternatively, details of further sources of support can be found below.

What data will be collected?

Participants will be asked to complete a number of questionnaires on an online portal. Participants will be asked to complete questionnaires relating to how they feel about themselves, their body, their eating and mood. This will also include questions about participants' experience of weight loss surgery and demographic information such as ethnicity and gender identity. The data from the questionnaires will be stored on a password protected computer and only the main investigators will have access to the data. All data collected will be remain anonymous. Participants will be instructed to generate individualised participant codes that will allow for identification of data should participants wish to withdraw their data from the study.

Will my participation be confidential?

Your participation and the information we collect about you during the course of the research will be kept strictly confidential.

Only members of the research team and responsible members of the University of Southampton may be given access to data about you for monitoring purposes and/or to carry out an audit of the study to ensure that the research is complying with applicable regulations. Individuals from regulatory authorities (people who check that we are carrying out the study correctly) may require access to your data. All of these people have a duty to keep your information, as a research participant, strictly confidential.

Do I have to take part?

No – your participation is voluntary and you do not have to take part if you do not want to.

What happens if I change my mind?

You can withdraw your data at any time prior to data analysis, without having to give a reason. You will be asked to generate an individualised code at the start of the study, which you will need to quote to the researchers (see contact details below) should you wish to withdraw your data.

What will happen to the results of the research?

It is the intention to write up the results of this research study for submission to an academic journal. However, all participants will be referred to anonymously. Once the write-up of the study is completed, you will be able to obtain a copy of the results using the contact details below.

Where can I get more information?

If you have any questions about any aspects of the study, please contact a researcher using the contact details below.

What happens if there is a problem?

If you have a concern about any aspect of this study, you should speak to the researchers who will do their best to answer your questions. If you remain unhappy or have a complaint about any aspect of this study, please contact the University of Southampton Research Integrity and Governance Manager (023 8059 5058, rgoinfo@soton.ac.uk).

Investigator Details

This piece of research is being carried out by Charlotte Clark (Trainee Clinical Psychologist) as part of a doctoral qualification in Clinical Psychology. The research is being supervised by Professor Lusia Stopa (Programme Director, University of Southampton) and Dr Hannah Tuner (Consultant Clinical Psychologist).

Charlotte Clark (Trainee Clinical Psychologist)

E: C.Clark@soton.ac.uk

T: 07957339449

Further Sources of Support

It is recommended that you contact your weight loss surgery support team to see what post-surgery support they are able to offer you. For advice on local services and further sources of support, contact your General Practitioner.

If you are experiencing psychological -difficulties, you can self-refer to your local IAPT service who will able to assess your suitability for different types of talking therapies. The following services can also be contacted confidentially:

Beat Helpline (Beating Eating Disorders) – **0845 634 1414** (Monday to Thursday 13:30-16:30)

The Samaritans – 0845 790 9090 (24hrs a day, 7 days a week)

Data Protection Privacy Notice

The University of Southampton conducts research to the highest standards of research integrity. As a publicly-funded organisation, the University has to ensure that it is in the public interest when we use personally-identifiable information about people who have agreed to take part in research. This means that when you agree to take part in a

research study, we will use information about you in the ways needed, and for the purposes specified, to conduct and complete the research project. Under data protection law, 'Personal data' means any information that relates to and is capable of identifying a living individual. The University's data protection policy governing the use of personal data by the University can be found on its website (https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page).

This Participant Information Sheet tells you what data will be collected for this project and whether this includes any personal data. Please ask the research team if you have any questions or are unclear what data is being collected about you.

Our privacy notice for research participants provides more information on how the University of Southampton collects and uses your personal data when you take part in one of our research projects and can be found at http://www.southampton.ac.uk/assets/sharepoint/intranet/ls/Public/Research%20and%20Integrity%20Privacy%20Notice/Privacy%20Notice%20for%20Research%20Participants.pdf

Any personal data we collect in this study will be used only for the purposes of carrying out our research and will be handled according to the University's policies in line with data protection law. If any personal data is used from which you can be identified directly, it will not be disclosed to anyone else without your consent unless the University of Southampton is required by law to disclose it.

Data protection law requires us to have a valid legal reason ('lawful basis') to process and use your Personal data. The lawful basis for processing personal information in this research study is for the performance of a task carried out in the public interest. Personal data collected for research will not be used for any other purpose.

For the purposes of data protection law, the University of Southampton is the 'Data Controller' for this study, which means that we are responsible for looking after your information and using it properly. The University of Southampton will keep identifiable information about you for 10 years after the study has finished after which time any link between you and your information will be removed.

To safeguard your rights, we will use the minimum personal data necessary to achieve our research study objectives. Your data protection rights – such as to access, change, or transfer such information - may be limited, however, in order for the research output to be reliable and accurate. The University will not do anything with your personal data that you would not reasonably expect.

If you have any questions about how your personal data is used, or wish to exercise any of your rights, please consult the University's data protection webpage (https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page) where you can make a request using our online form. If you need further assistance, please contact the University's Data Protection Officer (data.protection@soton.ac.uk).

Appendix T: Consent Form

CONSENT FORM

Study Title: **The Impact of Weight Loss Surgery in a Post-Weight Loss Surgery Population**

Researcher names: Charlotte Clark, Professor Lusia Stopa & Dr Hannah Turner

ERGO number: 32188

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (20/08/2018/version number 3) and have had the opportunity to ask questions about the study.	
I agree to take part in this research project and agree for my data to be used for the purpose of this study.	
I understand my participation is voluntary and I may withdraw for any reason without my participation rights being affected prior to data analysis.	
I understand that I will not be directly identified in any reports of the research.	

☐ Please tick (check) this box to indicate that you consent to taking part in this survey.

Appendix U: Letter Writing Exercise Instructions

Letter Writing Exercise

Think about a time today or recently where you noticed that you were feeling negative about your body. You might have been feeling distressed or ashamed or disgusted by a certain aspect of your appearance.

Now try to connect with that part of you that is kind and understanding of others. Think about what you would say to a friend in your position, and then what a friend would say to you in this situation.

Write a short letter to yourself from the perspective of this friend. This letter may take about **5–10 minutes** to write, and there is no 'right' or 'wrong' way of doing it. Try to have understanding for your distress (e.g. I am sad you feel distressed…) and recognise that your distress makes sense. Imagine that this friend can see all your strengths and all your weaknesses. What would this friend write in order to remind you that you are only human, that all people experience difficult times and have both strengths and weaknesses. Write down what this friend feels towards you, loving and accepting you exactly as you are. Try to infuse your letter with a strong sense of your friend's acceptance, kindness, caring, and desire for your health and happiness.

Write whatever comes to you, but make sure the letter provides you with what you think you need to hear in order to feel nurtured and soothed. Try and be good to yourself in spite of your disappointments. After writing the letter, re-read it again, really letting the words sink in. Notice how you feel.

Appendix V: Debriefing Statement

Study Title: **The Impact of Weight Loss Surgery in a Post-Weight Loss Surgery Population**

Debriefing Statement (written, version number 2, 20/08/2018)

ERGO ID: 32188

The aim of this research study was to gain a more comprehensive understanding about the impact of weight loss surgery on how individuals feel about themselves and their body, including the role of weight loss and body shape expectations, and how this impacts upon their eating behaviours post-weight loss surgery.

It was expected that individuals who had the biggest difference between their current and ideal body shapes would be most likely to experience body dissatisfaction and eating pathology post-surgery. Another aim of this research study was to us to explore whether self-compassion can help protect against the risk factors associated with body dissatisfaction and eating pathology post-weight loss surgery.

Your participation in this research study will help contribute towards promoting and improving the wellbeing of individuals who have undergone weight loss surgery through finding new ways of protecting against the factors associated with body dissatisfaction and eating pathology.

Once again, your participation in this research study will remain anonymous. You may withdraw your data at any time without having to give a reason by quoting your individualised code to the contact details below.

Free Prize Draw Entry

If you would like to be entered into a free prize draw to win either a £100, £75 or £50

Amazon Voucher, please provide your email address below. Entry into the prize draw is optional and your contact details will remain separate from your questionnaire responses. Winners will be notified at the end of the study via email.

Further Sources of Support

If you have any further questions or feel you need some time to talk about any of the issues raised during the study, please contact Charlotte Clark (C.Clark@soton.ac.uk) or 07957339449. It is recommended that you contact your weight loss surgery support team to see what post-surgery support they are able to offer you. For advice on local services and further sources of support, contact your General Practitioner. Alternatively, if you are experiencing psychological -difficulties, you can self-refer to your local IAPT service who will able to assess your suitability for different types of talking therapies. The following services can also be contacted confidentially:

Beat Helpline (Beating Eating Disorders) – **0845 634 1414** (Monday to Thursday 13:30-16:30)

The Samaritans – 0845 790 9090 (24hrs a day, 7 days a week)

Thank you for your participation in this research study.

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: +44 (0)23 8059 3856, email fshs-rso@soton.ac.uk

List of References

Aardoom, J. J., Dingemans, A. E., Op't Landt, M. C. S., & Van Furth, E. F. (2012). Norms and discriminative validity of the Eating Disorder Examination Questionnaire (EDE-Q). *Eating behaviors*, *13*(4), 305-309.

Adams, C. E., & Leary, M. R. (2007). Promoting self–compassionate attitudes toward eating among restrictive and guilty eaters. *Journal of Social and Clinical Psychology*, *26*(10), 1120-1144.

Albertson, E. R., Neff, K. D., & Dill-Shackleford, K. E. (2015). Self-compassion and body dissatisfaction in women: A randomized controlled trial of a brief meditation intervention. *Mindfulness*, *6*(3), 444-454.

Ali, M., El Chaar, M., Ghiassi, S., & Rogers, A. M. (2017). American Society for Metabolic and Bariatric Surgery updated position statement on sleeve gastrectomy as a bariatric procedure. *Surgery for Obesity and Related Diseases*, *13*(10), 1652-1657.

Allison, K. C., Wadden, T. A., Sarwer, D. B., Fabricatore, A. N., Crerand, C. E., Gibbons, L. M., ... & Williams, N. N. (2006). Night eating syndrome and binge eating disorder among persons seeking bariatric surgery: prevalence and related features. *Obesity*, *14*(S3), 77S-82S.

Annis, N. M., Cash, T. F., & Hrabosky, J. I. (2004). Body image and psychosocial differences among stable average weight, currently overweight, and formerly overweight women: the role of stigmatizing experiences. *Body image*, *1*(2), 155-167.

Armijo-Olivo, S., Stiles, C. R., Hagen, N. A., Biondo, P. D., & Cummings, G. G. (2012). Assessment of study quality for systematic reviews: a comparison of the Cochrane Collaboration Risk of Bias Tool and the Effective Public Health Practice Project Quality Assessment Tool: methodological research. *Journal of evaluation in clinical practice*. *18*(1), 12-18.

Arnow, B., Kenardy, J., & Agras, W. S. (1995). The Emotional Eating Scale: The development of a measure to assess coping with negative affect by eating. *International Journal of Eating Disorders*. *18*(1), 79-90.

Atchison, M., Wade, T., Higgins, B., & Slavotinek, T. (1998). Anorexia nervosa following gastric reduction surgery for morbid obesity. *International Journal of Eating Disorders, 23*(1), 111-116.

Baechle, C., Castillo, K., Straßburger, K., Stahl-Pehe, A., Meissner, T., Holl, R. W., ... & In Cooperation with the German Paediatric Surveillance Unit (ESPED) and the DPV-Science Initiative. (2014). Is disordered eating behaviour more prevalent in adolescents with early-onset type 1 diabetes than in their representative peers? *International Journal of Eating Disorders*. *47*(4), 342-352.

Ball, G. D., Gingras, J. R., Fimrite, A., Villetard, K., Kayman, S., & Mccargar, L. J. (1999). Weight relapsers, maintainers, and controls: metabolic and behavioural differences. *Canadian journal of applied physiology, 24*(6), 548-558.

Beaulac, J., & Sandre, D. (2015). Impact of a CBT psychotherapy group on post-operative bariatric patients. *SpringerPlus*. *4*(1), 764.

Beck, N. N., Johannsen, M., Støving, R. K., Mehlsen, M., & Zachariae, R. (2012). Do postoperative psychotherapeutic interventions and support groups influence weight loss following bariatric surgery? A systematic review and meta-analysis of randomized and nonrandomized trials. *Obesity surgery*. *22*(11), 1790-1797.

Bellg, A. J., Borrelli, B., Resnick, B., Hecht, J., Minicucci, D. S., Ory, M., ... & Czajkowski, S. (2004). Enhancing treatment fidelity in health behavior change studies: best practices and recommendations from the NIH Behavior Change Consortium. *Health Psychology*. *23*(5), 443.

Bemporad, J. R. (1996). Self-starvation through the ages: Reflections on the pre-history of anorexia nervosa. *International Journal of Eating Disorders*, *19*(3), 217-237.

Benotti, P. N., & Forse, R. A. (1995). The role of gastric surgery in the multidisciplinary management of severe obesity. *The American Journal of Surgery*, *169*(3), 361-367.

Bertoletti, J., Galvis Aparicio, M. J., Bordignon, S., & Trentini, C. M. (2018). Body Image and Bariatric Surgery: A Systematic Review of Literature. *Bariatric Surgical Practice and Patient Care*.

Bocchieri, L. E., Meana, M., & Fisher, B. L. (2002). A review of psychosocial outcomes of surgery for morbid obesity. *Journal of psychosomatic research*, *52*(3), 155-165.

Bowerman, B. L., & O'connell, R. T. (1990). *Linear statistical models: An applied approach*. Brooks/Cole.

Bradley, L. E., Forman, E. M., Kerrigan, S. G., Butryn, M. L., Herbert, J. D., & Sarwer, D. B. (2016). A pilot study of an acceptance-based behavioral intervention for weight regain after bariatric surgery. *Obesity surgery*. 26(10), 2433-2441.

Braun, T. D., Park, C. L., & Gorin, A. (2016). Self-compassion, body image, and disordered eating: A review of the literature. *Body image*, *17*, 117-131.

Breines, J. G., & Chen, S. (2012). Self-compassion increases self-improvement motivation. *Personality and Social Psychology Bulletin*, *38*(9), 1133-1143.

Breines, J., Toole, A., Tu, C., & Chen, S. (2014). Self-compassion, body image, and self-reported disordered eating. *Self and Identity*, *13*(4), 432-448.

Buchwald, H., & Oien, D.M. (2013). Metabolic/bariatric surgery worldwide 2011. *Obesity Surgery*. *23*(4), 427-436.

Buchwald, H., Avidor, Y., Braunwald, E., Jensen, M. D., Pories, W., Fahrbach, K., & Schoelles, K. (2004). Bariatric surgery: a systematic review and meta-analysis. *Jama*, *292*(14), 1724-1737.

Budak, A. R., & Thomas, S. E. (2009). Food craving as a predictor of "relapse" in the bariatric surgery population: A review with suggestions. *Bariatric Nursing and Surgical Patient Care*, *4*(2), 115-121.

Burgmer, R., Grigutsch, K., Zipfel, S., Wolf, A. M., de Zwaan, M., Husemann, B., ... & Herpertz, S. (2005). The influence of eating behavior and eating pathology on weight loss after gastric restriction operations. *Obesity surgery*, *15*(5), 684-691.

Burmeister, J. M., Hinman, N., Koball, A., Hoffmann, D. A., & Carels, R. A. (2013). Food addiction in adults seeking weight loss treatment. Implications for psychosocial health and weight loss. *Appetite*. *60*, 103-110.

Burney, J., & Irwin, H. J. (2000). Shame and guilt in women with eating disorder symptomatology. *Journal of clinical psychology*, *56*(1), 51-61.

Campbell, J. D., Assanand, S., & Paula, A. D. (2003). The structure of the self-concept and its relation to psychological adjustment. *Journal of personality*, *71*(1), 115-140.

Campbell, J. D., Trapnell, P. D., Heine, S. J., Katz, I. M., Lavallee, L. F., & Lehman, D. R. (1996). Self-concept clarity: Measurement, personality correlates, and cultural boundaries. *Journal of personality and social psychology*, *70*(1), 141.

Cassin, S. E., Sockalingam, S., Du, C., Wnuk, S., Hawa, R., & Parikh, S. V. (2016). A pilot randomized controlled trial of telephone-based cognitive behavioural therapy for preoperative bariatric surgery patients. *Behaviour research and therapy*. *80*, 17-22.

Chacko, S. A., Yeh, G. Y., Davis, R. B., & Wee, C. C. (2016). A mindfulness-based intervention to control weight after bariatric surgery: preliminary results from a randomized controlled pilot trial. *Complementary therapies in medicine*. *28*, 13-21.

Chang, C., Hung, C., Chang, Y., Tai, C., Lin, J., & Wang, J. (2010). Health-related Quality of Life in Adult Patients with Morbid Obesity Coming for Bariatric Surgery. *Obesity Surgery. 20*(8). 1121-1127.

Chang, S., Stoll, C.R.T., Song, J., Varela, J.E., Eagon, C.J., & Colditz, M.D. (2014)/ Bariatric surgery: an updated systematic review and meta-analysis, 2003-2012. *JAMA Surgery. 149*(3), 275-287.

Colles, S. L., Dixon, J. B., & O'brien, P. E. (2008). Grazing and loss of control related to eating: two high risk factors following bariatric surgery. *Obesity*, *16*(3), 615-622.

Colquitt, J. L., Pickett, K., Loveman, E., & Frampton, G. K. (2014). Surgery for weight loss in adults. *Cochrane Database of Systematic Reviews*, (8).

Conceição, E. M., Mitchell, J. E., Engel, S. G., Machado, P. P., Lancaster, K., & Wonderlich, S. A. (2014). What is “grazing”? Reviewing its definition, frequency, clinical characteristics, and impact on bariatric surgery outcomes, and proposing a standardized definition. *Surgery for Obesity and Related Diseases. 10*(5), 973-982.

Conceição, E. M., Mitchell, J. E., Pinto-Bastos, A., Arrojado, F., Brandão, I., & Machado, P. P. (2017). Stability of problematic eating behaviors and weight loss trajectories after bariatric surgery: a longitudinal observational study. *Surgery for Obesity and Related Diseases*. *13*(6), 1063-1070.

Conceição, E., Vaz, A., Bastos, A. P., Ramos, A., & Machado, P. (2013). The development of eating disorders after bariatric surgery. *Eating disorders*. *21*(3), 275-282.

Conceição, E.M., Utzinger, L.M., & Pisetsky, E.M. (2015). Eating disorders and problematic eating behaviours before and after bariatric surgery: Characterization, assessment and association with treatment outcomes. *European Eating Disorders Review. 23*, 417-425.

Counts, D. (2001). An adult with Prader-Willi syndrome and anorexia nervosa: A case report. *International Journal of Eating Disorders*. *30*(2), 231-233.

Courcoulas, A. P., Christian, N. J., Belle, S. H., Berk, P. D., Flum, D. R., Garcia, L., ... & Patterson, E. J. (2013). Weight change and health outcomes at 3 years after bariatric surgery among individuals with severe obesity. *Jama*, *310*(22), 2416-2425.

Courcoulas, A. P., King, W. C., Belle, S. H., Berk, P., Flum, D. R., Garcia, L., ... & Pories, W. J. (2018). Seven-year weight trajectories and health outcomes in the Longitudinal Assessment of Bariatric Surgery (LABS) study. *JAMA surgery*, *153*(5), 427-434.

Crawford, J. R., & Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British journal of clinical psychology, 43*(3), 245-265.

Cuzzolaro, M., Vetrone, G., Marano, G., & Garfinkel, P. E. (2006). The Body Uneasiness Test (BUT): development and validation of a new body image assessment scale. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, *11*(1), 1-13.

Dahl, J. K., Eriksen, L., Vedul-Kjelsås, E., Strømmen, M., Kulseng, B., Mårvik, R., & Holen, A. (2010). Prevalence of all relevant eating disorders in patients waiting for bariatric surgery: a comparison between patients with and without eating disorders. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, *15*(4), e247-e255.

Darcy, A. M., Adler, S., Miner, A., & Lock, J. (2014). How smartphone applications may be implemented in the treatment of eating disorders: case reports and case series data. *Advances in Eating Disorders: Theory, Research and Practice*, *2*(3), 217-232.

David, L. A., Sockalingam, S., Wnuk, S., & Cassin, S. E. (2016). A pilot randomized controlled trial examining the feasibility, acceptability, and efficacy of Adapted Motivational Interviewing for post-operative bariatric surgery patients. *Eating behaviors*. *22*, 87-92.

Daye, C. A., Webb, J. B., & Jafari, N. (2014). Exploring self-compassion as a refuge against recalling the body-related shaming of caregiver eating messages on dimensions of objectified body consciousness in college women. *Body Image*, *11*(4), 547-556.

de Zwaan, M., Enderle, J., Wagner, S., Mühlhans, B., Ditzen, B., Gefeller, O., ... & Müller, A. (2011). Anxiety and depression in bariatric surgery patients: a prospective, follow-up study using structured clinical interviews. *Journal of affective disorders*, *133*(1-2), 61-68.

de Zwaan, M., Georgiadou, E., Stroh, C. E., Teufel, M., Köhler, H., Tengler, M., & Müller, A. (2014). Body image and quality of life in patients with and without body contouring surgery following bariatric surgery: a comparison of pre-and post-surgery groups. *Frontiers in psychology*, *5*, 1310.

de Zwaan, M., Hilbert, A., Swan-Kremeier, L., Simonich, H., Lancaster, K., Howell, L. M., ... & Mitchell, J. E. (2010). Comprehensive interview assessment of eating behavior 18–35 months after gastric bypass surgery for morbid obesity. *Surgery for Obesity and Related Diseases*, *6*(1), 79-85.

Deitel, M., & Shikora, S.A. (2002). The development of the surgical treatment of morbid obesity. *Journal of the American College of Nutrition. 21*(5), 365-371.

Dent, M., Chrisopolous, S., Mulhall, C. & Ridler, C. (2010). *Bariatric surgery for obesity.* Oxford, UK: National Obesity Observatory.

Department of Health (2009). Cost of obesity to NHS in England: www.dh.gov.uk

Devlin, M. J., King, W. C., Kalarchian, M. A., White, G. E., Marcus, M. D., Garcia, L., ... & Mitchell, J. E. (2016). Eating pathology and experience and weight loss in a prospective study of bariatric surgery patients: 3-year follow-up. *International Journal of Eating Disorders*. *49*(12), 1058-1067.

Dixon, J. B., Dixon, M. E., & O'brien, P. E. (2002). Body image: appearance orientation and evaluation in the severely obese. Changes with weight loss. *Obesity surgery*, *12*(1), 65-71.

Donahue, E. M., Robins, R. W., Roberts, B. W., & John, O. P. (1993). The divided self: Concurrent and longitudinal effects of psychological adjustment and social roles on self-concept differentiation. *Journal of personality and social psychology*, *64*(5), 834.

Douglas, I. J., Bhaskaran, K., Batterham, R. L., & Smeeth, L. (2015). Bariatric surgery in the United Kingdom: a cohort study of weight loss and clinical outcomes in routine clinical care. *PLoS medicine*, *12*(12), e1001925.

Duarte, C., Matos, M., Stubbs, R. J., Gale, C., Morris, L., Gouveia, J. P., & Gilbert, P. (2017). The impact of shame, self-criticism and social rank on eating behaviours in overweight and obese women participating in a weight management programme. *PloS one*, *12*(1), e0167571.

Dymek, M. P., Le Grange, D., Neven, K., & Alverdy, J. (2002). Quality of life after gastric bypass surgery: a cross-sectional study. *Obesity research*, *10*(11), 1135-1142.

Engstrom, J. L., Paterson, S. A., Doherty, A., Trabulsi, M., & Speer, K. L. (2003). Accuracy of self-reported height and weight in women: an integrative review of the literature. *The Journal of Midwifery & Women's Health*, *48*(5), 338-345.

Faccio, E., Nardin, A., & Cipolletta, S. (2016). Becoming ex-obese: narrations about identity changes before and after the experience of the bariatric surgery. *Journal of Clinical Nursing*, *25*(11-12), 1713-1720.

Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire?. *International journal of eating disorders*. *16*(4), 363-370.

Fairburn, C. G., & Beglin, S. J. (2008). Eating disorder examination questionnaire. *Cognitive behaviour therapy and eating disorders*, *309*, 313.

Fairburn, C. G., Cooper, Z., & O'Connor, M. (1993). The eating disorder examination. *International Journal of Eating Disorders*, *6*, 1-8.

Ferreira, C., Pinto-Gouveia, J., & Duarte, C. (2013). Self-compassion in the face of shame and body image dissatisfaction: Implications for eating disorders. *Eating behaviors*. *14*(2), 207-210.

Field, A. (2009). *Discovering statistics using SPSS*. Sage Publications.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage Publications.

Fitzgibbon, M. L., Blackman, L. R., & Avellone, M. E. (2000). The relationship between body image discrepancy and body mass index across ethnic groups. *Obesity research*, *8*(8), 582-589.

Fobi, M. A., Lee, H., Holness, R., & Cabinda, D. (1998). Gastric bypass operation for obesity. *World journal of surgery*, *22*(9), 925-935.

Foster, G. D., Wadden, T. A., Vogt, R. A., & Brewer, G. (1997). What is a reasonable weight loss? Patients' expectations and evaluations of obesity treatment outcomes. *Journal of consulting and clinical psychology*, *65*(1), 79.

Franks, M. W. (2011). *Similarities between eating disorders and obesity*. (Unpublished doctoral dissertation). University of Leicester, Leicester, UK.

French, S. A., Epstein, L. H., Jeffery, R. W., Blundell, J. E., & Wardle, J. (2012). Eating behavior dimensions. Associations with energy intake and body weight. A review. *Appetite*. *59*(2), 541-549.

Gale, C., Gilbert, P., Read, N., & Goss, K. (2014). An evaluation of the impact of introducing compassion focused therapy to a standard treatment programme for people with eating disorders. *Clinical psychology & psychotherapy*, *21*(1), 1-12.

Garb, J., Welch, G., Zagarins, S., Kuhn, J., & Romanelli, J. (2009). Bariatric surgery for the treatment of morbid obesity: a meta-analysis of weight loss outcomes for laparoscopic adjustable gastric banding and laparoscopic gastric bypass. *Obesity Surgery. 19*(10), 1447-1455.

Gardner, R. M., Friedman, B. N., & Jackson, N. A. (1998). Methodological concerns when using silhouettes to measure body image. *Perceptual and motor skills, 86*(2), 387-395.

Gariepy, G., Nitka, D., & Schmitz, N. (2010). The association between obesity and anxiety disorders in the population: a systematic review and meta-analysis. *International journal of obesity. 34*(3), 407.

Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The eating attitudes test: psychometric features and clinical correlates. *Psychological medicine, 12*(4), 871-878.

Ghaderi, A., & Weineland, S. (2010). Subjective Binge Eating Questionnaire for bariatric surgery patients (SBEQ). *Unpublished Doctoral Study, University of Uppsala, Sweden*.

Gilbert, P. (2010). *Compassion focused therapy: Distinctive features*. Routledge.

Gilbert, P. (Ed.). (2005). *Compassion: Conceptualisations, research and use in psychotherapy*. Routledge.

Gilbert, P., & Irons, C. (2005). Focused therapies and compassionate mind training for shame and self-attacking. *Compassion: Conceptualisations, research and use in psychotherapy*, 263-325.

Gormally, J., Black, S., Daston, S., & Rardin, D. (1982). The assessment of binge eating severity among obese persons. *Addictive behaviors. 7*(1), 47-55.

Goss, K., & Allan, S. (2009). Shame, pride and eating disorders. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice, 16*(4), 303-316.

Goss, K., & Gilbert, P. (2002). Eating disorders, shame and pride. *Body shame: Conceptualisation, research and treatment*, 219-256.

Guisado, J. A., Vaz, F. J., Alarcón, J., López-Ibor, J. J., Rubio, M. A., & Gaite, L. (2002). Psychopathological status and interpersonal functioning following weight loss in morbidly obese patients undergoing bariatric surgery. *Obesity surgery*. *12*(6), 835-840.

Hafner, R. J., Watts, J. M., & Rogers, J. (1991). Quality of life after gastric bypass for morbid obesity. *International journal of obesity*, *15*(8), 555-560.

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy* (p. 6). New York, NY: Guilford Press.

Heatherton, T. F., & Polivy, J. (1991). Development and validation of a scale for measuring state self-esteem. *Journal of Personality and Social psychology*, *60*(6), 895.

Heinberg, L. J., Ashton, K., & Coughlin, J. (2012). Alcohol and bariatric surgery: review and suggested recommendations for assessment and management. *Surgery for Obesity and Related Diseases*. *8*(3), 357-363.

Helmio, M., Victorzon, M., Ovaska, J., Leivonen, M., Juuti, A., Peromaa-Haavisto, P., Nuutila, P., Vahlberg, T., & Salminen, P. (2014). Comparison of short-term outcome of laparoscopic sleeve gastrectomy and gastric bypass in the treatment of morbid obesity: A prospective randomized controlled multicentre SLEEVEPASS study with 6-month follow-up. *Scandinavian Journal of Surgery*. *103*(3), 175-181.

Higgins, E. T. (1987). Self-discrepancy: a theory relating self and affect. *Psychological review*, *94*(3), 319.

Higgins, J.P.T., & Green, S. (Eds.). (2011). *Cochrane Handbook for Systematic Reviews of Interventions* (Version 5.1.0.). Retrieved from http://handbook.cochrane.org

Highton, L., Ekwobi, C., & Rose, V. (2012). Post-bariatric surgery body contouring in the NHS: a survey of UK bariatric surgeons. *Journal of Plastic, Reconstructive & Aesthetic Surgery*, *65*(4), 426-432.

Himes, S. M., Grothe, K. B., Clark, M. M., Swain, J. M., Collazo-Clavell, M. L., & Sarr, M. G. (2015). Stop regain: a pilot psychological intervention for bariatric patients experiencing weight regain. *Obesity surgery. 25*(5), 922-927.

International Association for the Study of Obesity. (2012). *About Obesity*. Retrieved from http://www.iaso.org/policy/aboutobesity/

Kalarchian, M. A., Marcus, M. D., Levine, M. D., Courcoulas, A. P., Pilkonis, P. A., Ringham, R. M., ... & Rofey, D. L. (2007). Psychiatric disorders among bariatric surgery candidates: relationship to obesity and functional health status. *American journal of Psychiatry*. *164*(2), 328-334.

Kaly, P., Orellana, S., Torrella, T., Takagishi, C., Saff-Koche, L., & Murr, M.M. (2008). Unrealistic weight loss expectations in candidates for bariatric surgery. *Surgery for Obesity and Related Diseases. 4*(1), 6-10.

Karlsson, J., Persson, L. O., Sjöström, L., & Sullivan, M. (2000). Psychometric properties and factor structure of the Three-Factor Eating Questionnaire (TFEQ) in obese men and women. Results from the Swedish Obese Subjects (SOS) study. *International journal of obesity*, *24*(12), 1715.

Kazdin, A. E. (1980). Acceptability of alternative treatments for deviant child behavior. *Journal of Applied Behavior Analysis*. *13*(2), 259-273.

Kelly, A. C., & Carter, J. C. (2013). Why self-critical patients present with more severe eating disorder pathology: The mediating role of shame. *British Journal of Clinical Psychology*, *52*(2), 148-161.

Kelly, A. C., Vimalakanthan, K., & Miller, K. E. (2014). Self-compassion moderates the relationship between body mass index and both eating disorder pathology and body image flexibility. *Body image*, *11*(4), 446-453.

Kinzl, J. F., Traweger, C., Trefalt, E., & Biebl, W. (2003). Psychosocial consequences of weight loss following gastric banding for morbid obesity. *Obesity surgery*, *13*(1), 105-110.

Kitsantas, A., Gilligan, T. D., & Kamata, A. (2003). College women with eating disorders: Self-regulation, life satisfaction, and positive/negative affect. *The Journal of Psychology*, *137*(4), 381-395.

Kocalevent, R. D., Hinz, A., & Brähler, E. (2013). Standardization of the depression screener patient health questionnaire (PHQ-9) in the general population. *General hospital psychiatry*, *35*(5), 551-555.

Kofman, M. D., Lent, M. R., & Swencionis, C. (2010). Disordered eating behaviour patterns, quality of life, and weight outcomes following gastric bypass: results of an Internet survey. *Obesity*. *18*(10), 1938-1943.

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine*, *16*(9), 606-613.

Lavie, C. J., Milani, R. V., & Ventura, H. O. (2009). Obesity and cardiovascular disease. *Journal of the American College of Cardiology*. *53*, 1925-1932.

Leahey, T. M., Crowther, J. H., & Irwin, S. R. (2008). A cognitive-behavioral mindfulness group therapy intervention for the treatment of binge eating in bariatric surgery patients. *Cognitive and Behavioral Practice*. *15*(4), 364-375.

Lee, D. A. (2005). The perfect nurturer: A model to develop a compassionate mind within the context of cognitive therapy. In *Compassion* (pp. 338-363). Routledge.

Libeton, M., Dixon, J. B., Laurie, C., & O'brien, P. E. (2004). Patient motivation for bariatric surgery: characteristics and impact on outcomes. *Obesity surgery*, *14*(3), 392-398.

Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P. Y. (2008). Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. *Medical care*, *46*(3), 266-274.

Luce, K. H., Crowther, J. H., & Pole, M. (2008). Eating disorder examination questionnaire (EDE-Q): Norms for undergraduate women. *International Journal of Eating Disorders*, *41*(3), 273-276.

Luppino, F. S., de Wit, L. M., Bouvy, P. F., Stijnen, T., Cuijpers, P., Penninx, B. W., & Zitman, F. G. (2010). Overweight, obesity, and depression: a systematic review and meta-analysis of longitudinal studies. *Archives of general psychiatry*, *67*(3), 220-229.

Madura, J.A., & DiBlaise, J.K. (2012). Quick fix or long term cure? Pros and cons of bariatric surgery. *F1000 Medicine Reports. 4*, 19.

Magnus, C. M., Kowalski, K. C., & McHugh, T. L. F. (2010). The role of self-compassion in women's self-determined motives to exercise and exercise-related outcomes. *Self and identity*, *9*(4), 363-382.

Masheb, R. M., & Grilo, C. M. (2006). Emotional overeating and its associations with eating disorder psychopathology among overweight patients with binge eating disorder. *International Journal of Eating Disorders*, *39*(2), 141-146.

Mechanick, J. I., Youdim, A., Jones, D. B., Garvey, W. T., Hurley, D. L., McMahon, M. M., ... & Dixon, J. B. (2013). Clinical practice guidelines for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient—2013 update: cosponsored by American Association of Clinical Endocrinologists, the Obesity Society, and American Society for Metabolic & Bariatric Surgery. *Obesity*. *21*(S1), S1-S27.

Meek, C. L., Lewis, H. B., Reimann, F., Gribble, F. M., & Park, A. J. (2016). The effect of bariatric surgery on gastrointestinal and pancreatic peptide hormones. *Peptides*, *77*, 28-37.

Meloun, M., Militký, J., Hill, M., & Brereton, R. G. (2002). Crucial problems in regression modelling and their solutions. *Analyst*, *127*(4), 433-450.

Menard, S. (2002). *Applied logistic regression analysis* (Vol. 106). Sage.

Miller-Matero, L. R., Armstrong, R., McCulloch, K., Hyde-Nolan, M., Eshelman, A., & Genaw, J. (2014). To eat or not to eat; is that really the question? An evaluation of problematic eating behaviors and mental health among bariatric surgery candidates. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*. *19*(3), 377-382.

Mintz, L. B., & O'Halloran, M. S. (2000). The Eating Attitudes Test: validation with DSM-IV eating disorder criteria. *Journal of personality assessment*, *74*(3), 489-503.

Mitchell, J. E., King, W. C., Courcoulas, A., Dakin, G., Elder, K., Engel, S., ... & Pories, W. (2015). Eating behavior and eating disorders in adults before bariatric surgery. *International Journal of Eating Disorders*, *48*(2), 215-222.

Mitchell, J. E., Selzer, F., Kalarchian, M. A., Devlin, M. J., Strain, G. W., Elder, K. A., ... & Yanovski, S. Z. (2012). Psychopathology before surgery in the longitudinal assessment of bariatric surgery-3 (LABS-3) psychosocial study. *Surgery for Obesity and Related Diseases*. *8*(5), 533-541.

Mitchell, J.E., & de Zwaan, M. (2012). *Psychosocial Treatment and Assessment of Bariatric Surgery Patients*. New York, NY: Routledge.

Munoz, D., Chen, E. Y., Fischer, S., Sanchez-Johnsen, L., Roherig, M., Dymek-Valentine, M., ... & Le Grange, D. (2010). Changes in desired body shape after bariatric surgery. *Eating disorders*, *18*(4), 347-354.

Munoz, D., Lal, M., Chen, E.Y., Mansour, M., Fischer, S., Roherig, M., Sanchez-Johnsen, L., Dymel-Valentine, M., Alverdy, J.C., & Le Grange, D. (2007). Why patients seek bariatric surgery: a qualitative and quantitative analysis of patient motivation. *Obesity Surgery*. *17*(11), 1487-1491.

Myers, A., & Rosen, J. C. (1999). Obesity stigmatization and coping: relation to mental health symptoms, body image, and self-esteem. *International journal of obesity*. *23*(3), 221.

National Institute for Health and Care Excellence (2014). *Identification, assessment and management of overweight and obesity in children, young people and adults*. (Clinical Guideline 189). Retrieved from www.nice.org.uk/guidance/cg189

National Institute for Health and Clinical Excellence (2006). Obesity: guidance on prevention, identification, assessment and management of overweight and obesity in adults and children. *Clinical guidance 43*. London.

Neff, K. (2003a). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and identity*, *2*(2), 85-101.

Neff, K. (2011). *Self-compassion*. Hachette UK.

Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and identity*, *2*(3), 223-250.

Neff, K. D., Kirkpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *Journal of research in personality*, *41*(1), 139-154.

Nezlek, J. B., & Plesko, R. M. (2001). Day-to-day relationships among self-concept clarity, self-esteem, daily events, and mood. *Personality and social psychology bulletin*, *27*(2), 201-211.

Niego, S. H., Kofman, M. D., Weiss, J. J., & Geliebter, A. (2007). Binge eating in the bariatric surgery population: a review of the literature. *International Journal of Eating Disorders. 40*(4), 349-359.

O'brien, P. E., Dixon, J. B., & Brown, W. (2004). Obesity is a surgical disease: overview of obesity and bariatric surgery. *ANZ journal of surgery. 74*(4), 200-204.

Padwal, R., Klarenbach, S., Wiebe, N., Birch, D., Karmali, S., Manns, B., Hazel, M., Sharma, A.M., & Tonelli, M. (2011). Bariatric surgery: a systematic review and network meta-analysis of randomized trials. *Obesity Reviews. 12*(8), 602-621.

Parker, K., Mitchell, S., O'Brien, P., & Brennan, L. (2015). Psychometric evaluation of disordered eating measures in bariatric surgery patients. *Eating behaviors*, *19*, 39-48.

Passi, V. A., Bryson, S. W., & Lock, J. (2003). Assessment of eating disorders in adolescents with anorexia nervosa: Self-report questionnaire versus interview. *International Journal of Eating Disorders*, *33*(1), 45-54.

Peat, C. M., Peyerl, N. L., & Muehlenkamp, J. J. (2008). Body image and eating disorders in older adults: a review. *The Journal of General Psychology*, *135*(4), 343-358.

Petry, N. M., Barry, D., Pietrzak, R. H., & Wagner, J. A. (2008). Overweight and obesity are associated with psychiatric disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychosomatic medicine*, *70*(3), 288-297.

Picot, J., Jones, J., Colquitt, J.L., Loveman, E., & Clegg, A.J. (2012). Weight loss surgery for mild to moderate obesity: a systematic review and economic evaluation. *Obesity Surgery*. *22*(9), 1496-1506.

Pila, E., Sabiston, C. M., Brunet, J., Castonguay, A. L., & O'Loughlin, J. (2015). Do body-related shame and guilt mediate the association between weight status and self-esteem?. *Journal of health psychology*, *20*(5), 659-669.

Pinto-Gouveia, J., Ferreira, C., & Duarte, C. (2014). Thinness in the pursuit for social safeness: An integrative model of social rank mentality to explain eating psychopathology. *Clinical Psychology & Psychotherapy*, *21*(2), 154-165.

Pories, W. J., & MacDonald, K. G. (1993). The surgical treatment of morbid obesity. *Current opinion in general surgery*, 195-205.

Price, H. I., Gregory, D. M., & Twells, L. K. (2014). Body shape expectations and self-ideal body shape discrepancy in women seeking bariatric surgery: a cross-sectional study. *BMC obesity*, *1*(1), 28.

Public Health England. (2017). *Health matters: obesity and the food environment.* Retrieved from: https://www.gov.uk/government/publications/health-matters-obesity-and-the-food-environment/healthmatters-obesity-and-the-food-environment–2

Puhl, R. M., & Heuer, C. A. (2009). The stigma of obesity: a review and update. *Obesity*. *17*(5), 941-964.

Ritterband, L. M., & Tate, D. F. (2009). The science of internet interventions. *Annals of Behavioral Medicine, 38*(1), 1-3.

Robinson, A. H., Adler, S., Darcy, A. M., Osipov, L., & Safer, D. L. (2016). Early Adherence Targeted Therapy (EATT) for postbariatric maladaptive eating behaviors. *Cognitive and Behavioral Practice*. *23*(4), 548-560.

Rosenberg, M. (1965). Rosenberg self-esteem scale (SES). *Society and the adolescent self-image*.

Rudolph, A., & Hilbert, A. (2013). Post-operative behavioural management in bariatric surgery: a systematic review and meta-analysis of randomized controlled trials. *Obesity reviews*. *14*(4), 292-302.

Rusch, M. D., & Andris, D. (2007). Maladaptive eating patterns after weight-loss surgery. *Nutrition in Clinical Practice, 22*(1), 41-49.

Sallet, P. C., Sallet, J. A., Dixon, J. B., Collis, E., Pisani, C. E., Levy, A., ... & Cordás, T. A. (2007). Eating behavior as a prognostic factor for weight loss after gastric bypass. *Obesity Surgery, 17*(4), 445.

Sarwer, D. B., Dilks, R. J., & West-Smith, L. (2011). Dietary intake and eating behavior after bariatric surgery: threats to weight loss maintenance and strategies for success. *Surgery for Obesity and Related Diseases*. *7*(5), 644-651.

Sarwer, D. B., Thompson, J. K., Mitchell, J. E., & Rubin, J. P. (2008). Psychological considerations of the bariatric surgery patient undergoing body contouring surgery. *Plastic and reconstructive surgery*, *121*(6), 423e-434e.

Sarwer, D. B., Wadden, T. A., & Fabricatore, A. N. (2005). Psychosocial and behavioral aspects of bariatric surgery. *Obesity research*, *13*(4), 639-648.

Sarwer, D. B., Wadden, T. A., Moore, R. H., Baker, A. W., Gibbons, L. M., Raper, S. E., & Williams, N. N. (2008). Preoperative eating behavior, postoperative dietary adherence, and weight loss after gastric bypass surgery. *Surgery for Obesity and Related Diseases*, *4*(5), 640-646.

Saunders, R. (2004). "Grazing": a high-risk behavior. *Obesity Surgery*, *14*(1), 98-102.

Scioscia, T. N., Bulik, C. M., Levenson, J., & Kirby, D. F. (1999). Anorexia nervosa in a 38-year-old woman 2 years after gastric bypass surgery. *Psychosomatics*. *40*(1), 86-88.

Scott, K. M., McGee, M. A., Wells, J. E., & Browne, M. A. O. (2008). Obesity and mental disorders in the adult general population. *Journal of psychosomatic research*, *64*(1), 97-105.

Segal, A., Kussunoki, D. K., & Larino, M. A. (2004). Post-surgical refusal to eat: anorexia nervosa, bulimia nervosa or a new eating disorder? A case series. *Obesity surgery*, *14*(3), 353-360.

Shapira, L. B., & Mongrain, M. (2010). The benefits of self-compassion and optimism exercises for individuals vulnerable to depression. *The Journal of Positive Psychology*, *5*(5), 377-389.

Shure, J., & Weinstock, B. (2009). Shame, compassion, and the journey toward health. *Effective clinical practice in the treatment of eating disorders: The heart of the matter*, 163-177.

Sidani, S., Epstein, D. R., Bootzin, R. R., Moritz, P., & Miranda, J. (2009). Assessment of preferences for treatment: validation of a measure. *Research in nursing & health*. *32*(4), 419-431.

Sjöström, L. (2013). Review of the key results from the Swedish Obese Subjects (SOS) trial–a prospective controlled intervention study of bariatric surgery. *Journal of internal medicine*, *273*(3), 219-234.

Smith, F., & Farrants, J. R. (2013). Shame and self-acceptance in continued flux: Qualitative study of the embodied experience of significant weight loss and removal of resultant excess skin by plastic surgery. *Journal of health psychology*, *18*(9), 1129-1140.

Sockalingam, S., Cassin, S. E., Wnuk, S., Du, C., Jackson, T., Hawa, R., & Parikh, S. V. (2017). A pilot study on telephone cognitive behavioral therapy for patients six-months post-bariatric surgery. *Obesity surgery*. *27*(3), 670-675.

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of internal medicine*, *166*(10), 1092-1097.

Stapleton, P., & Nikalje, A. (2013). Constructing body image in university women: The relationship between self-esteem, self-compassion, and intuitive eating. *International Journal of Healing and Caring*, *13*(2).

Stewart, F., & Avenell, A. (2016). Behavioural interventions for severe obesity before and/or after bariatric surgery: a systematic review and meta-analysis. *Obesity surgery*. *26*(6), 1203-1214.

Stice, E., Akutagawa, D., Gaggar, A., & Agras, W. S. (2000). Negative affect moderates the relation between dieting and binge eating. *International Journal of Eating Disorders. 27*(2), 218-229.

Stice, E., Telch, C. F., & Rizvi, S. L. (2000). Development and validation of the Eating Disorder Diagnostic Scale: a brief self-report measure of anorexia, bulimia, and binge-eating disorder. *Psychological assessment*, *12*(2), 123.

Stunkard, A. J., & Allison, K. C. (2003). Binge eating disorder: disorder or marker?. *International Journal of Eating Disorders*, *34*(S1), S107-S116.

Stunkard, A. J., & Messick, S. (1985). The three-factor eating questionnaire to measure dietary restraint, disinhibition and hunger. *Journal of psychosomatic research*, *29*(1), 71-83.

Stunkard, A. J., & Sorensen, T. Schulsinger. F.(1983). Use of the Danish adoption register for the study of obesity and thinness. *Genetics of neurological and psychiatric disorders*, 115-120.

Stunkard, A.J., & Messick, S. (1988). *The Eating Inventory*. San Antonio, TX: Psychological Corporation.

Tabachnick, B. G., Fidell, L. S., & Osterlind, S. J. (2001). Using multivariate. *New York: Statistics*.

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (Vol. 5). Boston, MA: Pearson.

Thompson, J. K., & Altabe, M. N. (1991). Psychometric qualities of the figure rating scale. *International Journal of Eating Disorders*, *10*(5), 615-619.

Throsby, K. (2007). “How could you let yourself get like that?”: Stories of the origins of obesity in accounts of weight loss surgery. *Social Science & Medicine*, *65*(8), 1561-1571.

Tylka, T. L., Russell, H. L., & Neal, A. A. (2015). Self-compassion as a moderator of thinness-related pressures' associations with thin-ideal internalization and disordered eating. *Eating behaviors*, *17*, 23-26.

van de Laar, A. W., Dollé, M. H., de Brauw, L. M., Bruin, S. C., & Acherman, Y. I. (2015). Which baseline weight should be preferred as reference for weight loss results? Insights in bariatric weight loss mechanisms by comparing primary and revision gastric bypass patients. *Obesity surgery*, *25*(4), 687-693.

van de Laar, A., de Caluwé, L., & Dillemans, B. (2011). Relative outcome measures for bariatric surgery. Evidence against excess weight loss and excess body mass index loss from a series of laparoscopic Roux-en-Y gastric bypass patients. *Obesity surgery*. *21*(6), 763-767.

Van Hout, G. C., Verschure, S. K., & Van Heck, G. L. (2005). Psychosocial predictors of success following bariatric surgery. *Obesity surgery*, *15*(4), 552-560.

Vartanian, L. R. 2. (2012). Self-discrepancy theory and body image. *Encyclopedia of body image and human appearance*, *2*, 711-717.

Vartanian, L. R., & Dey, S. (2013). Self-concept clarity, thin-ideal internalization, and appearance-related social comparison as predictors of body dissatisfaction. *Body image*, *10*(4), 495-500.

Wang, S. S., Brownell, K. D., & Wadden, T. A. (2004). The influence of the stigma of obesity on overweight individuals. *International journal of obesity*. *28*(10), 1333.

Wang, Y. C., McPherson, K., Marsh, T., Gortmaker, S. L., & Brown, M. (2011). Health and economic burden of the projected obesity trends in the USA and the UK. *The Lancet*. *378*(9793), 815-825.

Wardle, J., & Beinart, H. (1981). Binge eating: A theoretical review. *British Journal of Clinical Psychology*, *20*(2), 97-109.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of personality and social psychology*, *54*(6), 1063.

Webb, C. (2000). *Psychological distress in clinical obesity: the role of eating disorder beliefs and behaviours, social comparison and shame* (Doctoral dissertation, Clinical Psychology).

Wee, C. C., Davis, R. B., Huskey, K. W., Jones, D. B., & Hamel, M. B. (2013). Quality of life among obese patients seeking weight loss surgery: the importance of obesity-related social stigma and functional status. *Journal of general internal medicine*. *28*(2), 231-238.

Weineland, S., Arvidsson, D., Kakoulidis, T. P., & Dahl, J. (2012). Acceptance and commitment therapy for bariatric surgery patients, a pilot RCT. *Obesity research & clinical practice*. *6*(1), e21-e30.

Weineland, S., Hayes, S. C., & Dahl, J. (2012). Psychological flexibility and the gains of acceptance-based treatment for post-bariatric surgery: six-month follow-up and a test of the underlying model. *Clinical obesity*. *2*(1-2), 15-24.

Wellbourne, R., Fiennes, C., Walton, P., & Kinsman, R. (2010). *The United Kingdom National Bariatric Surgery Registry: First registry report to March 2010*. Oxfordshire, United Kingdom: Dendrite Clinical Systems Ltd.

White, M. A., Kalarchian, M. A., Masheb, R. M., Marcus, M. D., & Grilo, C. M. (2010). Loss of control over eating predicts outcomes in bariatric surgery: a prospective 24-month follow-up study. *The Journal of clinical psychiatry*, *71*(2), 175.

Williamson, D. A., Gleaves, D. H., Watkins, P. C., & Schlundt, D. G. (1993). Validation of self-ideal body size discrepancy as a measure of body dissatisfaction. *Journal of Psychopathology and Behavioral Assessment*, *15*(1), 57-68.

Wnuk, S. M., Du, C. T., Van Exan, J., Wallwork, A., Warwick, K., Tremblay, L., ... & Sockalingam, S. (2018). Mindfulness-Based Eating and Awareness Training for Post-Bariatric Surgery Patients: a Feasibility Pilot Study. *Mindfulness. 9*(3), 949-960.

World Health Organisation. (2015). *Obesity and Overweight Fact Sheet Number 311*. Retrieved from https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

World Health Organization (2000). *Obesity: Preventing and Managing the Global Epidemic, Final Report of the WHO Consultation*. Retrieved from http://www.who.int/nutrition/publications/obesity/WHO_TRS_894/en/