RESEARCH THESIS

PSYCHOSOCIAL FACTORS INFLUENCING THE CONSIDERATION OF BARIATRIC SURGERY AS A TREATMENT FOR OBESITY

Claire Victoria Hamlet

A thesis submitted in fulfilment of the requirements of the University of the West of England, Bristol for the award of Professional Doctorate in Health Psychology

Department of Health and Social Sciences, Faculty of Health and Applied Sciences

University of the West of England, Bristol

August 2018

Table of Contents

In memory of my wonderful Grandmother, Marjorie Trousdale (1928-2018).

A strong woman, who instilled in me the confidence and perseverance that got me through.

Acknowledgements

Thank you to all the participants that kindly took part in this study.

Next, thank you to my supervisory team- my Director of Studies, Professor Diana Harcourt for her guidance, mentoring and patience, and Dr Tim Moss for his valuable insights.

A special thank you to Dr Paul White, for his statistical expertise and reassurance.

Thank you to my wonderful colleagues at the Centre for Appearance Research for their continued support. Especially Catrin- my personal cheerleader and source of thesis wisdom. Matt- my thesis writing buddy, our early mornings paid off! Lastly, Helena for her advice and laughter over the last couple of months.

I am also grateful to my friends and family, who offered me a much-needed escape from doctorate demands.

Lastly, thank you to my fellow trainees- I feel so blessed to have trained with such strong and supportive women.

Introduction to the thesis

The following thesis fulfils the research competency of the Professional Doctorate in Health Psychology, which consists of two parts, a systematic review and thesis. I have successfully completed and passed the systematic review, which you will find in Appendix A. This review titled 'The effect of psychosocial versus surgical weight loss interventions on body image' is the first to focus on body image changes following weight loss treatment. This review was conducted as body dissatisfaction is a key reason people seek weight loss, yet little is known about how body image changes following weight loss treatment, particularly bariatric surgery. This review highlighted that studies report bariatric surgery significantly improves body image when compared to psychosocial interventions, but that overall there is a lack of attention paid to long-term outcomes. Furthermore, I knew of emerging qualitative research indicating that bariatric surgery may actually be detrimental to body image, particularly in the long-term. This means that patients' expectation for an improved appearance following bariatric surgery may not be met. This laid the foundation for my interest in discovering the psychosocial reasons individuals pursue bariatric surgery and conducting the research project outlined in this thesis.

Abstract

This mixed methods study utilised an online survey to examine the predictors of an increased likelihood of considering bariatric surgery (BS) as a method of weight loss amongst a community sample of 432 women in the UK with a BMI ≥ 35. An embedded qualitative element sought to validate any quantitative findings and identify additional influential factors. In total 28.5% of participants agreed they would consider undergoing BS. Ordinal regression analyses on individual predictors revealed that higher internalised weight stigma (fear of stigma and self-devaluation), an external weight locus of control, reduced eating self-efficacy, higher body dissatisfaction and reduced health -related quality of life predicted an increased likelihood of considering BS. However, when all predictors were entered in the final model, only fear of being stigmatised, weight locus of control and poor health-related quality of life contributed, and accounted for 15.5% of the variance. Fear of enacted stigma was particularly influential as a 1-unit increase led to 1.075 (7.5%) increase in the odds ratio of considering BS. In addition, it mediated previous significant relationships found for eating self-efficacy, body dissatisfaction and self-devaluation. Content analysis on qualitative data highlighted additional barriers and motivators for considering BS, such as perception of risk and beliefs it will not to address the root cause of participants' obesity. The implications of the study's findings for health psychology, NHS weight management services and future research are discussed.

1. Literature Review

This section gives an overview of the incidence of obesity in the United Kingdom (UK) and the availability and take up of bariatric surgery (BS). It then reviews the literature relevant to the potential psychosocial factors influencing individuals to select BS. Finally, it concludes with the research aims and hypotheses.

1.1 Bariatric surgery in the United Kingdom

Obesity, defined as a body mass index (BMI) of ≥30 (World Health Organisation [WHO], 2015) has become one of the greatest health issues in the world. It is reported that 27% of adults in the UK are living with obesity and this rate is increasing annually (Fuller, Mindell & Prior, 2016). Whilst commonly attributed to excess caloric intake relative to expenditure, it is increasingly acknowledged that obesity is a complex disease (National Institute for Health and Clinical Excellence [NICE], 2014), developing as a result of many interrelated aetiologies, including behavioural, psychological, genetic and environmental factors (WHO, 2013). After smoking, obesity has the second largest impact on health (Dobbs et al., 2014). It is estimated that the UK's National Health Service (NHS) spent £6.1 billion on overweight and obesity-related ill health between 2014 and 2015 (Public Health England, 2017). As weight increases, so do the risks of developing serious health conditions, such as Type 2 diabetes, cardiovascular disease and cancer, all of which can lead to premature mortality (Douglas et al., 2015). Therefore, the development of effective interventions to reduce the prevalence of obesity is considered a priority.

Bariatric surgery is the generic term to define surgical procedures performed to restrict the space for food in the stomach in order to achieve weight loss (Elder & Wolfe, 2007). BS is increasingly being proposed as a permanent solution to the obesity 'crisis', as research consistently demonstrates that it is more effective for short and long-term weight loss when compared to non-surgical methods (Buchwald & Oien, 2013; Douglas et al., 2015). For example, BS typically produces weight loss of more than 50% of total body weight one year after surgery (Welbourn et al., 2014), in comparison to 8 to 10% for interventions based on diet and exercise, or medication

(Sarwer, Wadden & Fabricore, 2005). Furthermore, BS can improve, and sometimes eliminate the comorbidities typically associated with obesity, including Type 2 diabetes, high cholesterol, hypertension and heart disease (Douglas et al., 2015). Therefore, it is reported to offer financial savings for the NHS in the long-term (Royal College of Surgeons 2014).

BS typically results in weight loss, because it decreases the size of the stomach, resulting in early satiety and therefore reduced calorie intake (Elder & Wolfe, 2007). In the UK, the most common BS procedures are gastric bypass, sleeve gastrectomy and gastric band (Welbourn et al., 2014). Gastric bypass is most commonly performed, accounting for 60% of all procedures performed by the NHS in 2013 (Welbourn et al., 2014). Here, the stomach is divided and the small intestine rearranged so food enters a small pouch, rather than the whole stomach (Board, 2013). Sleeve gastrectomy involves removing a large portion of the stomach to reduce its capacity (Blazeby, 2014). Lastly, gastric banding is recommended for those with a lower BMI, and involves placing a band around the stomach. However, gastric banding procedures have reduced in recent years, as although reversible, it is associated with more complications than other procedures, such as slippage of the band (Welbourn et al., 2014).

NICE (2014) recommends BS may be suitable, and thus considered for those living with a BMI of ≥ 40, or ≥ 35 if obesity-related disease is present (e.g. Type 2 diabetes). However, it should only be considered when "all appropriate non-surgical measures have been tried but have failed to achieve or maintain adequate, clinically beneficial weight loss for at least 6 months" (NICE, 2014 p.27). Current guidance (Department of Health, 2013) recommends that weight management be delivered using a tiered approach (Figure 1). Tier 1 includes population-wide interventions, such as national campaigns or initiatives. Tier 2 is delivered within primary care, including advice from the General Practitioner (GP) or nurse, or referral to a community weight management programme (e.g. Slimming World or Weight Watchers). Tier 3 is more intensive, with interventions delivered by a multidisciplinary team which typically includes a specialist physician, nurse, psychologist, dietitian and physiotherapist. Tier 3 also includes assessment for BS, whereas Tier 4 delivers BS (Royal College of Surgeons 2014).

Recent reports claim that BS is underutilised in the UK, because the 18,283 operations performed between 2011 and 2013 represent less than 1% of those who could benefit (Welbourn et al., 2016). Explanations include changes in the commissioning of obesity treatment in recent years, which mean that Tier 3 services are not widely available across the UK. This precludes some from accessing BS and multidisciplinary input for weight loss (Wass & Finer, 2013). Additionally, GPs deliver primary care in the UK and are usually the initial port of call for those seeking assistance to lose weight, acting as gatekeepers to further specialist intervention on the NHS. However, the changing landscape of weight management services has led to confusion and a lack of confidence amongst GPs on how to access appropriate treatment for their patients (Kynaston, Matchell & Bruce, 2012; Sheewin & Larvin, 2015). It is also possible that the prolonged tiered weight management pathway deters patients from attempting to access specialist treatment on the NHS, and therefore the opportunity to receive BS (Owen-Smith et al., 2013). For example, if a patient is referred to Tier 3, they must receive care from a specialist multidisciplinary team for 12 to 24 months before being considered for surgery (Welbourn et al., 2016). This can leave patients feeling disheartened and withdrawing from Tier 3 services (Owen-Smith et al., 2013).

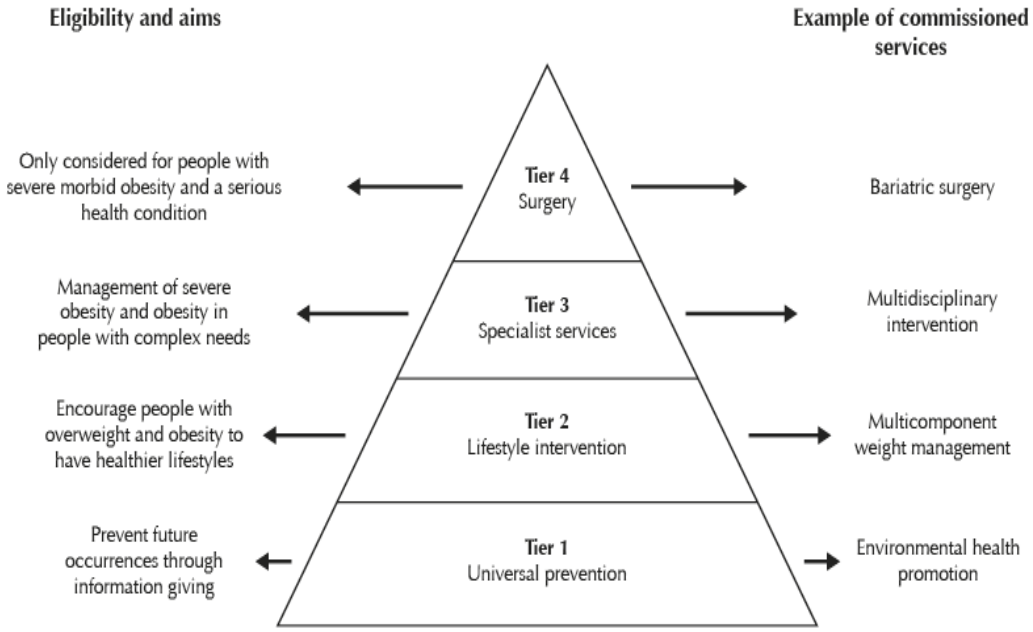


Figure 1: The UK Obesity Care Pathway (Department of Health, 2013). Contains public sector information licensed under the Open Government Licence v3.0.

In addition to systemic issues preventing some individuals living with obesity from accessing BS through the NHS, research outside of the UK has found that the risks of undergoing surgery is the most common deterrent. For example, in the United States, Stanford et al. (2015) found that only 32% of a sample of 920 adults living with obesity (BMI >40) indicated surgery would be an option for them, with most deeming it too risky. Additionally, Wharton et al. (2016) found that only 33.3% of participants (BMI >35) already attending a weight management clinic in Canada were interested in BS, with risks and side effects the most significant barriers. This concern is not unwarranted. BS is an invasive procedure and although mortality rates are low (1.7 per 1,000 patients; Welbourn et al., 2014), the procedure carries risks of adverse effects to the anesthesia, gastrointestinal issues such as bowel obstruction, stomach perforation and excessive bleeding, and longer-term effects such as malnutrition, nausea and vomiting (Schulman & Thompson, 2017; Natvik, Gjengedal & Raheim, 2013). Furthermore, BS can significantly impact upon an individual's lifestyle, as a lifelong commitment to behaviour change (e.g. changing eating habits) is required for a successful weight loss outcome (Kewin & Boyle, 2011). Therefore, when making a decision about undergoing BS, patients are required to weigh up the benefits of the procedure against these risks and consequences.

Despite the potential risks and consequences associated with BS, there is still growing interest in the procedure worldwide (Giardino et al., 2017). Figures suggest that over 6,000 individuals each year elect to undergo BS on the NHS (Welbourn et al., 2014). A small number of studies have explored the reasons individuals choose BS, yet these tend to focus on health reasons. For example, Dixon et al. (2009) examined the reasons a sample of 227 patients decided to have BS. They reported the top three reasons were to improve health (40 %), to improve medical conditions (29%) and to improve appearance (18%). Liberton et al. (2004) administered a questionnaire to 208 patients one year after surgery. Patients were asked to rank six statements (medical condition, health effect, appearance, physical fitness, physical limitation and embarrassment) reflecting the reasons why they sought surgery. In this study 52% of patients rated health or medical conditions as their top reason. Munoz et al. (2007) asked the question "Why are you seeking weight loss

surgery" and coded participants' answers. They reported found that 73.4% of individuals seeking BS cited existing medical conditions as the primary motivation, with the next frequently cited factor being the threat of developing associated co-morbidities, such as Type 2 diabetes (16.5%). Schauer et al. (2014) used a prospective design to assess potential predictors of BS in 200 individuals self-referring to attend an 'interest group meeting' for BS at a hospital in the United States. At the start of the interest group, participants completed a survey that included quality of life measures, an assessment regarding knowledge of bariatric surgical risks, the decisional conflict scale, the decision self-efficacy scale and potential clinical predictors of surgery. Patients that had proceeded or planned to have BS at the 12 month follow-up (33%), had lower decisional conflict about BS, lower quality of life and had checked their insurance prior to attending the group. Authors concluded the strongest predictor was a low decisional conflict score. In contrast to other studies (e.g. Liberton et al., 2004; Munoz, 2007; Dixon, 2009), this study found that health factors, such as BMI and obesity related health conditions were not a significant predictor.

A limitation of the above-mentioned studies exploring factors motivating individuals to undergo BS, is that they often involve those who have undergone, or are actively seeking BS. This means reports can be retrospective and patients often select their reasons from a list determined by the researchers, which tend to focus on health reasons. Furthermore, they are conducted in clinical settings, whereby patients could feel pressure to state improving health as primary reason. However, given the psychosocial burden of obesity, health reasons are unlikely to be the sole motivation for pursuing BS. Obesity is not tolerated comfortably by society (Luck-Sikorski, Ridel-Heller & Phelan, 2017) and whilst there are multiple contributing factors, including complex biological and environmental factors, obesity is still upheld as an easily reversed and individual problem (Sharma et al., 2011). Those living with obesity are subject to discrimination in everyday life and a constant pressure to lose weight (Puhl & Heuer, 2009). Obesity can also result in negative psychosocial outcomes, such as internalised weight stigma, low self-esteem, body dissatisfaction and poorer quality of life (Hunger & Major, 2015). Therefore, psychosocial

factors pertinent to living with obesity are likely to be highly influential in the pursuit of BS, but remain poorly understood in this context.

It is becoming increasingly important to gain a greater understanding of the psychosocial factors influencing individuals to pursue BS, as these may not be addressed by surgery alone but could result in poorer post-surgical outcomes, including weight gain. For example, it is reported that around 20-40% of patients regain the weight lost within two years (Ferchak & Meneghini, 2004; Elkins et al., 2005; Sarwer, Wadden, & Fabricatore, 2005; Livhits, et al., 2010), with the primary reason cited as being non-compliance with post-procedural behaviour change, particularly adherence to dietary advice (Elkins et al., 2005). Indeed, research has found a higher prevalence of disordered eating behaviours (e.g. binge eating) in those presenting for BS, compared to those who do not seek the procedure (Karlachian et al., 2002). Whilst BS may be more effective for weight loss than non-surgical interventions, its impact on psychosocial health, including disordered eating has yet to be determined, particularly in the long-term (Ivezaj & Grilo, 2018).

In summary, BS is invasive, associated with risks and side-effects and has a long-term impact on an individual's lifestyle. Furthermore, the long-term physical and psychosocial outcomes of the procedure are yet to be determined. Despite this, BS is still promoted by the medical profession as the most effective solution for obesity, and individuals are turning to BS as a way to achieve weight loss. However, given the psychosocial burden of obesity, health reasons are unlikely to be the sole motivation for seeking surgery. A greater understanding of the psychosocial factors predicting individuals to pursue BS is required as such factors may be an important influence on both physical and psychosocial post-surgical outcomes. Understanding these factors may help to improve bariatric care pre and post-operatively. Whilst the literature pertaining to the psychosocial predictors of pursuing BS is scarce, existing obesity research, and emerging qualitative research specific to BS, highlights factors that might be predictive in the consideration of BS. This literature will now be reviewed.

1.2 Weight stigma

Weight stigma, also known as weight bias, is defined as the social devaluation of individuals perceived to be living with excess weight, which leads to prejudice, discrimination, and negative stereotyping of those people (Tomiyama, 2014; Puhl & Heuer, 2009). Weight stigma is pervasive and debilitating, yet it remains acceptable in society (Wang, Brownell & Wadden, 2004; Brownell & Puhl, 2005). Whilst there are multiple contributing factors to obesity, including complex biological and environmental factors, this is not widely recognised amongst the general public, therefore obesity is upheld as an easily reversed and individual problem (Sharma et al, 2011).

Individuals living with obesity are subjected to a number of stereotypes, including assumptions they are lazy, weak-willed, unintelligent and non-compliant with weight reduction strategies (Puhl & Heuer, 2010). One reason for these stereotypes is the underlying belief about the responsibility of the individual for both *causing* and *resolving* obesity (Puhl & Heuer, 2010). Such beliefs can be explained by attribution theory, the process by which individuals explain the causes of behaviour and events (Weiner 1988). Negative attributions about obesity are strongly influenced by society, which places a heavy emphasis on the individual as the locus of change, framing them as personally responsible, as opposed to the environment or society (Luck-Sikorski, Ridel-Heller & Phelan, 2017). In the attribution model of societal discrimination (Corrigan, 2003), these causal beliefs about the controllability of obesity result in stigmatising attitudes, and potentially stigmatising behaviour. Therefore, individuals living with obesity experience direct stigma as a result, with both psychological and physical health costs beyond the effects of excessive weight itself (O'Brien et al., 2016; Schwartz & Brownell, 2008; Puhl & Brownwell, 2001). However, internalised weight stigma could lead to more distress and negative health outcomes than actual experiences of weight stigma (Mensinger & Meadows, 2017).

Internalised weight stigma is a multidimensional construct, involving negative emotions and beliefs about being overweight, often leading to feelings of incompetence and self-hatred (Hilbert et al., 2013). If individuals know they belong to a group that is highly stigmatised, they are acutely

aware of the possibility for rejection and stigma in their daily lives and become highly vigilant and in fear of it (Phelan et al., 2015; Lillis et al., 2010; Link & Phelan, 2001). Social identity theory can help to understand internalised weight self-stigma. This theory proposes that stereotypes arise due to a self-categorisation process, in which individuals place themselves into social categories and develop a positive social identity by making comparisons to others (Tajfel & Turner, 1979). The desire to maintain a positive social identity is central to prejudice, which occurs because members of an in-group stereotype others who do not hold the same attributes as their in-group (Puhl & Brownell, 2001). However, those living with obesity often lack a preference for their 'in-group'. For example, Wang, Brownell and Wadden (2004) studied the internalisation of anti-fat bias amongst overweight individuals participating in a weight-loss research programme by using the Implicit Association Test (IAT), a performance-based measure of bias. They found that overweight individuals held strong, consistent and negative implicit associations about being overweight and no preference for in-group members. Furthermore, they devalued others who were overweight by attributing stereotypes to them such as being lazy and stupid. They concluded that, those living with obesity are not protected by in-group status, rather they stigmatise themselves and others living with obesity, which serves to perpetuate weight stigma (Wang, Brownell & Wadden, 2004). However, a limitation of this study was the participants were already enrolled in a research weight loss programme and are not representative of the general population. Further, the impact of anti-fat bias internalisation on other psychosocial outcomes (e.g. weight loss, psychosocial wellbeing) was not explored.

Obesity stigma has been promoted as a public health tool, with the rationale that fear can motivate an individual to change their behaviour and lose weight (Bayer, 2008). For example, obesity prevention campaigns often employ fear-based tactics by highlighting the detrimental consequences of living with excess weight (Ruiter, Abraham & Kok, 2001). Whilst fear-based appeals have been found to be effective for promoting behaviour change if they include practical advice for alternative action (Witte & Allen, 2000), obesity-related campaigns are criticised for being simplistic and failing to provide actionable advice (Lewis et al., 2010). Additionally, they

typically communicate the idea that weight is a personal responsibility and fail to highlight external factors that can make controlling one's weight more difficult (Puhl & Heuer, 2010; Vartanian & Smyth, 2013). This can promote obesity stigma, which may unintentionally facilitate unhealthy weight control behaviours leading to weight gain (Ruiter, Abraham & Kok, 2001). In their review of the evidence that weight stigma motivates individuals to adopt healthier behaviours, Puhl and Heuer (2010) concluded that weight stigma is not beneficial as a public health tool. Firstly, they highlight that weight stigmatisation has increased considerably over the past few decades and if it were effective at motivating weight loss, obesity rates would not have continued to rise. Secondly, they highlight the mounting evidence that weight stigma actually poses numerous risks to physical and psychological health, which can lead to weight gain and difficulty with weight loss. For example, research has found that internalised weight self-stigma has been associated with depression, anxiety, low self-esteem, body dissatisfaction, eating disorders and low self-efficacy for weight loss (Carels et al., 2010; Roberto, Sysko & Bush, 2012; Durso & Latner; 2008). Furthermore, the threat to the social identity of those living with obesity is physiologically stressful, impairing the self-regulation strategies and health behaviours (e.g. diet and exercise) required to facilitate effective weight loss (Hunger et al., 2015; Schvey, Puhl & Brownwell, 2012; Phelan et al., 2015, Pearl & Puhl, 2018). Therefore, rather than successful weight loss, weight stigma is likely to lead to individuals suffering poorer mental health and engaging in unhealthy weight loss attempts, resulting in an increased chance of further weight gain or weight cycling (Neumark, Wall, Story & Standish, 2012; Tomiyama, 2014).

Whilst the majority of research indicates weight stigma has negative consequences for weight-related behaviour, there is one contradictory study. Latner et al. (2009) found that greater history of weight stigma was associated with increased weight loss and maintenance in women (N=185) attending a formal weight loss programme. Findings indicated that initial BMI, more experiences of stigma, lower body dissatisfaction and greater fear of fat predicted greater weight loss. Higher initial BMI and more stigmatising experiences predicted greater weight maintenance after six months in treatment. They concluded that although stigmatising experiences were

psychologically harmful, they might motivate participants. However, these findings were obtained in the context of formal weight loss treatment, which makes the findings difficult to generalise to a population outside of this setting. Additionally, the study was unique in that those who were unable to lose a predetermined amount of weight each month were removed from the programme. Therefore, participants were unlikely to be typical of most women attempting weight loss. Lastly, participants were required to recall historical experiences of weight stigma, which may have been inaccurate or affected by partaking in the programme.

Health professionals, including those specialising in obesity are not exempt from weight stigmatising attitudes (Swift et al., 2013; Schwartz et al., 2003). These can translate into health inequities, leaving those living with obesity vulnerable to unfair treatment (Ekeagwu, 2017). For example, Street, Gordon and Haidet (2007) discovered providers engaged less in patient-centred communications with patients who were living with obesity. In addition, the weight stigmatising attitudes of health professionals, in addition to an increased focus on the negative health impact of obesity, has the potential to humiliate and alienate patients living with obesity from accessing healthcare. Studies show that women with a higher BMI are less likely to seek healthcare than those with a lower BMI, reporting less for cervical, breast and colorectal cancer screenings (Reidpath et al., 2002; Rosen & Scneider, 2004; Wee et al., 2000). Explanations for this avoidance include the fear of being fat shamed or receiving unsolicited advice to lose weight (Drury & Louis, 2002; Lee & Pause, 2016). Indeed, Mensinger, Tylka and Calamari (2018) surveyed 313 individuals from a U.S. health panel database and found that the relationship between BMI and healthcare avoidance was explained by weight stigma, body shame and stress about attending healthcare services. A strength of this study was its inclusion of both experienced and internalised weight stigma measures. However, this study investigated general healthcare avoidance, and did not explore avoidance of weight-related services. Indeed, there is a lack of research exploring whether weight stigma also prevents those living with obesity from seeking help specifically to manage their weight. However, the aforementioned findings from the general healthcare literature suggests it could, potentially leading to a

discrepancy between the need for and use of weight related treatment in the UK. This could leave many without the benefit of assistance to achieve weight loss and could be potential risk factor for increased weight gain and reaching the point where BS is viewed as the only option.

One motivation for losing weight is to escape negative judgements and treatment from others (Dixon et al., 2009). Through examining stigma in individuals following weight loss, Granberg (2011) developed a theory of stigma exit, defined as "the process of discarding stigmatised self-definitions and transitioning toward identity meanings that are 'normal' with respect to the former stigmatised category" (Granberg, 2011, p.31). Therefore, individuals will take action to change their stigmatised obesity status through weight loss. Despite the potential relevance of weight stigma on the desire to lose weight through BS, there is a paucity of research exploring its influence. Sharma et al. (2011) found that in a sample of patients (mean BMI=40) attending a weight management clinic (n=115), 100% of those who selected BS (n=14), rather than other weight loss methods (e.g. lifestyle interventions and meal replacement plans), reported experiencing weight discrimination based on a single item question "Have you ever experienced weight discrimination, or had a negative experience because of your weight?'. However, this was a small sample, and experienced stigma was based upon one question created by the researchers, rather than a validated questionnaire, and was not explored as a predictor of BS uptake. Furthermore, this did not assess internalised weight stigma, which (as highlighted above) is more harmful than direct experiences of stigma (Mensinger & Meadows, 2017).

In summary, when weight is viewed as a personal responsibility prejudicial attitudes towards those living with obesity can entail. Overall, the evidence suggests that weight stigma is generally demotivating for behaviour change, which contrasts with current public health efforts. Obesity stigma can alienate those living with obesity from accessing healthcare and, potentially, weight loss treatment. This could leave them without the benefit of assistance to manage weight loss, with implications for failed attempts, weight gain and potentially considering BS to achieve weight loss. Furthermore, those living with obesity can internalise weight stigma, and rather than being a motivation to lose weight, it can have the opposite effect. This leaves

individuals in fear of being stigmatised in their everyday lives, but they can exit this stigmatised identity by losing weight.

1.3 Weight locus of control

Locus of control (LoC) refers to the degree in which a person believes that the actions they take will be effective enough to control events in their lives (Rotter, 1966) and it is often used to explain human behaviour. Those with an internal LoC believe they can control events affecting them; however those with an external LoC believe that their success or failure at a task is due to outside influences (Wallston, 2005). LoC has been applied extensively in the field of health psychology to predict health behaviours. Those with an internal health LoC believe that health events are a consequence of their own actions, willpower or sustained effort, and research shows that these individuals are more likely to show responsibility for their actions and engage in health-promoting behaviour than externals. Therefore, those with an internal LoC should have more success in performing the behaviours required to lose weight (Neymtoin & Nemzer, 2014). However, research exploring whether general health LoC can predict weight loss has historically produced mixed findings (Texeira et al., 2005). Consequently, researchers have advocated for the use of domain specific, rather than general LoC measures (Holt, Clark and Creuter, 2001). One scale capturing LoC regarding an individual's weight loss is the four-item Weight Locus of Control scale (WLOC) (Saltzer, 1982). Those with an internal WLoC believe that their weight is influenced by their own actions, whereas externals believe it is due to fate or factors out of their control (Martin, Veer & Perevan, 2007). Initially the WLOC scale was validated in two independent studies. The first in a college student sample, which found that those who were internally orientated were motivated to lose weight by their personal attitudes, whereas social pressure was the major factor for those externally orientated (Saltzer, 1982). The second study, with a sample of women beginning a weight loss programme, found that those who were internal were more likely to complete the full week programme than externals (Saltzer, 1982). Holt, Clark & Creuter (2001) found that externals are less likely to lose weight through their own endeavours than internals. Results from these studies suggest those with an external WLoC are less likely to

be successful in weight loss attempts and could benefit more from external assistance to manage their weight than those with an internal WLoC (Tucker et al., 2011).

To date, it appears no research has explored how an individual's WLoC may influence their preferences for weight loss treatment, including BS. However, as control features prominently in qualitative research exploring reasons for undergoing BS, it could be influential. For example, Ogden, Clementi and Aylwin (2006) reported the concept of control was significant in people's narratives of undergoing BS and it was central to many of their qualitative themes. Many participants believed their weight gain was due to factors out of their control and therefore did not believe they could lose weight through their own endeavours. They felt that undergoing surgery would hand over control to an external force because their weight and eating habits were out of control. Additionally, Knutsen, Terragni and Foss (2012) interviewed those awaiting, or having already undergone BS and reported control appeared as a reoccurring theme. In particular, participants believed they lacked self-discipline and viewed BS as the only available opportunity for them to take control of their weight. This suggests that those who possess an external WLoC may be more likely to consider BS due a belief they cannot control their weight. However, an external WLoC as an influential factor for considering (and therefore potentially undergoing) BS could have implications for post-surgical outcomes since individuals have to make significant behavioural changes after surgery in order for the procedure to be a 'success' in terms of weight loss. WLoC is a difficult trait to change (Holt, Clark & Creuter, 2001), so it is possible that those who are externally orientated could struggle with adopting the long-term behavioural changes that are required.

In summary, those who have an external WLoC are less likely to believe they can control their weight, and therefore this could be a reason to pursue BS. Although qualitative research has reported that those who pursue BS may do so because they believe their weight is out of their personal control, no research to date has empirically explored whether WLoC influences the consideration of BS.

1.4 Eating self-efficacy

While LoC is described as the belief that a behaviour will lead to a desired outcome (Rotter, 1966), self-efficacy is defined as one's belief in their **own** ability to perform a task or behaviour (Bandura, 1977). Self-efficacy has often been used to predict human health behaviour change, since individuals who have high self-efficacy will be more adept to deal with challenges, obstacles or failures and feel more able to master challenging tasks, including weight loss (Annesi & Gorjala, 2010).

Eating self-efficacy is defined as an individual's belief in their ability to manage their eating behaviour in challenging situations (e.g. negative emotional states, social pressures). It is an important predictor of weight gain and obesity (Ames et al., 2012; Nezami et al., 2016), as those who are low in eating self-efficacy have been found to be at increased risk of engaging in unhealthy eating behaviours (Masalu & Astrom, 2001). Self-efficacy for a particular behaviour or task is often linked to previous successes in accomplishing it (Batsis et al., 2009). Therefore, eating self-efficacy is an important concept to consider in relation to pursuing BS, as individuals living with obesity often report multiple failed weight loss attempts, which further diminishes their self-efficacy and chances of successful weight loss (Pearl & Lebowitz., 2014; Burnette & Finkel, 2012). Indeed, research has found those presenting for BS in a clinical setting have an extensive history of failed diet attempts, which was a motivating factor to pursue BS (Gibbons et al., 2006). Furthermore, qualitative research with individuals who have undergone BS has found that individuals view BS as last resort for weight loss when they feel they have tried and failed at other less drastic measures and do not possess the self-efficacy to lose weight without the assistance of surgery (Jumbe & Meyrick, 2018; Ogden & Hollywood, 2016). Despite these findings indicating eating self-efficacy is low in those selecting BS, it has not been studied as a predictive factor for considering or pursuing BS. However, patients are required to make significant changes to their diet and eating habits post BS (e.g. smaller portions). Therefore they will need self-efficacy to implement these changes, yet it unknown whether surgery alone can instigate this.

Eating self-efficacy is important for weight loss, yet experimental studies have found it to be negatively influenced by weight stigma. In their experiment, Seacat & Mickelson (2009) found that overweight women who were primed to think about weight-related stereotypes reported lower levels of self-efficacy to control their diet following it. Supporting this finding, Major et al. (2014) found that reading stigmatising media messages reduced feelings of self-efficacy for being able to control diet in those who perceive themselves to be overweight. Additionally, experiences of being stigmatised due to obesity have been found to predict overeating (Ashmore, Friedman, Reichmann & Musante, 2008; Schvey, Puhl & Brownell, 2014), with one explanation that this strategy is used to relieve self-stigmatising thoughts and worries (Weineland, 2012). This research indicates the pervasive nature of weight stigma can erode eating self-efficacy, with potential implications for initiating and maintaining the eating behaviours that are conducive for weight loss, including after BS.

One proposed theory of how stigma can influence self-efficacy in achieving goals is the "Why Try" effect, a process model of self-stigma primarily applied in the field of mental health. The "Why Try" effect is said to be a consequence of self-stigma, due to a sense of futility because individuals believe they are unworthy or incapable of achieving personal goals (Corrigan, 2009). This model (Figure 2) has three components (1) cognitive processes of self-stigma (2) mediating processes, including low self-esteem and self-efficacy and (3) the impact on goal-related behaviours and achievements. Recently Hilbert et al. (2013) have found evidence that this model is applicable to those living with obesity. Results of their cross-sectional research using a large general population sample (N=1158) found that in addition to leading to low self-efficacy for weight loss, weight stigma appears to make individuals more vulnerable to the negative effects of weight bias internalisation, including decreased health status and increased health care utilisation. This was in contrast to the study by Mensinger, Tylka and Calamari (2018) mentioned previously (p.19) who found that internalised weight stigma predicted increased, rather than decreased healthcare utilisation. A limitation of the study by Hilbert et al. (2013) was that they did not operationalise the type of healthcare service being used, or investigate whether weight stigma was

applicable to decreased use of obesity-related healthcare. An additional limitation was the cross-sectional nature of the study, which prevents causal inferences.

The process model of self-stigma is potentially applicable to how individuals come to view BS as their only hope of losing weight. This is because weight stigma appears to decrease one's eating self-efficacy, which is important for weight loss. Diminishing eating self-efficacy is more likely to result in failed weight loss attempts and feelings of hopelessness and further weight gain.

In summary, eating self-efficacy is crucial for weight loss attempts. Those living with obesity and presenting for BS often have a history of failed weight loss attempts and low eating self-efficacy. Qualitative research indicates that participants consider BS a last resort, however it is currently unclear whether low eating self-efficacy is predictive of considering this method of weight loss. Furthermore, eating self-efficacy might be negatively influenced by weight stigma and individuals may then believe they are unworthy or incapable of achieving weight loss (i.e. a potential reason they may consider BS).

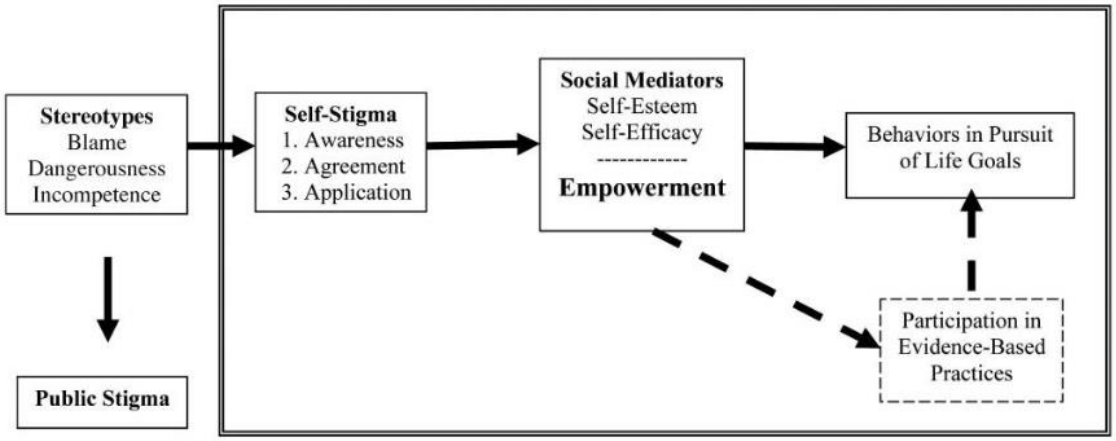


Figure 2. The "Why Try" effect. Reproduced with copyright permission of the publisher John Wiley and Sons.

1.6 Health-related quality of life

Health-related Quality of Life (HRQoL) and Quality of Life (QoL) are often used interchangeably in the literature, but are distinct from each other (Karimi & Brazier, 2016). QoL is said to be a broader concept which covers all aspects of life, whereas HRQoL focuses on measuring the impact of an illness, and often the impact of its treatment. As such, it is currently considered a vital outcome to measure following medical treatment worldwide, including after BS (Monpellier et al., 2017; Ogden & Hollywood, 2016).

The majority of published studies indicate that obesity impairs HRQoL and that higher degrees of obesity are associated with greater impairment (Fontaine & Barofsky, 2001). As those presenting for BS typically have a BMI ≥35, impaired HRQoL is common in this population. Poor HRQoL has been identified as a primary motivator for BS since HRQoL is poorer amongst this group when compared to those with a similar BMI but not seeking BS (Kolotkin & Ronette, 2012; Miras at al., 2015). Further, as already discussed (section 1.1), the limited research exploring motivations for BS has found that health-related factors are key (Liberton, 2004; Dixon, 2009: Munoz et al., 2007). This research suggests that patients are seeking BS due to the impact of obesity on their HRQoL and a desire to improve their health, yet whether it statistically influences the consideration of BS remains unclear.

Given that HRQoL is a factor influencing individuals to have BS, patients can have high expectations for improved HRQoL following surgery. Research exploring the effect of BS on HRQoL among those living with morbid obesity (BMI ≥40) indicates it can produce significant and sustained improvements in many HRQoL domains in the short to medium term (e.g. up to 5 years), however the impact on psychological outcomes is less clear (Driscoll et al., 2016). Additionally, the dearth of research pertaining to the long-term impact of BS on HRQoL has been questioned in recent literature (Kroes et al., 2016; Lindekilde, Gladstone & Lubeck, 2015). This is concerning, as it is suggested that improvements in HRQoL might not be maintained in the longer term and could decline one-year post-surgery with weight regain (Karlsson et al.,

2007). Additionally, health issues can arise from undergoing BS, which can negatively affect HRQoL post-surgery. For example, gastrointestinal symptoms can occur, particularly if there is poor adherence to the post-operative diet. Discomfort due to ingested food being lodged in the gastric pouch is reported to occur in 43% of gastric by-pass patients (Mitchell, Lancaster & Burgard, 2001). Vomiting can also occur and, although it is most common in the first few months postoperatively, it can continue and lead to complications such as malnutrition (Natvik, Gjengedal & Raheim, 2013). Further, in addition to the negative impact on body image mentioned previously, excess skin can also lead to significant physical and functional problems, for example fungal infections, itching, mobility problems and finding clothes to fit properly, which can impact on HRQoL (Biorserud, Olbres & Olsen, 2009; Kitzinger et al., 2012, Gilmartin, 2016).

BS can also affect mental health. Research indicates that disordered eating (for example, binge eating and loss of control eating (de Zwaan et al., 2010; Karlachian et al., 2002; White at al., 2010; Colles, Dixon & O'Brien, 2012) could (re)appear post-surgery, with implications for weight loss. Increased rates of problem drinking have been reported in those who undergo BS, as patients who can no longer eat normal amounts of food substitute their food addiction with alcohol (King et al., 2012). Additionally, whilst existing depression may improve, it has also been found to continue following BS, with implications for increased suicide, which has found to be significantly higher in BS patients when compared to those that do not have surgery (Adams et al., 2007; Tindle et al., 2010).

However, the relationship between higher BMI and poorer HRQoL may be explained by internalised weight stigma. In a study examining the moderating role of internalised weight stigma on the association between higher BMI and poorer physical HRQoL, the authors found that the association between BMI and poor HRQoL was found only in individuals reporting high levels of internalised weight stigma (Latner et al., 2014). Suggesting that it is internalised stigma, rather than higher BMI that explains poorer HRQoL. Indeed, longitudinal research has

also found that those living with obesity and reporting greater weight bias internalisation, had greater decline in overall health over 10 years than those who did not (Schafer & Ferarro, 2011).

It is evident that health-related factors are key in decisions for those actively seeking BS, and are therefore likely to be in the consideration of BS. This means individuals who seek BS may have high expectations for it improving their HRQoL. However, there is a possibility that these expectations may not be met as new health issues could emerge post-surgery, or existing issues persist. Additionally, emerging research suggests that poor HRQoL in those living with obesity can be affected by internalised weight stigma, but this has not yet been explored in amongst people considering or seeking BS.

1.5 Body dissatisfaction

Body dissatisfaction (negative thoughts and feelings about the body) is positively associated with BMI, and therefore reported as one of the most consistent outcomes of obesity (Sarwer, Thomson & Cash, 2005; Jumbe, Hamlet & Meyrick, 2017). This is not surprising, as modern Western culture promotes thinness and stigmatises those of larger body sizes - messages that individuals living with obesity can internalise, leading them to feel negatively about their appearance (Schwartz and Brownell, 2004). Body dissatisfaction is characterised by behaviours such as a preoccupation with weight, self-devaluation and avoidance of exposing one's body. It is also associated with indictors of psychological distress such as low-self-esteem and social anxiety (Puhl & Heuer, 2009). Body dissatisfaction is also related to a range of negative health behaviours, including a desire for cosmetic surgery (Calogero et al, 2014; Stice, 2006), unhealthy eating behaviours, such as binge eating and restive dieting (Stice & Shaw, 2004) and exercise avoidance (Pridgeon & Grogan, 2012).

Body dissatisfaction is reported as a significant reason why individuals seek weight loss treatment (Sarwer, Thompson & Cash, 2005; Friedman et al., 2002) and qualitative research reports that body dissatisfaction is a reason individuals undergo BS (Munoz et al., 2007; Rosenberger, Henderson and Carlos, 2006). Indeed, women seeking BS have been found to possess higher

levels of body dissatisfaction when compared to normative and non-clinical samples of obese women not seeking it (Wee et al., 2006; Ghai et al., 2014).

Weight is a source of anxiety and dissatisfaction for many women and men, who can possess a concept of their 'ideal weight'. If BS is successful, patients can expect to lose around 55% of excess body weight (Buchwald, 2009). However, research has found that those seeking BS desire weight loss beyond what is realistically expected from the procedure and are therefore willing to accept substantial risks to achieve this weight loss. Wee et al. (2006) explored the extent to which patients were willing to risk for a 'cure' to their obesity. They found that patients' desired weight was a 94% loss of their excess body weight, despite it being unlikely that they would achieve this. In a similar study with 654 patients, Wee et al. (2013) found that most (84.8%) were willing to accept some risk of dying to undergo BS, but a smaller majority (57.5%) would be willing if it meant they would only lose 20% of their body weight. This indicates that dissatisfaction related to current weight status is potentially a key motivator to undergoing BS, and that patients can have high expectations for weight loss from the procedure.

A recent systematic review reports that, on the whole, body image is significantly improved post-BS, but highlights the lack of long-term follow-up (Ivezaj & Grilo, 2018). This is problematic as weight loss typically occurs during the first 6 months after BS and then slows down (Bond et al., 2009). Therefore, it is possible that initial body image improvements will not be maintained in the long-term. Furthermore, qualitative research suggests that BS can be detrimental to long-term body image due to bodily changes that come with rapid weight loss. For example, patients can be left with scarring from the surgery, as well as sagging skin and excess soft tissue, this can result in body dissatisfaction and poor psychosocial health outcomes (Gilmartin, 2013). One study of 160 patients 8-48 months after BS found that although individuals were happy with their weight loss following BS, 70% (n=112) reported that the resulting excess skin negatively affected their appearance (Kinzl et al., 2003). Indeed, appearance dissatisfaction following BS due to excess skin is one of the reasons why many desire body-contouring surgery at a later date, although this

is not routinely offered on the NHS (Dunne et al., 2017). Therefore, body dissatisfaction due to weight status may transfer to the post-surgical appearance of the body and patients' expectations for improved appearance may not be met. Furthermore, as body dissatisfaction can lead to a range of unhealthy behaviours such as binge eating and restrictive dieting (Stice & Shaw, 2004) and exercise avoidance (Pridgeon & Grogan, 2012), body dissatisfaction could have implications for the success of BS in terms of weight loss and improved health.

Current Western society values thinness rather than being larger. As such, it may be the experience and internalisation of weight stigma, rather than higher body weight per se, that results in body dissatisfaction. Research is starting to demonstrate significant associations between body dissatisfaction and experiences of weight stigma. A recent systematic review that sought to determine the relationship between internalised weight stigma and body image (Pearl & Puhl, 2018), found that body dissatisfaction was consistently and significantly associated with the internalisation of weight stigma, and many of the studies reported strong correlations. These associations were present amongst community samples, as well as those seeking weight loss treatment and presenting for BS, and significant even after controlling for BMI. Further, increasingly research is highlighting how weight stigma might actually mediate the relationship between BMI and poor psychological outcomes, including body dissatisfaction. For example, Stevens et al. (2017) examined lifetime weight stigma as a mediator between current BMI and body image dissatisfaction and depression in 299 female undergraduate students not necessarily living with obesity. They found that weight stigma significantly mediated the relationship between BMI and body image dissatisfaction. However, a limitation of this study was that it measured experienced lifetime weight stigmatisation, which relies on recall of these experiences. Further, it failed to measure internalised weight stigma, which is claimed to be more harmful than direct experiences of stigma (Mensinger & Meadows, 2017).

In summary, individuals living with obesity often experience body dissatisfaction. As such, it can be a key motivation to lose weight, potentially influenced by a society that promotes the thin ideal and stigmatises those living with obesity. Although qualitative research indicates body image

dissatisfaction is an influential factor in the consideration of BS, it has not been explored in quantitative research for its predictive value. If found to be influential, this could be problematic because patient expectations of improved appearance might not be met due to residual excess skin and scarring after BS, which can negatively impact body image. Additionally, BS requires sustained behavioural change, especially in terms of changes in eating habits, and body dissatisfaction has been found to impact negatively on health behaviors. This makes body image dissatisfaction a potential risk factor for poor post-operative outcomes. Furthermore, as well as body dissatisfaction, excess skin can cause functional and psychosocial problems, which can contribute to poor health-related quality of life (Kinzl et al., 2003; Gilmartin, 2013).

1.7 Rationale for the current study: A summary

Bariatric surgery is arguably an extreme method to achieve weight loss, since it is invasive, associated with risks and side-effects, and requires a lifetime commitment to behaviour change. Furthermore, emerging evidence suggests it is not the solution for weight loss it was once thought to be. Despite this, individuals living with obesity in the UK are increasingly undergoing BS, however, little is known about the psychosocial factors that predict the take-up or acceptance of these procedures. It is likely that the aforementioned psychosocial factors pertinent to living with obesity, particularly weight stigma, could be predictive in the consideration of BS but these have not yet been explored in this context. Based on this gap in knowledge, this exploratory mixed methods study aimed to examine the consideration of BS amongst a community sample of women in the UK who are potentially eligible for surgery according to their current BMI (≥35). A cross-sectional quantitative analysis of data from standardised outcome measures explored the influence of internalised weight stigma, weight locus of control, eating self-efficacy, body dissatisfaction and health-related quality of life on the consideration of BS. Due to the association identified in the literature between weight stigma and the other variables in this study, its influence as a mediator was explored. An embedded qualitative component sought to identify additional factors influencing the consideration of BS. Understanding the psychological predictors of considering BS as a means of weight loss is a relatively new area of enquiry; whilst qualitative research has

been conducted with those who have already undergone BS, quantitative research prior to surgery is scarce. This exploratory study will start to address this gap in knowledge, building greater understanding of the reasons individuals living with obesity might consider BS.

1.8 Research aims and hypotheses

Amongst people with a BMI ≥35, who might be candidates for BS:

1. What are the independent effects of weight stigma, weight locus of control, self-efficacy, body image and health-related quality of life on the consideration of BS?

H1 Higher BMI will lead to an increased consideration of BS

H2 Higher internalised weight stigma (fear of enacted stigma and self-devaluation) will lead to an increased consideration of BS

H3 Greater external locus of control, will lead to an increased consideration of BS

H4 Higher levels of body dissatisfaction will lead to an increased consideration of BS

H5 Low eating-self efficacy will lead to an increased consideration of BS

H6 Low health-related quality of life will lead to an increased consideration of BS

H7 BMI and weight stigma will mediate significant relationships between weight locus of control, eating self-efficacy, body dissatisfaction and health-related quality of life and the consideration of BS

2. What are the joint effects of BMI, internalised weight stigma, locus of control, self-efficacy, body image and weight quality of life on the consideration of BS?

3. What are the reasons those with a BMI ≥35 give for considering or not considering BS?

2. Method

2.1 Design

A mixed methods approach was adopted, as this research consisted of a cross-sectional online survey using validated outcome measures, with an embedded qualitative element asking individuals to expand on their reasons for considering or not considering BS.

Mixed methods approaches are gaining popularity as they bridge the gap between both quantitative and qualitative methods that have historically been polarised (Haverkamp, Morrow & Ponterotto, 2005). Furthermore, intentionally integrating or combining quantitative and qualitative data maximises the strengths and minimises the weaknesses of each paradigm (Creswell et al., 2011).

When deciding which methods to employ, it is important to consider the intended audience. In this case, the key stakeholders of this research were likely to be health professionals treating those with obesity, as well as individuals living with it. The NHS is operating with limited resources, and it is important to focus on research that could be more representative of the wider population and easily understood – for this reason, quantitative research is often favoured by those within the NHS who are in a position to influence the provision and availability of services. However, understanding the psychosocial influences on the consideration of BS is a relatively new area of enquiry with a lack of theoretical underpinning, and a solely quantitative approach would miss an opportunity to gain a greater understanding of this important topic area. Therefore, a mixed methods approach was taken, which can appeal to a variety of different stakeholders (Bishop, 2014).

The validating quantitative data model (Figure 3) proposed by Creswell and Clark (2007, p.65) was employed in this study, with both quantitative and qualitative data collected within one phase. Priority was given to one method (QUANT) whilst the other approach (qual) was used to "confirm, cross-validate, or corroborate findings" (Creswell & Clark, 2007; p65). In this model,

qualitative items are an add-on to the quantitative survey, and therefore the data collected generally does not result in a rigorous qualitative data set. Nevertheless, they provide the researcher with interesting quotes that can be used to validate and expand on quantitative findings (Creswell & Clark, 2007; p65). Quantitative findings were cross-validated and built upon using an open-ended question asking participants their reasons for considering/not considering BS. This addressed the third study aim which was to understand the reasons individuals would or will not consider BS. Furthermore, it would permit participants to express their opinions, rather than being constrained to predetermined boxes.

Despite the benefits, mixed-methods research can be challenging and particularly time-consuming because multiple forms of data are collected and have to be analysed separately. This means researchers often struggle to work out how to combine both approaches to produce meaningful interpretations in the final stage of write up (Bishop, 2014). Furthermore, analytic and interpretative issues can arise during data analysis, when findings may contradict each other (Creswell et al., 2011). Lastly, with embedded designs, because one component is much larger and considered more informative than the other, the smaller component can be overlooked (Bishop, 2014).

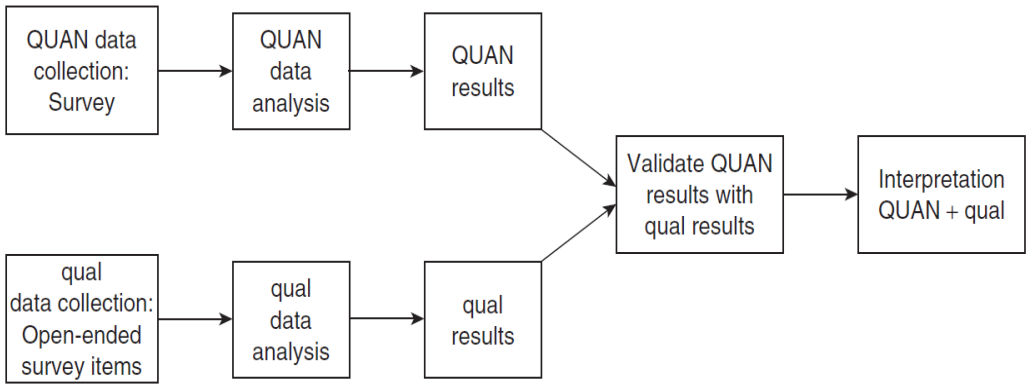


Figure 3. Triangulation Design: Validating Quantitative Data Model (Creswell & Clark, 2007). Reproduced with copyright permission of the publisher Sage Publishing.

2.2 Online methods

Online questionnaires offer a number of advantages for participants and researchers, when compared to paper questionnaires. First, the way online questionnaires are presented to participants can be controlled to reduce burden, for example, survey flow options mean participants are only presented with the items that are relevant to them based on their responses to previous questions (Smith et al., 2007). Burden is further reduced, as online questionnaires can be completed at home in participants' own time, meaning they do not need to travel to post the survey back or attend a face-to-face meetings (Naus, Philipp & Samsi, 2009). Online surveys are particularly useful for health researchers because they increase the ability to access patients who can be considered vulnerable, such as drug users (Duncan, White & Nicholson, 2003) cancer patients (Cantrell & Lupinacci, 2007) and those living with HIV (Yuan et al., 2014). Furthermore, sensitive subject matters (such as weight loss and BS) might lead to desirability bias, where participants might be less likely to be honest if they completed the questionnaire face-to-face (Krumpal, 2013). Online surveys also permit access to a larger number of potential study participants and increase the accuracy and efficiency of data entry and analysis (Ahern, 2005).

There are however, disadvantages of collecting data online. Although more people are becoming internet users, representativeness is a potential issue as those without access to a computer or smart phone would be excluded. Additionally, because online surveys are self-administered, the clarification of questions by the researchers is not possible, which can result in respondents misunderstanding the question or becoming frustrated and exiting the survey without finishing it (Ray & Tabor, 2003). Non-response rates can be problematic in online surveys, as participants may answer questions selectively or stop completing it halfway through, leading to a large amount of missing data. A number of recommendations have been made by Smyth, Dillman and Christian (2014) to overcome the issue of missing data in online research. For example, the information sheet should explain the importance of the study and how long it takes to complete. Progress bars can be helpful so participants know how far through the survey they are. Additionally, missing

data within a survey can present the risk of non-response error, particularly if the characteristics of those not responding to a part of the questionnaire differ. One way to minimise this risk is for the researchers to conduct a test of missing data completely at random (MCAR). These test whether there is any relationship between the missing data point and other values within the set, to establish whether missing data is systematic. If missing responses are identified to be "missing at random" or "missing completely at random" then this is unlikely to influence the research findings. Lastly, with recent publicity and controversy such as that surrounding the use of online data collected without consent by the company Cambridge Analytica, the public are becoming increasingly suspicious of internet-mediated research and how their data is used, handled and processed (Martin & Murphy, 2017; Schneble, Elger & Shaw, 2018). Although steps were taken in the current study to ensure minimal personal data were collected, and potential participants were fully informed as to how their data would be used and handled, there is the possibility that some may have decided not to take part due to data protection concerns.

2.3 Survey development and testing

The survey was designed and hosted on the online survey platform Qualtrics (www.qualtrics.com) and contained a number of standardised measures, selected based on the study aims and review of the current literature. The measures were the Weight Self-Stigma Questionnaire, Weight Locus of Control Scale, the Weight Efficacy Lifestyle Questionnaire, the Appearance Evaluation subscale of the Multidimensional Body-Self Relations Questionnaire and an Obesity Symptom subscale of the Obesity Related Well-Being questionnaire (further details in section 2.8.2). In addition, participants were asked to rate their agreement to the question '*I would consider undergoing bariatric surgery on the NHS in order to achieve weight loss*'. Following this, participants were asked '*Please could you explain the reason for your choice about bariatric surgery above, in a few sentences'* and were provided with a text box to type their answers into.

Once the survey was created, its content and structure was reviewed by seven researchers at the University of the West of England with expertise in body image research, but little knowledge of

bariatric surgery. Additionally, a clinical psychologist, with experience of working therapeutically with BS patients reviewed the survey for language and sensitivity. Researcher feedback included adding a progress bar and improvements to layout. Feedback from the clinical psychologist resulted in a statement being added at the start and end of the survey, which advised individuals to contact their GP if they were concerned about any of the issues raised in the survey.

Furthermore, three lay individuals known to the researcher (all classed overweight to obese based upon BMI) were asked to review the survey for comprehension and language sensitivity. This testing was advantageous as it provided greater confidence that the survey would not cause distress to participants. It also allowed a more accurate estimated completion time to be communicated to potential participants. It also alerted the researcher to inconsistencies in the flow of the questions and suggestions to improve readability of the survey. As an additional measure, participants were able to provide feedback on the survey using a free text box at the end. The researcher reviewed this feedback daily whilst the study was open to recruitment, in order to check for any concerns from participants. However, no major issues with the content of the survey were raised by any of the reviewers, and no question items were changed or removed as a result of their feedback. See Appendix E for a copy of the survey content.

2.4 Recruitment

A sample of adults over the age of 18 and living in the UK was recruited to take part in this study. A general, rather than clinical population (e.g. those referred for BS) was selected to understand the issue from the perspective of those who may choose BS in the future, rather than those who had already decided.

Power calculations were conducted to establish an appropriate sample size. Based on achieving a small effect size, with a statistical power of .90 (Field, 2009), and to include up to 10 predictor variables (including demographics) into the final regression model, the aim was to recruit a minimum of 125 participants with a BMI $\geq$ 35. Data were collected from over 1,700 individuals, however the focus of this study is on those with a BMI $\geq$ 35 (i.e. those who are potential candidates

for BS). The data of those with a BMI of less than 35 will be used in future analysis exploring attitudes towards BS across the BMI spectrum.

The primary avenue for recruitment was through advertising on social media, in particular Facebook which permits the creation of 'pages' that individuals can join to share information. There are a number of support pages for those interested in losing weight, so the researcher searched for 'weight loss group' or pages related to popular slimming groups (e.g. 'Slimming World', 'Weight Watchers') and contacted the administrators for permission to post the advert on their pages. Once permission was obtained, the researcher or page administrator posted a short description of the study, with a link to the survey. In addition, opportunity sampling was used, as the researcher encouraged friends and family, as well as those recruited through social media, to share the survey with others.

The link directed participants to the study's landing page, which contained an information sheet about the study, before they proceeded to give consent and complete the questionnaire if they decided to take part. Data collection occurred from September 2017 to November 2017.

2.5 Procedure

Potential participants were informed the aim of the study was to investigate people's views and preferences for weight loss treatment in the UK. They were advised that they would be asked demographical questions (e.g. gender, age, height and weight) and questions related to their health and wellbeing. As an incentive to participate, they were informed they had the choice of being entered into a prize draw for a chance to win a £20 shopping voucher on completion of the survey. Individuals were assured of confidentiality and informed of how their data would be handled, stored and protected. If individuals wanted to take part, they were advised to proceed to the consent page, and only after they had provided consent could they continue to complete the survey. This involved answering a series of demographic questions and standardised measures, and were then rating how likely they would be to consider BS as a method to achieve weight loss. To ensure all participants had a basic understanding of BS, they were provided with this short

definition: '*Bariatric surgery is a name for a group of surgical procedures performed in the stomach to achieve weight loss*'.

Once participants reached the end of the survey, a debriefing form was presented (see Appendix F). Following this, a hyperlink appeared which directed them to a separate survey to enter their email address if they wanted to be entered into the prize draw.

2.6 Ethical considerations

Ethical approval for this research was granted by the University of the West of England on 18 July 2017. A copy of the approval letter can be found in Appendix B. Examples of the information sheet, consent form, survey content and debrief form can be found in Appendix C, D, E and F respectively.

It was anticipated that this research would not present an overt risk to participants. However, as some could find questions pertaining to weight upsetting, a number of safeguards were implemented to minimise any harm. The recruitment advert did not explicitly target those experiencing obesity. Rather, it asked for participants who were willing to contribute to a survey about their opinions of weight loss treatment and permitted those across the BMI spectrum to contribute. Participants were provided with information about the study, without disclosing details that could potentially influence their answers to the questions. Within this information, they were informed that the study was about weight loss and would include some questions that may be uncomfortable to answer. They were also advised that they would need to enter their height and weight to participate. Participants were informed at the start of the survey that they could exit it at any time by closing the webpage. They were also advised they could have their data deleted up until two weeks after completing the survey, by emailing the lead researcher and quoting the participant code they generated at the start of the survey. Lastly, both at the start and end of the survey, participants were provided with the details of organisations that provide psychosocial and practical support related to weight loss or emotional wellbeing. They were also

provided with links to NHS resources for reaching a healthy weight, if they wanted more practical support.

2.7 Confidentiality

The data provided by participants was treated with the highest level of confidentiality. To preserve anonymity, personal data that could identify participants was not collected within the main survey. At the start of the study, participants created their own ID code, which was only used for the purpose of identifying individuals if they later wished to withdraw their data. The only time participants were asked to disclose identifying information was if they chose to enter the draw for a chance to win a £20 shopping voucher. If so, they were directed to an additional survey in Qualtrics to input their email address, which ensured that this remained separate from their questionnaire data.

Once the survey closed, the data from Qualtrics was downloaded into an SPSS file which was kept on a password protected computer in a locked office. The data was only accessible to the lead researcher who took full responsibility for data protection. In line with University regulations, the data will be securely stored on secured computers at the University of the West of England for five years, after which it will be deleted.

2.8 Measures

2.8.1 Demographic variables

Demographic questions included age, gender, ethnicity and education level. Additionally, participants were able to enter their weight and height in either metric (kg; cm) or imperial (stone and pounds; feet and inches) units. Based on these data, SPSS was used to calculate each participant's BMI using the metric formula weight (kg) / height (M^2). Additional questions included for context were whether they were currently attempting to lose weight and what method they were using, whether they had spoken to their GP about weight loss in the last year, and whether they had ever discussed BS and, if so, what the outcome of this discussion was.

2.8.2 Standardised measures

Standardised questionnaires were selected to measure the constructs of interest, chosen on the basis that they were well validated in those living with obesity and have been used in previous obesity research, including BS. Approvals were obtained from the authors of the standardised measures used in this study.

Internalised weight stigma

The Weight Self Stigma Questionnaire (WSSQ) is a 12-item measure of self-stigma that has been found to be a reliable assessment of internalised weight stigma in pre-bariatric surgery candidates (Pearl & Puhl, 2018). Participants rated a series of statements related to their weight on a Likert scale from 1 (completely disagree) to 5 (completely agree). The WSSQ contains two subscales, the Self Devaluation subscale with 6 items relating to ascribing personal blame and endorsing negative characteristics due to their weight (e.g. 'I became overweight because I am a weak person'). The Fear of Enacted Stigma subscale contains 6-items that assess the degree to which someone is concerned about the possibility of being the target of bias or ridicule (e.g. 'Others will think I lack self-control because of my weight problems'). Higher scores indicated more internalised stigma. The self-devaluation subscale (Cronbach alpha 0.87) and enacted stigma (Cronbach alpha 0.88) have demonstrated good internal consistency and construct validity in previous research (Lillis et al., 2010). The Cronbach's alpha in this study was 0.79 for self-devaluation and 0.87 for fear of negative evaluation.

Weight locus of control

The Weight Locus of Control (WLOC) scale is a 4-item specific measure for locus of control in relation to personal weight, developed to predict weight reduction behaviours (Saltzer, 1982). On a Likert scale of 1 (strongly disagree) to 6 (strongly agree) respondents are asked to rate four statements related to their personal weight control and maintenance. Two of the items in the scale are internally worded and two externally. The WLOC is scored in the external direction and

reversed scored for the internally worded items. The range for the scale is 4-24, with lower scores representing a more internal orientation. Saltzer (1982) obtained test–retest reliability coefficients of r=.67 over a 24-day interval, and internal validity coefficients of α=0.58 and α=0.56 for the two administrations. The WLOC can classify individual's weight locus of control as internal or external using a median split, however, in this study the score was used continuously to predict the likelihood of considering BS using regression. The Cronbach's alpha in this study was .63.

Eating self-efficacy

The Weight Efficacy Lifestyle-Short Form (WEL-SF) is an 8-item measure of the degree of confidence for controlling eating behaviour in a variety of situations. Items such as "I can resist overeating when I am angry" and "I can resist overeating when I am depressed (or down)" are rated on a 0 (not confident) to 10 (very confident) scale. A lower score indicated lower eating-self efficacy. It has been tested in a pre-bariatric surgery population, with a Cronbach's alpha of 0.92 (Ames et al., 2015). The Cronbach's alpha in the current study was .87

Body dissatisfaction

The 7-item Appearance Evaluation subscale of the Multidimensional Body-Self Relations Questionnaire (MBSRQ) was selected. Items such as "I like my looks just the way they are" are rated on a five-point scale (1 = definitely disagree, 5 = definitely agree). The Appearance Evaluation subscale of the MBSRQ was selected for use in this study since it has been used widely in research with those experiencing obesity and undergoing BS (Song et al., 2016; Ghai et al., 2014). The MBSRQ has demonstrated excellent psychometric properties. Its internal consistency is reliable (Cronbach's alpha = .73 to .89 for subscales) and test-retest reliability (r= .74 to .91) according to the published manual (Cash, 2000). The Cronbach's alpha in this study was .87.

Health-related quality of life (HRQoL)

The Obesity Related Well-Being (ORWELL 97) questionnaire is a self-reported measure of quality of life specific to obesity (Mannuccia et al., 1999) and taps into both the physical and psychological impacts of obesity. It contains 18 items using three domains: symptoms (5 items), discomfort (7 items) and impact (6 items). Only the 5-item symptom subscale was selected for use in this study, as this measures the construct of interest (health-related quality of life) - the other two subscales are concerned with psychosocial functioning. This subscale measures the impact of weight on physical activity, sexual activity, breathing, sleepiness and sweating. For each item, the occurrence and subjective relevance of the impact are measured. The ability of patients to subjectively appraise the importance of each symptom, according to their own value and beliefs, was the primary reason for its selection in the current study. For example, if exercising is not important to the individual then the impact of obesity on the ability to exercise would not be as relevant as it would for somebody who values it highly. The ORWELL 97 asks patients to rate on a 4-point Likert scale from 0 (not at all) to 3 (much or often) the relevance and then the impact of each dimension. The score of each item is calculated as the product of occurrence and relevance by adding the two scores together. A higher score indicates diminished obesity-related quality of life. The ORWELL 97 has shown good reliability and validity in obese populations, with good internal consistencies (a=.83). The Cronbach's alpha in this study was .77.

2.8.3 Outcome variable

The outcome variable in this study was the consideration of BS. First, participants were presented with a brief explanation '*Bariatric surgery is a name for a group of surgical procedures performed in the stomach to assist with weight loss'.* They were then asked to rate their agreement with the following statement '*I would consider undergoing bariatric surgery on the NHS in order to achieve weight loss*' on a 5-point scale (strongly agree [5] to strongly disagree [1]).

2.8.4 Qualitative element

Following the question outlined in 2.8.3 participants were asked 'Please could you explain the reason for your choice about bariatric surgery above in a few sentences'. They were provided with a text box to type their answers into.

2.9 Data analysis

2.9.1 Quantitative data analysis

The outcome variable related to the consideration of BS in order to achieve weight loss has characteristics that reflect an ordinal trend (strongly agree to strongly disagree), therefore a series of ordinal logistic regressions were conducted to determine what psychosocial variables influence the consideration of BS. Ordinal regression can be thought of as an extension of the logistic regression model for dichotomous dependent variables, allowing for more than two ordered responses (McCullah & Nelder, 1989). There are assumptions that need to be considered when running an ordinal regression. The outcome variables should be measured at the ordinal level, and there should be no multicollinearity (strong correlations between predictor variables), as it leads to issues in understanding which independent variable contributes to the explanation of the dependent variable.

SPSS v24 was used to conduct all analyses. Firstly, descriptive statistics were used to summarise, organise and simplify data to look for patterns. This included participants' demographic information and calculating means and standard deviations for each variable based on the level of agreement with considering BS. Next Spearman correlations were conducted to examine relationships amongst predictor variables and the consideration of BS. Following this, univariate ordinal logistic regressions were conducted to determine how each predictor influences the likelihood of considering BS, and then whilst controlling for the influence of BMI and weight stigma. The final analysis considered all independent variables together in one model. Lastly, mediation analyses were conducted to explore any mediating effects of weight stigma.

2.9.2 Qualitative data analysis

Content analysis was selected to analyse and quantify qualitative data from the question where participants were asked to elaborate on the reason for the rating they provided (strongly agree to strongly disagree) to the question '*I would consider undergoing bariatric surgery on the NHS in order to achieve weight loss*'.

Content analysis involves coding and categorising qualitative data in order to identify the occurrences of a particular theme within the data, thereby converting the raw qualitative data into quantitative frequencies (Green & Thorogood, 2006). Content analysis was selected as the most suitable approach because when conducting research where little is known about the topic, it can be useful for the simple reporting of common issues mentioned within the data (Green & Thorogood, 2006). In addition, participants were asked to provide a couple of sentences explaining why they would/would not consider BS, therefore it was acknowledged that answers would be unlikely to provide data rich enough to make use of other approaches to analysis, such as thematic analysis. Lastly, one aim of the study was to capture additional reasons why BS may or may not be considered amongst those living with obesity and content analysis permitted a 'count' of these reasons, which could identify those that occurred most frequently to cross-reference with quantitative findings.

An Excel spreadsheet was used to manage and code this data, which was read several times to enable the researcher to become familiar with it and remove responses that were unclear. Responses were then categorised into reasons for and against considering BS. This data was then coded by the researcher by identifying key themes or points and noting these in the spreadsheet. Categories were then created by grouping similar codes together and a code book was created. These categories and codes were assessed by a another researcher working in appearance research, but with little knowledge of BS. In a consensus meeting, codes were collapsed and made redundant. In the next phase, the codebook was used to independently code 10% of the data to ensure intercoder consistency of at least 80% (Miles & Huberman, 1994). Adequate intercoder

consistency (81%) was achieved, and therefore the main researcher continued to code the remainder of the data independently. After this, frequencies were counted.

3. Results

3.1 Quantitative data

3.1.1 Data cleaning and preparation

In total 564 out of 1,700 individuals who completed the survey had a BMI ≥ 35. An extremely large proportion of respondents to this survey were women (n=550; 97.4%). Initially it was intended that data from both men and women would be analysed and compared for gender effects. However, since only 14 men with a BMI ≥ 35 completed the survey, it was decided that the hypotheses would be investigated in women only, and men were removed from the dataset. This is because gender effects for body dissatisfaction and weight stigma are consistently found in the psychological literature, with women faring worse (e.g. Grogan, 2016; Hebl & Turchin, 2005; Lieberman, Tybur & Latner, 2012). Therefore, including gender as a variable would give unstable estimates of its effect, as the variance would be dictated by the small number of men and would be underpowered, making any results difficult to generalise to a male population.

Additionally, because careless or random responding can challenge the validity of research (Berinsky, Margolis & Sances, 2014; Curran, 2016), a validity or attention check question was placed within the survey, which requested participants to select a specific answer ("Please choose 'Agree' for this question"). In total, 89 individuals failed this check and all of their data was removed from analysis. Additionally, those that had already sought BS were also excluded from analysis (n=27). These individuals were currently on a waiting list (n=9), had undergone BS on the NHS (n=9), had been referred to NHS services but decided to have the procedure privately (n=5), or were not referred or were told they were not eligible for BS on the NHS, but went directly to private providers (n=4).

According to Tabachnick and Fidell (2007) the first step in data screening should be the inspection of univariate descriptive statistics to establish the accuracy of input, out of range values, means and standard deviations. Missing data accounted for no more than 0.4% of the dataset, and the pattern of missing data was missing completely at random (Little MCAR's test = chi square 39.616, df=30; p=.115). Therefore, there was no significant difference in any of the variables between participants who had missing data and those who did not. When missing data accounts for less than 5% of the total and is confirmed to be missing in a random pattern "almost any procedure for handling missing values yields similar results" (Tabachnick & Fiddell, 2007, p.63). Therefore, cases were deleted list wise (n=2). There was no evidence of multicollinearity between independent variables, as all variables showed tolerance levels greater than .02 and VIF values smaller than 4 (O'brien, 2007), see Table 1.

Table 1: Multicollinearity assumptions between independent variables

Variable	**Tolerance**	**VIF**
BMI	.891	1.122
Fear of Enacted Stigma	.525	1.906
Self-devaluation	.573	1.744
Weight Locus of Control	.956	1.046
Eating self-efficacy	.708	1.413
Appearance Evaluation	.687	1.456
Health-related quality of life	.801	1.248

3.1.2 Sample characteristics

Following data cleaning and preparation, 432 women over the age of 18 with a BMI $\geq$ 35 formed the final data set. Demographic data is reported in Table 2. The self-reported weight and height of participants resulted in BMIs ranging from 35 to 81, with a mean BMI of 41.42 (SD=6.68). According to NICE (2014) obesity classification guidelines, 49.5% (n= 213) of the women were living with obesity Class II (BMI 35-39.9) and 50.7% (n=219) Class III (BMI 40+). Participants' ages ranged from 18 to 74 years, with a mean age of 42.34 (SD= 12.02). The majority were White

British (n=410, 95.1%). With regards to highest level of education achieved, most had studied beyond secondary/high school (n=370, 85.7%), with 43.1% (n=186) of participants having achieved an undergraduate degree or higher. The greatest proportion of women were married (n=214, 49.5%) and heterosexual (n=405, 93.8%).

In terms of co-morbidities commonly attributed to obesity; 21.3% (n=92) reported high blood pressure, 15.3% had asthma (n=66), 8.6% had type 2 diabetes (n=37), 8.3 % had high cholesterol (n=36), 1.9% (n=8) had cardiovascular disease and 1.6% (n=7) had metabolic syndrome. However, 63.7% (n=275) of the total sample were living without any of these conditions, whilst 23.4% (n=101) were living with one of these conditions, 7.4% (n=32) with two, and 5.5% (n=24) with three or more.

Participants were asked questions relating to their weight loss history, which is presented in Table 3. The majority were currently trying to lose weight (n=370, 85.6 %). In total 33.3% (n=144) had discussed weight loss with their GP in the last year and 12.8% (n=55) had spoken to their GP about BS. Of those who had spoken to their GP about BS, 36% (n=20) decided they did not want to be referred on, 23.6% (n=13) were not referred by their GP as they were not eligible, 16.4% (n=9) were told to lose weight before referral, 16.4% (n=9) were referred for the procedure but then decided not to proceed and 7.3% (n=4) were not sure of the outcome of this discussion.

The mean scores on outcome measures were compared to previous studies using a similar population. Women in the current study showed an elevated score on the Fear of Enacted Stigma subscale (mean = 20.72) when compared with previous research developing the WSSQ in treatment-seeking obese individuals (Lillis et al., 2010: mean=16.66), but similar to a study assessing fear of enacted stigma in a pre-bariatric population in Germany (Hubner, 2016: mean=21.38). The scores from the WSSQ Self-Devaluation subscale (mean=20.99) were also slightly elevated when compared to the Lillis et al. (2010) study with treatment-seeking adults (mean=16.66) but similar to the Hubner (2016) study with pre-bariatric surgery patients (mean=21.38).

Scores for Weight Locus of Control (mean=8.54) were similar to another study in overweight women at the start of a weight loss intervention (Bryan & Tiggemann, 2000: mean=8.5 - 8.9).

Compared to previous research using the MBSRQ 'Appearance Evaluation' subscale, women living with obesity in this study had significantly poorer body image (mean=1.92) when compared to adult norm data (Cash, 2000; mean=3.36). Scores were similar (mean=1.63) in a study amongst women living with severe obesity seeking weight loss treatment (Dixon, Dixon & O'Brien, 2002) and slightly worse than another study with a population prior to BS (Song et al., 2016; mean=2.15).

Scores on the Eating Self Efficacy short-form, indicated that individuals in this study were significantly lower in eating self-efficacy (mean total score=29.07), compared to previous research in those presenting for BS (Ames et al., 2015: mean=54.33).

As only the items related to obesity related symptoms were selected from the Obesity Related Well-Being questionnaire (ORWELL 97) it was not possible to compare scores from this study to other research.

Table 2: Participant demographics

Demographic	Number	%
Ethnicity		
White British	410	95.1
White other	16	3.7
Other ethnicity	5	1.0
Not answered	1	0.2
Education		
No formal education	3	0.7
Secondary/high school	59	13.7
College/vocational	184	42.6
Undergraduate degree	142	32.9
Master degree	39	9.0
Doctorate/PhD	5	1.2
Marital status		
Married	214	49.5
Civil partnership	3	0.7
Single, never married	44	10.2
Separated	10	2.3
Divorced	44	10.2
Cohabiting	94	21.8
In a relationship but not living together	13	3.0
Widowed	6	1.4
Rather not say	4	0.9
Sexuality		
Heterosexual or straight	405	93.8
Lesbian	5	1.2
Bisexual	18	4.2
Rather not say	4	0.9
Co-morbidities		
Type 2 diabetes	37	8.6
High blood pressure	92	21.3
High cholesterol	36	8.3
Asthma	66	15.3
Metabolic syndrome	7	1.6
Cardiovascular disease	8	1.9

Table 3: Weight loss history questions

Question	N	%
Are you currently trying to lose weight?		
Yes	370	85.6
No	62	14.4
Current weight loss method		
Commercial plan (e.g. Slimming World, Weight Watchers)	317	85.7
Medication	2	.5
Meal replacement	2	.5
Own weight loss plan	37	10
Other	12	3.2
Discussed weight loss treatment with GP in the last year?		
Yes	144	33.3
No	288	66.7
Discussed BS with GP ever?		
Yes	55	12.8
No	376	87.2
Outcome following discussion with GP		
Decided did not want to be referred	20	36.4
Not referred by GP- not eligible	13	23.6
Told to lose weight before referral	9	16.4
Referred but then decided not to	9	16.4
Not sure of outcome	4	7.3

Table 4: Participants' ratings of considering BS and mean scores for each predictor variable

'I would consider undergoing bariatric surgery on the NHS in order to achieve weight loss'						
	Strongly Agree/ Agree N=123 (28.5%)		**Neither Agree or Disagree N=109 (25.2%)**		**Strongly Disagree/ Disagree N=200 (46.3%)**	
	M	**SD**	**M**	**SD**	**M**	**SD**
BMI	42.70	7.87	41.38	5.88	40.66	6.19
WLOC	9.24	3.50	8.96	3.20	7.89	3.09
FES	22.89	5.20	21.23	4.57	19.10	5.50
SD	22.26	4.62	20.99	4.21	20.21	4.99
AE	4.28	0.66	4.12	0.59	3.93	0.75
ESE	46.35	16.14	42.65	15.14	40.77	16.7
HRQoL	16.13	9.76	11.90	7.50	10.75	7.92

BMI= Body Mass Index; WLOC=weight locus of control; FES= fear of enacted stigma; SD= self-devaluation subscale; AE= Appearance Evaluation; ESE=eating self-efficacy; HRQoL= health-related quality of life.

Note- Scores are all in the same direction- a higher score indicates a worse outcome

3.1.3 Consideration of BS

The original five-point scale (strongly agree-strongly disagree) participants used to rate how much they would agree with the statement *"I would consider undergoing bariatric surgery on the NHS in order to achieve weight loss*" was reduced to represent three ordinal categories for analysis ([1] Strongly Disagree/Disagree, [2] Neither Agree or Disagree [3] Strongly Agree/Agree). This is because the proportional odds assumption for the original five categories was not met, and in such instances, an option is to collapse categories to increase model fit (Adeleke & Adepoju, 2010). Participants' consideration of BS, with predictor variable mean scores and standard deviations for each group are presented in Table 4. For ease of interpretation scores were transformed so that higher scores indicated a more negative outcome.

3.1.4 Correlational analyses

Firstly, correlations were investigated by computing zero-order Spearman's ρ correlation coefficients for ordinal data (Table 5). This was in order to establish the strength of the relationship between possible predictor variables and the consideration of BS to achieve weight loss, as well as between each predictor variable. All predictor variables significantly correlated with considering BS (p <.01). Furthermore, although data preparation found no evidence of multicollinearity, there were stronger correlations between weight stigma, appearance evaluation and eating self-efficacy

Table 5: Correlations among measures, BMI and the likelihood of considering bariatric surgery

	Mean	**SD**	**Range**	**1. BMI**	**2. WLOC**	**3. FES**	**4. SD**	**5. AE**	**6.ESE**	**7.HRQoL**	**8.CBS**
1. BMI	*41.42*	*6.68*	*35-81*	-	-	-	-	-	-	-	-
2. WLOC	*8.54*	*3.29*	*4-24*	.068	-	-	-	-	-	-	-
3. FES	*20.72*	*5.43*	*6-30*	.279**	.152**	-	-	-	-	-	-
4. SD	*20.99*	*4.77*	*8-30*	.119*	.035	.538**	-	-	-	-	-
5. AE	*1.92*	*.70*	*1-5*	.171**	-018	.492**	.415**	-	-	-	-
6.ESE	*29.07*	*16.28*	*0-80*	.086	.043	.348**	.465**	.295**	-	-	-
7.HRQoL	*8.17*	*9.21*	*0-41*	.244**	.124*	.389**	.297**	.288**	.292**	-	-
8.CBS	*1.82*	*2.84*	*1-5*	.130**	.185**	.314**	.170**	.203**	.120**	.236**	-

Spearman's Correlation *p<.05. **p<.01 ***p<.001

BMI= Body Mass Index; WLOC=weight locus of control; FES= fear of enacted stigma; SD= self-devaluation; AE= Appearance Evaluation; ESE=eating self-efficacy; HRQoL= obesity health-related quality of life; CBS=consideration of bariatric surger

3.1.5 Step 1: Univariate analyses

Univariate logistic ordinal regressions determined which predictor variables had a statistically significant effect on the consideration of BS in order to confirm or reject initial hypotheses. Table 6 reports results from these analyses.

Hypothesis 1: Higher BMI will lead to an increased consideration of BS

There was a significant association ($p<.05$) between increased BMI and an increased consideration of BS (Nagelkerke pseudo-$R^2 = .019$).

Hypothesis 2: Higher internalised weight stigma will lead to an increased consideration of BS

There was a significant association ($p<.001$) between an increased fear of being stigmatised due to weight and an increased consideration of BS. (Nagelkerke pseudo-$R^2 = .107$)

There was a significant association ($p<.001$) between increased self-devaluation due to weight and an increased consideration of BS (Nagelkerke pseudo-$R^2 = 0.37$)

Hypothesis 3: A higher external locus of control will lead to an increased consideration of BS

There was a significant association ($p<.001$) between an external weight locus of control and an increased consideration of BS (Nagelkerke pseudo-$R^2 = .038$).

Hypothesis 4: Higher levels of body dissatisfaction will lead to an increased consideration of BS

There was a significant association ($p<.001$) between a lower appearance evaluation and an increased consideration of BS (Nagelkerke pseudo-$R^2 = .054$).

Hypothesis 5: Lower eating self-efficacy will lead to an increased consideration of BS

There was a significant association ($p<.01$) between lower eating self-efficacy and an increased consideration of BS (Nagelkerke pseudo-R^2 = .023).

Hypothesis 6: Lower health-related quality of life will lead to an increased consideration of BS

There was a significant association ($p<.001$) between reduced health-related quality of life and an increased consideration of BS (Nagelkerke pseudo-R^2 = .072).

Table 6: Univariate analyses

	Est	**SE**	**Wald**	**Df**	**Sig**	**OR**	**95% confidence**	
							Lower	**Upper**
BMI	.037	.014	7.260	1	.007 **	1.038	1.010	1.066
FES	.118	.019	39.763	1	.001***	1.125	1.085	1.167
SD	.074	.020	14.237	1	.001***	1.076	1.036	1.118
AE	.616	.136	20.468	1	.001***	1.852	1.418	2.418
ESE	.017	.006	8.697	1	.003 **	1.017	1.006	1.028
WLOC	.107	.028	14.639	1	.001***	1.113	1.054	1.175
HRQoL	.058	.011	28.172	1	.001***	1.059	1.037	1.082

*p < .05 **p < .01 ***p < .001

BMI= Body Mass Index; WLOC=weight locus of control; FES= fear of enacted stigma; SD= self-devaluation subscale; AE= Appearance Evaluation; ESE=eating self-efficacy; HRQoL= health-related quality of life.

3.1.6 Step 2: Conditional analyses controlling for BMI

Conditional analyses do not show how each variable interrelates when considered together. Therefore, because BMI could potentially confound the relationship between the predictor variables and the consideration of BS, the second step of analysis entered BMI alongside each predictor variable (Table 7). All independent variables remained significant in this model, indicating that BMI did not change the relationship between each predictor and the dependent variable.

Table 7: Conditional ordinal regression analyses controlling for BMI

	Est	SE	Wald	Df	Sig	OR	95% confidence	
							Lower	Upper
WLOC	.101	.028	12.949	1	.000***	1.106	1.047	1.169
BMI	.032	.014	5.478	1	.019*	1.033	1.005	1.061
FES	.113	.019	34.441	1	.001***	1.119	1.078	1.162
BMI	.016	.014	1.237	1	.266	1.016	.988	.044
SD	.072	.020	13.522	1	.001***	1.075	1.034	1.117
BMI	.036	.014	6.740	1	.009**	1.036	1.009	1.045
AE	.584	.137	18.193	1	.001***	1.793	1.371	2.344
BMI	.030	.014	4.835	1	.028*	1.031	1.003	1.057
ESE	.016	.006	8.521	1	.004**	1.017	1.005	1.028
BMI	.036	.014	7.077	1	.008**	1.037	1.010	1.065
HRQoL	.054	.011	23.809	1	.001***	1.055	1.033	1.078
BMI	.022	.014	2.420	1	.120	1.022	.994	1.050

*p < .05 **p < .01 ***p < .001

BMI= Body Mass Index; WLOC=weight locus of control; FES= fear of enacted stigma; SD= self-devaluation subscale; AE= Appearance Evaluation; ESE=eating self-efficacy; HRQoL= health-related quality of life.

3.1.7 Step 3: Conditional analyses controlling for BMI and weight stigma

The next stage of analysis was to control for both BMI and weight stigma by entering them alongside each predictor variable. The decision to control for weight stigma was due to existing literature reporting its impact on many of the variables in this study, in addition to the significant correlations identified between weight stigma and other predictors. Firstly, the subscale 'fear of enacted stigma' was entered (Table 8). The significant main effects remained for weight locus of control and health-related quality of life but were reduced, indicating partial mediation. However, significant effects for BMI, body image, eating self-efficacy and self-devaluation on the consideration of BS did not hold, suggesting that weight stigma is mediating or confounding (explaining) the relationship between these variables and the consideration of BS.

Secondly, the subscale 'self-devaluation' was controlled for (Table 9). The significant main effects remained for all predictor variables apart from eating self-efficacy, suggesting that self-devaluation is fully mediating the relationship between eating self-efficacy and the consideration of BS. The relationship between weight locus of control was not affected by self-devaluation. However, self-devaluation appeared to be partially mediating the relationship between body image and health-related quality of life on the consideration of BS.

Table 8: Conditional ordinal regressions controlling for BMI and fear of enacted stigma

Variable	**Est**	**SE**	**Wald**	**Df**	**Sig**	**OR**	**95% confidence**	
							Lower	**Upper**
WLOC	.080	.029	7.929	1	.005**	1.084	1.025	1.146
FES	.106	.019	30.327	1	.001***	1.112	1.071	1.155
BMI	.013	.014	.838	1	.360	1.013	.985	1.042
SD	.013	.023	.291	1	.590	1.013	.968	1.060
FES	.107	.022	22.722	1	.001***	1.113	1.065	1.162
BMI	.017	.014	1.360	1	.244	1.017	.989	1.046
AE	.250	.155	2.601	1	.107	1.285	.948	1.742
FES	.097	.022	20.196	1	.001***	1.102	1.056	1.149
BMI	.016	.014	1.274	1	.259	1.016	.988	1.045
ESE	.006	.006	.870	1	.351	1.006	.994	1.018
FES	.107	.020	27.419	1	.001***	1.113	1.069	1.158
BMI	.017	.014	1.382	1	.240	1.017	.989	1.046
HRQoL	.037	.012	9.846	1	.002**	1.037	1.014	1.061
FES	.095	.020	22.061	1	.001***	1.099	1.057	1.143
BMI	.009	.014	.410	1	.522	1.009	.981	1.038

*p < .05 **p < .01 ***p < .001

BMI= Body Mass Index; WLOC=weight locus of control; FES= fear of enacted stigma; SD= self-devaluation subscale; AE= Appearance Evaluation; ESE=eating self-efficacy; HRQoL= health-related quality of life

Table 9: Conditional ordinal regressions controlling for BMI and self-devaluation

							95% confidence	
Variable	**Est**	**SE**	**Wald**	**Df**	**Sig**	**OR**	**Lower**	**Upper**
WLOC	.102	028	13.145	1	.001***	1.108	1.048	1.171
SD	.074	.020	13.863	1	.001***	1.076	1.035	1.119
BMI	.031	.014	4.902	1	.027*	1.031	1.004	1.059
FES	.107	.022	22.722	1	.001***	1.113	1.065	1.162
SD	.013	.023	.291	1	.590	1.013	.968	1.060
BMI	.017	.014	1.360	1	.244	1.017	.989	1.046
AE	.462	.149	9.617	1	.002**	1.587	1.185	2.125
SD	.046	.021	4.737	1	.030*	1.048	1.005	1.092
BMI	.031	.014	4.892	1	.026*	1.031	1.004	1.059
ESE	.009	.006	1.723	1	.189	1.009	.996	1.021
SD	.058	.022	6.747	1	.009**	1.060	1.014	1.107
BMI	.036	.014	6.735	1	.009**	1.036	1.009	1.064
HRQoL	.046	.011	16.684	1	.001***	1.048	1.024	1.071
SD	.051	.020	6.433	1	.011*	1.053	1.012	1.095
BMI	.023	.014	2.657	1	.103	1.023	.995	1.051

*p < .05 **p < .01 ***p < .001

BMI= Body Mass Index; WLOC=weight locus of control; FES= fear of enacted stigma; SD= self-devaluation subscale; AE= Appearance Evaluation; ESE=eating self-efficacy; HRQoL= health-related quality of life.

3.1.8 Step 4: Ordinal regression including all predictors

Finally, all predictors (BMI, weight locus of control, fear of enacted stigma, self-devaluation, appearance evaluation, eating self-efficacy and health-related quality of life) were entered into the final model (Table 10). The final model included the predictors BMI, weight locus of control, fear of enacted stigma, self-devaluation, appearance evaluation, eating self-efficacy and health-related quality of life. An important assumption in the ordinal logistic regression is the assumption of parallelism. This means that each independent variable has an identical effect at each cumulative split of the ordinal dependent variable (Agresti, 2010). The parallel assumption was validated as

tested by the chi square test (x2=5.830, p>.05), demonstrating that each category of the dependent variable of consideration of BS was equal. This means it is appropriate to apply ordinal logistic regression analysis.

The deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $X^2(855) = 853.948$, p=.504. The final model statistically predicted the dependent variable over and above the intercept-only model $X^2(7)= 63.333$, p<.001, demonstrating the existence of a relationship between the dependent variable and the independent variables.

The accuracy of the fit of the model is tested by the pseudo-R2 value. This value aims to measure and assess the power of the relationship between the outcome variable and predictor variables. The Nagelkerke value is considered for ordinal regression, which shows the percentage of the outcome variable that is explained by the predictor variables. The Nagelkerke pseudo r^2 was .155, indicating that 15.5% of variance in the consideration of BS was accounted for in the full model.

The Wald test was considered to establish whether the predictor variables were significant. The odds ratio was obtained to interpret the model. For continuous independent variables the odds ratio indicates how much the outcome will increase or decrease for each point/unit increase in the predictor variable. The results of this analysis is presented in Table 10. Examining the significant findings in the model reveals that weight locus of control, fear enacted stigma and health-related quality of life have a statistically significant effect on the consideration of BS as a method of losing weight. A 1-unit increase in external weight locus of control was associated with an increase in the likelihood of considering BS, with an odds ratio of 1.086 (95% CI, 1.026 to 1.149), X^2 (1)=8.050 , p<.001. A 1-unit increase in fear of enacted stigma was associated with an increase in the likelihood of considering BS, with an odds ratio of 1.075 (95% CI, 1.028 to 1.124), X^2 (1)= 9.978, p<.005. A 1-unit increase in poorer health-related quality of life was associated with an increase in the likelihood of considering BS, with an odds ratio of 1.034 (95% CI, 1.010 to 1.058), X^2 (1)= 7.900, p<.01)

Table 10: Multivariate ordinal regression model including all predictors

							95% confidence	
Variable	**Est**	**SE**	**Wald**	**Df**	**Sig**	**OR**	**Lower**	**Upper**
BMI	.008	.015	.291	1	.589	1.008	.979	1.037
WLOC	.083	.029	8.050	1	.005**	1.086	1.026	1.150
FES	.070	.024	9.978	1	.002**	1.075	1.023	1.126
SD	.005	.026	.038	1	.846	1.005	.956	1.057
AE	.244	.161	2.355	1	.125	1.280	.928	1.755
ESE	.001	.006	.039	1	.844	1.001	.988	1.014
HRQoL	.033	.012	7.900	1	.005**	1.034	1.010	.1.058
Nagelkerke .155								

*p < .05 **p < .01 ***p < .001

BMI= Body Mass Index; WLOC=weight locus of control; FES= fear of enacted stigma; SD= self-devaluation subscale; AE= Appearance Evaluation; ESE=eating self-efficacy; HRQoL= health-related quality of life.

Figure 4 represents a Receiver Operating Characteristic (ROC) curve for 'fear of enacted stigma' predicting agreement to the statement '*I would consider undergoing bariatric surgery on the NHS in order to achieve weight loss*', analysing all possible cut off points of sensitivity (true positive rate) and 1-specitivity (false positive rate) over the reference line (Kumar & Indrayan, 2011) and full model including all variables. The ROC curve demonstrates that weight stigma was almost as effective at predicting a consideration of BS when compared to the full model.

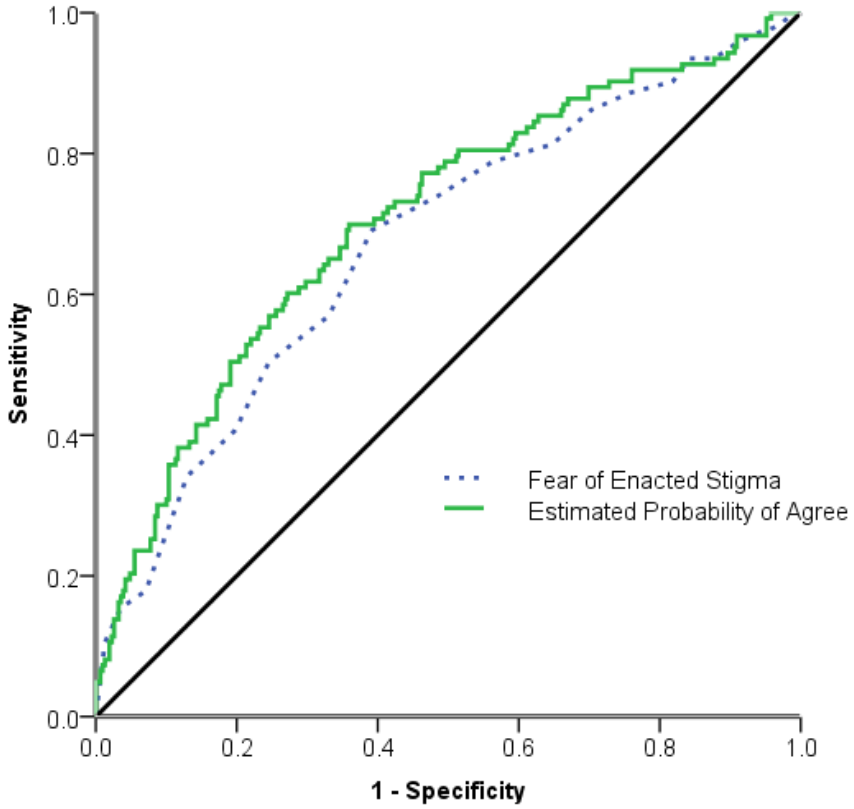


Figure 4. ROC curve for 'fear of enacted stigma' vs full model in predicting agreement to the statement '*I would consider undergoing bariatric surgery on the NHS in order to achieve weight loss*'

3.1.9 Step 5: Indirect effects

A variable may be considered a mediator to the extent that it carries the influence of the predictor variable to the outcome variable. Prior analyses had revealed that weight stigma was removing or reducing the influence of many of the predictor variables on the consideration of BS. Therefore, the analytic approach of Baron and Kenny (1986) was used to confirm this. This specifies that four conditions must be met to demonstrate mediation: (1) a significant relationship between the predictor variable and the outcome variable, (2) a significant relationship between the predictor and proposed mediating variable, (3) a significant relationship between the mediating variable and outcome when entered simultaneously in predicting the outcome variables, (4) to demonstrate full mediation, the relationship between the predictor and outcome variable must become zero in step 3. Finally, if the

four steps provide evidence for mediation, the significance of the mediation variable effect is established by using a test assessing the joint significance of the mediating variable effects.

In line with conditions for mediation, the first condition has been confirmed in prior analyses, all variables significantly predict the consideration of BS. A series of linear regressions between the predictor variables and mediator variables were conducted to test the second condition. Results demonstrated that all predictor variables significantly predicted both weight stigma (mediator) variables; apart from weight locus of control which regressed onto self-devaluation. Therefore, Baron and Kenny's (1986) conditions for mediation were all met (see Table 11). The third step found that fear of enacted stigma removed previous relationships between BMI, body image, eating self-efficacy and self-devaluation and the consideration of BS, indicating full mediation. In addition, relationships between weight locus of control and health-related quality of life reduced, indicating partial mediation. When self-devaluation was entered eating self-efficacy no longer predicted the consideration of BS. Additionally self-devaluation reduced the previous relationships between body image and health-related quality of life and the consideration of BS, indicating partial mediation.

Therefore, as a formal test of these observations, the Sobel test was used to test the mediating role of the weight stigma variables 'fear of enacted stigma' and 'self-devaluation' (http://quantpsy.org/sobel/sobel.htm). The Sobel test is one of the most commonly reported tests for mediation analysis of large sample sizes. It is used to determine whether the reduction in the effect of the predictor variable, when including the mediator variable, is significant enough to demonstrate that a mediation effect is statistically significant (Sobel, 1982). All Sobel tests were significant at the 0.05 level, indicating mediation for indirect paths (Table 10). The presence of a significant direct path in the model determined whether there was partial or full mediation.

Table 11: Weight stigma mediation analyses

	Criterion 1		**Criterion 2**		**Criterion 3**		**Sobel Test**			**Full or partial mediation**
	SE	WALD	SE	B	SE	WALD	Sobel	Std. Error	P Value	Full
BMI-FES-CBS	.014	7.260**	.037	.215***	.020	34.44***	4.096	.006	.001***	Full
WLOC-FES-CBS	.028	14.639***	.079	.243**	.019	34.518***	2.747	.009	.006**	Partial
AE-FES-CBS	.136	20.468***	.318	3.97***	.021	23.603***	4.526	.089	.001***	Full
ESE-FES-CBS	.006	8.697**	.015	.124***	.020	32.679***	4.743	.003	.001***	Full
SD-FES-CBS	.020	14.237***	.046	.623***	.020	27.519***	4.880	.014	.001***	Full
HRQoL-FES-CBS	.011	28.172***	.028	.241***	.020	24.01***	4.258	.005	.001***	Partial
AE-SD-CBS	.136	20.468***	.296	2.89***	.021	4.659*	2.108	.063	.034*	Partial
ESE-SD-CBS	.006	8.697***	.012	.148***	.022	7.192**	2.628	.003	.001***	Full
HRQoL-SD-CBS	.011	28.172***	.025	.153***	.020	6.241*	2.334	.003	.020*	Partial

*p < .05 **p < .01 ***p < .001

BMI= Body Mass Index; FES= fear of enacted stigma; SD=self-devaluation; AE= Appearance Evaluation; ESE=eating self-efficacy; HRQoL=health-related quality of life CBS=consideration of BS. Note: Criterion 1- Relationship between predictor and outcome, Criterion 2- relationship between predictor and proposed mediator, Criterion 3 relationship between mediator and outcome when entered with predictor

3.1.10 Summary: quantitative results

It was hypothesised that a higher BMI, higher internalised weight stigma, an external weight locus of control, higher body dissatisfaction and lower health-related quality of life would predict an increased consideration of bariatric surgery in a community sample of women living with a BMI $\geq$ 35. Univariate analyses confirmed all hypotheses, even when controlling for BMI.

Due to the identified association in existing literature between internalised weight stigma and other variables included in this study (supported by observed correlations) the next stage of analysis involved controlling for fear of enacted stigma and self-devaluation. Results indicated that a fear of enacted stigma fully mediated the relationship between BMI, eating self-efficacy, body image, self-devaluation and the consideration of BS, in addition to partially mediating the relationship between weight locus of control and health-related quality of life. Self-devaluation fully mediated the relationship between eating self-efficacy and the consideration of BS, and partially mediated the relationship between body image and health-related quality of life. Sobel tests formally confirmed these as significant.

The final ordinal regression model including all variables was statistically significant, and accounted for 15.5% of the variance in considering BS. However, only fear of enacted stigma, weight locus of control and health-related quality of life were statistically significant in this model. Fear of enacted stigma was particularly influential, a 1-unit increase in fear of enacted stigma led to 1.075 (7.5%) increase in the odds ratio of considering BS.

3.2 Results: content analysis

In total, 394 participants provided reasons for their rating of the statement '*I would consider undergoing bariatric surgery on the NHS in order to achieve weight loss'*. Following a review of the data, 17 participants' statements were deleted as they lacked clarity and could not be coded. Therefore, 377 participants provided 484 reasons for considering or not considering BS, and these went forward for coding.

As participants could select 'Neither agree nor disagree' as an answer, it was not possible to split the group into 'agree' and 'disagree' based on their response considering BS. Instead, each participant's response was read and then categorised as either 'for' or 'against' considering BS. In total, 280 participants provided reason(s) they would not consider BS and 107 provided reasons they would.

Tables 12 and 13 show the frequencies of responses for each theme and subtheme, with examples of quotes. A narrative summary of the 'Top 5' reasons provided for and against considering BS are presented below. If a theme was challenged or contradicted it is discussed, additionally the qualitative data is cross-referenced to the quantitative findings in a summary paragraph.

3.2.1 Reasons for considering bariatric surgery

Low self-efficacy for weight loss without BS

The most frequently reported reason identified in the data for considering BS was because participants felt they were not able to lose weight without BS, demonstrating a lack of weight loss self-efficacy. Many spoke about how they viewed BS as a last resort, having exhausted other methods to achieve weight loss "*I have tried all manner of diets and I haven't been able to achieve the weight loss I desire. I feel that BS is my only option".* Others reported their desperation to achieve weight loss and therefore a willingness to try anything to achieve it *"I literally would do anything to lose weight and feel better about myself".* Some referred directly to a lack of eating self-efficacy, a variable which was measured in the quantitative analysis "*I get so far on my diet then start over eating again".*

Control

The second most frequently cited reason that individuals would consider BS was the belief it would provide them with control over their weight. Paradoxically this would be achieved by removing the need for them to personally control their food intake *"I use food as an emotional crutch like an alcoholic uses alcohol and it would be wonderful to have that taken away from me so I have no choice but to be careful with what I eat so I can be healthy".* Others reported how restrictions in the

stomach would control their mind-set *"It would make me think how much I am putting on my plate! It would control my way of thinking".*

However, the removal of control also featured prominently as a reason why individuals would not consider BS. Some individuals wished to control their own weight, and thus felt BS would leave them feeling out of control *"I want to be able to control my weight and what I eat. Bariatric treatment would be a measure out of my control and restrict me from certain activities that I may want to take part in. I would much rather lose weight and be in control without that type of help*".

Improved health

Improved health was another reason individuals would consider BS. Participants reported various health conditions and believed that losing weight would help with these, and even help them avoid death "*I am fast approaching 50 with type 2 diabetes controlled by insulin, I know my excessive weight is playing a huge part in my illness and I don't want to be a statistic by being dead"*. Some also made reference to feeling that their weight was affecting their mental health and believed that losing weight would improve this "*Because I suffer with anxiety and depression which I feel has a lot to do with my weight".*

A permanent solution

Participants spoke about how they were interested in BS as they viewed it as a permanent solution to a lifelong battle to lose weight, and some made reference to a past history of losing weight and then regaining it "*After following numerous diets over the years and always putting the weight back on I feel I need a more permanent solution".* However, the permanency of the procedure was also reported in the data as a reason they would not consider the procedure *"I feel this is more permanent and not something I would want to live with forever"*.

Motivation of quick weight loss

Participants also reported they would consider BS due to the perception that the quick weight losses it provides would be motivational and help them lose more weight. For example, one participant stated "*When you are overweight like me you need a bit of encouragement and once you see the weight coming off it boosts your confidence and that helps you to lose more weight"*.

3.2.2 Reasons for not considering bariatric surgery

Risks and side effects

The most frequently cited reason for not considering BS was the risk of the procedure. Many participants referred generically to risk (e.g.*"not worth taking unnecessary risk*") rather than being specific about what this risk was. Some stated that the risk was about undergoing any surgery, rather than it being specific to BS. For example, some felt the risk of anaesthetic was an additional worry due to living with obesity *"I just don't like the idea of going under general while being so overweight".*

In addition to risks of the surgery itself, side-effects of the procedure were also made reference to. Appearance concerns related to loose skin were reasons why some would not consider BS "*The main problem with the surgery is when you have lost the weight you are left with skin flaps that make you feel unsightly*". Some highlighted this as being problematic because the NHS does not routinely remove loose skin after BS "*Very fast weight loss leaves horrific loose skin which the NHS will not deal with. You're left even worse off".* In addition, others were concerned about the risk of nutritional deficiencies after BS "*It is not a natural way to lose weight. You are essentially restricting your body of vital vitamins, food groups and healthy minerals in needs in order to achieve maximum weight loss"*. Lastly, participants also felt that BS would have a negative impact on their lifestyle, particularly eating "*it means you can never eat normally again - for me this is too drastic".*

Weight loss as a personal responsibility

Weight loss as a personal responsibility was reflected in participants' accounts as a key reason they would not consider BS "*I ate myself large, so I can work on eating myself smaller*'. Believing that weight control is a personal responsibility, BS was typically viewed as easy way out or a 'quick fix' for them (and others) because weight can be lost without surgery "*I feel it's a lazy decision to have surgery for weight loss. It should be about changing eating habits that made me fat in the first place, not a quick fix as surgery is (in my opinion)"*. Related to weight as a personal responsibility was references to NHS resources being used for BS, particularly when weight can be controlled by the individual "*the NHS has more important things to do rather than surgery to help people lose weight when they can do it themselves if they have the right mind frame".*

Does not address the root cause

Many felt that BS was not appropriate for them as it would be ineffective in addressing the reasons for their obesity, which were predominantly stated to be psychological. Many stated that they over-ate for psychological reasons (e.g. comfort, stress) and knew that BS would not address this *"Surgery is not tackling the psychological reason and cause for being overweight […] it has nothing to do with putting food in your mouth. It's to do with addiction, emotions, loneliness and feelings"*. A smaller number of participants attributed their obesity to the existence of a medical condition that would not be solved through BS and would not lead to weight loss in their case *"It would not solve my reason for obesity, severe hypothyroidism".* However, there was also evidence in the data that some believed BS could benefit them psychologically, especially in helping their relationship with food *"I'm weak willed and have an unhealthy relationship with food, surgery would help me fix this".*

Possesses self-efficacy for weight loss without BS

Many participants reported they would not consider BS, as they possess self-efficacy for weight loss. Some referred to their current methods of weight loss that were working successfully for them "*I have managed to reach the half way mark of my current weight loss goal and so hope that I can*

achieve my target on my own". Others felt they could lose weight if they needed to, which meant they knew they would not have to resort to BS *"I know that I can lose the weight when in the right frame of mind".*

Negative influence of others' experiences

A number of participants reported that knowing someone else who had undergone BS with undesirable outcomes was a reason they would not consider the procedure for themselves. Negative outcomes included witnessing others weight regain through not changing their eating habits *"I have had family and friends have weight loss surgery, they lose weight so rapidly that they start to look very sick, and then none of them have managed to keep the weight off - after a couple of years they start piling it back on because they haven't changed any habits".* Others reported witnessing undesirable impacts on others lifestyles, even if weight was lost *"My sister had a bypass, her weight loss is amazing, but her social life has been affected. Can't go out for tea with friends, as she can't even eat a full starter. Plus very sick for a few months afterwards".* However, some also spoke of knowing someone else who had good results from BS as a reason they would consider BS *"I have a friend that has seen amazing results".*

3.2.3 Comparison of qualitative findings to quantitative results

The predictors for considering BS selected for quantitative analysis were all reflected in the qualitative data, apart from a fear of being stigmatised. Themes related to the variables eating self-efficacy (Low self-efficacy for weight loss without BS), weight locus of control ('Control') and health-related quality of life ('Improved Health') all featured as a 'Top 5' reason for considering BS. Improved appearance through surgery featured very rarely as a reason individuals would consider BS, despite body dissatisfaction being a significant predictor in quantitative analysis. A fear of enacted stigma due to weight was not evident in participants' accounts. Internalised weight stigma was identified in the data but as a reason for not undergoing BS. For example, the theme 'Weight loss as a personal responsibility' reflected participants' beliefs that they had caused their obesity, and that they, not surgery, should rectify this. Interestingly, some of the themes were reflected in both

reasons for and against considering BS, and included appearance reasons, permanency of the procedure, hearing of others experiences and BS as providing control. For example, BS as a way to provide control over weight was positive for some, whereas for others it would leave them feeling out of control, which was a deterrent for considering BS.

Table 12: Reasons for considering bariatric surgery (n=107).

Rank	Category	Description	% (n) participants reporting	Examples
1	**Low self-efficacy for weight loss without BS**	BS is viewed as a last resort to lose weight and/or maintain it. Individuals are desperate to lose weight, or have low self-efficacy for weight loss	41.1% (n=44)	*"Diets for over 12 years have not worked. Nor did the pills from the doctor and I do not have time to go to a gym"* *"I would try anything at this stage my only worry would be if anything went wrong I would blame myself because I chose to have surgery rather than using my willpower"* *"I would do anything to help get me out of this self-fulfilling cycle of get depressed - eat - hate being fat - get depressed"* *"I get so far on my diet then start over eating again then I gain all that I lost"*
2	**Improved health**	BS would improve health or mental health conditions. Risk of obesity to health has overtaken risk of surgery	19.6% (n=21)	*"I am fast approaching 50 with type 2 diabetes controlled by insulin, I know my excessive weight is playing a huge part in my illness and I don't want to be a statistic by being dead"* *"Overall the surgery would outweigh the cons of being very overweight"*
3	**Removing control**	BS would mean weight loss is out of their control.	18.7% (n=20)	*"I feel I have a very bad relationship with food and it would be better if food was taken out of the equation.... as much as it can be!"* *"It would mean eating too much wouldn't be an option anymore so it's out of my control"*
4	**Permanent solution**	BS would be a permanent solution to the battle with weight loss	9.3% (n=10)	*"Have tried 'dieting' my whole life. Weight always comes back. Surgery would be more permanent"*

				There is no evidence for diets, medication or anything other than surgery working other than in the very short term. Evidence based decision"
5	**Motivation of quick weight loss**	The quick weight loss would be motivational and inspire a healthy lifestyle	6.5% (n=7)	*"The fast results would make me so happy that I would be bolstered to continue a healthy eating plan to maintain my new figure"*
6	**Body dissatisfaction**	Weight loss through BS would enable individuals to feel good about their body	4.7% (n=5)	*"I hate the way I look"*
7	**Others' experiences**	Witnessing others' positive experiences of BS is a reason they would consider	2.8% (n=3)	*"I have a friend that has seen amazing results"*

Table 13: Reasons for not considering bariatric surgery (n=280)

Rank	Category	Description	% (n) participants reporting	Examples
1	**Risks or side effect**	BS as a procedure, or undergoing surgery is risky in general. Risk often non-specified.	27.5% (n=77)	*"At my size I was afraid that I would not survive the operation"* *"Risky"* *"Major surgery is extreme, I would worry about complications during and after surgery"* *"I've had enough operations for serious conditions, I don't want any unnecessary ones"*
		Would not consider BS due to side-effects or implications of the surgery	9.6% (n=27)	
		-Detrimental to health or nutrition	(n=9)	*"The surgery is too drastic and causes further health complications down the line"*
		-Impact on appearance (e.g. skin and scarring)	(n=8)	*There are very big drawbacks to surgery that is permanent, mutilating and changes your whole life. In addition very fast weight loss leaves horrific lose skin which the NHS will not deal with."*
		-Impact of lifestyle (e.g. family, not being able to eat properly)	(n=6)	*"Eating with my children is important. I don't want my daughter seeing me eat different foods"*
		-'Side effects' non specified	(n=4)	*"It would bring about lots of side effects which could be just as difficult to deal with or worse than the effort and willpower needed to focus on weight loss"*

2	**Weight loss as a personal responsibility**	Weight should and could be controlled by the individual. BS is considered as an easy way out. Views that weight can be lost without BS.	25% (n=70)	*"I done. This. Myself. So. I'm. Responsible"* *"I feel it's a lazy decision to have surgery for weight loss. It should be about changing eating habits that made me fat in the first place"* *"I think it's taking the easy way out. I know that the whole process isn't easy but a person should be able to lose weight by sorting out their diet and exercise, and not chopping part of their stomach out"* *I would not wish to undergo this surgery as Doctors and Nurses should be able to have time for patients who are really ill"* *"I would want to pay for the procedure myself if I were to have it, it is not fair to make other people pay for my bad choices"*
3	**Does not address the root cause**	Will not address the psychological reasons for obesity BS wouldn't address medical cause for obesity Root cause not specified	12.9% (n=36) 1.1% (n=3) 1.8% (n=5)	*I don't feel having surgery to solve your weight problems actually tackles the reasons why you gained the weight in the first place.* *"It's not dealing with the psychological reasons for you over eating. The addiction and the compulsion. That doesn't just go away. People have addictions to food, the same as alcohol, drugs and cigarettes, unfortunately you just get pigeon holed as greedy, or lazy"* *"Too dangerous and it would not solve my reason for obesity Severe hypothyroidism from RAI therapy"* *"It doesn't sort the cause of the problem"*
4	**Possesses self-efficacy for weight loss without BS**	Would not consider BS as they have weight loss self-efficacy e.g. are currently losing weight successfully, or confident they can lose weight without surgery.	10.7% (n=30)	*"I think changing your eating habits and exercise is enough to get results I have done this with slimming world and am now 2 stone 1 pound lighter, still a long way to go but I'm getting there"* *"I believe I can do it on my own without surgery"*

5	**Negative influence of others' experiences**	Negative influence of knowing someone else who has had BS	6.4% (n=18)	*"I have had family and friends have weight loss surgery, they lose weight so rapidly that they start to look very sick, and then none of them have managed to keep the weight off - after a couple of years they start piling it back on because they haven't changed any habits"* *"My sister had bariatric surgery when she weighed 24stone. She rapidly lost weight but substituted alcohol for food. She died aged 44 weighing 7 stone. She was an alcoholic. The surgery did not solve her problems it exacerbated underlying issues"*
6	**Last resort**	Would (or others should) only use BS a last resort, when other methods are exhausted	6.4% (n=18)	*"I feel I have other options before this one. This would be my final choice when all other options are exhausted"*
7	**Too drastic or extreme**	BS stated to be too drastic or an extreme measure for the individual	6.1% (n=17)	*'Surgery is too drastic a measure at my age'* *"I wouldn't like to go to this extreme"*
8	**Risk of BS vs Risk of obesity**	Would not consider BS as they don't believe they are big enough to warrant an intervention. Risk of obesity has not outweighed risk of surgery	4.3% (n=12	*"I don't think that my weight is substantial enough to risk any type of surgery as I am aware that with any surgery there are always risks and don't feel that my current situation warrants such a risk"* *"I believe that the risks of any surgery outweigh any weight loss it may bring about"*
9	**Permanency**	Would not like BS as it's a permanent procedure	3.9% (n=11)	*"I feel this is more permanent and not something I would want to live with forever"*
10	**Loss of control**	Would not like BS as control for weight loss would be taken away	3.2% (n=9)	*"I want to be able to control my weight and what I eat. Bariatric treatment would be a measure out of my control and restrict me from certain activities that I may want to take part in. I would much rather lose weight and be in control without that type of help"*

	Not informed enough	Do not feel informed enough to make a decision, they would need more information	1.4% (n=4)	*"I would need to understand more about the procedures and associated risks and likelihood of success before making a final choice"*
	MISC	BS is cosmetic Guaranteed to improve health	1.1% (n=3) 0.36% (n=1)	*"I do not believe in cosmetic surgery where results can be achieved through alternative methods"* *"If it would help and guarantee other medical issues were stabilised I would"*

4. Discussion

This study has addressed a gap in understanding by quantitatively exploring the psychosocial variables predicting the consideration of BS as a method of weight loss amongst those who are potentially eligible for the procedure based upon BMI (≥ 35). Based upon the qualitative BS literature and quantitative obesity literature, it was hypothesised that internalised weight stigma, external weight locus of control, low eating-self efficacy, body dissatisfaction and poor health-related quality of life would individually be associated with an increased consideration of BS. Whilst all these hypotheses were confirmed through analyses when controlling for BMI, a fear of enacted stigma explained the greatest variance in the consideration of BS. Due to the negative impact of weight stigma, its possible mediating effect was explored. A fear of enacted stigma was found to fully mediate the relationship between BMI, eating self-efficacy, body dissatisfaction and the consideration of BS, and partially the relationship between weight locus of control and the consideration of BS. Self-devaluation was found to fully mediate the relationship between eating self-efficacy and the consideration of BS, and partially the relationship between body dissatisfaction and health-related quality of life on the consideration of BS.

An embedded qualitative element permitted a greater understanding of the reasons women living with obesity may or may not consider BS. Reasons for considering BS identified in the data included it being a last resort for weight loss, providing control and leading to improved health. Reasons for not considering BS included hearing others' negative experiences and believing it does not address the root-cause of their obesity, primarily psychosocial factors.

In this section, results of this research will be discussed in light of relevant obesity and BS literature. The implications for health psychology and NHS weight management services will be discussed. Limitations and strengths of the study will be outlined and recommendations for future research made, ahead of a reflection on the methodology and my own views of BS.

4.1 Consideration of BS

Just over a quarter (28.5%) of the women in this study would consider undergoing BS. This is a similar figure to another study amongst individuals in the US, which found that 32% of those living with a BMI >40 believe it is an acceptable option for them (Stanford et al., 2015), and a study in Canada finding 33.3% of those amongst those attending a weight management clinic (BMI >35) expressed an interest in BS (Wharton et al., 2015).

4.2 Weight stigma

Internalised weight stigma has not previously been explored for its influence on considering or pursuing BS as a treatment. Based on the pervasiveness of weight stigma (Puhl & Heuer, 2010), its negative impact on health and emotional wellbeing (Pearl, White & Grilo, 2014) and Granberg's (2011) theory of stigma exits, it was hypothesised that those living with obesity would consider BS, at least in part to escape weight stigma. To test this, the impact of internalised weight stigma, specifically a fear of enacted stigma and self-devaluation on the consideration of BS was explored. There was full support for this hypothesis, as both significantly predicted an increased consideration of BS in analyses, even when controlling for BMI.

When entered into the full model, a fear of enacted stigma was the most influential factor above all other potential predictors in the consideration of BS. Interestingly, a fear of enacted stigma was found to fully mediate the existing relationship between the other weight stigma variable, self-devaluation, and the consideration of BS. These two dimensions of internalised weight stigma have been investigated for their influence on weight loss outcomes in an internet-based behavioural and dietary weight loss intervention (Lillis, Thomas & Levin, 2017). Results demonstrated that a fear of enacted stigma predicted less weight loss and self-devaluation did not predict weight loss. A fear of enacted stigma refers to the experience of wondering and worrying about whether others will reject, hurt, and discriminate against you (Lillis, Thomas & Levin, 2017). It appears to be more powerful than self-devaluation both for

weight loss attempts and for considering BS. The direction of this relationship is unclear, for example does a fear of enacted stigma result in more self-devaluation or vice versa? However, it appears that a fear of stigma is detrimental to weight loss attempts, and could be one reason for its significant influence on the consideration of BS in the current study.

The influence of weight stigma on the consideration of BS supports research published during the write up of this research, which found that amongst those referred for BS, weight stigma led to an increased willingness to accept risk (Giardino et al., 2017). Taken together, these results indicate that BS, which typically results in significant and rapid weight loss, could be viewed as a way to exit weight stigma. However, this is not guaranteed. Firstly, realistic expectations for weight loss via BS are around 55% of excess body weight (Buchwald, 2009), therefore individuals may not lose enough weight to successfully exit this stigmatised identity. Furthermore, because how an individual attempts to lose weight is as important as whether they actually lose weight or not (Stambush, Hill-Mercer & Mattingly, 2016), patients can still be subject to residual weight loss stigma following BS, because they are not seen as being responsible for their weight loss (Fardouly & Vartanian, 2012). Therefore, internalised weight stigma, that appears to be influential in an individual's consideration of BS, could persist post-surgery if an individual chooses to undergo it.

Despite a fear of enacted stigma predicting an increased consideration BS, over and above the other variables in this study, this was not reflected in the qualitative data. For example, no participants stated they wanted to lose weight using BS because of concerns around stigma. Potential explanations for this include that the internalisation of weight stigma occurs largely at the implicit level, and thus without conscious awareness (Flint, Hudson & Lavallee, 2015). For example, experiential avoidance is high in those living with obesity (Lillis & Wing, 2015), and is a coping style characterised by the tendency to avoid unwanted thoughts and feelings (Hayes et al., 2006). However, explicit stigma towards BS as a method of weight loss, and associated shame of utilising it was reported by some. Participants perceived BS an easy way out for a condition they are responsible for. This also appeared to influence disapproval for

BS being funded and performed by the NHS. The lack of support for publicly funded BS (and other obesity interventions) has also been identified in a study by Lund, Sandøe and Lassen (2011) amongst the Danish public. They found that this disapproval was predicted by beliefs that individuals should be personally responsible for their weight. It is evident that stigma towards BS as an intervention, and anticipated shame of resorting to it are reasons individuals in this study rejected BS. The shame of having to 'resort' to BS has been identified as a reason individuals decide not to disclose the procedure to family and friend (Sutton, Murphy & Raines, 2009). However, social support helps people maintain their weight loss, whilst a lack of support is linked with weight gain and weight cycling (Metzgar et al., 2014), therefore failing to disclose BS to significant others may put individuals at higher risk for negative post-surgical outcomes.

It is possible that internalised weight stigma is a conflicting influence on the consideration of BS. Whilst confirmed as a statistically significant predictor for the consideration of BS, qualitative data demonstrated participants felt that the procedure is an easy way out for weight loss, and anticipated shame or guilt for using it. Therefore, in addition to decision making being influenced by the risks and benefits of surgery, individuals may also be influenced by weight stigma. For example, they could believe that BS offers them the best chance to lose weight and successfully exit a stigmatised identity. However, they could also feel shame for considering the procedure, rather than achieving weight loss independently. This could result in decisional conflict - the personal uncertainty about what course of action to take when the choice involves risk, loss or regret or a challenge to personal life values (Carpentio, 2000). Indeed, low decisional conflict has been found to be a significant predictor of undergoing BS in an already interested population (Schauer et al., 2014).

4.3 Weight locus of control

Weight locus of control (WLoC) measures the belief someone has in their ability to control their weight and therefore it is key in weight loss attempts (Neymotin & Nemzer, 2014). As

those living with an external WLoC are less likely to succeed in weight loss attempts, due to a belief their obesity is out of their control, and because BS could be seen as an 'external' intervention for weight loss, WLoC was investigated for its influence on the consideration of BS. As predicted, a more external WLoC significantly predicted an increased consideration of BS, even after controlling for the potential influence of BMI and weight stigma. Therefore, it appears BS is appealing to those with an external WLoC who may believe they are unable to control their weight. This finding was supported by qualitative data in this study, whereby individuals reported believing BS would provide them with the necessary control to achieve weight loss. This supports existing qualitative research, whereby patients have reported belief that BS was the only available opportunity for them to take control of their weight (Ogden, Clementi & Aylwin, 2006; Knutsen, Terragni & Foss, 2012). Additionally, perhaps indicative of an internal/external split on the consideration of BS. The removal of control featured as a reason individuals would not consider BS.

However, when a fear of enacted stigma was controlled for, the predictive value of WLoC reduced, indicating that fear of enacted stigma partially mediated the relationship between WLoC and the consideration of BS. Although controllability beliefs are associated with increased weight stigma (Puhl & Heuer, 2010), the link between WLoC and internalised stigma is not clear in the literature. However, belief in having control over behaviours is important for performing successful health behaviours, including weight loss. This might enable individuals to possess a sense of personal agency and confidence over weight loss, whereas having an external WLoC could leave individuals more vulnerable to internalising societal attitudes about the controllability of weight, as they believe they are unable to change their weight.

This is the first study to explore the influence of WLoC on the consideration of BS as a treatment, so it is not possible to compare these findings to previous literature. However, some studies have found that WLoC is a significant factor in successful weight loss attempts (Holt, Clark & Creuter, 2001; Saltzer, 1982), which is important to note alongside the findings

in this study. An external WLoC appears to be influential in considering BS, and this has potential implications for post-surgical outcomes if they do proceed. This is because BS requires a significant effort post-surgery to adopt the behavioural changes necessary to make the procedure a long-term success (e.g. eating a balanced healthy diet and exercising). Whilst there is still some debate as to whether locus of control is a fluid or stable trait, the overall consensus it that it is difficult to change (Holt, Clark & Creuter, 2001; Page & Scalora, 2004). Therefore, it is unlikely that undergoing BS alone would shift someone with an external WLoC to possess an internal WLoC, which could have implications for the success of the procedure. Indeed, Janse Van Vuuren et al. (2016) interviewed 17 females who had had a primary failed laparoscopic adjustable gastric band and then had more than three revisional procedures. One of their key findings was that these patients had unrealistic expectations of weight loss surgery to address their long-term difficulties. They demonstrated an external locus of control, as they believed that surgery was the only satisfactory solution to their difficulties and communicated that their inability to achieve weight loss was due to factors outside of their control. This suggests that patients with an external locus of control may struggle to adopt the behaviour changes required following BS. Therefore, external WLoC might not only be influential in considering BS, but could lead to the risk of poorer outcomes following BS if chosen. This indicates it could be an important psychosocial variable to measure in those presenting for BS, as those individuals with an external locus of might require additional post-surgical psychological support, or support that is adapted to their locus of control.

4.4 Eating self-efficacy

It was hypothesised that because low eating self-efficacy results in individuals feeling they are unable to lose weight, it would predict an increased likelihood of considering BS. In univariate analyses, this was confirmed, as low eating self-efficacy significantly predicted an increased likelihood of considering BS to achieve weight loss. Additionally, low eating self-efficacy is predictive of an increased consideration of BS was reflected by qualitative data. Low eating

self-efficacy, as well as low self-efficacy to achieve weight loss without BS, was the most cited reason individuals would consider it. Many reported viewing BS as a last resort to manage their weight and reported repeatedly failing at dieting attempts. This supports previous qualitative research that has also found that low self-efficacy for weight loss is a key reason for undergoing BS (Jumbe & Meyrick, 2018; Ogden & Hollywood, 2016). Low-eating self-efficacy as a predictor of considering BS is problematic as those who undergo BS still have to adhere to dietary guidelines post-surgery. Research investigating whether eating self-efficacy is improved simply through undergoing BS is scarce. However, research in clinical settings has found that individuals low in eating self-efficacy post-surgery may struggle to make dietary changes and achieve post-operative weight loss, particularly in the long-term (Boeka, Prentice-Dunn and Lokke, 2009; Batsis, Lopez-Jimenez, Collazo-Clavell, 2009).

Existing research highlights the negative influence of weight stigma on eating behaviour, and the "Why Try" process model of self-stigma posits that if an individual makes stigma relevant to them (self-stigma), this reduces self-esteem and self-efficacy which can lead to a lack of goal-related behaviour (Corrigan, 2009). Whilst the "Why Try" process model of self-stigma was not tested explicitly in this research, based upon this model it was predicted that internalised weight stigma would precede low eating self-efficacy, and this would result in an increased consideration of BS. Indeed, when either the fear of enacted stigma or self-devaluation variable were controlled for in analyses, the relationship between eating self-efficacy and the consideration of BS became insignificant. These variables appeared to be fully mediating (explaining) the previous relationship between eating self-efficacy and the consideration of BS. Tests of direct effects confirmed this was significant. Mediators and confounders use the same statistical analysis, however, a confounder is a factor that distorts the observed association between the predictor and the outcome, but is not an intervening causal variable (MacKinnon, Krull & Lockwood, 2000). Conclusions about whether a variable is a mediator or a confounder are based on existing literature. In line with the "Why Try" process model of self-stigma, it is proposed that internalised weight stigma is a confounder,

resulting in reduced eating self-efficacy in those living with obesity, leading to an increased consideration of BS.

The negative impact of weight stigma on eating-self efficacy supports previous correlational studies highlighting the negative influence that weight stigma has on performing health behaviours conducive for weight loss. For example Latner, Durso and Mond (2013) found that an internalised weight stigma predicted a lower core self-evaluation (including self-efficacy), which in turn predicted greater anxiety and depression, and lower global health status in those living with obesity. Pearl et al. (2015) found that internalised weight stigma correlated negatively with exercise motivation and self-efficacy, resulting in lower reported exercise behaviours. Eating self-efficacy has been identified an important predictor of post-surgical success (Boeka, Prentice-Dunn and Lokke, 2009; Batsis, Lopez-Jimenez, Collazo-Clavell, 2009) and these findings suggest it might be affected by internalised weight stigma. However, with correlational data it is impossible to determine the direction of causality or to eliminate possible third-variable explanations. Therefore, weight stigma may lie on the causal pathway between eating self-efficacy and the consideration of BS. For example, low self-efficacy for controlling eating behaviour and achieving weight loss could leave individuals more vulnerable to internalising weight stigma, which then leads to an increased consideration of BS.

Interestingly, learning about negative experiences of others who had undergone BS featured as a reason why individuals would and would not consider BS. Vicarious experiences (witnessing others perform the task) are reported as key to improving self-efficacy as they reinforce the belief that perseverance will lead to personal accomplishment (Bandura, 1977). This is important to consider as a potential influence on behaviour change in those who choose to undergo BS. This is because learning of others' negative experiences of BS (e.g. not being successful at addressing eating behaviour) could negatively influence the belief that they can make the required behaviour change post-surgery. Whereas, having the chance to learn of positive experiences could enhance self-efficacy for behaviour change post-

surgery. Indeed, engaging in BS peer support groups can be a valuable component of follow-up care and positively related to the amount of weight loss (e.g. McMahon et al., 2006; Song et al., 2008)

4.5 Body dissatisfaction

Based on previous literature highlighting that body dissatisfaction in those living with obesity is a key reason for seeking weight loss treatment, it was hypothesised that increased body dissatisfaction would predict an increased consideration of BS. Univariate analyses demonstrated support for this hypothesis, as increasing body dissatisfaction significantly predicted an increased consideration of BS. Body dissatisfaction or appearance concerns did not feature strongly as a reason for considering BS in qualitative data. This is somewhat surprising, as research has highlighted individuals can be motivated to lose weight, including via BS, due to body dissatisfaction (Sarwer, Thompson & Cash, 2005; Friedman et al., 2002; Munoz et al., 2007; Rosenberger, Henderson & Carlos, 2006). Indeed, the body dissatisfaction of participants in this study (measured by the MBSRQ-AE) was similar to individuals with severe obesity seeking weight loss treatment (Dixon, Dixon & O'Brien, 2002) and slightly worse than another study with a population prior to BS (Song et al., 2016). However, it may be that BS body dissatisfaction is not a salient or conscious motivating factor for BS for participants in this study, explaining why it was not reflected in qualitative data. Additionally, this could be attributable to desirability bias, as individuals may have felt they should not cite appearance as a reason they would consider BS. This could have been for a fear of appearing vain or related BS being a publicly funded procedure in the UK.

Society values the thin ideal and stigmatises those of larger sizes, leading many individuals to feel bad about their bodies (Pearl, White & Grilo, 2014). Therefore, it was anticipated there would be a relationship between body dissatisfaction and weight stigma on the consideration of BS and this was indicated by the strong correlations between a fear of enacted stigma and body dissatisfaction. Therefore, a fear of enacted stigma and self-devaluation were controlled

in the next stage of analysis, and revealed that a fear of enacted stigma was a full mediator, as it fully accounted for the existing relationship between body dissatisfaction and the consideration of BS. This suggests that the consideration of BS is not just influenced by body dissatisfaction, but occurs via a fear of being stigmatised due to weight. In addition, self-devaluation partially explained the previous relationship between body dissatisfaction and the consideration of BS, indicating that body dissatisfaction's relationship with the consideration of BS partially occurs due to self-devaluation.

It is unclear whether weight stigma is acting as a mediator or confounder in this case. However, as body dissatisfaction is a form of self-stigma (Weineland, 2012), it is likely the relationship is bidirectional. This makes conceptual sense in a society that exhibits stigma towards those of larger body sizes and where individuals are likely to internalise sociocultural pressures to be thin. This internalisation means individuals living with obesity may be increasingly likely to perceive their bodies as unattractive and in need of modification. As such, they may seek BS as a way to reduce their weight and increase body satisfaction, particularly as its success for weight loss is widely promoted. Indeed, previous studies have highlighted that internalised stigma is highly correlated with body image dissatisfaction (Durso & Latner, 2008; Durso, Latner & Ciao, 2016; Heijens, Janssens & Streukens, 2012). Furthermore, body dissatisfaction can result in greater, and often unrealistic weight loss desires amongst those living with obesity and presenting for BS (Wee et al., 2006; Wee et al., 2013). Therefore, individuals high in body dissatisfaction may be more likely to consider BS due to the dramatic amount of weight loss it can produce.

It is problematic that body dissatisfaction is a significant predictor of considering BS, as whilst evidence for the short-term impact of BS on body image appears positive, research exploring long-term outcomes is scarce (Ivezaj & Grilo, 2018). Weight loss can be dramatic in the first 6 months but then slows down (Bond et al., 2009), and weight is regained in 20-40% of patients (Ferchak & Meneghini, 2004; Elkins et al., 2005; Sarwer, Wadden & Fabricatore, 2005; Livhits, et al., 2010) Therefore, initial body image improvements may not be maintained in

the long-term. Furthermore, patients can be left with excess skin and scarring that negatively impacts on body image and function (Gilmartin, 2013). As such, body dissatisfaction due to living with excess weight may be replaced with dissatisfaction with the post-surgical appearance of the body.

Body dissatisfaction not only predicts the consideration of BS, but might also have implications for successful weight loss following BS due to its link with negative health behaviours. For example, body dissatisfaction has been found to be strongly associated with disordered eating behaviours in BS candidates, such as binge eating (Rosenberger, Henderson & Grilo, 2006) or avoidance of exercise (Pridgeon & Grogan, 2012). Therefore if BS is an influential factor in the pursuit of BS, but is not addressed via surgery, it could negatively affect the health behaviours required for successful BS outcomes.

4.6 Health-related quality of life

As predicted, a poorer health-related quality of life (e.g. sweating, breathlessness) predicted an increased consideration of BS. This supports existing research that found health was the primary reason why people undergo BS (Dixon et al., 2009; Pfeil et al., 2013; Trainer & Benjamin, 2016). In the current study this quantitative finding was supported by qualitative data, as health-related factors were cited as key reasons why individuals would consider BS. Furthermore, some individuals reported considering BS when the risk of living with obesity was outweighing the perceived risk of undergoing BS, supporting the findings of previous research (e.g. Gilinski, Wetzler & Goodman, 2001). Interestingly, some individuals stated that if they reached the point where BS was required for health reasons, they would then have the motivation to lose weight. Therefore, it may be the presence, rather than the threat of health conditions that is key in influencing individuals' consideration of BS.

HRQoL remained a significant predictor for considering BS, even when controlling for weight stigma, yet both a fear of enacted stigma and self-devaluation partially mediated this relationship. This is supported by considerable evidence documenting the links between

HRQoL and weight stigma. Whilst impairments in health and HRQoL are often attributed to excess weight, this study and others (Latner et al., 2014; Schafer & Ferarro, 2011) suggest it might actually be internalised weight stigma that leads to poor HRQoL.

4.7 BMI

Univariate analyses highlighted that a higher BMI was associated with an increased consideration of BS for weight loss. However, when BMI was controlled for, it did not appear to explain any of the variance in existing relationships between the predictor variables and the consideration of BS. This was surprising, as reviewed research indicated that a higher degree of obesity predicts worse outcomes on these variables (Sarwer, Thomson & Cash, 2005; Jumbe et al., 2017; Fontaine & Barofsky, 2001). Furthermore, results of the correlational analysis indicated that BMI correlated positively with a fear of enacted stigma, self-devaluation, body dissatisfaction, health-related quality of life and consideration of BS.

This is potentially explained by the influence of a fear of enacted stigma since, when controlled for, the significant influence of BMI on the consideration of BS disappeared. Indeed, most studies assume BMI has a direct effect on health and psychosocial wellbeing, therefore little attention is paid to the psychosocial mediators through which BMI might be operating, such as fear of enacted stigma in this case. However, in other studies, internalised weight stigma has been found to be significantly associated with self-reported health (Hunger & Major, 2015), depressive symptoms (O'Brien & Latner, 2016) and self-esteem (Durso, Latner & Ciao, 2016), even when controlling for BMI. Therefore, the degree of obesity appears to be inconsequential on the consideration of BS, because a fear of enacted stigma may account for this relationship.

4.8 Additional factors in the consideration of bariatric surgery

The purpose of the quantitative element of this study was to gain a greater understanding of factors predicting an increased consideration of BS. In addition to cross-validating these

findings, the qualitative element permitted the exploration of other factors potentially influential in the consideration of BS. This was important to understand as the final model explained just 15% of the variance in the consideration of BS. The most widely reported reason why individuals in this study would not consider BS was the perceived risks of the surgery, supporting research findings that risk is a key reason why people decline BS (Stanford et al., 2015; Wharton et al., 2015). Many participants did not explicitly state what the particular risk was that was preventing them from considering BS. However, when explained, they were often not specific to BS, and were, instead, risks of undergoing a surgical procedure in general, including the anaesthetic. This indicates that the perception of risk is obtained outside of the clinical setting, and it may be any surgical procedure, rather BS in particular, that is viewed as risky.

Interestingly, qualitative data from this study highlights that those living with obesity know that psychological factors (e.g. stress and emotions) are a significant contributor to overeating, and therefore perceived BS as ineffective in addressing this. This perhaps reflects a recognition of the wider determinants of obesity amongst those living with it and the need and desire for psychological input.

One unexpected finding was the number of people who stated the reason they would not have BS is because they knew someone who had it with unfavourable weight loss, side-effects or lifestyle outcomes. Social influences on an individual's decision to undergo BS appears not to have been studied in the literature to date, but this study indicates that learning of others' negative experiences is a potential deterrent. Social control theory (Lewis, 1999) could be useful to consider the ways in which others can influence decision making, as it accounts for interactions in one's social network that can influence behaviour. On the whole, the influence of social context in relation to surgical decision-making is not well established (Fischer et al., 2015), however evidence suggests that family, friends and society are a source of influence for other surgeries such as for treatment of prostate cancer (Srirangam et al., 2003), breast cancer (Hawley et al., 2009) and inflammatory bowel disease (Rini et al., 2011). Although

patients might have encouragement and support from a healthcare provider, the decision to undergo BS will ultimately fall to them (Ekegwu, 2017). Therefore, individuals may turn to their social network to aid their decision-making. As research highlights that those without direct experience of a particular surgery are influential in a patient's decision, those who have undergone the same surgery could be even more influential. Therefore, it is highly likely that learning about negative experiences could deter individuals considering BS, or contribute to increased decisional conflict. This influence may intensify as time goes on, as over 6,000 operations are carried out each year in the UK (Welbourn et al., 2014), so the number of people having previously undergone BS is increasing, as will the chance that individuals considering BS will know someone that has had it. This could have implications for future uptake of the procedure.

4.9 Major contributions and implications for health psychology

This study quantitatively studied the factors influencing the consideration of BS in a large UK community sample of women living with obesity (BMI $\geq$ 35), who have not been referred for BS. It has advanced the literature into psychosocial aspects of BS in three key ways. First, it has quantitatively explored the psychosocial variables influencing the consideration of BS. Whilst qualitative research into BS has introduced the variables in this study as potentially key in decisions to undergo BS, they have never been explored for their predictive value. Second, this study highlights that weight stigma, particularly a fear of being stigmatised, may be the most influential factor in individuals considering (and therefore potentially undergoing) BS. The findings of this study suggest that weight loss through BS may be considered as a way to permanently exit a stigmatised identity. Additionally, weight stigma negatively influenced other variables in this study and mediated existing relationships between them and the consideration of BS, demonstrating its wide-ranging impact. Lastly, qualitative data has permitted a greater understanding of the reasons individuals living with obesity in the UK would or would not consider BS as a method to achieve weight loss. Whilst generally cross-validating quantitative findings, this study found that hearing of others' negative experiences

and believing that BS will not address the psychological origin of their obesity were key factors deterring them from BS. These findings have implications for BS care and interventions at the individual, organisational and societal level and will now be discussed.

This study adds to the compelling evidence base that internalised weight stigma is disempowering and has consequences for psychological and physical health (Weineland et al., 2012; Ogden & Clementi, 2010). Considering its negative impact, targeting weight self-stigma in those seeking BS (or other weight loss treatments) appears to be an appropriate treatment aim. Currently most weight loss interventions are weight normative, as weight loss is viewed the primary goal for increasing health. However, such interventions may not decrease weight self-stigma, and actually harm weight loss attempts or result in weight regain (Foster et al., 2003; Puhl & Heuer, 2009). Currently, very few well-researched treatment options for obesity acknowledge the impact of weight stigma. However, Acceptance and Commitment Therapy (ACT; Hayes, Strosahl & Wilson, 2011), an acceptance based cognitive behavioural therapy, is showing promise for weight related applications, including weight stigma and body dissatisfaction (Forman et al., 2013; Lillis et al., 2009). Data is limited on the effectiveness of acceptance-based interventions in targeting weight stigma in those presenting for BS. However, as the main processes of ACT are acceptance, mindfulness, diffusion and commitment, it could be effective in reducing self-stigmatisation. For example, a fear of enacted stigma appears particularity influential in the consideration of BS, and ACT actively targets experiential avoidance. Experiential avoidance refers to a natural human tendency to avoid painful experiences, yet can contribute to a range of mental and behavioural health problems (Hayes et al., 2006). Therefore targeting weight stigma through ACT may help ensure decisions for BS are based upon an individual's values and desires, rather than driven by societal stigma. Targeting weight stigma may also weaken its negative influence on other psychosocial factors as identified in this study which may lead to significant psychological benefits, as well as a greater chance for weight loss in any chosen intervention.

Internalised weight stigma is caused by societal stigma, therefore, progress needs to be made in the UK to develop effective public enlightenment campaigns which educate the public on the complex nature of obesity, including its psychological aetiology (Puhl, Peterson & Luedicke, 2013). Evidence suggests that increasing public knowledge about the complex aetiology of obesity is a good strategy to reduce stigma. Studies have found that providing information about alternative causes of increased weight (e.g. a medical condition) reduces stigma, because it reduces perceived controllability of obesity (Puhl, Schwartz & Brownell, 2005; Anesbury & Tiggeman, 2000; Dierdrichs & Barlow, 2011). Future campaigns should consider including education on the behavioural, psychological, genetic and environmental factors that can cause obesity. This may go some way to reducing societal, and therefore internalised weight stigma in those living with obesity.

Campaigns that aim to address obesity by encouraging the public to eat healthily and exercise in order to lose weight should be mindful not to perpetuate weight stigma. Although these efforts might stem from positive intentions to improve public health, many have been criticised for inciting negative attitudes towards those living with obesity and therefore perpetuating weight stigma (Puhl, Luedicke & Peterson, 2013). Furthermore, highly stigmatising obesity-related health campaigns have been found to be no more likely to instil motivation for improving health behaviours than those that are not (Puhl, Luedicke & Peterson, 2013). Therefore, public health campaigns should not promote obesity stigma in an attempt to raise public awareness about obesity or incentivise individuals to lose weight, since this is not an effective tactic. In fact, it may actually lead individuals to engage in unhealthy eating behaviours, avoid exercise, and increase avoidance of health care, all of which can impair weight loss efforts and lead to weight gain (Puhl, Luedicke & Peterson, 2013).

Unfortunately, some individuals living with obesity also experience weight stigma in healthcare settings (Ekeagwu, 2017) and in interactions with health professionals whose primary role is to treat individuals with obesity (Flint, 2015). Therefore, it is becoming increasingly important to address weight stigma amongst healthcare professionals, but as these

attitudes are difficult to change, this is not an easy task (Daníelsdóttir, O'Brien & Ciao, 2010). In their systematic review assessing the impact of interventions designed to reduce weight bias in healthcare professionals or students, Alberga et al. (2016) found interventions utilised one (or a combination of) four primary approaches. Firstly, education on the negative effects of weight stigma. Secondly focusing on the lived experience of people that are living with obesity to increase empathy. A third approach was to understand the presence and impact of their own unconscious implicit biases. Lastly, the use of respected leaders who can challenge and influence others thinking about weight stigma. This review found that many studies reported changes in health professionals' beliefs and knowledge about obesity aetiology. However, the review found a lack of robust and well-evaluated interventions to decrease weight stigma in healthcare settings and highlighted the need for well-designed trials to test the impact of interventions. Whilst definitive evidence on the most effective approach appears unclear, health professionals working in the NHS should, as a minimum, receive training on weight stigma and its impact on health and psychosocial wellbeing using the aforementioned approaches. This is particularly important in NHS settings where BS is an option (e.g. Tier 3 or 4), as results from this study indicate that patients with a BMI ≥ 35 already have high levels of internalised weight stigma and this should not be exacerbated.

Psychological assessment for BS is important due to the psychosocial nature of obesity, but also in order to identify and manage any psychosocial contradictions to surgery (Kewin & Boyle, 2014). This study indicates measuring internalised weight stigma, weight locus of control, eating self-efficacy, body dissatisfaction and health-related quality of life should be considered in a patient's assessment, as they are predictive of considering BS, yet may not be addressed through weight loss and/or surgery. Moreover, they are highly relevant to weight loss behaviour, and could negatively impact post-surgery health behaviour change if they are not addressed. For example, the extensive literature demonstrates the importance of self-efficacy in predicting long-term behaviour change. In this study, low eating self-efficacy predicted an increased consideration of BS. It also emerged strongly as a reason why

individuals would consider BS, with participants communicating a sense of helplessness for being able to achieve weight loss without it. Therefore, interventions aimed at enhancing self-efficacy could be beneficial for those considering BS to see if they can lose weight without surgery. Due to the close association between internalised weight stigma and low eating self-efficacy in this study, this may be indirectly achieved through reducing internalised weight stigma. For those that choose to undergo BS, enhancing eating self-efficacy could be key to improving weight loss outcomes as previous research has found a strong relationship between high eating self-efficacy and increased weight loss following BS (e.g. Batsis et al., 2009).

In addition to highlighting those that may benefit from increased support pre or post-surgery, pre-surgical assessment of factors that influence individuals to pursue BS may help practitioners to ensure patient expectations for surgery are more realistic. For example, body dissatisfaction is predictive of considering BS and has a strong association with internalised weight stigma. This study highlights that it is vital patients are fully informed about the possibility they may still live with obesity after surgery, as this has implications for continuing weight stigma and increased body dissatisfaction. In addition, they should be informed of the possibility of excess skin due to rapid weight loss, which can potentially worsen or fail to improve body dissatisfaction. This is particularly important in the current climate, as UK funding for body contouring surgery to address excess skin is not guaranteed due to variation in protocols and funding (Kewin & Boyle, 2011).

Patients are understandably concerned about the risks of BS, and hearing of others' negative experiences can influence their consideration of BS. However, BS may be successful for some. In all cases, it would be useful if health professionals could present evidence for the long-term effectiveness of the procedure in order to support patients to make fully informed decisions, but currently this evidence is not available. In addition, emerging research on the potential negative psychosocial impact of BS (e.g. body dissatisfaction, alcohol abuse and increased risk of suicide) (King et al.,2012; de Zwaan et al., 2010; Karlachian et al., 2002; White et al., 2010; Colles, Dixon & O'Brien, 2012; Adams et al., 2007; Tindle et al., 2010) should

not be ignored and requires further examination. The current lack of evidence for the long-term physical and psychosocial impacts of BS has led to psychologists and researchers advocating for robust longitudinal research into BS outcomes (Jumbe, 2018; Kewin & Boyle, 2011) and this requires urgent attention.

BS is viewed as superior to other interventions because it offers the greatest weight loss (Thom & Lean, 2016). However, just a 5-10% weight loss can produce valuable health improvements, yet this is often overlooked by health professionals, and patients (Foster et al., 2002). This study highlights that a large majority of individuals living with obesity would not consider BS an option, and one reason is because they do not feel it is appropriate to address the psychological origin of their obesity. Psychology has an important place in the care of those who want to gain control over their weight, yet it is often neglected within current applied programmes (Waumsley, 2011). Furthermore, the current provision of Tier 3 weight management services in the NHS is patchy (Thom & Lean, 2016); leaving many without the benefit of multidisciplinary support, that should include psychology input. There is not yet a model of effectiveness for the treatment of obesity (Thom & Lean, 2016). Further, the lack of evidence for the clinical and cost effectiveness of existing obesity interventions is an obstacle to them being commissioned (Wilding, 2018). Therefore, future research needs to evaluate existing interventions for weight loss in the NHS and establish evidence for their effectiveness, or develop them if not proved effective. Given that obesity is a multifactorial issue with a large psychosocial component, all weight loss interventions should address the behavioural and psychosocial aspects of obesity, in particular weight stigma. This will give those living with obesity, not only the psychosocial support they desire, but alternative opportunities to lose weight, before resorting to an invasive operation which is associated with risks and consequences, and for which the long-term outcomes are yet to be determined.

The aforementioned interventions need to be delivered at the individual, organisational and societal level. In addition, further research pertaining to the outcomes of BS is paramount. In the UK, health psychologists are trained to enable individuals to deal with the psychological

aspects of their health condition and to deliver behaviour change techniques. Additionally, they deliver valuable training to health professionals on the psychology of health and wellbeing, and can provide consultation at a public health level. Furthermore, they possess research expertise, with the ability to disseminate this to a range of audiences. As such, health psychologists are well placed to deliver and improve the NHS weight management services, resulting in better psychosocial and health outcomes for those living with obesity.

4.10 Limitations

This study has started to understand what psychosocial factors are influential in the consideration of BS amongst those living with obesity. However, the findings should be considered in light of the study's limitations. The first relates to the cross-sectional design, which prevents assumptions of causality, or the elimination of third-variable explanations. For example, the direction of the relationship between weight stigma and other psychosocial variables could not be confirmed. Furthermore, whilst there is evidence that all variables in this study predict the consideration of BS, this does not mean that individuals will actively pursue or undergo it. These limitations can only be addressed through a longitudinal design, which could also disentangle whether weight stigma leads to poorer psychosocial outcomes or whether poorer psychological outcomes leaves individuals more vulnerable to internalising weight stigma. Longitudinal designs would also provide information about how these variables might change across time and what influence they may have on weight loss behaviours for those undergoing BS, or alternative weight loss treatments.

It should be noted that the final model only explained 15.5% of the variance, indicating there are many other influential factors in the consideration of BS. For example, whilst the existence of psychological co-morbidities was not measured in this study, specific literature indicates a higher prevalence of psychological co-morbidities (e.g. depression, anxiety and personality disorders) when compared to controls or other living with obesity that do not seek the procedure (Karlarchian et al., 2007). Furthermore, participants' perception that BS is risky

was the most influential reason for not considering the procedure. Whilst outside of the remit of this study, measuring such factors might have improved the predictive value of the final model.

Recruitment and therefore sampling was a limitation of the current study. Although a very good sample size was achieved, most participants were white British women and all were in the UK, therefore results cannot be generalised outside of this population. Additionally, as previously mentioned, participants were recruited from social media pages dedicated to weight loss and a high number were following commercial weight loss programmes. Therefore, these findings cannot be generalised to those in clinical settings, or those living with obesity but not actively trying to lose weight. Future studies should establish if the factors identified as predictive in this study are any different for those in clinical settings, or not current attempting weight loss.

The mixed method approach in the study is a strength. However, as participants completed outcome measures prior to providing qualitative data, their responses to the open question could have been prompted or led by the quantitative aspect of the survey. As a further limitation, BMI was calculated by the researcher based upon participants' self-reported height and weight. However, as self-report often leads to an underestimation of health and weight status (Visscher, 2006), the BMI in this study may have been higher than reported. Finally, only a minority of participants had spoken to their GP about BS, and although they were all provided with a brief explanation of BS prior to rating whether they would consider it, variations in how informed they were about BS could have affected responses.

4.11 Future research

Individuals living with obesity continue to seek BS at increasing rates, yet up until now little attention has been paid to understanding the psychosocial factors that may influence this. This study has made a promising start and has demonstrated that internalised weight stigma is particularly influential. Prospective and longitudinal studies are needed to strengthen the

confidence in the role internalised weight stigma, and the other psychosocial factors identified in this research might play in the pursuit and subsequent selection of BS. Furthermore, such designs could ascertain whether the factors predicting and increased consideration of BS are improved or addressed in those that choose to undergo it, and what influence this could have on health outcomes.

Weight stigma should be explored in larger and more ethnically diverse populations. For example, findings might have been different for cultures and in societies that are more accepting of larger women. Research exploring weight stigma and risk taking in those seeking BS, found white women were more influenced by weight stigma than black women (Giardino et al., 2017). Additionally, despite similar rates of obesity prevalence amongst men and women, less than 20% of BS patients are men (Farinholt et al., 2013), potentially because men are less likely to attend weight management programmes (Gray et al., 2013). Therefore, concerted efforts are needed to understand psychosocial factors influencing men to pursue BS and whether these differ from those reported in the current study. For example, although weight stigma is higher in women living with obesity (Puhl & Heuer, 2009), it could still be relevant to men's pursuit of BS. As in this study, mixed methods would be a useful approach towards gaining a better understanding of the issues raised in the current study, but with a male sample. Weight loss groups on social media proved effective for recruiting women in this study, but not men. Therefore, future studies may want to consider alternative social media avenues to recruit men living with obesity. For example, there is a growing recognition that professional sports clubs (e.g. football, rugby, cricket), attract men who are harder to reach and might be at risk of poorer health, and these have been effective at recruiting men to obesity research (Gray et al., 2013; Witty, 2011).

Predictors examined in this research explained just a small amount of the variance in the consideration of BS. Furthermore, qualitative data highlighted other contributing factors (e.g. BS as risky, others' experiences of the procedure and BS as ineffective at addressing the root cause of their obesity) which would be worth exploring for their predictive value and could

explain a greater amount of the variance. Additionally, there is likely to be other variables, not measured or stated by participants that might influence the pursuit of BS and require consideration. For example, mental health conditions were not explored, yet as depression is associated both with obesity (Arterburn et al., 2012) and weight stigma (Koball & Carels, 2011), it may be an important variable to study.

4.12 Reflection

This section outlines my reflection on conducting mixed methods research and considers how my own views of BS may have influenced this research.

Methodological reflections

Exploring a relatively new field, such as the consideration of bariatric surgery, is advantageous because of the clear need to increase knowledge in this area and the vast topics to be studied. However, it also had disadvantages, for example the reduced (particularly quantitative) body of literature on which to build the research made it difficult to decide on the specific variables to include. This was compensated by drawing upon existing obesity and weight loss literature, in addition to the increasing amount of qualitative work exploring the experiences of individuals who have undergone BS.

The paucity of research in this area upon which to select the variables of interest and the lack of a theoretical underpinning was the primary reason for deciding to conduct a mixed methods study. Throughout my research career, I have believed in the benefits of combining qualitative and quantitative research methods and agree with others who state this is superior to using just one approach (Yardley & Bishop, 2015). A strength of this research was the use of a mixed method approach using the validating quantitative data model proposed by Creswell and Clark. Priority was given to one method (QUANT) whilst the other approach (qual) was used to "confirm, cross-validate, or corroborate findings" (Creswell & Clark, 2007; p65). However, there were challenges with utilising a mixed methods approach. Firstly, conducting two

different analyses on the data was lengthy and time consuming. Specifically, the content analysis of 484 statements significantly added to the timeframe of this research. Additionally, it was challenging to work out how to combine the results of both approaches to produce a meaningful report of the results. Whilst relatively few formal techniques exist, this research may have benefited from a clear approach to data integration. The Pillar Integration Process (PIP) is a transparent and rigorous four-stage technique for integrating and presenting qualitative and quantitative findings in a joint display at the interpretation stage of the research (Johnson, Grove and Clark, 2017). The four stages to PIP (listing, matching, checking and pillar building) are completed sequentially after the initial quantitative and qualitative analyses. Using a structured approach such as the PIP in this study may have enhanced the data integration, interpretation and clarity in the presentation of the results, in addition to greater transparency of the process. Nevertheless, this research has demonstrated the usefulness of mixed methods research to examine the reasons individuals may seek BS. The combination of the two different approaches has identified issues which would not have been evident if using just one method.

Personal reflection

I have always had an interest in weight loss and the reasons some people are more successful at it than others. Moreover, through working in body image research, I am becoming increasingly knowledgeable of the damaging effect our society's obsession with appearance and pursuit of the thin ideal is having on health and wellbeing. As such, I have developed a keen interest in the psychological impact of weight stigma, and how this may be related to the selection of weight loss methods. Because BS is arguably the most invasive and risky method to achieve weight loss, I have found my attention focussing on the psychosocial aspects of bariatric surgery and, as a result, I have become increasingly sceptical about claims BS can solve obesity. I am alarmed about the lack of research pertaining to psychosocial outcomes of BS, particularly in the long-term, and am feeling increasingly uncomfortable about the number of individuals undergoing it when so little is known about the psychosocial variables driving

this increase. I am aware my opinions might have influenced my approach to reviewing the literature when developing my research proposal, with the potential that I have focussed on the negative, rather than positive influences and outcomes of BS. This was part of the reason I believed it was important to obtain qualitative data expanding on why individuals would consider BS, to see if there are any other perceived benefits of the procedure. Whilst there is the possibility my views on BS might have influenced my analysis of the qualitative data, a second coder and intercoder reliability should have reduced this.

This research has been challenging, yet rewarding. I have improved my confidence in conducting mixed methods research, particularly statistical analysis. In addition, it has increased my interest in the impact that stigma can have on the way those living with obesity, and others who have any condition that distinguishes them from the 'norm', feel. This is an area I hope to continue to pursue in my research career.

4.13 Conclusion

The research undertaken in this thesis has enriched our understanding of the psychosocial factors predictive in the consideration of BS amongst women living with obesity. It identified that weight stigma, weight locus of control, eating self-efficacy, body dissatisfaction and health-related quality of life all significantly predicted the consideration of BS. Although weight stigma is on the rise and is a significant public health problem (Puhl & Heuer, 2010), no research has examined its influence on pursuing BS. However, this study highlights that a fear of being stigmatised due to weight accounts for more variance in the consideration of BS than any other variable explored in this study. Weight stigma also fully or partially explained existing relationships between these psychosocial variables and the consideration of BS, confirming its wide-ranging negative impact on psychosocial wellbeing. This study has highlighted that many living with obesity do not consider BS to be an appropriate treatment for them, recognising obesity has psychological origin.

It is important that longitudinal research seeks to understand the role of the variables examined in this study, and others, preoperatively and postoperatively, and how they change over time. In terms of implications for NHS weight management services, the current study supports the need for access to evidence-based psychosocial support for weight loss as an alternative to BS. Such interventions could stand-alone or be delivered alongside weight normative interventions, including BS. It is also essential that psychosocial interventions focus on minimising the negative impact of weight stigma. Health psychologists, who work across research and clinical settings, and at the individual, organisational and societal settings, are well placed to address the issues raised in this research.

References

Adams, T.D., Gress, R.E., Smith, S.C., Halverson, R.C., Simper, S.C., Rosamond, W.D., LaMonte, M.J., Stroup, A.M. and Hunt, S.C. (2007) Long-term mortality after gastric bypass surgery. *New England Journal of Medicine*, *357*(8), pp.753-761.

Adeleke, K.A. and Adepoju, A.A. (2010) Ordinal logistic regression model: An application to pregnancy outcomes. *Journal of Mathematics and Statistics*, *6*(3), pp.279-285.

Ahern, N.R. (2005) Using the Internet to conduct research. *Nurse Researcher*, *13*(2), p.55.

Agresti, A. (2010) *Analysis of ordinal categorical data* (Vol. 656). John Wiley & Sons.

Ames, G.E., Heckman, M.G., Grothe, K.B. and Clark, M.M. (2012) Eating self-efficacy: development of a short-form WEL. *Eating behaviors*, *13*(4), pp. 375-378.

Anesbury, T. and Tiggemann, M. (2000) An attempt to reduce negative stereotyping of obesity in children by changing controllability beliefs. *Health Education Research*, *15*(2), pp.145-152.

Annesi, J.J. and Gorjala, S. (2010) Relations of self-regulation and self-efficacy for exercise and eating and BMI change: A field investigation. *BioPsychoSocial medicine*, *4*(1), pp.10-16.

Arterburn, D.E., Olsen, M.K., Smith, V.A., Livingston, E.H., Van Scoyoc, L., Yancy, W.S., Eid, G., Weidenbacher, H. and Maciejewski, M.L. (2015). Association between bariatric surgery and long-term survival. *Jama*, *313*(1), 62-70.

Ashmore, J.A., Friedman, K.E., Reichmann, S.K. and Musante, G.J. (2008) Weight-based stigmatization, psychological distress, & binge eating behavior among obese treatment-seeking adults. *Eating Behaviors*, *9*(2), pp.203-209.

Baldofski, S., Rudolph, A., Tigges, W., Herbig, B., Jurowich, C., Kaiser, S., Dietrich, A. and Hilbert, A. (2016) Weight bias internalization, emotion dysregulation, and non-normative eating behaviors in prebariatric patients. *International Journal of Eating Disorders*, *49*(2), pp.180-185.

Bandura, A. (1977) Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, *84*(2), p.191.

Baranowski, T., Cullen, K.W., Nicklas, T., Thompson, D. and Baranowski, J., 2003. Are current health behavioral change models helpful in guiding prevention of weight gain efforts?. *Obesity research*, *11*(S10), pp.23-43.

Baron, R.M. and Kenny, D.A. (1986) The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, *51*(6), pp.1173-1182

Batsis, J.A., Lopez-Jimenez, F., Collazo-Clavell, M.L., Clark, M.M., Somers, V.K. and Sarr, M.G. (2009) Quality of life after BS: a population-based cohort study. *The American journal of medicine* [online] *122*(11), pp.1055. [Accessed 30 October 2017].

Bayer, R. (2008) Stigma and the ethics of public health: not can we but should we. *Social science & medicine*, *67*(3), pp.463-472.

Berinsky, A.J., Margolis, M.F. and Sances, M.W. (2014) Separating the shirkers from the workers? Making sure respondents pay attention on self-administered surveys. *American Journal of Political Science*, *58*(3), pp.739-753.

Biörserud, C., Olbers, T. and Olsén, M.F.(2011) Patients' experience of surplus skin after laparoscopic gastric bypass. *Obesity surgery*, *21*(3), pp.273-277.

Bishop, F.L.(2015) Using mixed methods research designs in health psychology: An illustrated discussion from a pragmatist perspective. *British journal of health psychology*, *20*(1), pp.5-20.

Blazeby, J.M., Byrne, J. and Welbourn, R.(2014) What is the most effective operation for adults with severe and complex obesity?*BMJ.* 348, pp. 1763.

Board, N.C. (2013) Clinical commissioning policy: complex and specialised obesity surgery. [online]. *London: NHS Commissioning Board*. Available from https://www.england.nhs.uk/wp-content/uploads/2016/05/appndx-6-policy-sev-comp-obesity-pdf.pdf [Accessed 30 September 2018].

Boeka, A.G., Prentice-Dunn, S. and Lokken, K.L. (2010) Psychosocial predictors of intentions to comply with BS guidelines. *Psychology, health & medicine*, *15*(2), pp.188-197.

Bond, D.S., Phelan, S., Leahey, T.M., Hill, J.O. and Wing, R.R. (2009) Weight-loss maintenance in successful weight losers: surgical vs non-surgical methods. *International journal of obesity*, *33*(1), pp.173-180

Bryan, J. and Tiggemann, M. (2001) The effect of weight-loss dieting on cognitive performance and psychological well-being in overweight women. *Appetite*, *36*(2), pp.147-156.

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

Buchwald, H., Estok, R., Fahrbach, K., Banel, D., Jensen, M.D., Pories, W.J., Bantle, J.P. and Sledge, I. (2009) Weight and type 2 diabetes after bariatric surgery: systematic review and meta-analysis. *The American journal of medicine*, *122*(3), pp.248-256.

Burnette, J.L. and Finkel, E.J. (2012) Buffering against weight gain following dieting setbacks: An implicit theory intervention. *Journal of Experimental Social Psychology*, *48*(3), pp.721-725.

Calogero, R.M., Pina, A. and Sutton, R.M. (2014) Cutting words: Priming self-objectification increases women's intention to pursue cosmetic surgery. *Psychology of Women Quarterly*, *38*(2), pp.197-207.

Cantrell, M.A. and Lupinacci, P. (2007) Methodological issues in online data collection. *Journal of advanced nursing*, *60*(5), pp.544-549.

Carels, R.A., Young, K.M., Wott, C.B., Harper, J., Gumble, A., Hobbs, M.W. and Clayton, A.M. (2009) Internalized weight stigma and its ideological correlates among weight loss treatment seeking adults. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, *14*(2-3), pp. 92-97.

Carpenito LJ. (2000) Decisional conflict. In: Carpenito-Moyet LJ, ed. *Nursing Diagnosis: Application to Clinical Practice*. Philadelphia: Lippincott Williams & Wilkins; pp. 312–321.

Cash, T.F. (2000) MBSRQ Users' Manual. 3rd rev. *Unpublished user's manual*, Old Dominion University, Norfolk, VA.

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

Corrigan, P., Markowitz, F.E., Watson, A., Rowan, D. and Kubiak, M.A. (2003) An attribution model of public discrimination towards persons with mental illness. *Journal of health and Social Behavior*, pp.162-179.

Corrigan, P.W., Larson, J.E. and Ruesch, N. (2009) Self-stigma and the "why try" effect: impact on life goals and evidence-based practices. *World psychiatry*, *8*(2), pp.75-81.

Creswell, J.W. and Clark, V.L.P. (2007) *Designing and conducting mixed methods research*. Sage publications.

Creswell, J.W., Klassen, A.C., Plano Clark, V.L. and Smith, K.C. (2011) Best practices for mixed methods research in the health sciences. *Bethesda (Maryland): National Institutes of Health*, pp. 2094-2103.

Curran, P.G. (2016) Methods for the detection of carelessly invalid responses in survey data. *Journal of Experimental Social Psychology*, *66*, pp.4-19.

Daníelsdóttir, S., O'brien, K.S. and Ciao, A. (2010) Anti-fat prejudice reduction: a review of published studies. *Obesity facts*, *3*(1), pp.47-58.

de Zwaan, M., Hilbert, A., Swan-Kremeier, L., Simonich, H., Lancaster, K., Howell, L.M., Monson, T., Crosby, R.D. and 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), pp.79-85.

Department of Health (2013) Developing a Specification for Lifestyle Weight Management Services: Best Practice Guidance for Tier 2 Services [online] Available at: http://bit.ly/20qSBZS/.[Accessed 15 August 2018].

Diedrichs, P.C. and Barlow, F.K. (2011) How to lose weight bias fast! Evaluating a brief anti-weight bias intervention. *British journal of health psychology*, *16*(4), pp.846-861.

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

Dixon, J.B., Laurie, C.P., Anderson, M.L., Hayden, M.J., Dixon, M.E. and O'brien, P.E. (2009) Motivation, readiness to change, and weight loss following adjustable gastric band surgery. *Obesity*, *17*(4), pp.698-705.

Dobbs, R., Sawers, C., Thompson, F., Manyika, J., Woetzel, J.R., Child, P., McKenna, S. and Spatharou, A. (2014). *Overcoming obesity: an initial economic analysis*. McKinsey global institute.

Douglas, I.J., Bhaskaran, K., Batterham, R.L. and Smeeth, L. (2015) Bariatric surgery in the United Kingdom: a cohort study of weight loss and clinical outcomes in routine clinical care. *PLoS medicine* [online], *12*(12). [Accessed 02 December 2017].

Driscoll, S., Gregory, D.M., Fardy, J.M. and Twells, L.K. (2016) Long-term health-related quality of life in bariatric surgery patients: A systematic review and meta-analysis. *Obesity*, *24*(1), pp.60-70.

Drury, A., Aramburu, C. and Louis, M. (2002) Exploring the association between body weight, stigma of obesity, and health care avoidance. *Journal of the American Association of Nurse Practitioners*, *14*(12), pp.554-561.

Duncan, D.F., White, J.B. and Nicholson, T. (2003) Using internet-based surveys to reach hidden populations: Case of nonabusive illicit drug users. *American journal of health behavior*, *27*(3), pp.208-218.

Dunne, J.A., Wormald, J.C., Ghedia, R. and Soldin, M. (2017) Implementation of national body contouring surgery guidelines following massive weight loss: A national cross-sectional survey of commissioning in England. *Journal of Plastic, Reconstructive & Aesthetic Surgery*, *70*(1), pp.54-59.

Durso, L.E. and Latner, J.D. (2008) Understanding self-directed stigma: development of the weight bias internalization scale. *Obesity*, *16*(2), pp.80-86.

Durso, L.E., Latner, J.D. and Ciao, A.C. (2016) Weight bias internalization in treatment-seeking overweight adults: Psychometric validation and associations with self-esteem, body image, and mood symptoms. *Eating behaviors*, *21*, pp.104-108.

Ekeagwu, O.A. (2017) Weight Stigma in Healthcare Settings in the United Kingdom: A Review. *Global Journal of Health Science*, *9*(10), p.155.

Elder, K.A. and Wolfe, B.M. (2007) Bariatric surgery: a review of procedures and outcomes. *Gastroenterology*, *132*(6), pp.2253-2271.

Elkins, G., Whitfield, P., Marcus, J., Symmonds, R., Rodriguez, J. and Cook, T. (2005) Noncompliance with behavioral recommendations following bariatric surgery. *Obesity surgery*, *15*(4), pp.546-551.

Fardouly, J. and Vartanian, L.R. (2012) Changes in weight bias following weight loss: the impact of weight-loss method. *International Journal of Obesity*, *36*(2), pp.314-319.

Farinholt, G.N., Carr, A.D., Chang, E.J. and Ali, M.R. (2013) A call to arms: obese men with more severe comorbid disease and underutilization of bariatric operations. *Surgical endoscopy*, *27*(12), pp.4556-4563.

Ferchak, C.V. and Meneghini, L.F. (2004) Obesity, bariatric surgery and type 2 diabetes—a systematic review. *Diabetes/metabolism research and reviews*, *20*(6), pp.438-445.

Field, A. (2009) Discovering Statistics Using SPSS, Thrid Edition.

Fischer, S., Pelka, S. and Riedl, R. (2015) Understanding patients' decision-making strategies in hospital choice: Literature review and a call for experimental research. *Cogent Psychology*, *2*(1), pp. 1-24.

Flint, S.W. (2015) Obesity stigma: Prevalence and impact in healthcare. *British Journal of Obesity*, *1*(1), pp.14-18.

Flint, S.W., Hudson, J. and Lavallee, D. (2015) UK adults' implicit and explicit attitudes towards obesity: a cross-sectional study. *BMC obesity*, *2*(1), p.31.

Fontaine, K.R. and Barofsky, I. (2001) Obesity and health-related quality of life. *Obesity reviews*, *2*(3), pp.173-182.

Foster, G.D., Wadden, T.A., Makris, A.P., Davidson, D., Sanderson, R.S., Allison, D.B. and Kessler, A. (2003) Primary care physicians' attitudes about obesity and its treatment. *Obesity research*, *11*(10), pp.1168-1177.

Forman, E.M., Butryn, M.L., Juarascio, A.S., Bradley, L.E., Lowe, M.R., Herbert, J.D. and Shaw, J.A. (2013) The mind your health project: a randomized controlled trial of an innovative behavioral treatment for obesity. *Obesity*, *21*(6), pp.1119-1126.

Friedman, K.E., Reichmann, S.K., Costanzo, P.R. and Musante, G.J. (2002) Body image partially mediates the relationship between obesity and psychological distress. *Obesity research*, *10*(1), pp.33-41.

Fuller, E., Mindell, J. and Prior, G. (2016) Health survey for England 2015. *London: NHS Digital*.

Ghai, A., Milosevic, I., Laliberte, M., H. Taylor, V. and E. McCabe, R. (2014) Body image concerns in obese women seeking bariatric surgery. *Ethnicity and Inequalities in Health and Social Care*, *7*(2), pp.96-107

Giardino, J.B., Keitel, M.A., Patelis, T. and Takooshian, H. (2017) The Impact of Weight Stigma on Decisions About Weight Loss Surgery. Stigma and Health. Advance online publication. http://psycnet.apa.org/doi/10.1037/sah0000115

Gibbons, L.M., Sarwer, D.B., Crerand, C.E., Fabricatore, A.N., Kuehnel, R.H., Lipschutz, P.E., Raper, S.E., Williams, N.N. and Wadden, T.A. (2006) Previous weight loss experiences of BS candidates: how much have patients dieted prior to surgery?. *Obesity*, *14*(3).pp. 70-76.

Glinski, J., Wetzler, S. and Goodman, E. (2001) The psychology of gastric bypass surgery. *Obesity surgery*, *11*(5), pp.581-588.

Gilmartin, J. (2013) Body image concerns amongst massive weight loss patients. *Journal of clinical nursing*, *22*(9-10), pp.1299-1309.

Gilmartin, J., Bath-Hextall, F., Maclean, J., Stanton, W. and Soldin, M. (2016) Quality of life among adults following bariatric and body contouring surgery: a systematic review. *JBI database of systematic reviews and implementation reports*, *14*(11), pp.240-270.

Granberg, E.M. (2011) "Now my 'old self'is thin" Stigma Exits after Weight Loss. *Social Psychology Quarterly*, *74*(1), pp.29-52.

Gray, C.M., Hunt, K., Mutrie, N., Anderson, A.S., Treweek, S. and Wyke, S. (2013) Weight management for overweight and obese men delivered through professional football clubs: a pilot randomized trial. *International Journal of Behavioral Nutrition and Physical Activity*, *10*(1), p.121-138.

Green, J. and Thorogood, N. (2006) Analysing qualitative data. *Prins Soc Res*, *75*, p.99.

Grogan, S. (2016) *Body image: Understanding body dissatisfaction in men, women and children*. Routledge.

Haverkamp, B.E., Morrow, S.L. and Ponterotto, J.G. (2005) A time and place for qualitative and mixed methods in counseling psychology research. Journal of Counseling Psychology (25), pp.123–125.

Hawley, S.T., Lantz, P.M., Janz, N.K., Salem, B., Morrow, M., Schwartz, K., Liu, L. and Katz, S.J. (2007) Factors associated with patient involvement in surgical treatment decision making for breast cancer. *Patient education and counseling*, *65*(3), pp.387-395.

Hayes, S.C., Luoma, J.B., Bond, F.W., Masuda, A. and Lillis, J. (2006) Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour research and therapy*, *44*(1), pp.1-25.

Hebl, M.R. and Turchin, J.M. (2005) The stigma of obesity: What about men? *Basic and applied social psychology*, *27*(3), pp.267-275.

Heijens, T., Janssens, W. and Streukens, S. (2011) The effect of history of teasing on body dissatisfaction and intention to eat healthy in overweight and obese subjects. *The European Journal of Public Health*, *22*(1), pp.121-126.

Hilbert, A., Braehler, E., Haeuser, W. and Zenger, M. (2014) Weight bias internalization, core self-evaluation, and health in overweight and obese persons. *Obesity*, *22*(1), pp.79-85.

Holt, C.L., Clark, E.M. and Kreuter, M.W. (2001) Weight locus of control and weight-related attitudes and behaviors in an overweight population. *Addictive Behaviors*, *26*(3), pp.329-340.

Hsieh, H.F. and Shannon, S.E. (2005) Three approaches to qualitative content analysis. *Qualitative health research*, *15*(9), pp.1277-1288.

Hübner, C., Schmidt, R., Selle, J., Köhler, H., Müller, A., de Zwaan, M. and Hilbert, A. (2016) Comparing self-report measures of internalized weight stigma: the Weight Self-Stigma Questionnaire versus the Weight Bias Internalization Scale. *PloS one* [online] *11*(10). [Accessed 11 October 2017].

Hunger, J. M., & Major, B. (2015). Weight Stigma Mediates the Association Between BMI and Self-Reported Health. *Health Psychology : Official Journal of the Division of Health Psychology, American Psychological Association*, *34*(2), pp.172–175.

Hunger, J.M., Major, B., Blodorn, A. and Miller, C.T., 2015. Weighed down by stigma: how weight-based social identity threat contributes to weight gain and poor health. *Social and personality psychology compass*, *9*(6), pp.255-268.

Ivezaj, V. and Grilo, C.M., 2018. The complexity of body image following bariatric surgery: a systematic review of the literature. *Obesity Reviews.*19 (8), pp. 1116-1140.

Jumbe, S., Hamlet, C. and Meyrick, J. (2017) Psychological aspects of bariatric surgery as a treatment for obesity. *Current obesity reports*, *6*(1), pp.71-78.

Jumbe, S. and Meyrick, J. (2018) Contrasting views of the post-bariatric surgery experience between patients and their practitioners: A qualitative study. *Obesity surgery*, *28*(8), pp.2447-2456.

Kalarchian, M.A., Marcus, M.D., Wilson, G.T., Labouvie, E.W., Brolin, R.E. and LaMarca, L.B. (2002) Binge eating among gastric bypass patients at long-term follow-up. *Obesity Surgery*, *12*(2), pp.270-275.

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

Karimi, M. and Brazier, J.(2016) Health, health-related quality of life, and quality of life: what is the difference?. *Pharmacoeconomics*, *34*(7), pp.645-649.

Karlsson, J., Taft, C., Ryden, A., Sjöström, L. and Sullivan, M. (2007) Ten-year trends in health-related quality of life after surgical and conventional treatment for severe obesity: the SOS intervention study. *International journal of obesity*, *31*(8), p.1248.

Kewin, E. and Boyle, S. (2011) Weight loss surgery. *Obesity in the UK: A psychological perspective*, pp.39-51.

King, W.C., Chen, J.Y., Mitchell, J.E., Kalarchian, M.A., Steffen, K.J., Engel, S.G., Courcoulas, A.P., Pories, W.J. and Yanovski, S.Z. (2012) Prevalence of alcohol use disorders before and after bariatric surgery. *Jama*, *307*(23), pp.2516-2525.

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

Kitzinger, H.B., Abayev, S., Pittermann, A., Karle, B., Kubiena, H., Bohdjalian, A., Langer, F.B., Prager, G. and Frey, M. (2012) The prevalence of body contouring surgery after gastric bypass surgery. *Obesity surgery*, *22*(1), pp.8-12.

Koball, A.M. and Carels, R.A.(2011) Coping responses as mediators in the relationship between perceived weight stigma and depression. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, *16*(1), pp.17-23.

Knutsen, I.R., Terragni, L. and Foss, C. (2013) Empowerment and BS: negotiations of credibility and control. Qualitative Health Researcher. 23 (1), pp.66–67

Kolotkin, R.L., Davidson, L.E., Crosby, R.D., Hunt, S.C. and Adams, T.D. (2012) Six-year changes in health-related quality of life in gastric bypass patients versus obese comparison groups. *Surgery for Obesity and Related Diseases*, *8*(5), pp.625-633.

Kroes, M., Osei-Assibey, G., Baker-Searle, R. and Huang, J. (2016) Impact of weight change on quality of life in adults with overweight/obesity in the United States: a systematic review. *Current medical research and opinion*, *32*(3), pp.485-508.

Krumpal, I. (2013) Determinants of social desirability bias in sensitive surveys: a literature review. *Quality & Quantity*, *47*(4), pp.2025-2047.

Kumar, R. and Indrayan, A. (2011) Receiver operating characteristic (ROC) curve for medical researchers. *Indian pediatrics*, *48*(4), pp.277-287.

Kynaston, J., Mitchell, A. and Bruce, D. (2012) A survey of GP's knowledge and attitudes towards bariatric surgery in Scotland. *Gut* [online]. 61(2). [Accessed 01 November 2017].

Latner, J.D., Wilson, G.T., Jackson, M.L. and Stunkard, A.J. (2009) Greater history of weight-related stigmatizing experience is associated with greater weight loss in obesity treatment. *Journal of Health Psychology*, *14*(2), pp.190-199.

Latner, J.D., Barile, J.P., Durso, L.E. and O'Brien, K.S. (2014) Weight and health-related quality of life: The moderating role of weight discrimination and internalized weight bias. *Eating Behaviors*, *15*(4), pp.586-590.

Latner, J.D., Durso, L.E. and Mond, J.M. (2013) Health and health-related quality of life among treatment-seeking overweight and obese adults: associations with internalized weight bias. *Journal of Eating Disorders* [online] *1*(3) [Accessed 18 December 2017].

Lee, J.A. and Pausé, C.J. (2016) Stigma in practice: barriers to health for fat women. *Frontiers in psychology* [online],7, [Accessed 20 December 2017]

Lewis, M.A. and Rook, K.S. (1999) Social control in personal relationships: Impact on health behaviors and psychological distress. *Health psychology*, *18*(1), p.63-71.

Lewis, S., Thomas, S.L., Hyde, J., Castle, D., Blood, R.W. and Komesaroff, P.A. (2010)" I don't eat a hamburger and large chips every day!" A qualitative study of the impact of public health messages about obesity on obese adults. *BMC Public Health*, *10*(1), p.309.

Lieberman, D.L., Tybur, J.M. and Latner, J.D. (2012) Disgust sensitivity, obesity stigma, and gender: Contamination psychology predicts weight bias for women, not men. *Obesity*, *20*(9), pp.1803-1814.

Liberton, M., Dixon, J. and Laurie, C. (2004) Patient motivation for bariatric surgery: Characteristics and outcomes. *Obesity Surgery, 14(3),* pp.392-398.

Lillis, J., Luoma, J.B., Levin, M.E. and Hayes, S.C. (2010) Measuring weight self-stigma: the weight self-stigma questionnaire. *Obesity*, *18*(5), pp.971-976.

Lillis, J., & Wing, R. R. (2015) The role of avoidance-based coping in the psychosocial functioning of weight loss treatment-seeking adults. *Obesity Science & Practice*, *1*(1), pp. 59–64.

Lillis, J., Thomas, J.G., Levin, M.E. and Wing, R.R. (2017) Self-stigma and weight loss: The impact of fear of being stigmatized. *Journal of health psychology [online]*. [Accessed 28 January 2018]

Lindekilde, N., Gladstone, B.P., Lübeck, M., Nielsen, J., Clausen, L., Vach, W. and Jones, A. (2015) The impact of bariatric surgery on quality of life: a systematic review and meta-analysis. *Obesity reviews*, *16*(8), pp.639-651.

Link, B.G. and Phelan, J.C. (2001) Conceptualizing stigma. *Annual review of Sociology*, *27*(1), pp.363-385.

Livhits, M., Mercado, C., Yermilov, I., Parikh, J.A., Dutson, E., Mehran, A., Ko, C.Y. and Gibbons, M.M. (2010) Exercise following bariatric surgery: systematic review. *Obesity surgery*, *20*(5), pp.657-665.

Luck-Sikorski, C., Riedel-Heller, S.G. and Phelan, J.C. (2017) Changing attitudes towards obesity–results from a survey experiment. *BMC public health*, *17*(1), p.373-386.

Lund, T.B., Sandøe, P. and Lassen, J. (2011) Attitudes to publicly funded obesity treatment and prevention. *Obesity*, *19*(8), pp.1580-1585.

MacKinnon, D.P., Krull, J.L. and Lockwood, C.M. (2000) Equivalence of the mediation, confounding and suppression effect. *Prevention science*, *1*(4), pp.173-181.

Major, B., Hunger, J.M., Bunyan, D.P. and Miller, C.T. (2014) The ironic effects of weight stigma. *Journal of Experimental Social Psychology*, *51*, pp.74-80.

Martin, B.A., Veer, E. and Pervan, S.J. (2007) Self-referencing and consumer evaluations of larger-sized female models: A weight locus of control perspective. *Marketing Letters*, *18*(3), pp.197-209.

Martin, K.D. and Murphy, P.E. (2017) The role of data privacy in marketing. *Journal of the Academy of Marketing Science*, *45*(2), pp.135-155.

Masalu, J.R. and Åstrøm, A.N. (2001) Predicting intended and self-perceived sugar restriction among Tanzanian students using the theory of planned behavior. *Journal of Health Psychology*, *6*(4), pp.435-445.

McCullagh, P. and Nelder, J.A. (1989) *Generalized linear models*. 2nd edition. CRC press.

McMahon, M.M., Sarr, M.G., Clark, M.M., Gall, M.M., Knoetgen III, J., Service, F.J., Laskowski, E.R. and Hurley, D.L. (2006) Clinical management after bariatric surgery: value of a multidisciplinary approach. In *Mayo Clinic Proceedings*. Elsevier. pp. 34-45.

Mensinger, J.L. and Meadows, A. (2017) Internalized weight stigma mediates and moderates physical activity outcomes during a healthy living program for women with high body mass index. *Psychology of Sport and Exercise*, *30*, pp.64-72.

Mensinger, J.L., Tylka, T.L. and Calamari, M.E. (2018) Mechanisms underlying weight status and healthcare avoidance in women: A study of weight stigma, body-related shame and guilt, and healthcare stress. *Body image*, *25*, pp.139-147.

Metzgar, C.J., Preston, A.G., Miller, D.L. and Nickols-Richardson, S.M. (2015) Facilitators and barriers to weight loss and weight loss maintenance: a qualitative exploration. *Journal of Human Nutrition and Dietetics*, *28*(6), pp.593-603.

Miles, M.B., Huberman, A.M., Huberman, M.A. and Huberman, M. (1994) *Qualitative data analysis: An expanded sourcebook*. Sage.

Miras, A.D., Al-Najim, W., Jackson, S.N., McGirr, J., Cotter, L., Tharakan, G., Vusirikala, A., le Roux, C.W., Prechtl, C.G. and Scholtz, S. (2015) Psychological characteristics, eating behavior, and quality of life assessment of obese patients undergoing weight loss interventions. *Scandinavian Journal of Surgery*, *104*(1), pp.10-17

Mitchell, J.E., Lancaster, K.L., Burgard, M.A., Howell, L.M., Krahn, D.D., Crosby, R.D., Wonderlich, S.A. and Gosnell, B.A. (2001) Long-term follow-up of patients' status after gastric bypass. *Obesity surgery*, *11*(4), pp.464-468.

Monpellier, V.M., Antoniou, E.E., Aarts, E.O., Janssen, I.M. and Jansen, A.T. (2017) Improvement of health-related quality of life after Roux-en-Y gastric bypass related to weight loss. *Obesity surgery*, *27*(5), pp.1168-1173.

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

Natvik, E., Gjengedal, E. and Råheim, M. (2013) Totally changed, yet still the same: Patients' lived experiences 5 years beyond bariatric surgery. *Qualitative health research*, *23*(9), pp.1202-1214.

Naus, M. J., Philipp, L. M., and Samsi, M. (2009) From paper to pixels: A comparison of paper and computer formats in psychological assessment. Computers in Human Behavior, 25, pp. 1–7.

Neumark-Sztainer, D., Wall, M., Story, M. and Standish, A.R. (2012) Dieting and unhealthy weight control behaviors during adolescence: associations with 10-year changes in body mass index. *Journal of Adolescent Health*, *50*(1), pp.80-86.

Neymotin, F. and Nemzer, L.R. (2014) Locus of control and obesity. *Frontiers in endocrinology*, *5*, pp.159-163.

Nezami, B.T., Lang, W., Jakicic, J.M., Davis, K.K., Polzien, K., Rickman, A.D., Hatley, K.E. and Tate, D.F. (2016) The effect of self-efficacy on behavior and weight in a behavioral weight-loss intervention. *Health Psychology* [online], *35*(7). [Accessed 14 November 2018].

NICE. (2014) *Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children.* CG189. NICE. London. Available from https://www.nice.org.uk/guidance/cg189 [accessed 30 March 2018].

O'Brien, R.M. (2007) A caution regarding rules of thumb for variance inflation factors. *Quality & quantity*, *41*(5), pp.673-690.

O'Connor, A.M., Rostom, A., Fiset, V., Tetroe, J., Entwistle, V., Llewellyn-Thomas, H., Holmes-Rovner, M., Barry, M. and Jones, J. (2004) Decision aids for patients facing health treatment or screening decisions: systematic review. *Studying the Organisation and Delivery of Health Services: A Reader*, *319*, pp.74.

O'Brien, K. S., Latner, J. D., Puhl, R. M., Vartanian, L. R., Giles, C., Griva, K., & Carter, A. (2016) The relationship between weight stigma and eating behavior is explained by internalized weight stigma and psychological distress. *Appetite*, *102*, pp. 70-76.

Ogden J., Hollywood A. (2016) Health-Related Quality of Life Before and After Bariatric Surgery. In: Agrawal S. (eds) Obesity, Bariatric and Metabolic Surgery. Springer, Cham

Ogden, J. and Clementi, C. (2010) The experience of being obese and the many consequences of stigma. *Journal of obesity*, *2010*.

Ogden, J., Clementi, C. and Aylwin, S. (2006) The impact of obesity surgery and the paradox of control: A qualitative study. *Psychology & health*, *21*(2), pp.273-293.

Owen-Smith, A., Kipping, R., Donovan, J., Hine, C., Maslen, C. and Coast, J. (2013) A NICE example? Variation in provision of bariatric surgery in England. *BMJ* [online]. *346* [accessed 11 December 2017].

Page, G.L. and Scalora, M.J. (2004) The utility of locus of control for assessing juvenile amenability to treatment. *Aggression and Violent Behavior*, *9*(5), pp.523-534.

Pearl, R.L. and Lebowitz, M.S. (2014) Beyond personal responsibility: effects of causal attributions for overweight and obesity on weight-related beliefs, stigma, and policy support. *Psychology & health*, *29*(10), pp.1176-1191.

Pearl, R.L. and Puhl, R.M. (2018) Weight bias internalization and health: a systematic review. *Obesity Reviews*, 19(8), pp.1141-1163.

Pearl, R.L., Puhl, R.M. and Dovidio, J.F. (2015) Differential effects of weight bias experiences and internalization on exercise among women with overweight and obesity. *Journal of health psychology*, *20*(12), pp.1626-1632.

Pearl, R.L., White, M.A. and Grilo, C.M. (2014) Weight bias internalization, depression, and self-reported health among overweight binge eating disorder patients. *Obesity*, *22*(5), pp.142-148.

Pfeil, M., Pulford, A., Mahon, D., Ferguson, Y. and Lewis, M.P. (2013) The patient journey to gastric band surgery: a qualitative exploration. *Bariatric surgical practice and patient care*, *8*(2), pp.69-76.

Phelan, S.M., Burgess, D.J., Yeazel, M.W., Hellerstedt, W.L., Griffin, J.M. and Ryn, M., (2015) Impact of weight bias and stigma on quality of care and outcomes for patients with obesity. *Obesity Reviews*, *16*(4), pp.319-326.

Pridgeon, L. and Grogan, S. (2012) Understanding exercise adherence and dropout: an interpretative phenomenological analysis of men and women's accounts of gym attendance and non-attendance. *Qualitative research in sport, Exercise and Health*, *4*(3), pp.382-399.

Public Health England (2017) *Health matters: obesity and the food environment*. Available from: https://www.gov.uk/government/publications/health-matters-obesity-and-the-food-environment/health-matters-obesity-and-the-food-environment--2 [accessed 26 January 2019]

Puhl, R. and Brownell, K.D. (2001) Bias, discrimination, and obesity. *Obesity research*, *9*(12), pp.788-805.

Puhl, R. M., & Brownell, K. D. (2006). Confronting and coping with weight stigma: an investigation of overweight and obese adults. *Obesity (Silver Spring), 14*, pp.1802–1815.

Puhl, R., Peterson, J.L. and Luedicke, J. (2013) Fighting obesity or obese persons? Public perceptions of obesity-related health messages. *International Journal of Obesity*, *37*(6), p.774.

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

Puhl, R.M. and Heuer, C.A. (2010) Obesity stigma: important considerations for public health. *American journal of public health*, *100*(6), pp.1019-1028.

Raves, D.M., Brewis, A., Trainer, S., Han, S.Y. and Wutich, A. (2016) Bariatric surgery patients' perceptions of weight-related stigma in healthcare settings impair post-surgery dietary adherence. *Frontiers in psychology*, *7*, p.1497.

Ray, N.M. and Tabor, S.W. (2003) Several issues affect e-research validity. *Marketing News*, *37*(19), pp.50-53.

Reidpath, D.D., Crawford, D., Tilgner, L. and Gibbons, C. (2002) Relationship between body mass index and the use of healthcare services in Australia. *Obesity research*, *10*(6), pp.526-531

Rini, C., Jandorf, L., Goldsmith, R.E., Manne, S.L., Harpaz, N. and Itzkowitz, S.H. (2011) Interpersonal influences on patients' surgical decision making: the role of close others. *Journal of behavioral medicine*, *34*(5), pp.396-407.

Roberto, C.A., Sysko, R., Bush, J., Pearl, R., Puhl, R.M., Schvey, N.A. and Dovidio, J.F. (2012) Clinical correlates of the weight bias internalization scale in a sample of obese adolescents seeking bariatric surgery. *Obesity*, *20*(3), pp.533-539.

Rosen, A.B. and Schneider, E.C. (2004) Colorectal cancer screening disparities related to obesity and gender. *Journal of General Internal Medicine*, *19*(4), pp.332-338.

Rosenberger, P.H., Henderson, K.E. and Grilo, C.M. (2006) Correlates of body image dissatisfaction in extremely obese female bariatric surgery candidates. *Obesity surgery*, *16*(10), pp.1331-1336.

Rotter, J.B. (1966) Generalized expectancies for internal versus external control of reinforcement. *Psychological monographs: General and applied*, *80*(1), p.1.

Royal College of Surgeons (2014) Commisioning guide: Weight assessment and management clinics (Tier 3).

Ruiter, R.A., Abraham, C. and Kok, G. (2001) Scary warnings and rational precautions: A review of the psychology of fear appeals. *Psychology and health*, *16*(6), pp.613-630.

Saltzer, E.B. (1982) The weight locus of control (WLOC) scale: a specific measure for obesity research. *Journal of Personality Assessment*, *46*(6), pp.620-628.

Sarwer, D.B. and Crerand, C.E. (2004) Body image and cosmetic medical treatments. *Body image*, *1*(1), pp.99-111.

Sarwer, D.B., Thompson, J.K. and Cash, T.F. (2005) Body image and obesity in adulthood. *Psychiatric Clinics*, *28*(1), pp.69-87.

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

Schafer, M.H. and Ferraro, K.F. (2011) The stigma of obesity: does perceived weight discrimination affect identity and physical health?. *Social Psychology Quarterly*, *74*(1), pp.76-97.

Schauer, D.P., Arterburn, D.E., Wise, R., Boone, W., Fischer, D. and Eckman, M.H. (2014) Predictors of bariatric surgery among an interested population. *Surgery for Obesity and Related Diseases*, *10*(3), pp.547-552.

Schneble, C.O., Elger, B.S. and Shaw, D. (2018) The Cambridge Analytica affair and Internet-mediated research. *EMBO reports* [online]. 19(8). [Accessed 20 May 2018].

Schulman, A.R. and Thompson, C.C. (2017) Complications of bariatric surgery: what you can expect to see in your GI practice. *The American journal of gastroenterology*, *112*(11), p.1640.

Schvey, N.A., Puhl, R.M. and Brownell, K.D. (2014) The stress of stigma: exploring the effect of weight stigma on cortisol reactivity. *Psychosomatic medicine*, *76*(2), pp.156-162.

Schwartz, M. B, Vartanian, L. R., Nosek, B. A, & Brownell, K. D. (2006) The influence of one's own body weight on implicit and explicit anti-fat bias. *Obesity Research,* 14, pp,440-448.

Schwartz, M.B. and Brownell, K.D. (2004) Obesity and body image. *Body image*, *1*(1), pp.43-56.

Schwartz, M.B., Chambliss, H.O.N., Brownell, K.D., Blair, S.N. and Billington, C. (2003) Weight bias among health professionals specializing in obesity. *Obesity research*, *11*(9), pp.1033-1039.

Seacat, J.D. and Mickelson, K.D. (2009) Stereotype threat and the exercise/dietary health intentions of overweight women. *Journal of Health Psychology*, *14*(4), pp.556-567.

Sharma, S., Wharton, S., Forhan, M. and Kuk, J.L. (2011) Influence of weight discrimination on weight loss goals and self-selected weight loss interventions. *Clinical obesity*, *1*(4-6), pp.153-160.

Sherwin, M. and Larvin, M (2015) The discrepancy between the number of patients eligible for bariatric surgery and the number undergoing operations: What is stopping people having weight loss surgery on the NHS?. *The Bulletin of the Royal College of Surgeons of England*, *97*(4), pp.1-10.

Slevec, J. and Tiggemann, M. (2010) Attitudes toward cosmetic surgery in middle-aged women: Body image, aging anxiety, and the media. *Psychology of women quarterly*, *34*(1), pp.65-74.

Smith, B., Smith, T.C., Gray, G.C., Ryan, M.A. and Millennium Cohort Study Team (2007) When epidemiology meets the Internet: Web-based surveys in the Millennium Cohort Study. *American journal of epidemiology*, *166*(11), pp.1345-1354.

Smyth, J.D., Dillman, D.A., Christian, L.M. and Stern, M.J. (2006) Comparing check-all and forced-choice question formats in web surveys. *Public Opinion Quarterly*, *70*(1), pp.66-77.

Sobel, M.E. (1982) Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological methodology*, *13*, pp.290-312.

Song, Z., Reinhardt, K., Buzdon, M. and Liao, P. (2008) Association between support group attendance and weight loss after Roux-en-Y gastric bypass. *Surgery for obesity and related diseases*, *4*(2), pp.100-103.

Song, P., Patel, N.B., Gunther, S., Li, C.S., Liu, Y., Lee, C.Y., Kludt, N.A., Patel, K.B., Ali, M.R. and Wong, M.S. (2016) Body image and quality of life: changes with gastric bypass and body contouring. *Annals of plastic surgery*, *76*(3), pp. 216-221

Srirangam, S.J., Pearson, E., Grose, C., Brown, S.C.W., Collins, G.N. and O'reilly, P.H., (2003) Partner's influence on patient preference for treatment in early prostate cancer. *BJU international*, *92*(4), pp.365-369.

Stambush, M.A., Hill-Mercer, A.E. and Mattingly, B.A. (2016) Residual Fat Stigma After Weight Loss: The Mediating Role of Perceived Effort. *Journal of Applied Biobehavioral Research*, *21*(3), pp.188-201.

Stanford, F.C., Kyle, T.K., Claridy, M.D., Nadglowski, J.F. and Apovian, C.M. (2015) The influence of an individual's weight perception on the acceptance of bariatric surgery. *Obesity*, *23*(2), pp.277-281.

Stemler, S. (2001) An overview of content analysis. *Practical assessment, research & evaluation*, *7*(17), pp.137-146.

Stevens, S.D., Herbozo, S., Morrell, H.E., Schaefer, L.M. and Thompson, J.K. (2017) Adult and childhood weight influence body image and depression through weight stigmatization. *Journal of health psychology*, *22*(8), pp.1084-1093.

Stice, E. and Shaw, H. (2004) Eating disorder prevention programs: a meta-analytic review. *Psychological bulletin*, *130*(2), p.206.

Street Jr, R.L., Gordon, H. and Haidet, P. (2007) Physicians' communication and perceptions of patients: is it how they look, how they talk, or is it just the doctor?. *Social science & medicine*, *65*(3), pp.586-598.

Sutton, D., Murphy, N. and Raines, D.A. (2009) I've got a secret: Nondisclosure in persons who undergo bariatric surgery. *Bar Times*, pp.1-12.

Swami, V. (2009) Body appreciation, media influence, and weight status predict consideration of cosmetic surgery among female undergraduates. *Body Image*, *6*(4), pp.315-317.

Swift, J.A., Hanlon, S., El-Redy, L., Puhl, R.M. and Glazebrook, C. (2013) Weight bias among UK trainee dietitians, doctors, nurses and nutritionists. *Journal of human nutrition and dietetics*, *26*(4), pp.395-402.

Tabachnick, B.G. and Fidell, L.S. (2007) *Using multivariate statistics*. Allyn & Bacon/Pearson Education.

Tajfel, H. and Turner, J.C. (1979) An integrative theory of intergroup conflict. *The social psychology of intergroup relations*, *33*(47), pp.74-89.

Teachman, B.A. and Brownell, K.D., 2001. Implicit anti-fat bias among health professionals: is anyone immune? *International journal of obesity*, *25*(10), p.1525.

Teixeira, P.J., Going, S.B., Sardinha, L.B. and Lohman, T. (2005) A review of psychosocial pre-treatment predictors of weight control. *obesity reviews*, *6*(1), pp.43-65.

Thom, G. and Lean, M. (2016) Who wants weight loss? What do they need? Time to re-think non-surgical approaches in obesity management. *Clinical obesity*, *6*(6), pp.361-364.

Tindle, H.A., Omalu, B., Courcoulas, A., Marcus, M., Hammers, J. and Kuller, L.H. (2010) Risk of suicide after long-term follow-up from bariatric surgery. *The American journal of medicine*, *123*(11), pp.1036-1042.

Tomiyama, A.J. (2014) Weight stigma is stressful. A review of evidence for the Cyclic Obesity/Weight-Based Stigma model. *Appetite*, *82*, pp.8-15

Tucker, C.M., Marsiske, M., Rice, K.G., Nielson, J.J. and Herman, K. (2011) Patient-centered culturally sensitive health care: model testing and refinement. *Health Psychology*, *30*(3), p.342.

Trainer, S. and Benjamin, T. (2017) Elective surgery to save my life: rethinking the "choice" in bariatric surgery. *Journal of advanced nursing*, *73*(4), pp.894-904.

Vartanian, L.R. and Smyth, J.M. (2013) Primum non nocere: obesity stigma and public health. *Journal of bioethical inquiry*, *10*(1), pp.49-57.

Visscher, T.L., Viet, A., Kroesbergen, H.T. and Seidell, J.C. (2006) Underreporting of BMI in adults and its effect on obesity prevalence estimations in the period 1998 to 2001. *Obesity*, *14*(11), pp.2054-2063.

von Soest, T., Kvalem, I.L., Skolleborg, K.C. and Roald, H.E. (2006) Psychosocial factors predicting the motivation to undergo cosmetic surgery. *Plastic and reconstructive surgery*, *117*(1), pp.51-62.

Wallston, K.A. (2005) The validity of the multidimensional health locus of control scales. *Journal of health psychology*, *10*(5), pp.623-631.

Wang, S.S., Brownell, K.D. and Wadden, T.A. (2004) The influence of the stigma of obesity on overweight individuals. *International journal of obesity*, *28*(10), pp.1333-1337.

Wass, J. and Finer, N. (2013) Action on obesity: comprehensive care for all. *Clinical Medicine*, *13*(1), pp.4-5.

Waumsley J. (2011) Conclusion. *Obesity in the UK: A psychological perspective*, pp.79-80

Wee, C.C., Hamel, M.B., Apovian, C.M., Blackburn, G.L., Bolcic-Jankovic, D., Colten, M.E., Hess, D.T., Huskey, K.W., Marcantonio, E.R., Schneider, B.E. and Jones, D.B. (2013) Expectations for weight loss and willingness to accept risk among patients seeking weight loss surgery. *JAMA surgery*, *148*(3), pp.264-271.

Wee, C.C., Jones, D.B., Davis, R.B., Bourland, A.C. and Hamel, M.B. (2006) Understanding patients' value of weight loss and expectations for BS. *Obesity surgery*, *16*(4), pp.496-500.

Wee, C.C., McCarthy, E.P., Davis, R.B. and Phillips, R.S. (2000) Screening for cervical and breast cancer: is obesity an unrecognized barrier to preventive care?. *Annals of internal medicine*, *132*(9), pp.697-704.

Weigold, A., Weigold, I. K., & Russell, E. J. (2013). Examination of the equivalence of self-report survey-based paper-and-pencil and internet data collection methods. *Psychological Methods, 18*(1), pp 53-70.

Weineland, S., Arvidsson, D., Kakoulidis, T.P. and Dahl, J. (2012) Acceptance and commitment therapy for bariatric surgery patients, a pilot RCT. *Obesity research & clinical practice*, *6*(1), pp.21-30.

Weiner, B., Perry, R, P. and Magnusson, J. (1988) An attributional analysis of reactions to stigmas. *Journal Personal Social Psychology*, 55 (5), pp.738-748.

Welbourn, R., le Roux, C.W., Owen-Smith, A., Wordsworth, S. and Blazeby, J.M. (2016) Why the NHS should do more bariatric surgery; how much should we do. *BMJ* [online] *353* [accessed 27 November 2017].

Welbourn, R., Small, P., Finlay, I., Sareela, A., Somers, S., Mahawar, K., Walton, P. and Kinsman, R. (2014) The United Kingdom national BS registry. *Second Registry Report.* Available from http://www.wlsinfo.org.uk/assets/Documents/Extract-from-the-NBSR-2014-Report.pdf [Accessed 03 January 2018]

Wharton, S., Serodio, K.J., Kuk, J.L., Sivapalan, N., Craik, A. and Aarts, M.A. (2016) Interest, views and perceived barriers to bariatric surgery in patients with morbid obesity. *Clinical obesity*, *6*(2), pp.154-160.

White, M.A., Kalarchian, M.A., Masheb, R.M., Marcus, M.D. and 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), pp.175-184.

Wilding, J. (2018) The road to life saving surgery for some obese patients is blocked- research can help clear the path. *Nursing times online* Available from : https://www.nursingtimes.net/opinion/expert-opinion/the-road-to-life-saving-stomach-surgery-for-some-obese-patients-is-blocked-research-can-help-clear-a-path/7023438.article?blocktitle=Expert-Opinion&contentID=20307 [Accessed 01 November 2017].

Witte, K. and Allen, M. (2000) A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health education & behavior*, *27*(5), pp.591-615.

Witty, K (2011) Tackling men's health: implementation of a male health service in a rugby stadium setting. *Community Practitioner*, *84*(4), p.29-32

World Health Organization (2015) *Obesity, situation and trends.* Available from: http://www.who.int/topics/obesity/en/ [Accessed 01 October 2017].

Yardley, L. and Bishop, F.L. (2015) Using mixed methods in health research: Benefits and challenges. *British Journal of Health Psychology*, *20*(1), pp.1-4.

Yuan, P., Bare, M.G., Johnson, M.O. and Saberi, P. (2014) Using online social media for recruitment of human immunodeficiency virus-positive participants: a cross-sectional survey. *Journal of medical Internet research*, *16*(5).

Appendices

Appendix A: Systematic Review

The effect of psychosocial versus surgical weight loss interventions on body image: A systematic review

Background: Body image dissatisfaction is prevalent in the overweight and obese population and is a key reason people seek weight loss treatment, yet little is known about the effects that weight loss interventions have on body image. This review aimed to assess how much body image changes following treatment and whether this is related to the amount of weight loss by comparing two different approaches to weight loss: psychosocial and surgical.

Methods: A systematic review of the literature was conducted. Outcomes of interest were body image and weight loss. Studies were assessed for quality by two reviewers. Hedges g effect sizes representing the magnitude of pre to post intervention change on body image and weight loss were calculated where data was provided. Findings were analysed using narrative synthesis.

Results: A review of 21 papers supports the notion that weight loss interventions may improve body image, with improvements on at least one measure of body image across all studies whether psychosocial or surgical. The relationship between weight loss and body image was unclear as some interventions improved body image in the absence of weight loss. Future weight loss interventions should measure changes in body image and consider its role during weight loss.

1. Introduction

Obesity, which is defined as a body mass index (BMI) of ≥30, has become one of the greatest health issues in the world. In the UK, 67% of men and 57% of women are currently overweight or obese (1). As weight increases, so do the risks of developing serious health conditions, such Type 2 diabetes, cardiovascular disease and cancer, all of which can lead to premature mortality (2). The cost of obesity to the NHS is projected to reach £9.7 billion by 2050 (3). These factors, combined with the rising prevalence makes preventing obesity a major public health challenge.

In the UK, there is a great deal of focus by local government and the NHS to stem the rise of obesity (4). Current interventions for obesity vary widely in their approach and intensity. They include advice on diet and exercise, medication and increasingly surgical procedures.

Psychosocial[1] approaches to facilitate weight loss are evolving over time and are frequently being added to interventions that promote changes in diet and increasing physical activity, as recommended by The National Institute for Health and Clinical Excellence (5). Cognitive behavioural treatments have been regarded as the gold standard for facilitating behaviour change and treating obesity (6), however weight loss interventions are increasingly incorporating mindfulness and acceptance based approaches, which shift the focus from changing thoughts to accepting thoughts and feelings, consistent with personal values (7). Regardless of the method used, research shows that weight loss attempts of any kind, are often effective in the short term, yet over time individuals are unable to maintain their new health behaviours and often regain the weight they lost, or more (8).

Obese individuals often turn to bariatric surgery as a last resort, when multiple failed attempts at weight loss have been made (4). Bariatric surgery is rated as the most effective treatment for short and long term weight loss in the severely obese defined as a BMI ≥40 (9). It has been shown to cure obesity-related physical comorbidities, such as Type two diabetes and lead to improved psychosocial status, such as reductions in depression and anxiety (10). Nevertheless bariatric surgery needs to be balanced with post-surgical risks such as bleeding, and infection (11) and the presence of excess skin and tissue (12).

In view of Western society's messages that being thin equals beauty and success (13) and the negative stigma attached to being overweight (14, 15), it is not surprising that obesity can be associated with poorer psychological outcomes such as depression, low self-esteem and poor body image (14).Body image is referred to as "one's body-related self-perceptions and self – attitudes, including thoughts, beliefs, feelings and behaviours" (16).Body image dissatisfaction; defined as 'a persons' negative thoughts and feelings about his or her body' (17) is common at all sizes, although it is increasingly being associated with an increased BMI (18).Overweight or obese women often report grater dissatisfaction with their bodies than normal weight women and a higher BMI is a risk factor for disordered eating (13).

The physiological benefits of losing weight through treatment are well documented, yet the psychological benefits, such as improved body image remain less clear. Considering body image dissatisfaction is reported play a significant role in people seeking weight loss treatment (18, 19) and bariatric surgery (20),it would be sensible to assume that losing weight would improve body image. Some research suggest that this is the case, for example Foster et al.,

[1] The terms to describe weight loss interventions that incorporate psychological principles are used interchangeably in the literature (e.g. behaviour therapy, lifestyle modification, psychological treatment) but for the purposes of the current review they will be referred to as psychosocial interventions.

(21)found that body image improved as weight was lost and reduced as weight was gained, however in general this correlation is not particularly strong (18). Furthermore, in the case of surgical weight loss, research has found that although patients are usually happy to see weight loss and improved health initially, the rapid weight loss, frequently resulting in skin and soft tissue excess can leave them dissatisfied with their appearance and in fear of weight gain (12, 22, 23).

1.2 Why is it important to do this review?

Body image dissatisfaction appears to be prevalent in the overweight and obese population and is a key reason people seek weight loss treatment, which makes it important to investigate whether body image is improved by losing weight through treatment. No systematic reviews to date have investigated whether the holistic approach embraced by psychosocial interventions affects body image differently when compared to the biomedical approach of surgery. Comparing these is important as psychosocial interventions is less invasive compared to undergoing a surgical procedure. Additionally, projected weight losses via these interventions are different, with those undergoing surgery losing 25% of their initial body weight on average in the first year (10), compared to 10% for those in psychosocial interventions (24). The current review presents an opportunity to contribute to a greater understanding of body image changes and any relationship to the amount weight loss in patients undergoing surgical or psychosocial interventions.

In summary, the aim of this systematic review was to investigate and compare psychosocial and surgical weight loss intervention in relation to their effect on body image in overweight or obese individuals. It aims to establish how much body image changes following weight loss treatment and whether this is related to the amount of weight loss. Twenty-one articles met the inclusion criteria for the review. Studies were synthesised by the first author into two categories: psychosocial and surgical interventions.

2. Method

2.1 Literature Search

To enable us to achieve our objectives we searched for relevant studies in the literature that delivered either a psychosocial or surgical intervention for weight loss and provided pre to post intervention data on body image and weight loss. An initial search was conducted by the first author using the following electronic databases during the period August 10 to August 14 2015: PsycINFO, CINAHL, Psycharticles, ERIC, MEDLINE and EMBASE. Due to the breadth of weight loss research and requirements to capture recent psychosocial interventions for weight loss, the searches were limited to the period 1995-2015. Searches were conducted

using key words relating to the intervention and outcome of interest. Intervention search terms included: “weight loss interventions”, “obesity”, “bariatric surgery” ,“weight loss surgery”, “treatment”, “ programs”, “therapy”, “approach”, “LAGB”, “lap-band”, “adjustable band”. Outcome search terms included: “body image”,” body shape”, “body satisfaction”, “body dissatisfaction” or “appearance”.

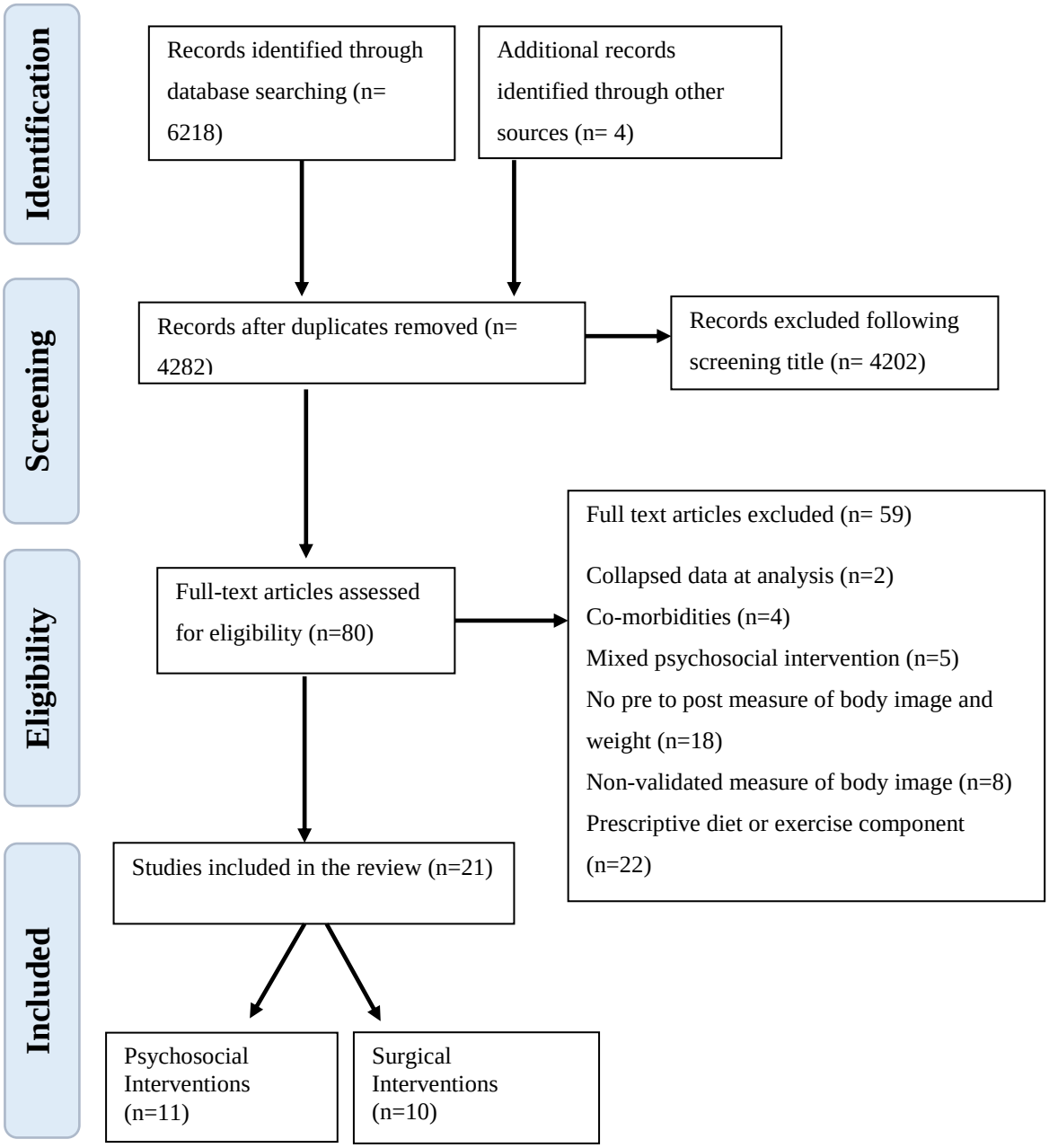
2.2 Study selection process

Figure 1 reports the stages of study selection and the number and reasons for papers excluded at each stage. In addition, grey literature databases were searched in addition to the reference list of all included articles for additional papers. Following this and the removal of duplication, the initial search strategy yielded 4282 articles. These articles were then screened and papers excluded on the basis of their title or abstract. This resulted in 80 articles eligible for full text review and 21 articles being eligible. The majority of studies were excluded due to the lack of pre to post intervention weight loss and body image outcomes or because the psychosocial intervention was contaminated with a prescriptive diet or exercise component.

2.3 Eligibility Criteria

Prior to conducting the literature search, clear inclusion and exclusion criteria and working definitions of key aspects were developed. Psychosocial weight loss interventions were defined as those that aimed to address the social, emotional or behavioural aspects related to being overweight. Body image was defined as one’s body-related self-perceptions and self – attitudes, including thoughts, beliefs, feelings and behaviours” (16) and the requirement was that body image should be assessed with validated scales or questionnaires. No papers were found that directly compared psychosocial to surgical weight loss interventions and measured body image. In these situations, it helpful to include non-randomised studies (25). Therefore, any papers that included at least one psychosocial or surgical intervention arm and provided both pre to post intervention data on body image and weight loss (BMI, weight in kg or percentage of weight lost) were included. Criteria for inclusion in the review were overweight or obese adults, indicated by a BMI of 25. Studies assessing co-morbidities or subgroups of participants (e.g. mental health conditions or binge eating) were excluded. Studies that could contaminate the effects of interventions, such as those that combined two difference psychosocial interventions or delivered a very prescriptive diet or exercise intervention in combination with the psychosocial intervention (i.e. meal replacement or supervised exercise activities) were also excluded.

Figure 1 PRISMA flow chart of study selection



2.4 Data extraction and Quality assessment

For each article in the final analysis the first author independently extracted and tabulated the following data: Reference and year of publication, sample gender and age, BMI, number of participants, a brief description of the intervention and whether there was a comparator group, the duration of the intervention[2], follow-up time points, body image measure(s) used and body image outcome, weight loss outcome and whether a relationship between the two was reported. Study quality was assessed using the Effective Public Health Project (EPHPP) "Quality Assessment Tool for Quantitative studies[3]. This tool was selected as it was developed for use in public health to evaluate the study design of RCTs, non-randomised trials, pre to post and case-control studies (26). It is suitable for reviews of treatment effectiveness and has been examined by experts in the field, receiving excellent ratings (27).It is reported to have good content and construct validity. Recently the EPHPP was shown to have excellent inter-rater reliability when compared to the Cochrane Collaboration Risk of Bias Tool (28).The tool assesses six domains: selection bias; study design; confounders; blinding; data collection method and withdrawals/dropout. Using these criteria each paper was rated independently by two reviewers (CH and HW) as either "strong", "moderate" or "weak" depending on the reported data. Once these ratings were totaled each paper is assigned an overall strength score. Studies were not excluded on the basis of this quality assessment but are considered in the studies critique, with greater weight being given to those of better quality.

2.5 Data Analysis

Where data was provided, within-group effect sizes were calculated using Hedges' g standardised mean difference (29) to assess the magnitude of body image and weight loss change pre to post intervention (Appendix 1). Effect sizes for any comparator groups were calculated to establish if this was any different to the intervention groups. Hedges g is a variation of Cohens d (30) and was selected for use in the current review as it controls for smaller sample sizes (29).Cohen described effect sizes of 0.2, 0.5 and 0.8 as small, medium and large respectively and this was the basis for reporting in the current review Effect sizes were not pooled with a meta-analysis as there was a distinct lack of RCTs amongst the included papers and studies lacked methodological and clinical homogeneity. Given the high variability conducting a meta-analysis could lead to misleading findings (31), therefore a narrative synthesis was conducted instead.

[2] For psychosocial papers only

[3] The tool and accompanying dictionary are available from www.hamilton.ca/ephpp.

3. Results

The following section provides a synopsis of the 21 included studies. It begins with an overview of study quality and characteristics. Following this, information is provided on the magnitude of effect that psychosocial or surgical interventions have upon both body image and weight loss by taking into account study quality. By taking into account the magnitude of calculated effect sizes and outcome measures utilized, psychosocial and surgical interventions will be compared for the any difference they might have upon outcomes of body image.

3.1 Quality assessment summary

Each study included in the review was assessed for the standard of methodology using the EPHPP tool and e results served to act as a critique of the studies within the narrative synthesis- see Table 3. The overall methodological quality across all papers was moderate to weak. No studies in the current review received a strong rating, which permitted no more than one weak rating across all domains. For psychosocial interventions the overall quality was moderate as 73% of papers received this rating (n=8) compared to weak for 60% of surgical interventions (n=6). Blinding was the most problematic domain across all studies. Blinding was difficult to assess as very few studies explicitly reported on blinding participants to the intervention (not applicable for surgical interventions) or blinding outcome assessors to intervention status of participants. Furthermore, body image data was collected using self-report measures potentially resulting in reporting bias. The failure to report on withdrawal or drop-out data or high attrition to follow-up was problematic across surgical interventions. Selection bias was high for psychosocial papers whose participants usually self-selected to take part through advertising the study and therefore the sample was unlikely to be representative of the population.

Reference	Sample Gender and Age	BMI (kg/m2)	N	Interventions	Duration	Follow-up?	BI measure	Body image and weight loss outcomes
Annesi and Porter (2014)	Morbidly obese females aged 21+ (mean=41.7±10.4)	45.1±3.8	161	CBT based support of physical activity and CBT based nutrition information	6mth	none	MBSRQ-BAS	BI: significant within group changes WL: significant within group changes R: WL and BI improved each other reciprocally
Bacon (2002)	Obese females aged 30-45 (mean=39.3± 4.5)	35.7 ± 3.6	78	Non-diet (1) vs traditional weight loss (2)	6 mth	12 mth	BIAQ	BI improved in both TWL and ND at both 6 and 12 mths, significantly greater in ND WL significant in (2) but not (1)
Carels (2014)	Overweight/obese males and females aged 65 (mean=44.3±13.2)	39.7 ± 10.3	59	'New perspectives' (1) vs Behavioural (2)	12 wk	6 mth	MBSRQ-AE MBSRQ-AO MBSRQ-BASS MBSRQ-OP	BI: similar improvement in both conditions MBSRQ-OP-decreased pre to post in NP and increased pre-post in TYL MBSRQ-BASS-both groups significant increase in satisfaction pre-post, no difference between groups WL: significant for both TYL and NP interventions.
Crerand (2007)	Obese females (mean= 44.2±10)	35.9 ± 4.5	123	Non-diet (1) vs meal replacement	40 wk	40 wk	BSQ	BI: No significant difference between groups at wk 20 or 40

				(2) vs balanced deficit diet (3)				WL: dieting group lost sig more weight than non-diet group at wk 20 and wk 40
Gelo (2014)	Obese females aged 27-67 (mean= 50.7±10.4)	34.1 ± 5.5	60	Hypnoenergetic therapy (1) vs Hypnobehavioural (2)	8.5 mth	6 mth	FBCS-SSAKH FBCS-SPKF FBCS-SAKA FBCS-SASE	BI: Significant increase in BI for scales SSAKH,SPKF,SASE across both groups but not for SAKA WL: Significant loss across both groups
Munsch (2003)	Obese males and females (mean=45.2±23.9)	CBT (GP) F:49 ± 23 M:45 ± 14 vs CBT (center) F:46 ± 13 M:37 ± 13 vs Control F:49 ± 12 M:49 ± 10	122	GP Group Cognitive Behavioural Therapy (1) vs Clinic Group Cognitive Behavioural Therapy (2) vs Non-specific advice (3)	16 x 90min sessions	12 mth	FBek	BI: self-evaluation of attractiveness scale domain increased significant in both treatment groups (1,2) and maintained at f/u. No significant changes in GP control (3). No significant pre-post changes for accentuation of appearance, insecurity/concern or physical/sexual misperception. Insecurity/concerns decreased in GP BASEL from baseline to f/u WL:GP BASEL significantly lower weight post treatment and f/up -differed significantly from control

Palmeira (2009)	Overweight/obese females aged 24+ (mean=38.4±6.7)	31.1 ± 4.1	193	Cognitive behavioural skills (1) (LEARN program) vs General health education (2)	12 mth	None	BIAQ BSQ	BI: BIAQ-BSD reduced more effectively in the intervention group. BSQ improved significant for both groups WL: smaller in control compared to intervention
Palmeria (2010)	Overweight/obese females aged 24+ (mean=38.3±5.8)	30.2 ± 3.7	143	Cognitive behavioural skills (LEARN program)	4 mth	12 mth	BIAQ BSQ PSPP-PSW PSPP-ATT	BI: All BI variables improved during intervention. BIA showed greatest change WL: significant R: Improvements in BIA and PSPP associated with WL during treatment, but not BSQ.
Ramirez (2001)	Obese males and females aged 19-63 (mean44.0 ±9.7)	33.78 ± 5.13 yrs	88	Cognitive behavioural skills LEARN program plus cognitive-behavioural body image therapy (1) vs LEARN program (2)	16 wk	3mth 12mth	BSQ	BI: significant change for both groups, no significant difference between groups WL: No differences between groups both groups lost significant amount post-treatment and remained significantly lower at 12 mth f/u R: Greater improvement in BI pre-post treatment was associated with greater WL post-treatment
Rapoport (2000)	Overweight women aged 18-65 (mean= intervention:	Intervention:35.4 ± 6.3	84	Modified CBT (1) Aim was in preventing weight	10 wk	6mth 12mth	BIAQ	BI: significant improvement across time for both groups but no difference between groups

	49±10. Control: 46±12)	Control:35.3 ± 5.6		gain not weight loss vs.1200 calorie diet with CBT (2)				WL: Significant WL in S-CBT had occurred by end of treatment but not in M-CBT. 12 mth f/u WL significant for both groups
Teixeira (2010)	Overweight/obese females aged 25-50 (mean=37.6± 7.0)	31.3 ± 4.1	225	Cognitive behavioural skills LEARN program (1) vs General health education (2)	12mth	12 mth	BSQ BIAQ PSPP-PSW PSPP-ATT	BI: Improved at 12 mths. WL:higher in the intervention group R: Improvement in BI correlated with weight loss

BIA= Body image assessment questionnaire; BSQ= Body shape questionnaire BIAQ=Body image avoidance questionnaire; FBCS= Frankfurt body concept scales (subscales SSAK=Self-acceptance of body parts; SPKF=Attention and care given to the care and appreciation of one's appearance and health; FBeK= Rating one's own body questionnaire (subscales ATT/SC= attractiveness and self-confidence; AoA accentuation of appearance; I/C=insecurity/concern; P/S MIS = physical/sexual misperception);; MBRSQ: Multidimensional Body-Self Relations Questionnaire (subscales BASS=Body areas satisfaction scale ; AO=Appearance Orientation; AE= appearance evaluation); PSPP= (subscales PSW= physical self-worth; ATT=attractiveness); SAKA=Acceptance of body by others; SASE=Aspects of physical appearance);

BI=body image; WL= weight loss; R=relationship between body image and weight loss

Table 2 Surgical Interventions

Reference	Sample	BMI (kg/m2)	N	Surgical Intervention	Follow-up	BI measure	Body image and weight loss outcomes
Adami (1999)	Obese males and females aged 21-56 (mean=36.8)	48.7 ± 1.4	30	Biliopancreatic Diversion vs never-obese control	36 mth	BSQ BAQ	WL:significant R: corresponded to normalisation of BD, FF and ATT. DISP, SS and BSQ improved compared to baseline but was still different to control.
De Panfilis (2007)	Obese males and females aged 27-57 (mean=41.2±8.3)	45.5 ± 4.8	35	Laparoscopic adjustable gastric banding	12 mth	BUT	WL: significant BI: significant improvement on GSI, CSM, BIC and A subscales of BUT but not on WP, D and PST
Dixon (2002)	Obese males and females (mean=41.2±9.7)	44.1 ± 7.4	322	Lap-band gastric restrictive surgery	12 mth	MBSRQ-AE MBSRQ-AO	BI: No change in AO at 1-4 yrs posts surgery, apart from the super obese BMI>50kg/m2 Major improvement in AE 1 year after surgery and maintained at 4 years. R: Change in AE correlated positively with the percentage of excess weight lost
Hrabosky (2006)	Extremely obese males and females aged 18-62 (mean=42.5±10.4)	51.5 ± 7.6	109	Gastric bypass surgery	6 mth 12 mth	BSQ	Substantial WL correlated with significant improvement on BSQ from baseline to 6mths to 12mths post-surgery R: Degree of WL did not predict BI scores at 6mths and 12mths
Leombruni (2007)	Severely obese men and women (mean age=39.8±9.92)	43.52 ± 5.52	38	Laparoscopic vertical banded gastroplasty	6 mth	BSQ	WL: significant loss at 6 mths post-surgery BI: significant improvements 6 mth post-surgery

Ortega (2012)	Morbidly obese (mean= 44.05±10.86)	44.9 ± 6.3	60	Laproscopic Roux-en-Y	6mth 12 mth	BSQ	WL: significant at 6mth and 12mth f/u BI: BSQ improved significantly at 6mth and 12 mth
Sarwer (2010)	Obese males and females (mean= 42.6±9.9)	51.4 ± 9.0	200	Roux-en-Y	20 wks 40 wks 92 wks	BIQLI BSQ	BI: Improvements in BSQ and BIQOL at wk 20 and remained improved at 40 and 92 wks compared to pre-op WL: significantly decreased at 20,40, 92 wks. R: Larger WL associated with significant improvements in BIQOL but not BSQ
Sarwer (2013)	Obese females aged 18+ (median=41)	44.5 (median)	106	85 Roux-en-Y 21 Laparoscopic adjustable gastric banding	12 mth 24 mth	BIQLI BSQ	BI statistically improved at 12mth and 24 mth f/u WL: significant change from pre to 1 yr post-surgery but not significant from 12mth-24mth
Sarwer (2015)	Obese males aged 18+ (median=48)	45.1 (median)	32	Roux-en-Y	12 mth 24 mth 36 mth 48 mth	BIQLI BSQ	WL: weight was lost baseline to 12 mth and 24 mth but then started to increase at 36 and 48 mth. BI: significant improvements in BIQOL and BSQ at 12,24,36 and 48 mth when compared to baseline
Van Hout (2009)	Morbidly obese males and females (mean age 38.8± 8.3)	45.4 ± 5.1	98	Vertical banded gastroplasty	24 mth	BAT	WL: significant BI: Significant improvement in BAT 24mth post-surgery but poorer when compared to norms.

BAT=Body Attitude Test; BIQLI= Body image quality of life inventory BSQ= Body shape questionnaire; BUT=Body uneasiness test; MBRSQ= Multidimensional Body-Self Relations Questionnaire (subscales BAS= Body areas satisfaction scale ; AO=Appearance Orientation; AE= appearance evaluation).

BI=body image; WL= weight loss; R=relationship between body image and weight loss

Table 3 Quality Assessment of Psychosocial (1-11) and Surgical Studies (12-21) using the EPHPP tool

	Reference	Study Type	Selection Bias	Study Design	Confou-nders	Blinding	Data Collection	Withdrawals & Dropouts	Global Rating
1	Annesi (2014)	PP	+	++	NA	++	+++	+++	++
2	Bacon (2002)	CCT	+	+++	+++	++	+++	+	+
3	Carels (2014)	RCT	+	+++	+++	++	+++	++	++
4	Crerand (2007)	CCT	+	+++	+++	++	+++	+++	++
5	Gelo (2014)	RCT	+	+++	+++	++	+++	+++	++
6	Munsch (2007)	CCT	+	+++	+++	++	+++	++	++
7	Palmeira (2009)	CAS	+	++	+++	+	+++	+++	+
8	Palmeria (2010)	PP	+	++	NA	+	+++	+++	+
9	Ramirez (2001)	CCT	+	++	+++	++	+++	++	++
10	Rapoport (2000)	RCT	+	+++	+++	++	+++	++	++
11	Teixeira (2010)	CCT	+	+++	+++	++	++	+++	++
12	Adami (1999)	PP	++	++	NA	+	+++	+	+
13	De Panfilis (2007)	PP	++	++	NA	+	+++	+	+
14	Dixon (2002)	PP	+++	++	NA	+	+++	++	++
15	Hrabosky (2006)	PP	+	++	NA	+	+++	+	+
16	Leombruni (2007)	PP	+++	++	NA	+	+++	+	+
17	Ortega (2012)	PP	+	++	NA	+	+++	+	+
18	Sarwer (2010)	PP	++	++	NA	+	+++	+++	++
19	Sarwer (2013)	PP	+++	++	NA	+	+++	+++	++
20	Sarwer (2015)	PP	++	++	NA	+	+++	+++	++
21	Van Hout (2009)	PP	+++	++	NA	+	+++	+	+

Abbreviations: +++=strong; ++=moderate; +=weak; RCT=randomised controlled trial; CCT=non-randomised controlled clinical trial; CAS=cohort analytic study; PP= pre to post design NA=not applicable.

3.2 Study Characteristics

The characteristics of psychosocial and surgical interventions that met the inclusion criteria are summarised in Table 1 and 2. The 11 psychosocial papers contained a total of 16 psychosocial interventions as some studies compared one psychosocial intervention to another. The type of psychosocial interventions varied across studies. The majority of the psychosocial interventions acting as the treatment group employed a cognitive-behavioural approach to weight loss (n=6) whilst the others utilised psychotherapy (n=1). Over a third (n=4) were based on the concept of 'non-dieting' and reflects a recent move away from the typical restrictive, diet focused approach to weight loss. Health at Every Size (HAES) is an example of such a paradigm, it shifts the focus from weight management to health promotion by teaching eating based on hunger and satiety, encouraging people to find enjoyable ways to be active and encouraging body acceptance (32).Four used a psychosocial comparator or control group, three of which were based on CBT (n=3) and one psychotherapy (n=1). All but one of the psychosocial interventions of interest (33) addressed some aspect of body image within their program e.g. improving body acceptance; increasing body confidence or reducing the salience of appearance for self-worth.

All participants in these psychosocial interventions were either overweight or obese with a BMI ranging from 30 to 49. The majority of included psychosocial studies used a female sample. Female's taking part in psychosocial interventions (n=1256) significantly outweighed males (n=57). All psychosocial interventions were delivered face-to-face to a group of participants. On the whole sessions were delivered weekly or bi-weekly, lasting between one and two hours. The duration of interventions ranged from 10 weeks up to 12 months and on average were around 6 months. The majority of psychosocial interventions were facilitated by a multidisciplinary team consisting of at least a psychologist (or someone with a psychology training) alongside a dietician (34-42) . The rest were delivered by wellness specialists (33) or therapists experienced in the psychological technique (43). Details on the training or qualifications of the people delivering the intervention were generally not specified.

Surgical interventions were performed by experienced surgeons using standard weight-loss surgery techniques (e.g. Roux-en-Y or gastric banding). Consideration of the type of surgery for its influence upon weight loss outcomes and body image would be futile in this review and is not addressed. All of the included studies focused on post-surgical outcomes and did not mention if any psychological support was available for their patients. The BMI of participants in surgical interventions ranged from 44 to 52. All of the studies except one (44) included males and females in their sample. A larger number of females underwent weight-loss surgery (n=869) compared to males (n=175)

3.3 Intervention effects

This review aimed to assess how much body image changes following treatment and whether this is related to the amount of weight loss by comparing two different interventions for weight loss. Of the 21 studies reviewed, all reported significant increases in at least one measurement of body image pre-post treatment. All psychosocial studies apart from (34, 37, 41) also reported significant pre to post intervention weight loss and all surgical studies reported significant weight loss. Calculated Hedges g effect sizes for both body image and weight loss were reviewed to establish if body image improvement was related to weight loss and whether this differed between psychosocial and surgical interventions, these can be seen in Appendix 1.

3.4 Weight loss and body image change in moderate quality psychosocial studies

There were a total of eight moderate quality psychosocial studies these consisted of three RCT's (35, 41, 43), four controlled clinical trials (36, 37, 40, 42) and one pre-post design (33).Some studies included another psychosocial comparator group which meant a total of 13 weight loss outcomes were reported across moderate studies. All reported significant pre to post treatment weight loss, apart from one CBT arm in Munsch et al. which emphasised lifestyle and eating behaviour (37) and one CBT arm in Rapoport et al. (41) which used modified CBT by emphasising the prevention of weight gain rather than weight loss. To establish the magnitude of the significant effect on weight loss, effect sizes were calculated on all significant psychosocial interventions, apart from two studies (36, 42) that did not provide sufficient data to do this. A total of seven Hedges g effect sizes representing the magnitude of weight change pre to post intervention were on the whole small, but ranged to medium (d=0.21-0.74). One medium effect size was found for a for the CBT based weight management programme called LEARN[4] (40) and 4 small effect sizes one for CBT based support of nutrition and activity (33), one for the LEARN program which added an extra body image component (40), one GP based CBT intervention (37) and another CBT based program (41). Two psychotherapy based interventions from the same study (43)failed to achieve a small effect size for weight loss despite reporting significant results (d=0.12 and 0.16).

The eight moderate quality psychosocial studies all reported a significant change in participant's body image on at least one measure. Body image was measured 31 times within these studies as some used multiple measures or reported on subscale scores. Non-significant results for body image change were reported in 10 outcomes, mainly across the subscales of two measures: The FKKS (assessment of one's body concept) within a psychotherapy intervention (43) and the FBek (subjective judgement of the body) within a CBT intervention (37). One study (35) reported a non-

[4] The LEARN weight management programme includes educational content and practical applications in the areas of physical activity/exercise, diet/eating behaviour and behaviour modification (Brownell, 2000)

significant effect of a non-diet intervention on the MBSRQ-AO, the appearance orientation subscale of the Multidimensional Body-Self Relations Questionnaire. Hedges g effect sizes, representing the magnitude of pre to post body image change during weight loss interventions were calculated for 20 measures and ranged from small to large (d=0.13-1.70). Large, medium and small effect sizes for body image change were calculated in eight, seven and four measures respectively. One study (35) failed to achieve a small effect size for improvements in body image (d=0.13), suggesting the claim of significance in this paper is stronger than the true effect.

3.5 Weight loss and body image change in weak quality psychosocial studies

There were a total of 3 weak quality psychosocial studies. One was a controlled clinical trial of a non-diet intervention (34), one was a controlled analytical study of the CBT based program LEARN (38) and another pre to post study from the same study team using CBT LEARN (39). The CBT based studies reported significant weight loss and the non-diet study non-significant. Hedges g effect sizes representing the magnitude of weight change pre to post intervention could only be calculated for one of the two studies claiming significant changes (38) as the other did not provide sufficient data (39) The result revealed a small effect size for weight loss (d=0.38). The three weak quality psychosocial studies all reported a significant change in participant's body image across all seven different measurements of body image. Hedges g effect sizes representing the magnitude of pre to post body image change during weight loss interventions were calculated for all 7 measures and these ranged from d=0.30-1.14. Large, medium and small effect sizes were calculated across three, one and three measures respectively.

3.6 Weight loss and body image in moderate quality surgical studies

There were a total of four moderate quality surgical interventions, all of which reported a significant weight loss at the first follow-up assessment after surgery. Hedges g effect sizes representing the magnitude of change for weight loss could only be calculated for one study (45), as the three others studies from the same author did not provide sufficient data (44, 46, 47). The effect size for this study was very large (d=1.40).

The four moderate quality surgical studies measured body image using eight different measures/subscales. These reported significant pre to post-surgical improvements on all measures apart from one (45) who reported a non-significant result for the Appearance Orientation subscale of the MBSRQ. Hedges g effect sizes representing the magnitude of body image change at post surgery follow-up were calculated for all 7 measures and these ranged from d=0.73-12.82. Large effect sizes were calculated for six measures of body image and a medium effect size for one.

3.7 Weight loss and body image in weak quality surgical studies

The review included a total of six weak quality surgical interventions all of which reported a significant weight loss. Hedges g effect sizes representing the magnitude of weight loss pre to post surgery was calculated across all studies and ranged from medium to very large (d=0.66-16.14). The six weak quality studies measured body image 12 times, as some studies reported on more than one body image measure or reported on subscales. All of these reported significant pre to post-surgical improvements on all measures. Hedges g effect sizes representing the magnitude of body image change pre to post surgery ranged from medium to very large (d=0.62-4.55). Large effect sizes were reported in 10 measures/subscale score and medium for two. .

3.8 Relationship between body image improvements and the amount of weight loss

Analysing calculated effect sizes of improvements on the various body image measures did not reveal any significant patterns, and ranged in size across all interventions. The Body Shape Questionnaire (BSQ) is used to assess body shape concerns and it was most frequently utilised across 12 of the included studies (36, 38, 39, 42, 44, 46-51). Significant improvements in the BSQ of medium to large effect sizes were observed across all studies that utilised it, six of these studies were of moderate methodological quality.

Eight studies across all included papers reported on the relationship between weight loss and improvements in body image in their studies Five of these were moderate quality (33, 40, 42, 45, 46) and 3 weak (39, 48, 49) . Seven of these moderate to weak studies reported that these improvements on at least one measure of body image was progressively related to the amount of weight lost. Three studies (39, 46, 49) reported that the degree of weight lost did not predict body image scores on the BSQ- a measure used to assess body shape concerns. Furthermore, some studies reported that body image played a reciprocal role as both an outcome and mediator of weight loss (33, 38, 40, 42).

3.9 Long term follow-up and maintenance of weight loss and body image improvement

A comparison was made to assess the long term influence of both interventions on body image and weight loss outcomes. For the purposes of this review long-term follow-up was defined as 12 months' post-intervention because rapid weight loss, especially for surgical interventions occurs in the first 6 months and then slows down (52). Duration of follow-up ranged from 3 to 12 months for psychosocial studies, two studies did not conduct follow up (33, 38). Surgical studies follow-up ranged from 20 weeks to 48 months. Only four psychosocial studies followed participants for at least a year (34, 40-42), Attrition to long term follow-up was reviewed across all 21 studies as this could favourably bias results and ranged from 10%-26%. Surgical studies on the whole followed participants for at least a year, attrition from long-term follow-up was only reported in 5 surgical studies and ranged from 2%-54%.

Moderate quality studies were reviewed for their reports on long-term body image and weight loss outcomes. Four out of the five studies that included long term follow-up were of moderate quality (37, 40-42). Munsch et al. (37) reported significant weight loss effects were maintained at 12 months, as were the body image subscale based on attractiveness and self-confidence. Ramirez and Rosen (40) reported that in the period between post intervention and 12 month follow up body dissatisfaction had increased and weight regain predicted this. Rapoport et al. (41) reported significant weight loss was maintained at 12 month follow-up. However, despite a significant effect being maintained, the CBT based psychosocial arm reported that body dissatisfaction had started to increase between 6 and 12 month after the end of the intervention. Teixeria et al. (42) reported that predictors of weight loss at 12 months' post intervention were improvements in body image but not concerns with body shape during the intervention. They did not assess body image at 12 month follow-up, only weight which remained reduced. All of the four surgical studies of moderate quality followed participants for at least 12 months, two studies follow participants up until 48 months (45, 47). Participant's weight continued to decrease post-surgery across all four studies. Body image remained significantly improved compared to baseline across all measures, however body image mean scores fluctuated across follow up in for three studies (44, 45, 47).

4. Discussion

This systematic review focused on psychosocial and surgical interventions in relation to the effect on body image in a sample of overweight to obese individuals. Significant and large effect sizes for weight loss were found for surgical interventions, whilst psychosocial interventions resulted in smaller effect sizes and in some case non-significant weight loss. Despite this disparity, both interventions produced considerable improvements in body image. Some studies investigated the direct relationship between weight loss and body image in their studies and found body image improvements are related to weight loss and that this can be reciprocal, whilst some reported improvements in body image despite no concurrent weight loss. It appears that it might not be the psychological component of a weight loss intervention, but the act of receiving treatment that may bring some initial benefit to body image, independent of weight loss. This finding is clouded by the fact that psychosocial interventions often addressed body image during treatment. This finding might reflect the inclusion criteria for the review and suggests that body image is only assessed as an outcome of weight loss treatment if the intervention addresses it. Nevertheless, psychosocial studies whose participants lost weight through traditional weight loss programs without a psychological component also showed body image improvements. Those undergoing surgery also had improvements in body image, despite studies not reporting additional psychosocial support or intervention. This suggests that improvements in body image in this group are related to actual weight loss, at least in the short term. Future research should consider measuring body image even if their

intervention does not address as this will make it clear whether improvements in body image can be attributed to the weight lost, the intervention type, the body image component of the intervention or a combination of these.

To enable better comparisons on the impact that weight loss interventions have upon body image, researchers need to collaborate to reach a consensus around measurement and study design. Body image measures and study design varied widely across interventions which made comparisons difficult. If weight loss is positively related to improvements in body image as suggested by this review then consistency across studies in their use of body image measures will be key to future research in the area. Furthermore, it would be interesting to determine which dimensions of body image are affected by which types of interventions and how these changes (whether positive or not) relate to weight loss and maintenance. In this review some aspects of body image were improved by taking in a weight-loss intervention but not others, as some studies reported significant improvements on one measures/subscale but not another. Despite significant improvements on the BSQ reported across studies, three moderate quality studies reported that weight loss reported was not correlated with improvements on the BSQ, even when other measures used within the study correlated. The BSQ is a measure of the body shape preoccupations that are typical of bulimia nervosa and anorexia and is well recognised tool within the field of body image research (53). If those presenting for weight loss treatment have concerns similar to those with eating disorders and weight loss does not address this, then this is a consideration for interventions. Future research should consider investigating the role of body shape pre-occupations for those presenting for weight loss treatment.

The small number of papers included in this review in comparison to the considerable amount of research being conducted into weight loss interventions indicates that few studies are considering the potential importance of body image during weight loss. If they are measuring body image it is because they have targeted it in their intervention. It is recommended that future weight loss treatments should investigate body image outcome and its role in weight loss due to the high prevalence of body dissatisfaction in people presenting for treatment (18). It should also explore the reciprocal nature of changes in body image and weight loss during treatment in greater depth, as recommended by Palmeira (38). This is of importance; as if body image is more than just an outcome of weight loss treatment then attempts to improve it during an individual's weight loss attempts could be the key to success.

Results clearly indicate that surgical interventions are superior for the amount of weight loss over psychosocial interventions but comparable for improvements in body image. This could be indicative of broader psychological benefits, such as reduced in depression and quality of life as found in other reviews (54). Furthermore, when 12 month follow-up was reported, data revealed that both interventions were successful in maintaining a significant effect of weight loss as found by other

research investigating surgical and non-surgical weight loss methods (52). This is an important outcome to consider as surgical interventions are more expensive compared to psychosocial interventions and come with inherent risks and significant side effects and the potential for long-term body image concerns (11, 12, 22, 23). Furthermore a weight reduction of 5-10% has been shown to reduce co-morbidities and mortality significantly (4). If weight loss and maintenance can be achieved through psychosocial rather than surgical procedures this would clearly be a favourable option. The issue is that few achieve success in the first place through psychosocial weight loss interventions compared to surgical methods, which means development of effective psychosocial interventions is required. Additionally, the distinct lack of long term follow-up across all studies was noted and future research should employ long term follow-up, particularly of bariatric surgery patients to determine if improvements in body image seen initially during the rapid weight loss period continue to be improved or are at least sustained long-term.

Some psychosocial interventions in the current review demonstrated that beneficial changes in body image can occur without concurrent weight loss and that psychosocial interventions are not necessarily more effective than traditional weight loss programs in achieving this. This discrepancy may be due to the heterogeneity of included psychosocial interventions, namely the content of the intervention and the comparison group, the type of body image measures used, dimensions of body image. The majority of psychosocial interventions in this review were based on CBT or the concept of non-dieting. These approaches didn't necessarily result in significant weight loss when compared to traditional weight loss treatments used as comparator groups in some of the studies, this is a common criticism of non-dieting approaches (55). This raises the issue of how success in weight loss interventions are usually narrowly defined in terms weight loss. The psychological wellbeing and body image improvements demonstrated through these interventions can be considered a success even in the absence of weight loss. Future consideration should be given to them as a viable treatment option for overweight or obese individuals.

5. Limitations

With regards to the methodological quality of included interventions and therefore the degree of confidence to be placed in their findings, many of the studies had several limitations that compromised their integrity. All but one of the surgical interventions failed to include a comparator or control group which did not allow for a comprehensive assessment of whether improvement in body image due to surgery is directly comparable to other non-surgical interventions. Although this is harder to achieve due ethical aspects of designs that withhold interventions from control groups, a number of RCTs comparing surgical and non-surgical interventions for weight loss have been conducted, as demonstrated by another systematic review (56). In most of these interventions, body image was not the primary outcome of interest, often secondary physiological outcomes such as

weight loss, which meant that studies may not have been powered sufficiently to assess change in body image. This could explain the variation in strength of effect sizes observed, particularly in relation to smaller sample sizes within the psychosocial interventions.

The majority of included studies did not follow-up or provide data on participants beyond 12 months which means the long-term impact of these interventions on weight loss, its maintenance and the influence on body image is missing. This is particularly problematic for surgical interventions, as research shows that weight loss for surgery typically occurs during the first 6 months then slows down until weight loss stops (52). In addition weight loss begins to increase again in 20-30% of patients within two years (57). If weight loss is related to improvements in body image, it is unclear what happens when this occurs. Research is starting to suggest that bariatric surgery can be detrimental to long-term body image due to bodily changes that come with rapid weight loss, such as loose and excess skin (12, 58). Furthermore, reports of "phantom fat" can occur in formerly overweight women, whereby despite significant weight loss, the perception of oneself as obese remains unchanged (57).

Females in both interventions massively outweighed males, for which it is unclear. There are potential reasons for this. Firstly it could be due to the studies sampling methods that didn't appeal to men, or because males are more successful in losing weight through their own means rather than presenting for weight loss treatments. Lastly it could be that men are less likely to seek advice around their health compared to females (59) and therefore be offered the opportunity to take part research. Future research should aim to establish men's requirements and experiences when engaging in weight loss interventions and to explore whether men's body image plays a role in their weight loss.

6. Conclusion

Consistent improvements in various constructs of body image across the 21 studies in our review support the notion that taking part in weight loss interventions can improve body image in obese/overweight adults. Body image appears to be both an outcome and mediator of weight loss and its improvement is not always concurrent with weight loss. It is acknowledged that these results are far from conclusive and clearly, further research is required to gain a greater understanding of this the role of body image in weight loss interventions using higher quality designs such as RCTs. Future weight loss research should measure body image even if it is not directly addressed during the intervention. This could help to clarify the nature of relationship between weight loss and body image, what role body image plays during treatment and enable researchers to establish a core set of body image measures to be used across studies. Future research should also try to isolate what aspects of the body image are affected through weight loss and whether the intervention type has any influence on this.

References

1. Ng M, Fleming T, Robinson M, Thomson B, Graetz N, Margono C, et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. The Lancet. 2014;384(9945):766-81.

2. Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. JAMA. 2004;291(23):2847-50.

3. Butland B, Jebb S, Kopelman P, McPherson K, Thomas S, Mardell J, et al. Foresight. Tackling obesities: future choices. Project report. Foresight.Tackling obesities: future choices.Project report. 2007.

4. Obesity Working Group. Obesity in the UK: a psychological perspective. . 2011.

5. Managing overweight and obesity in adults-lifestyle weight management services. [Internet].; 2014 [cited 21st January 2016]. Available from: http://pathways.nice.org.uk/pathways/lifestyle-weight-management-services-for-overweight-or-obese-adults#path=view%3A/pathways/lifestyle-weight-management-services-for-overweight-or-obese-adults/lifestyle-weight-management-services-for-overweight-or-obese-adults-overview.xml&content=view-index.

6. Jensen MD, Ryan DH, Apovian CM, Ard JD, Comuzzie AG, Donato KA, et al. 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. J Am Coll Cardiol. 2014;63(25_PA).

7. Niemeier HM, Leahey T, Reed KP, Brown RA, Wing RR. An acceptance-based behavioral intervention for weight loss: A pilot study. Behavior Therapy. 2012 06;43(2):427-35.

8. Avenell A, Brown T, McGee M, Campbell M, Grant A, Broom J, et al. What interventions should we add to weight reducing diets in adults with obesity? A systematic review of randomized controlled trials of adding drug therapy, exercise, behaviour therapy or combinations of these interventions. Journal of Human Nutrition and Dietetics. 2004;17(4):293-316.

9. Buchwald H, Avidor Y, Braunwald E, Jensen MD, Pories W, Fahrbach K, et al. Bariatric surgery: a systematic review and meta-analysis. JAMA. 2004;292(14):1724-37.

10. Karlsson J, Taft C, Rydén A, Sjöström L, Sullivan M. Ten-year trends in health-related quality of life after surgical and conventional treatment for severe obesity: the SOS intervention study. Int J Obes. 2007;31(8):1248-61.

11. Brethauer SA, Chand B, Schauer PR. Risks and benefits of bariatric surgery: current evidence. Cleve Clin J Med. 2006;73(11):993.

12. Kinzl J, Traweger C, Trefalt E, Biebl W. Psychosocial consequences of weight loss following gastric banding for morbid obesity. Obesity Surg. 2003;13(1):105-10.

13. Tiggemann M. Media influences on body image development. Body image: A handbook of theory, research, and clinical practice. 2002:91-8.

14. Friedman KE, Reichmann SK, Costanzo PR, Zelli A, Ashmore JA, Musante GJ. Weight stigmatization and ideological beliefs: relation to psychological functioning in obese adults. Obes Res. 2005;13(5):907-16.

15. Schwartz MB, Brownell KD. Obesity and body image. Body Image. 2004 1;1(1):43-56.

16. Cash TF. Body image: Past, present, and future. Body image. 2004;1(1):1-5.

17. Grogan S. Body image: Understanding body dissatisfaction in men, women and children. Routledge; 2007.

18. Sarwer DB, Thompson JK, Cash TF. Body image and obesity in adulthood. Psychiatr Clin North Am. 2005 Mar;28(1):69,87, viii.

19. Friedman KE, Reichmann SK, Costanzo PR, Musante GJ. Body image partially mediates the relationship between obesity and psychological distress. Obes Res. 2002;10(1):33-41.

20. Wee CC, Jones DB, Davis RB, Bourland AC, Hamel MB. Understanding patients' value of weight loss and expectations for bariatric surgery. Obesity Surg. 2006;16(4):496-500.

21. Foster GD, Wadden TA, Vogt RA. Body image in obese women before, during, and after weight loss treatment. Health Psychology. 1997;16(3):226.

22. Gilmartin J. Body image concerns amongst massive weight loss patients. J Clin Nurs. 2013;22(9-10):1299-309.

23. Kitzinger HB, Abayev S, Pittermann A, Karle B, Kubiena H, Bohdjalian A, et al. The prevalence of body contouring surgery after gastric bypass surgery. Obesity Surg. 2012;22(1):8-12.

24. Wadden TA, Crerand CE, Brock J. Behavioral treatment of obesity. Psychiatr Clin North Am. 2005;28(1):151-70.

25. Higgins JP, Green S. Cochrane handbook for systematic reviews of interventions. Wiley Online Library; 2008.

26. Jackson N, Waters E, Guidelines for Systematic Reviews in Health Promotion and Public Health Taskforce. Criteria for the systematic review of health promotion and public health interventions. Health Promot Int. 2005 Dec;20(4):367-74.

27. Deeks JJ, Dinnes J, D'amico R, Sowden A, Sakarovitch C, Song F, et al. Evaluating non-randomised intervention studies. Health Technol Assess. 2003;7(27):iii,x, 1-173.

28. Armijo-Olivo S, Stiles CR, Hagen NA, Biondo PD, Cummings GG. 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. J Eval Clin Pract. 2012;18(1):12-8.

29. Hedges L, Olkin I. Statistical models for meta-analysis. New York: Academic Press.Hedges, LV, & Pigott, TD (2001).The power of statistical tests in meta-analysis.Psychological Methods. 1985;6:203-17.

30. Cohen J. Statistical power analysis for the behavioural sciences. 1988. Lawrence Earlbaum Associates.: Hillsdale, New Jersey.

31. Kontopantelis E, Springate DA, Reeves D. A re-analysis of the Cochrane Library data: the dangers of unobserved heterogeneity in meta-analyses. PLoS One. 2013;8(7):e69930.

32. Bacon L, Stern JS, Van Loan M,D., Keim NL. Size acceptance and intuitive eating improve health for obese, female chronic dieters. J Am Diet Assoc. 2005 06;105(6):929-36.

33. Annesi JJ, Porter KJ. Reciprocal effects of exercise and nutrition treatment-induced weight loss with improved body image and physical self-concept. Behavioral Medicine. 2015 01;41(1):18-24.

34. Bacon L, Keim NL, Van Loan MD, Derricote M, Gale B, Kazaks A, et al. Evaluating a 'non-diet' wellness intervention for improvement of metabolic fitness, psychological well-being and eating and activity behaviors. Int J Obes. 2002 06;26(6):854-65.

35. Carels RA, Burmeister JM, Koball AM, Oehlhof MW, Hinman N, LeRoy M, et al. A randomized trial comparing two approaches to weight loss: Differences in weight loss maintenance. Journal of Health Psychology. 2014 02;19(2):296-311.

36. Crerand CE, Wadden TA, Foster GD, Sarwer DB, Paster LM, Berkowitz RI. Changes in obesity-related attitudes in women seeking weight reduction. Obesity. 2007 03;15(3):740-7.

37. Munsch S, Biedert E, Keller U. Evaluation of a lifestyle change programme for the treatment of obesity in general practice. Swiss Med Wkly. 2003 03/08;133(9-10):148-54.

38. Palmeira AL, Markland DA, Silva MN, Branco TL, Martins SC, Minderico CS, et al. Reciprocal effects among changes in weight, body image, and other psychological factors during behavioral

obesity treatment: A mediation analysis. The International Journal of Behavioral Nutrition and Physical Activity. 2009 02/09;6.

39. Palmeira AL, Branco TL, Martins SC, Minderico CS, Silva MN, Vieira PN, et al. Change in body image and psychological well-being during behavioral obesity treatment: Associations with weight loss and maintenance. Body Image. 2010 06;7(3):187-93.

40. Ramirez EM, Rosen JC. A comparison of weight control and weight control plus body image therapy for obese men and women. J Consult Clin Psychol. 2001 06;69(3):440-6.

41. Rapoport L, Clark M, Wardle J. Evaluation of a modified cognitive-behavioural programme for weight management. Int J Obes Relat Metab Disord. 2000 12;24(12):1726-37.

42. Teixeira PJ, Silva MN, Coutinho S, Palmeira AL, Mata J, Vieira PN, et al. Mediators of weight loss and weight loss maintenance in middle-aged women. Obesity. 2010 04;18(4):725-35.

43. Gelo OCG, Zips A, Ponocny-Seliger E, Neumann K, Balugani R, Gold C. Hypnobehavioral and hypnoenergetic therapy in the treatment of obese women: A pragmatic randomized clinical trial. Int J Clin Exp Hypn. 2014 03 Jul 2014;62(3):260-91.

44. Sarwer DB, Spitzer JC, Wadden TA, Mitchell JE, Lancaster K, Courcoulas A, et al. Changes in sexual functioning and sex hormone levels in women following bariatric surgery. JAMA Surg. 2014 01;149(1):26-33.

45. Dixon JB, Dixon ME, O'Brien P,E. Body image: appearance orientation and evaluation in the severely obese. Changes with weight loss. Obes Surg. 2002 02;12(1):65-71.

46. Sarwer DB, Wadden TA, Moore RH, Eisenberg MH, Raper SE, Williams NN. Changes in quality of life and body image after gastric bypass surgery. Surgery for Obesity and Related Diseases. 2010 November-December 2010;6(6):608-14.

47. Sarwer DB, Spitzer JC, Wadden TA, Rosen RC, Mitchell JE, Lancaster K, et al. Sexual functioning and sex hormones in men who underwent bariatric surgery. Surgery for Obesity and Related Diseases. 2015 01 May 2015;11(3):643-51.

48. Adami GF, Meneghelli A, Bressani A, Scopinaro N. Body image in obese patients before and after stable weight reduction following bariatric surgery. J Psychosom Res. 1999 03;46(3):275-81.

49. Hrabosky JI, Masheb RM, White MA, Rothschild BS, Burke-Martindale C, Grilo CM. A prospective study of body dissatisfaction and concerns in extremely obese gastric bypass patients: 6- and 12-month postoperative outcomes. Obes Surg. 2006 12;16(12):1615-21.

50. Leombruni P, Pierò A, Dosio D, Novelli A, Abbate-Daga G, Morino M, et al. Psychological predictors of outcome in vertical banded gastroplasty: a 6 months prospective pilot study. Obes Surg. 2007 07;17(7):941-8.

51. Ortega J, Fernandez-Canet R, Alvarez-Valdeita S, Cassinello N, Baguena-Puigcerver M. Predictors of psychological symptoms in morbidly obese patients after gastric bypass surgery. Surg Obes Relat Dis. 2012 11/20;8(6):770-6.

52. Bond DS, Phelan S, Leahey TM, Hill JO, Wing RR. Weight-loss maintenance in successful weight losers: surgical vs non-surgical methods. Int J Obes. 2009;33(1):173-80.

53. Rosen JC, Jones A, Ramirez E, Waxman S. Body Shape Questionnaire: Studies of validity and reliability. Int J Eat Disord. 1996;20(3):315-9.

54. Lasikiewicz N, Myrissa K, Hoyland A, Lawton C. Psychological benefits of weight loss following behavioural and/or dietary weight loss interventions. A systematic research review. Appetite. 2014;72:123-37.

55. Fontaine KR, Faith MS, Allison DB, Cheskin LJ. Body weight and health care among women in the general population. Arch Fam Med. 1998 Jul-Aug;7(4):381-4.

56. Gloy VL, Briel M, Bhatt DL, Kashyap SR, Schauer PR, Mingrone G, et al. Bariatric surgery versus non-surgical treatment for obesity: a systematic review and meta-analysis of randomised controlled trials. BMJ. 2013 Oct 22;347:f5934.

57. Weineland S, Arvidsson D, Kakoulidis TP, Dahl J. Acceptance and commitment therapy for bariatric surgery patients, a pilot RCT. Obesity Research & Clinical Practice. 2012;6(1):e21-30.

58. Sarwer DB, Wadden TA, Fabricatore AN. Psychosocial and behavioral aspects of bariatric surgery. Obes Res. 2005;13(4):639-48.

59. Galdas PM, Cheater F, Marshall P. Men and health help-seeking behaviour: literature review. J Adv Nurs. 2005;49(6):616-23.

Appendix 1

Hedges g effect sizes representing the magnitude of body image change and weight loss pre-post psychosocial intervention

Reference	Intervention	BI measure/Weight Loss	Hedges g*	95% confidence interval	
				Upper Bound	*Lower Bound*
Annesi (2014)	CBT b	MBRSQ-BAS	-0.53	-0.59	-0.46
	CBT c	Weight Loss	0.26	-1.24	1.76
Bacon (2002)	Non-diet a	BIAQ	0.97	-1.18	3.12
	Traditional b	BIAQ	0.49	-2.07	3.04
	Non-diet WL ns	Weight Loss	ns	ns	ns
	Traditional WL c	Weight Loss	0.40	-0.80	1.60
Carels (2014)	New Perspectives (NP) b	MBSRQ-BASS	-0.74	-0.86	0.61
	New Perspectives (NP) b	MBSRQ-OP	-0.56	-0.78	-0.34
	New Perspectives (NP)	MBSRQ-AO	ns	ns	ns
	Behavioural (TYL) a	MBSRQ-BASS	-0.82	-0.99	-0.65
	Behavioural (TYL) c	MBSRQ-OP	0.39	0.18	0.61
	Behavioural (TYL)	MBSRQ-AO	0.13	-0.09	0.35
	New Perspectives (NP) Sig	Weight Loss	utc	utc	utc
	Behavioural (TYL)	Weight Loss	utc	utc	utc
Crerand (2007)	Meal replacement	BSQ	utc	utc	utc
	Balanced deficit	BSQ	utc	utc	utc
	Non-diet	BSQ	utc	utc	utc
	Meal replacement sig	Weight loss	utc	utc	utc
	Balanced deficit sig	Weight loss	utc	utc	utc
	Non-diet sig	Weight loss	utc	utc	utc
Gelo (2014)	Hypnoenergetic Therapy	FKKS-BC	ns	ns	ns
	Hypnoenergetic Therapy b	FKKS_SAoB	-0.51	-1.78	0.75
	Hypnoenergetic Therapy	FKKS-SAoBO	ns	ns	ns
	Hypnoenergetic Therapy b	FKKS AoPA	-0.70	-2.26	0.83
	Hypnobehavioural Therapy	FKKS-BC	ns	ns	ns
	Hypnobehavioural Therapy c	FKKS_SAoB	-0.46	-1.98	1.06
	Hypnobehavioural Therapy	FKKS-SAoBO	ns	ns	ns
	Hypnobehavioural Therapy c	FKKS AoPA	-0.35	-1.83	1.13
	Hypnoenergetic Therapy	Weight Loss	0.16	-1.60	1.92
	Hypnobehavioural Therapy	Weight Loss	0.12	-1.56	1.80
Munsch (2003)	GP CBT b	FBek-ATT/SC	-0.43	-1.14	0.31
	GP CBT	FBeK-AoA	ns	-	-
	GP CBT	FBek- I/C	ns	-	-
	GP CBT	FBek P/S MIS	ns	-	-

	Clinic CBT a	FBek-ATT/SC	-0.84	-1.57	-.0.11
	Clinic CBT	FBeK-AoA	ns	-	-
	Clinic CBT	FBek- I/C	ns	-	-
	Clinic CBT	FBek P/S MIS		-	-
	GP control (non-specific advice)	FBek-ATT/SC	ns	-	-
	GP control (non-specific advice)	FBeK-AoA	ns	-	-
	GP control (non-specific advice)	FBek- I/C	ns	-	-
	GP control (non-specific advice)	FBek P/S MIS	ns	-	-
	GP CBT c	Weight Loss	0.21	-1.04	1.46
	Clinic CBT	Weight Loss	ns	ns	ns
	GP control	Weight Loss	ns	ns	ns
Palmeira (2009)	CBT (LEARN program) a	BIA	1.14	1.06	1.22
	CBT (LEARN program) a	BSQ	0.75	-2.37	3.88
	General Health Education c	BIA	0.37	0.21	0.53
	General Health Education b	BSQ	0.59	-4.0	5.18
	CBT (LEARN program) c	Weight Loss	0.38	-1.03	1.78
	General Health Education	Weight Loss	ns	ns	ns
Palmeira (2010)	CBT (LEARN program) b	BIA	0.52	0.41	0.63
	CBT (LEARN program) c	BSQ	0.33	-3.25	3.91
	CBT (LEARN program) c	PSPP-BA	-0.41	-0.82	0.01
	CBT (LEARN program) c	PSPP-PSW	-0.30	-0.81	0.21
	CBT (LEARN program)	Weight Loss	utc	utc	utc
Ramirez (2001)	Weight control (LEARN program)a	BSQ	1.17	-6.18	8.52
	Weight control plus BI therapy a	BSQ	1.70	-3.72	7.13
	Weight control (LEARN program)b	Weight Loss	0.74	-2.56	4.03
	Weight control plus BI therapy c	Weight Loss	0.39	-4.63	5.41
Rapoport (2000)	Modified CBT c	BIAQ	0.19	-2.42	2.80
	Standard CBT b	BIAQ	-0.59	-3.13	1.95
	Modified CBT	Weight Loss	ns	ns	ns
	Standard CBT c	Weight Loss	0.24	-1.22	1.70
Teixeria (2010)	CBT (LEARN program) a	BSQ	1.35	-2.71	3.83
	CBT (LEARN program) a	BIA	1.35	1.24	1.46
	CBT (LEARN program) a	PSPP-PSW	-0.91	-1.43	-0.39
	CBT (LEARN program) a	PSPP-ATT	-0.81	-1.30	-0.31
	General Health Education b	BSQ	0.48	-3.21	4.18
	General Health Education b	BIA	0.69	0.58	0.80

	General Health Education b	PSPP-PSW	-0.54	-1.05	-0.03
	General Health Education	PSPP-ATT	-0.42	-0.66	0.24
	CBT(LEARN program)	Weight loss	utc	utc	utc
	General Health Education	Weight loss	utc	utc	utc

a= large effect size; b=medium effect size; c=small effect size utc=unable to calculate; ns=non-significant

BIA= Body image assessment questionnaire; BSQ= Body shape questionnaire BIAQ=Body image avoidance questionnaire; FBCS= Frankfurt body concept scales (subscales SSAK=Self-acceptance of body parts; SPKF=Attention and care given to the care and appreciation of one's appearance and health; FBeK= Rating one's own body questionnaire (subscales ATT/SC= attractiveness and self-confidence; AoA accentuation of appearance; I/C=insecurity/concern; P/S MIS = physical/sexual misperception);; MBRSQ: Multidimensional Body-Self Relations Questionnaire (subscales BASS=Body areas satisfaction scale ; AO=Appearance Orientation; AE= appearance evaluation); PSPP= (subscales PSW= physical self-worth; ATT=attractiveness); SAKA=Acceptance of body by others; SASE=Aspects of physical appearance).

*= A negative score indicates improvement in body image using the: MBSRQ, FKKS, FBeK, PSPP. A positive score indicates improvement in body image using the BIAQ, BSQ, BIA,

Hedges g effect sizes representing the magnitude of body image change and weight loss pre to post surgery

Reference	BI measure/Weight Loss	Hedges g*	95% confidence interval	
			Upper Bound	*Lower Bound*
Adami (1999)	BSQ a	3.33	1.68	4.98
	BAQ-FF a	4.55	4.11	5.00
	BAQ-DISP a	2.42	2.15	2.69
	BAQ –SF b	0.62	0.41	0.82
	BAQ-SS a	3.71	3.49	3.93
	BAQ-ATT a	-2.80	-2.95	-2.65
	BAQ-LBF a	4.06	3.90	4.21
	Weight Loss a	16.14	15.86	16.42
De Panfilis (2007)	BUT (GSI) b	0.63	0.37	0.89
	Weight Loss a	1.48	0.27	2.68
Dixon (2002)	MBSRQ-AO x	ns	ns	ns
	MBSRQ-AE a	-1.44	-1.49	-1.38
	Weight a	1.40	0.85	1.95
Hrabowsky (2006)	BSQ a	1.50	-2.85	5.84
	Weight loss	2.01	1.18	3.022
Leombruni (2007)	BSQ a	1.18	-6.01	8.37
	Weight Loss a	1.91	0.69	3.12
Ortega (2012)	BSQ a	1.93	0.94	2.93
	Weight Loss b	0.66	-6.87	8.18
Sarwer (2010)	BSQ a	12.82	12.56	13.08
	BIQOL a	-1.00	-1.01	-0.99
	Weight Loss			
Sarwer (2013)	BSQ a	1.85	-1.61	5.32
	BIQOL a	-1.58	-1.74	-1.42
	Weight Loss			
Sarwer (2015)	BSQ a	1.06	-5.74	7.85
	BIQOL b	-0.73	-1.06	-0.40
	Weight			
Van Hout (2008)	BAT a	1.64	-0.57	3.85
	Weight Loss a	2.44	1.71	3.165

a= large effect size; b=medium effect size; c=small effect size; utc=unable to calculate; ns=non-significant. BAT=Body Attitude Test; BIQLI= Body image quality of life inventory BSQ= Body shape questionnaire; BUT=Body uneasiness test; MBRSQ= Multidimensional Body-Self Relations Questionnaire (subscales BASS= Body areas satisfaction scale; AO=Appearance Orientation; AE= appearance evaluation). *= A negative score indicates improvement in body image using the: MBSRQ, BIQOL. A positive score indicates improvement in body image using the BSQ, BAT, BUT.

Appendix B: Evidence of ethical approval

University of the West of England
BRISTOL

Faculty of Health & Applied Sciences
Glenside Campus
Blackberry Hill
Stapleton
Bristol BS16 1DD

Tel: 0117 328 1170

UWE REC REF No: HAS.17.06.182

18th July 2017

Claire Hamlet
Room 2C26
Frenchay Campus
Bristol
BS16 1QY

Dear Claire

Application title: The influence of locus of control, body image and health status on the acceptance of bariatric surgery as a method of weight loss in the UK

Your ethics application was considered by the Faculty Research Ethics Committee and, based on the information provided, has been given ethical approval to proceed.

You must notify the committee in advance if you wish to make any significant amendments to the original application using the amendment form at
http://www1.uwe.ac.uk/research/researchethics/applyingforapproval.aspx

Please note that any information sheets and consent forms should have the UWE logo. Further guidance is available on the web:
http://www1.uwe.ac.uk/aboutus/departmentsandservices/professionalservices/marketingandcommunications/resources.aspx

The following standard conditions also apply to all research given ethical approval by a UWE Research Ethics Committee:

1. You must notify the relevant UWE Research Ethics Committee in advance if you wish to make significant amendments to the original application: these include any changes to the study protocol which have an ethical dimension. Please note that any changes approved by an external research ethics committee must also be communicated to the relevant UWE committee.
2. You must notify the University Research Ethics Committee if you terminate your research before completion;

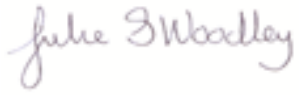
3. You must notify the University Research Ethics Committee if there are any serious events or developments in the research that have an ethical dimension.

Please note: The UREC is required to monitor and audit the ethical conduct of research involving human participants, data and tissue conducted by academic staff, students and researchers. Your project may be selected for audit from the research projects submitted to and approved by the UREC and its committees.

Please remember to populate the HAS Research Governance Record with your ethics outcome via the following link: https://teams.uwe.ac.uk/sites/HASgovernance.

We wish you well with your research.

Yours sincerely



Dr Julie Woodley
Chair
Faculty Research Ethics Committee

cc Professor Diana Harcourt

Appendix C: Example of information sheet

Exploring public views and preferences for weight loss treatment

Information Sheet

Before you decide if you would like to accept this invitation to participate in this study, it is important for you to understand the purpose of this research and what it will involve.

Please take your time to read the following information carefully and take your time to decide if you wish to take part and email me (claire.hamlet@uwe.ac.uk) if anything is unclear or if you would like more information.

Who is carrying out the research?

This project is being carried out by Claire Hamlet who is a Trainee Health Psychologist based at the University of the West of England.

What is the purpose of the study?

The purpose of this study is to investigate people's views and preferences of weight loss treatments in the United Kingdom.

Who can take part?

Anybody over the age of 18 and living in the United Kingdom can take part.

What will participation involve?

If you agree to take part, you will be asked to fill in an online survey. You will be asked some questions about yourself (including your weight and height) and to answer some health and wellbeing questions. You will also be asked for your opinions of weight loss treatments. The survey will take approximately 10-15 minutes of your time to complete, as it is not possible to return to the survey after you have started it, please allow enough time to complete it in one sitting.

Will the information I provide remain anonymous?

The information you provide will be treated with the highest level of confidentiality. The survey does not ask for any information which would reveal your identity, unless you wish to enter the prize draw, in which case you will be asked enter an email address using a different link. This means that your email will not be linked to your data.

It is likely the data from this study will be published in an academic journal (or elsewhere) and presented at conferences. Although direct quotes may be used in a paper or report, you

will remain entirely anonymous. The data collected will only be accessible to those working on the study.

Can I withdraw?

Your participation in this research is entirely voluntary. You can decide to stop completing the questionnaire at any point by closing the webpage. Additionally, you can withdraw from the study up to two weeks after you have completed the survey by sending an email to claire.hamlet@uwe.ac.uk and quoting your participation identification code, which you will generate at the start of the online survey. This will enable us to locate your responses within the data and delete it for you.

What are the potential disadvantages of taking part?

We do not expect that participating in this study will have any negative effects on you. However, participating in any kind of research can lead you to encounter issues you may find difficult. Please remember, there are no right or wrong answers to this survey as we want to hear your opinions.

What are the potential benefits of taking part?

The findings that you contribute to will build upon existing knowledge in the field of treatments for weight loss. In addition, you will have the opportunity to be entered into a prize draw to win a £20 shopping voucher of your choice!

Advice and Support

This survey will cover issues related to weight and wellbeing. If you feel you need further advice and support, you might find the following organisations helpful:

NHS Livewell: If you wish to learn about developing healthier eating habits and becoming more active, you can go to the NHS Livewell website, where you can receive helpful advice and resources: http://www.nhs.uk/livewell/loseweight/Pages/Loseweighthome.aspx

BEAT is a charity that provides support for people who are experiencing difficulties with food, weight and shape. You can contact their telephone support line on **0845 634 1414** or you can email **help@b-eat.co.uk.**

Samaritans: If you would like to talk to someone about your emotional health and well-being: Samaritans is a charity that provides people with emotional support. You can contact them on **08457 90 90 90** or you can email them on **jo@samaritans.org.**

Appendix D: Example of consent form

Consent

Please read the following statements and tick if you agree

I have read the information about the study at the start of this survey (Yes/No)

I understand that I can ask questions about the study by contacting the researcher via email (claire.hamlet@uwe.ac.uk) (Yes/No)

I understand that by consenting to take part in this study I can withdraw (up to two weeks after completing the survey) without having to give any reason (Yes/No)

I understand that my data remains anonymous and I will never be personally identified in any report or write up from this research (Yes/No)

I am over the age of 18 and I live in the UK (Yes/No)

I agree to take part in this study (Yes/No)

If you decide over the next two weeks you would like you withdraw your data, we need to be able to locate it. **Please generate your 6-digit participant code using your date and month of birth and your initials. For example, if you are called John Smith and you were born on 31st March, you would enter 3103JS ……**

Appendix E: Survey content

Demographic Questions

Gender (Male/Female/Transgender/Other (I don't identify with any of the above)

Age

What is your height? (feet and inches or centimetres)

What is your weight (stone and pounds or kilograms)

Are you currently trying to lose weight? (Yes/No/Plan to in next 30 days)

What type of weight loss method are you using?

- A commercial weight loss programme (e.g. Slimming World, Weight Watchers)
- Medication prescribed by the GP
- Diet plan prescribed by GP
- Over the counter medication
- Meal replacement porducts
- A weight loss method I have chosen myself (e.g. calorie counting)
- Other

Have you discussed weight loss treatment with your GP in the last year? (Yes/No)

Have you ever discussed the option of weight loss (bariatric) surgery with your GP? (Yes/No)

Do you have any of the following conditions? Tick all that apply

- Type 2 diabetes
- High blood pressure
- High cholesterol
- Asthma
- Metabolic Syndrome
- Cardiovascular disease
- None of the above

Which of the follow best describes you?

- White British
- White other
- Asian or Asian British: Indian
- Asian or Asian British: Pakistani
- Asian or Asian British: Other
- Black or Black British: Black Caribbean
- Black or Black British: Black African
- Black or Black British: Other Black
- Chinese of other Ethic Group: Chinese
- Mixed: White and Black Caribbean
- Mixed: White and Black African
- Mixed: White and Asian
- Mixed: other Mixed
- Other: ……
- Rather not say

What is your highest level of education?

- No formal education
- Secondary school/high school
- College/ vocational qualification
- Undergraduate degree
- Masters degreeDoctorate/PHD

What is your marital status?

- Married
- Civil partnership
- Single, never married
- Separated
- Divorced
- Cohabiting
- In a relationship but not living together
- Widowed

Do you consider yourself to be

- Heterosexual or straight
- Gay or lesbian
- Bisexual
- Rather not say

The Weight Self Stigma Questionnaire

Items 1-6 Self-devaluation subscale

Items 7-12 Fear of enacted stigma subscale

	Completely disagree	Disagree	Neither agree or disagree	Agree	Completely agree
I'll always go back to being overweight					
I caused my weight problems					
I feel guilty because of my weight problems					
I became overweight because I'm a weak person					
I would never have any problems with weight if I were stronger					
I don't have enough self-control to maintain a healthy weight					
I feel insecure about others' opinions of me					
People discriminate against me because I've had weight problems					
It's difficult for people who haven't had weight problems to relate to me					
Others will think I lack self-control because of my weight problems					
People think that I am to blame for my weight problems					
Others are ashamed to be around me because of my weight					

The WLOC Scale

	Strongly disagree	Disagree	Slightly disagree	Slightly Agree	Agree	Strongly Agree
Whether I gain, lose or maintain my weight is entirely up to me						
Being the right weight is largely a matter of good fortune						
No matter what I intend to do, if I gain or lose weight, or stay the same in the near future, it is just going to happen						
If I eat right and get enough exercise and rest, I can control my weight in the way that I desire						
I am able to lose weight if I take action to do it						

Weight Efficacy Lifestyle-Short Form (WEL-SF)

	0 Not at all confident	1	2	3	4	5	6	7	8	9	10 Very confident
I can resist overeating when I am anxious or nervous											
I can resist overeating on the weekend											
I can resist overeating when I am tired											
I can resist overeating when I am watching TV (or using the computer)											
I can resist overeating when I am depressed (or down)											
I can resist overeating when I am in a social setting (or at a party)											
I can resist overeating when I am angry (or irritable)											
I can resist overeating when others are pressuring me to eat											

The Multidimensional Body-Self Relations Questionnaire (MBSRQ) – Appearance Evaluation Subscale

	Definitely disagree	Mostly disagree	Neither agree or disagree	Mostly agree	Definitely agree
1. My body is sexually appealing	1	2	3	4	5
2. I like my looks just the way they are	1	2	3	4	5
3. Most people would consider me good looking	1	2	3	4	5
4. I like the way I look without my clothes on	1	2	3	4	5
5. I like the way my clothes fit me	1	2	3	4	5
6. I dislike my physique	5	4	3	2	1
7.I am physically unattractive	5	4	3	2	1

The ORWELL 97 obesity symptoms subscale

	Not at all 0	1	2	Much 3
How important is it for you to exercise regularly				
Is your weight an obstacle for your physical activity?				
How important is it for you to have regular sexual activity				
Does your weight represent a physical obstacle for your sexual activity?				
Do you suffer from shortness of breath?				
Does shortness of breath represent an obstacle for your daily activities?				
Do you ever feel sleepy				
Does sleepiness interfere with your daily activities?				
Do you suffer from excessive sweating				
Does sweating interfere with your daily activities?				

Outcome variable- Consideration of bariatric surgery

Bariatric surgery is a name for a group of surgical procedures performed in the stomach to help weight loss.

I would consider undergoing bariatric surgery on the NHS in order to achieve weight loss

- Strongly agree
- Agree
- Neither agree or disagree
- Disagree
- Strongly disagree

Please could you explain the reason for your choice about bariatric surgery above in a few sentences:

Appendix F: Study debrief

About the study

Thank you very much for completing this survey. We really appreciate your time and input and could not do research like this, without you.

Aims of the study

Due to reports of falling rates of bariatric surgery in the UK, we wanted to understand the acceptance of the procedure as a method of weight loss and understand the barriers and facilitators to people considering it, regardless of their BMI. We also wished to investigate whether factors such as an individual's belief about whether they can control their health and how they they feel about their body, influenced their acceptance of bariatric surgery. The findings from this study will help researchers to understand this topic better.

Help and support

This survey covered issues related to weight, body image and emotional wellbeing. If you feel you could benefit from further advice and support about this topic, you can speak to your GP, or you might find the following organisations helpful:

NHS Livewell website: If you wish to develop healthier eating habits and get more active you can go to the NHS Livewell website, where you can receive helpful advice and resources: http://www.nhs.uk/livewell/loseweight/Pages/Loseweighthome.aspx

Beat: a charity that provides support for people who are experiencing difficulties with food, weight and shape. You can contact their telephone support line on **0845 634 1414** or you can email them at **help@b-eat.co.uk**

Samaritans: If you would like to talk to someone about your emotional health and well-being, Samaritans is a charity that provides people with emotional support. You can contact them on **08457 90 90 90** or you can email them on **jo@samaritans.org.**

If you would like to enter the draw to receive a £20 shopping voucher of your choice, please click this link to enter your email: https://uwe.eu.qualtrics.com/jfe/form/SV_3fawYqdPAHlIj53

If you have any questions about the study, feel free to contact the lead researcher Claire Hamlet via email on claire.hamlet@uwe.ac.uk

Thank you very much for taking part